

**THE EFFICACY AND RELATED FACTORS
OF THE GROWTH MONITORING AND PROMOTION PROGRAMME IN CLINICS OF
VHEMBE DISTRICT, SOUTH AFRICA.**

By

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DECLARATION

I, declare that:-


- a) This thesis has not been submitted for a degree at any other institution.
- b) The work contained within this thesis is my own, original work. The work of other authors are acknowledged and referenced.

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ABSTRACT

Aim: To determine the growth monitoring and promotion (GMP) related knowledge, perceptions and skills of nursing staff and mothers with IYC under five at selected clinics in the rural areas of Vhembe district, Limpopo Province, South Africa.

Methods: The study sample included 82 randomly selected clinics from the four sub-districts in Vhembe district, Limpopo province. In three of the four sub-districts, 24 clinics were sampled from from each, while the fourth sub-district was represented by ten clinics. A cross-sectional exploratory descriptive survey employing quantitative and qualitative data collection techniques was conducted to explore the variables under investigation. The quantitative phase included 312 nursing staff with an equal number of participants from each randomly sampled clinic. Data collection was conducted by trained fieldworkers using a research instrument consisting of open- and closed-ended questions, as well as an observation tool. A recording sheet was used for documenting the prevalence of moderate- and severe acute malnutrition in the district. For the qualitative phase, nine focus group discussions (FGDs), with a total of 83 purposively sampled biological mothers of IYC were conducted in three of the four sub-districts using a semi-structured interview guide.

Means and standard deviations were computed for continuous variables. A comparison between means was conducted using the independent samples t-test, while correlations between continuous variables were done with Pearson's correlations. Frequency distributions were calculated for categorical variables, followed by Chi-square tests to determine the relationship between categorical variables. Time series analysis by means of ANOVA was used to analyse the prevalence of SAM/MAM across the five years for which clinic statistics were obtained.

For the qualitative phase of the study, FGDs were recorded on a digital voice recorder with verbatim transcripts being translated into English by back translation. These

transcripts were imported into Atlas ti. version 8.4 computer software for thematic content analysis, followed by the creation of themes and sub-themes for creating codes and networks of responses.

Results: Participating nursing staff that worked with GMP for 12.0 ± 8.8 years, had a mean knowledge score regarding GMP of 48.9%, with 40% having a score of $\leq 50\%$. Fieldworker observations of nursing staff while conducting growth monitoring (GM), generated evidence that the majority of participants did not follow the correct procedure when measuring weight, length, height or mid-upper arm circumference (MUAC). The low mean scores obtained for knowledge, as well as the ability to interpret growth indicators, are cause for concern. In addition, 20.1% of the study sample was never offered training and/or never attended refresher training following completion of their formal training. A significant positive correlation was documented for knowledge regarding GMP and the ability of participants to interpret growth indicators if both mean values were expressed as percentages ($r=0.251$; $p<0.000$).

Based on the FGD discussions conducted with mothers, it was evident that they knew the importance of taking their IYC to the clinic for GMP, despite the fact that some were not familiar with the reasons for its importance.

Conclusion: Although nursing staff had positive perceptions regarding GMP, their knowledge regarding the programme, as well as their ability to accurately conduct anthropometric measurements was not optimal. Mothers of IYC that make use of GMP in Vhembe district have the necessary knowledge regarding its importance. However, there are several barriers preventing them from optimally utilising the GMP services offered by clinics. Findings highlight the need for nursing staff, clinics and the Department of Health to address the barriers mothers face, as it has the potential to impact on the aims and successful implementation of GMP in the district.

Key concepts: Clinics, GMP, knowledge, mothers with IYC, nursing staff and skills

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CHAPTER 1: THE PROBLEM AND ITS SETTING

1. INTRODUCTION

1.1 Motivation for the study

Globally, malnutrition annually contributes to 3.5 million of the mortality and 35% of morbidity rates among infants and young children (IYC) under five years of age (Hendricks & Bourne, 2010). Great global strides have been made towards reducing child mortality rates, and therefore the attainment of the fourth Millennium Development Goal that was set for 2015. Although there have been great improvements in the reduction of the IYC mortality rate, the United Nations (UN) reported that the global child mortality rate remains high, with an estimated six million children younger than five years dying on an annual basis (UN, 2015). In addition, IYC malnutrition is responsible for an estimated 5.6 million of the 10 million under five childhood deaths, with severe acute malnutrition (SAM) contributing to about 1.5 million of these deaths (Heinekens, Bunn, Amadi, Manary, Mhhagan, Berkley et al., 2008). The World Health Organization (WHO) stated that nearly 45% of the six million annual childhood deaths of children younger than five years are estimated to be directly linked to malnutrition (WHO, 2016). In addition, SAM is estimated to globally affect 19 million children under five, accounting for approximately 400 000 annual deaths (WHO, 2013). Malnourished children, especially those with SAM, have a higher mortality risk when compared to those common childhood illnesses [United Nation Children Fund (UNICEF), 2019]. The WHO (2019) also reported that 38.3% and 28.7% of children under five are stunted and underweight respectively.

Several factors, including underlying, immediate and basic causes of childhood malnutrition outlined by UNICEF Conceptual Framework, play a role in the prevalence of malnutrition affecting children under five (UNICEF, 2008). Immediate causes refer to inadequate dietary intake and exposure to diseases, resulting in the suppression of appetite, increased metabolic requirements and increased nutrient losses, while

underlying causes are related to inadequate access to food and health care, driven by basic causes such as political and economic factors (UNICEF, 2015). Contributing factors may vary from country to country, depending on nutritional, economic, social ecological and other factors (Mengistu et al., 2013). Sub-Saharan Africa requires special attention, as child mortality rates are the highest in the world, while population growth continues at a rapid pace (UN, 2019).

Malnutrition continues to be the most common nutritional disorder in developing countries, continuing to be a major public health problem due to its contribution to childhood morbidity and mortality (Musa, Musa, Ali, & Musa, 2014; Mengistu, Alemu, & Destaw, 2013), with the majority of deaths being related to stunting, severe wasting, intra-uterine growth retardation, suboptimal breastfeeding practices and micronutrient deficiencies (Black, Allen, Bhutta, Caulifield, de Onis, Ezzati, Mathers, & Rivera, 2008). A study conducted among malnourished children under five in Bangladesh, revealed a high prevalence of stunting (42%) and underweight (40%) (Siddiqi, Hque, & Goni, 2011). The Sustainable Development Goal (SDG) number three aims to reduce global neonatal mortality to 12 per 1 000 live births and under-five mortality rates to 25 per 1000 live births by 2030 (Nilsson, Griggs, & Visbeck, 2016), with notable progress being made towards reducing the global under five mortality rate from 93 to 59 percent deaths per 1000 live births in 1990. However, the burdern of childhood deaths remains immense as a 41% decrease still falls short of what must be achieved to reach the global target of 29 deaths per 1000 live births by 2030 (Battersby, 2017).

Of the 24 million children annually born in Africa, four million (16.6 %) do not survive to see their fifth birthday, even though over 50% of these deaths are largely preventable through immunisation, growth monitoring and timely interventions (Bello & Esther, 2010; CDC, 1998). According to the Central Statistics of the Federal Democratic Republic of Ethiopia, malnutrition is widespread, with the prevalence of stunting at 44% and underweight and wasting being 29% and 10% respectively (Ethiopian, 2012). Furthermore, in 2014, 53% of infant and young child (IYC) deaths were observed to be

related to malnutrition [United States Agency for International Development (USAID), 2014]. A cross sectional study conducted in Ethiopia among children under five, documented that 28.5% were underweight, 24% were stunted and 17.7% wasted (Edris, 2006). In a developing country like Ethiopia, the prevalence of malnutrition has major economic and societal implications, as malnutrition results in a loss of economic potential of children. As a result, it has been reported that non-governmental organizations (NGOs) are working towards preventative and promotional activities such as Growth Monitoring and Promotion (GMP) to curb the prevalence of malnutrition amongst children (Roberfroid, Lefevre, Hoeree & Kolsteren, 2005). Zambia is another developing country where the child mortality rate is high, accounting for 62.0% of children with severe acute malnutrition (SAM) with GMP also being used as a key strategy to combat child mortality and malnutrition (Lundström, 2016). Even in a low-income countries with limited resources a two third reduction in under five mortality has been reported by countries such as Eritrea, Ethiopia, Liberia, Malawi, Mozambique, Nepal, Niger, Rwanda, Uganda and Tanzania from 1990 to 2018, thus providing a clear message that with commitments, concerted efforts and political will. A reduction in IYC mortality can be achieved through the expansion of high-impact preventative and curative interventions targeting the main causes of childhood deaths (UN, 2019).

According to the Nigeria Demographic and Health Survey (NDHS, 2013), the prevalence of malnutrition has declined from 41 percent in 2008 to 37 percent in 2013. Despite the IYC mortality rate remaining unacceptably high, with an estimated four million infants dying within the first 28 days of life, and approximately 28% of these neonatal deaths occurring in the first week post-delivery [National Population Commission (NPC) and Inter City Fund (ICF) International 2014]. A Sudanese study reported that 31.0% of children under five are moderately or severely underweight, 32.5% suffer from moderate or severe chronic malnutrition, while 14.8% suffer from acute malnutrition [Sustainable Development Goals (SDG) report, 2010].

Despite the South African (SA) government's implementation of growth monitoring as a fundamental intervention aimed at reducing the prevalence of malnutrition among children under five (Chopra & Sander, 1997), De Lange (2010) reported that 5.6 out of 10 million childhood deaths in South Africa occurred as a result of malnutrition. The Global Hunger Index based on the proportion of undernourished children in the population, the prevalence of wasting and stunting among IYC under five and the under five mortality rate for SA in 2015 was 12.4, considered to be a moderate being lower by 8.6 points compared to 2005 value (von Grebmer, Bernstein, de Waal, Prasai, Yin & Yohannes, 2015). Furthermore, the Global Nutrition Report (2015), documented that despite the introduction of growth monitoring and promotion (GMP), the prevalence of IYC malnutrition documented in the Limpopo Province was 69.9%. Malnutrition in SA (2012) also reported that the Limpopo province is one of the provinces in need of interventions to address the prevalence of moderate acute malnutrition (MAM)/severe acute malnutrition (SAM), despite the implementation of GMP in the area as a global strategy to combat malnutrition (SANHANES-1, 2012).

The majority of SA infants are born with a low birth weight, while 5% of SA children are underweight and considered to be wasted (Malnutrition in SA, 2012). In 2005, the National Food Consumption Survey Fortification Baseline (NFCS-FB), documented that 9.3% of children aged one to nine years were underweight, 18% were stunted and 4.5% were wasted, with the prevalence being higher among rural children. Regarding stunting and underweight, the Limpopo Province was regarded as one of the provinces in dire need of intervention, with 23.8% of children under five suffering from MAM and SAM (Labadarios, Steyn, & Maunder, 2008). The South African National Health and Nutrition Examination Survey (SANHANES-1) reported that among children, a quarter of those under three years of age were stunted, while the highest prevalence of overweight and obesity (18.1% and 4.6%, respectively), was found in children between two and five years of age (Shisana, Labadarios, Rehle, Simbayi, Zuma, Dhansay, Reddy, Parker, Hoosain, Naidoo, Hongoro, Mchiza, Steyn, Dwane, Makoae, Maluleke, Ramlagan, Zungu, Evans, Jacobs, Faber, SANHANES-1, 2013). Furthermore, the SANHANES-1 data documented

that boys were more likely to be stunted, wasted and underweight than girls, with the highest prevalence of stunting being in the youngest age group (0–3 years). In terms of geographic location, undernutrition was more prevalent in rural informal areas. In addition, the double burden of malnutrition in a rural health and demographic surveillance system site in SA, reported a high prevalence of undernutrition in a form of thinness (25%), affecting 29% of boys and 22% of girls (Modjadji & Madiba, 2019).

For developing countries, UNICEF recommends monthly growth monitoring for all children up to 18 months, with the aim of improving nutrition through the detection of feeding difficulties in younger children, chronic ill health from whatever cause and social deprivation where poverty and home circumstances are the leading cause of poor nutrition (UNICEF, 1990). In SA, the Road-to-Health booklet (RTHB) is issued to an infant's mother at birth, or to a subsequent caregiver immediately after an infant is delivered (Jacob & Coetzee, 2015). The RTHB is a comprehensive tool that includes records for the following interventions: immunisation; developmental screening; oral health; health promotion (HP); GM; infectious diseases, including HIV and tuberculosis; vitamin A supplementation; and deworming. Healthcare workers should therefore communicate health promotion messages to caregivers at each clinic visit (Du Plessis, Koornhof, Marais & Blaauw, 2017).

1.2 Problem statement

Globally, growth monitoring (GM) has been advocated as one of the key strategies for promoting child survival at a primary health care level, serving as an excellent tool for assessing the growth and development of a child (Haymond, Kappelgaard, Czernichow, Biller, Takano & Kiess, 2013; Ashworth, Shrimpton, Jamil, 2008; de Onis, Blossner, Borghi, Frongillo, & Morris, 2004), thereby enabling the early detection of changes in nutritional status that justify appropriate interventions by health care professionals to ensure that growth continues uninterrupted (Bhan & Ghosh, 1986; Ghosh, 1986). Although GM is seen as an essential component of well-baby clinics in developed countries, in developing

countries, health workers monitor growth to detect and intervene when children have growth faltering (de Onis & Blossner, 2003).

In order to comply with UNICEF recommendations and other international agencies, the SA government has spent billions of Rand on a GM programme, as it plays a fundamental role in the strategy to combat malnutrition (Global Nutrition Report, 2015). Despite the implementation of this strategy, inadequacies of child GM at health care facilities have been described (Baraki, Gebru & Belay, 2016; Chopra & Sanders, 1997). While studies have primarily focused on aspects such as the feasibility and usefulness of GM, its relevance and effectiveness in promoting child nutrition and health have not been studied satisfactorily (Griffiths & Rosso, 2007). In addition, available data does not give an adequate indication of the effective implementation of GM. As a result, nutrition and health programme planners in the developing world consider GM as ineffective in its potential for contributing to child survival and development (Bilal et al., 2014).

It has been reported that after completion of the childhood immunisation schedule at nine months, health care facility attendance for GM declines (Schoeman, Dhansay, Fincham, Kunneke, & Benade, 2003). Furthermore, underweight that often peaks after 18 months, and stunting, often go undetected due to irregular clinic attendance, poor GM and health facility practices (Harrison, Hees, Harker & Mann, 1998). According to the National Food Consumption Survey (2005), children one to three years of age are the ones who were more affected by stunting and underweight as opposed to older children (Labadarios, Steyn, & Maunder, 2008). Factors such as irregular clinic attendance, poor GM at health facilities, poor monitoring and promotion activities such as nutrition education and low coverage have brought into question the effectiveness of GM (UNICEF, 2008). Data generated by SANHANES-1 2012, revealed that 21.6% of children under five are stunted, 2.5% are wasted and 5.5% are undernourished. Those who are between zero to three years of age, showed the highest prevalence of stunting, at 26.9% and 25.9% for boys and girls respectively (Shisana, Labadarios, Rehle, Simbayi, Zuma, Dhansay et al., 2013).

In most developing countries, including rural SA, the majority of children are undernourished either in terms of weight, height or due to a micronutrient deficiency (Pinstrup-Andersen, 2000; SANHANES-1, 2012). Furthermore, it has been projected that under the most likely circumstances, about 135 million children under the age of five in developing countries will be malnourished by 2020. Children suffering from SAM, seem to be at a higher risk of mortality than those who are undernourished (Schoeman, 2003). Although the Limpopo Province has been reported as being one of the provinces with the highest prevalence of malnutrition (Labadarios, Steyn, & Maunder, 2008), the incidence and prevalence of malnutrition in the rural district of Vhembe is unknown. In 2011, the SA population was 51.7 million, with 5.4 million people living in the Limpopo Province, of which 1.3 million were residing in the Vhembe district [Statistics South Africa (StatsSA), 2012]. However, this does not mean that the prevalence and incidence of malnutrition is not documented at individual health facilities. To date, there are no published papers documenting the prevalence of MAM or SAM in sub-districts of Vhembe, or for the district as a whole. In addition, there are no SA studies that have documented the GMP-related knowledge and skills of nursing staff at clinic level. In light of the above studies findings, which indicate that a high prevalence of malnutrition and the disadvantage of being in rural area of the Limpopo Province, the district has been chosen to explore related contributory factors to the success of GMP implementation.

1.3 Conceptual framework of the study

IYC under five are at risk of developing malnutrition, especially undernutrition, with severe outcomes that include diarrhoea, malaria, and pneumonia if not detected early, and the appropriate interventions not implemented accordingly (Mayhew et al., 2014). GMP was therefore implemented as a global strategy to combat malnutrition (UNICEF, 2008). Figure 1.1 illustrates the relationship between malnutrition and GMP as a programme that aims to address the problem, thereby improving the nutritional status, health and well-being of IYC if properly implemented and utilised. The figure also

illustrates how nursing staff, mothers, primary health care facilities and the Department of Health (DOH) play a significant role regarding the best practice of GMP, thereby improving the likelihood of optimal intervention outcomes. However, should GMP not be implemented optimally in terms of available and accessible facilities, equipment and adequately trained nursing staff; and the potential beneficiaries of the intervention, namely mothers and caregivers, not access available services optimally. It is unlikely that intended intervention outcomes, namely a reduction in the prevalence of IYC malnutrition, will be achieved.

Although several studies regarding the implementation of GMP have been conducted globally, there is a paucity of data regarding the effectivity of the programme (Mangasaryan, 2011; Charlton et al., 2009; Roberfroid et al., 2005). In view of the above, the current study was conducted to determine and describe the effectiveness of GMP programmes in promoting healthy growth and development of IYC in Vhembe district, Limpopo Province. The conceptual framework of the study, was guided by a review of the relevant literature, and the problem statement above.

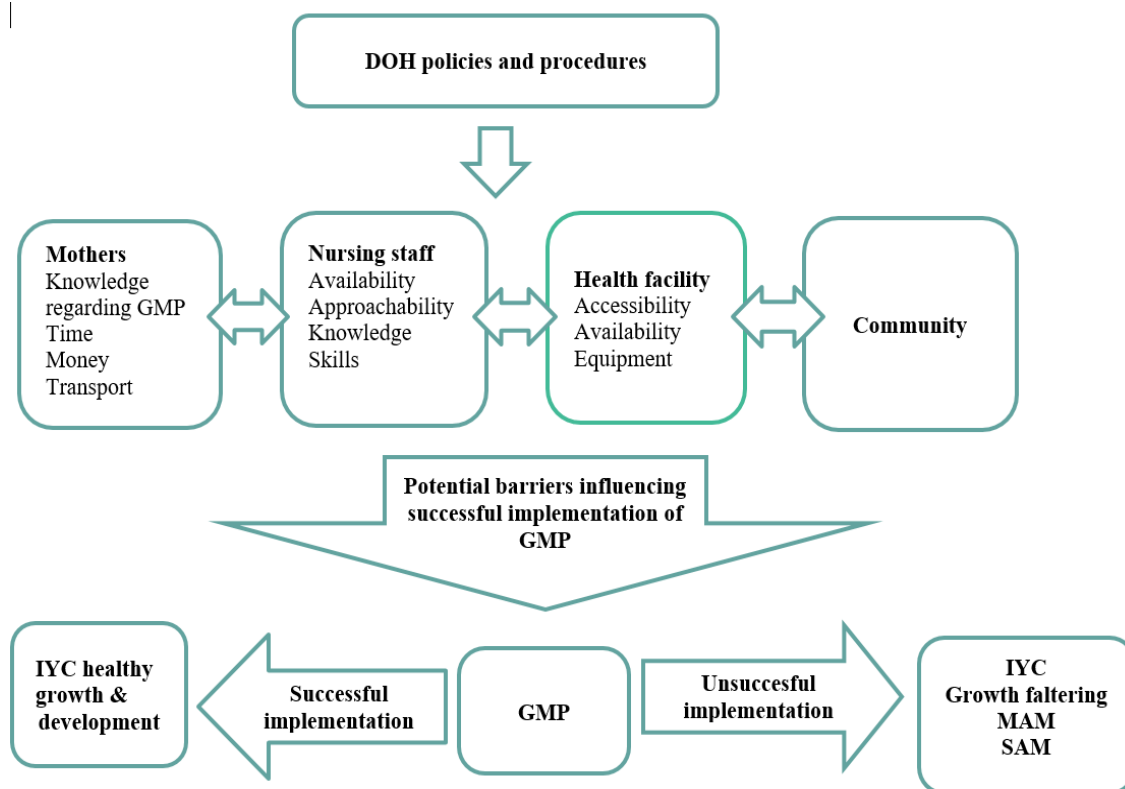


Figure 1.1: Conceptual framework of the study

1.4 Study rationale

The primary aim of GMP is to provide a diagnostic tool for health and nutrition surveillance of individual IYC, and to implement effective remedial action in response to growth faltering including the education of mothers, families and health workers on how diet and disease can affect IYC growth. In turn, the latter would stimulate individual initiatives and improved practises, as well as provide initial regular contact with primary health care services to facilitate their utilisation (Ashworth et al., 2008). The benefits of GMP are considered to be an improvement in IYC nutritional status and increased utilisation of health services, ultimately resulting in a reduced prevalence of undernutrition, morbidity and mortality rates of IYC under five years of age (Liu, Long & Garner, 2017).

The following activities form part of GMP: (1) weighing IYC accurately; (2) plotting anthropometric measurements on a growth chart; (3) interpreting the growth curve; (4) discussing options with the caregiver and agreeing on future action; and (5) evaluating the child's response (Ashworth et al., 2008). WHO guidelines recommend the measurement of mid upper-arm circumference (MUAC), in addition to an examination for bilateral pitting oedema in IYC 6-59 months of age at community level for early identification and referral of IYC with SAM for full assessment at a treatment centre. Both weight-for-height z-score (WHZ) and MUAC are recommended to identify severely malnourished children for treatment (Golden & Grellety, 2018).

It has been reported that GMP is regarded as the primary method for evaluating the health of IYC (UNICEF, 2013). However, there is lack of evidence regarding the efficacy of the GMP programme, as well as the underlying factors that are responsible for the high prevalence of malnutrition in the Vhembe district of Limpopo province. Kitenge and Govender (2013) evaluated the challenges faced by professional nurses in monitoring IYC growth during consultations in Vhembe district. However, the study only covered one local area in one sub-district. Hence the results cannot be generalised as being representative of the Vhembe district. Moreover, the scope of the variables investigated were limited, and the prevalence of MAM/SAM and the factors that could contribute to the prevalence thereof in the district were not documented. It is within this context that the current study was conducted, as it is the first study that evaluated the implementation of GMP among IYC under five in Vhembe, in addition to related factors that could have an impact on its effectivity. In so doing, barriers that have the potential to impact on the successful implementation of GMP in the district were identified. Furthermore, there is a paucity of data regarding studies that have evaluated the effectivity of GMP using mixed methods research. This underscores the need for conducting an evaluation of the GMP programme in order to improve its effectivity through the compilation of GMP guidelines. Several local studies (Naidoo et al., 2018; Blaauw et al., 2017; Sibanda et al., 2016; Cloete et al., 2013; Kitenge & Govender, 2013) have highlighted a lack of knowledge and understanding of nurses, in addition to a lack of skills when conducting GM, while not

investigating nursing staff and mothers perceptions of factors that serve as barriers to the effective implementation of GMP. Therefore, the current study provided nursing staff, as well as mothers of IYC the opportunity to share their perceptions regarding the challenges they face that could serve as barriers towards the effective execution of GMP in the district surveyed.

1.5 Study alignment to national imperatives

The primary benefits of GMP, especially in developing countries, is related to a reduction in the prevalence of underweight, morbidity and mortality among IYC under five years (Budree, Goddard, Brittain, Myer, & Zar, 2016). In addition, mothers and caregivers must be able to detect growth failure early and implement the necessary intervention to address suboptimal growth of their IYC (Ashworth et al., 2008). Hence the current study focused on addressing goal three of the National Development Plan (NDP) 2030 which aims to reduce infant and child mortality by reducing IYC under-five mortality from 56 to below 30 per 1000 live births (SDG, 2015). In addition, the Sustainable Development Goal (SDG) number three, also focuses on good health and well-being for all people, thereby ensuring healthy lives and the promotion of well-being for people of all ages (SDG, 2015). The purpose of this study was therefore aligned with both national and international goals, because once GMP is implemented properly, its success can contribute to a reduction in the prevalence of IYC malnutrition, thereby reducing the prevalence of IYC morbidity and mortality (SDG, 2015).

The compilation of a report for DOH, with recommendations based on the study outcomes, could serve as a guideline to address problem areas identified in Vhembe district. In addition, it could assist with adapting district and/or provincial GMP programmes and policies in order to promote healthy growth and development of IYC under five, by strengthening the existing GMP programme. Study recommendations also have the potential for having an impact on the behaviour of mothers, nursing staff as well as the community at large.

1.6 Research question

In order to address the research problem based on available literature, the following research question was formulated:

What is the GMP related knowledge, perceptions and skills of (i) nursing staff; and (ii) mothers with IYC younger than five years at selected clinics in the rural area of Vhembe district, Limpopo Province, SA that could serve as potential barriers to the successful implementation of GMP in the district, and therefore addressing the documented prevalence of MAM and SAM?

1.7 Study aim and objectives

1.7.1 Aim

To determine the GMP related knowledge, perceptions and skills of (i) nursing staff; and (ii) mothers with IYC younger than five years at selected clinics in the rural area of Vhembe district, Limpopo Province, SA through mixed methods research in order to address the prevalence of MAM and SAM in the district.

1.7.2 Research objectives

For the purpose of this study, the following objectives were formulated in order to attain the study aim:

- To determine the GMP related knowledge, perceptions and skills of nursing staff working at government clinics in the Vhembe district;
- To determine barriers to the effective implementation of GMP encountered by nursing staff who work at government clinics in the Vhembe district;
- To determine the prevalence of SAM/MAM among IYC under five years attending government clinics in the Vhembe district;
- To determine the GMP related knowledge and barriers to complying of GMP services of mothers with IYC under five years attending government

clinics in the Vhembe district;

- To compile a report for the DOH, with relevant practical recommendations based on the study outcomes, with the potential of being used as a guideline to address problem areas related to GMP identified in Vhembe district.

1.8 Definition of operational terms and concepts

The following section provides an explanation of the terms and concepts used when conceptualising the study:

1.8.1 Growth monitoring

Growth monitoring is the process of following the growth rate of a child in comparison to a standard by periodic anthropometric measurements in order to assess growth adequacy and identify faltering at early stages (Griffiths & Rosso, 2007).

1.8.2 Growth monitoring and promotion

The WHO defines GMP as nutritional interventions that not only measures and charts the weight of children, but also generates information on physical growth to counsel parents to motivate actions that improves health (WHO, 1986). However, UNICEF defined GMP as a prevention activity comprised of GM linked to the promotion (usually counselling), that increases awareness regarding child growth, improvement of caring practices, increased demand for other activities in an integrated child health and nutrition programme when appropriate (UNICEF, 2008). Bilal, Moser, Blanco, Spigt and Dinant (2014), in support of the WHO and UNICEF definitions, defined GMP as a prevention activity comprised of GM and promotional activities, usually in the form of tailored counselling and promotional activities based on the GM results, since measuring and analysing the growth of a child provide foundations from which tailored counselling and other actions can be designed.

1.8.3 Growth

Growth is a progressive increase in weight and height of a child and other body parts as the child matures (Child's Health, 2017).

1.8.4 Severe acute malnutrition

SAM can be described as a child with severe visible wasting and/or WH z-score of less than -3SD and/or mid-upper arm circumference (MUAC) less than 11.5 cm and/or presence of bilateral pitting oedema (Panda, Nanda, Murmu, Giri & Debi, 2019).

1.8.5 Moderate acute malnutrition

MAM can be described as a child with a weight for height (WH) z-score of less than -2SD but greater than -3SD and/or MUAC between 11.5 cm to 12.4 cm. (Panda et al., 2019).

1.8.6 Infant

An infant is the term used to describe the first or early stage of life, growth and development i.e. from birth to 12 months of age, and is characterised by rapid growth in weight and height, more than any other phase of life (Gokhale & Kirschner, 2003).

1.8.7 Young child

A child is defined as a human being below the age of 18 years unless under the law applicable to the child, majority is attained earlier (South Africa Age Structure, 2019). For the purpose of this study, young children refers to children that are younger than five years but older than 12 months.

1.8.8 Nursing staff

Nursing staff are described as persons who help in identifying or preventing or treating illness or disability. Licensed Practical Nurse (LPN) refers to a nurse who has enough training to be licensed by a state to provide routine care for the sick or a person trained in the scientific basis of nursing, meeting certain prescribed standards of education and clinical competence (Miller-Keane Encyclopedia and Dictionary of Medicine, Nursing &

Allied Health, 2003). However, the Democratic Nursing Organisation of South Africa (DENOSA) define nursing staff as a person who provides nursing service to patients in an organised facility, institution, or agency.

1.8.9 Clinic

A clinic can be defined as a facility at and from which a range of primary health care services is provided that is normally open eight or more hours a day based on the need of the community to be served (DoH KwaZulu-Natal, 2001).

1.8.10 Mother

A mother is defined as looking at someone in a motherly way (Hornby, 2020). For the purpose of this study, a female parent or a biological mother was referred to as a mother.

1.9 Abbreviations

DENOSA	Democratic Nursing Organisation of South Africa
DOH	Department of Health
DHS	Demographic Health Survey
FGD	Focus Group Discussion
GDCGM	Global Database on Childhood Growth and Malnutrition
GIS	Geographic Information System
GM	Growth Monitoring
GMP	Growth Monitoring and Promotion
IBM	International Business Machines
ICF	Inter City Fund
IDIs	In-Depth Interviews
INP	Integrated Nutrition Programme
IYC	Infant and Young Children
LPN	Licensed Practical Nurse
MAM	Moderate Acute Malnutrition

MCQ'S	Multiple Choice Questions
MDGs	Millennium Development Goals
MUAC	Mid Upper Arm Circumference
NFCS-FB	National Food Consumption Survey Fortification Baseline
NGO	Non – Governmental Organizations
NPC	National Population and Commission
ORS	Oral Rehydration Solution
SA	South Africa
SADHS	South African Demographic and Health Survey
SAM	Severe Acute Malnutrition
SANHANES	South African National Health and Nutrition Examination Survey
SDG	Sustainable Development Goal
SG	Surveyor – General
SMDG	Sustainable Millennium Development Goals
SPSS	Statistical Package for Social Sciences
UNICEF	United Nation Children’s Fund
UNGSWCAH	United Nations Global Strategy for Women’s, Children’s and Adolescents Health
WHO	World Health Organization

1.10 Delimitations

Delimitations are those characteristics that limit the scope and define the boundaries of a study, but are within the researcher’s control (Simon, 2011). Furthermore, delimitations are set to be choices made by the researcher, for example, things that will not be included in the study, as well as the reason behind it. The study did not include infants aged zero to five months as they are supposed to be exclusively breastfed or formula fed. IYC aged six to 59 months were included, as SAM/MAM most often presents during the period of transition in feeding (Budree et al., 2016).

The study did not assess the nutritional status of IYC as it did not fall within the scope of the study. Instead, the study focused on determining the GMP related knowledge, perceptions and skills of nursing staff and to determine the GMP related knowledge of mothers with IYC under five years attending government clinics in the Vhembe district. Other health professionals were not included in the study, as GMP only directly involves nursing staff and mothers of IYC.

1.11 Assumptions

Study assumption are aspects that fall outside the control of the researcher. However, should they disappear, the study would become irrelevant (Simon, 2011). Leedy and Ormrod (2015) posited that assumptions are so basic that the research problem itself could not exist. Furthermore, Wargo (2015), defined assumptions as a statement that is presumed to be true, often only temporarily or for a specific purpose such as building a theory or the condition under which statistical techniques yield valid results.

For the purpose of this study, the following assumptions were made:

- The GMP programme will continue to be an integral strategy for combatting malnutrition, especially among IYC, since it is able to detect growth failure early to enable the timeous implementation of the necessary interventions.
- Nursing staff surveyed, were honest in their responses to questions forming part of the in depth interviews conducted by fieldworkers.
- Mothers participating in focus group discussions (FGDs), were truthful regarding their relationship to the IYC that was brought to the clinic for GMP at the time the study was conducted.
- Mothers were truthful in their opinions expressed as part of FGDs.

1.12 Thesis outline

The thesis is presented as nine chapters. A brief description regarding the content of each chapter is presented below.

Chapter 1: The problem and its setting – provides an overview and background of the study and presents the problem statement. The theoretical framework is also discussed with reference to the problem statement. In addition, the study aim and related objectives are presented, followed by the significance of the study.

Chapter 2: Review of the related literature – presents an overview of relevant literature outlining the factors that have an impact on the effectivity of GMP. The chapter also provides a rationale regarding the strategies used to support GMP in South Africa.

Chapter 3: Methods and materials – outlines the methodology that was used to conduct the study. As a result, aspects covered include methods employed for the purpose of data collection, the study population and sample selection, location of the study area, as well as the approach used for data analysis.

Based on the study objectives, the study results and the discussion thereof, chapters four to nine were written with the purpose of being presented as stand alone chapters for the purpose of publishable journal papers.

Chapter 4: GMP knowledge, perceptions and skills of nursing staff employed at government clinics in the Vhembe district, South Africa.

Chapter 5: Barriers to the effective implementation of GMP: findings of an evaluation conducted at government clinics in the Vhembe district, South Africa.

Chapter 6: Prevalence of MAM and SAM among IYC under five years attending government clinics in the Vhembe district, South Africa.

Chapter 7: Maternal knowledge and perceived barriers to the success of the growth monitoring and promotion programme in Vhembe district, South Africa.

Chapter 8: Recommendations for improving the implementation of the Growth Monitoring and Promotion Programme in Vhembe district based on recommendations from nursing staff and participating mothers.

Chapter 9: Conclusion and recommendations.

1.13 Conclusion

This chapter provided a background, outlining how malnutrition threatens the lives of IYC younger than five years globally, in developing countries, Sub-Saharan Africa and more especially in the Limpopo province of South Africa. It also highlighted the fact that the GMP programme is regarded as a solution to malnutrition of children under five years of age if correctly implemented and utilised in order to meet its goals and objectives. In addition, the effectivity of GMP in Vhembe district was also highlighted.

Despite the fact that GMP has been trusted to assist in achieving national imperatives such as the sustainable development goals and the national development plan, various stakeholders including health facilities, health professionals, mothers/caregivers and members of the community are viewed as those who are directly or indirectly involved in contributing to the success of the programme, seeing that the effectiveness of the programme has been questioned by several authors.

In the chapter that follows, the findings of studies that have investigated various aspects of GMP are reviewed. Available data regarding the knowledge and perception of health workers and mother towards the GMP programme will also be reviewed.

CHAPTER 2: REVIEW OF THE RELATED LITERATURE

This chapter will be guided by the conceptual framework indicating how various factors have an impact on GMP of IYC younger than five years, thereby having the potential to contribute towards the prevalence of malnutrition. The integration of the reviewed literature will generate an outline of the aspects that make a positive contribution towards the successful implementation of GMP. In addition, reviewed studies will also highlight how various findings underscore one another, or contradict the aspects that have an impact on GMP success, depending on the country where the research was conducted.

2.1 Conceptual framework of literature review

In Figure 2.1 below, the conceptual framework of the literature review is presented.

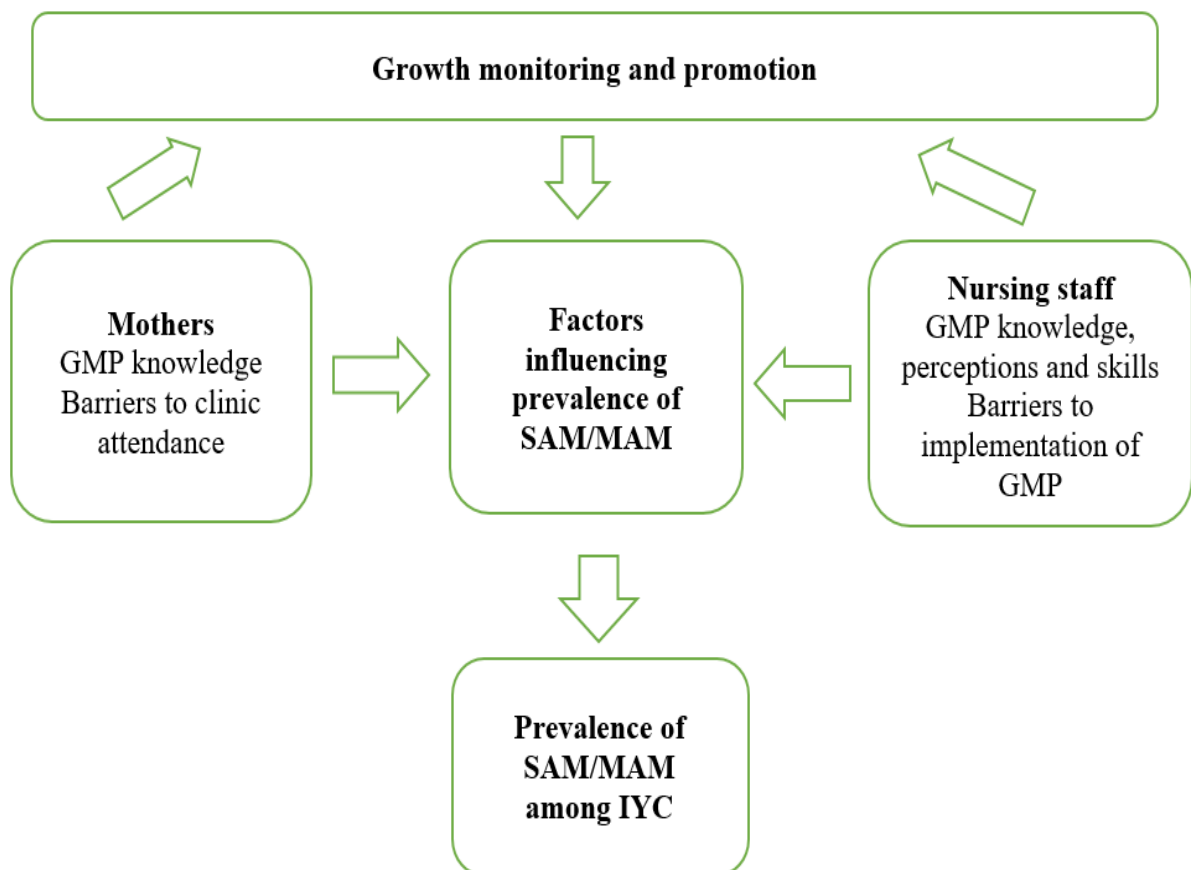


Figure 2.1: Conceptual framework outlining the literature review

2.2 Introduction

Malnutrition remains one of the biggest contributing factors to under five mortality globally, with an estimated 45% of child deaths being directly associated with malnutrition (WHO, 2016). MAM and SAM has a significant impact on global health with 32.88 and 18.7 million children being affected respectively, and the highest burden being carried by low to middle income countries (Black et al., 2008). Even though there has been a decline in the overall under five mortality rates in SA from 58 to 38.5 per 1000 live births since 2009, the impact of SAM on childhood mortality remains unacceptable (UN, 2009). This was also confirmed by the SANHANES-1 study reporting that SA children under three years carry the highest burden of malnutrition, with the prevalence of wasting and underweight being 2.2 % and 6 % respectively (Shisana et al., 2013).

GM has the potential to have a significant impact on childhood health and mortality, due to its probable impact on the prevalence of malnutrition (Khadilkar, Khadilkar, Choudhury, Agarwal, Ugra & Shah, 2007). However, the ability of GMP programmes to improve child survival and development through early detection and prevention of malnutrition, has been questioned repeatedly (Charlton, Kawana & Hendricks, 2009). However, despite the ability of GMP to prevent malnutrition being questioned, SA continues to put more effort into the GMP programme, due to its potential for having contributed towards the achievement of the MDG related to reducing child mortality globally (Bilal, 2014), as well as the SDG number three that aims to reduce global neonatal mortality, as well as under-five mortality rates by 2030 (Nilsson, Griggs, & Visbeck, 2016).

2.3 Description of the GMP programme

GM is regarded as an entry point to preventative and curative health care, thereby forming an integral part of programmes that are associated with significant reductions in malnutrition and mortality (Ashwort et al., 2008). In South Africa, GMP is part of the PHC services and is prioritised as a platform for delivering infant and young child feeding education

and counselling and prevention of severe malnutrition (DoH, 2016). Additionally, nutrition assessment using growth charts and counselling on feeding, especially at sick child visits, is also included in the Integrated Management of Childhood Illness (IMCI) strategy that is implemented at PHC facilities in South Africa. Authors in developing and developed countries (WHO, 2016; Adenike et al., 2010; Mangasarian, 2008; UNICEF, 2008; Ben-Joseph, 2007; WHO, 1986) have described GMP in various ways. However, a common denominator was the focus on improvement of IYC nutritional status and promotion of a healthy life, thereby serving as a way of achieving the SDGs of reducing hunger and child mortality by two thirds by 2015 (SDG, 2015). With reference to Table 2.1 below, many authors did not outline their strategies, nor the stakeholders that are supposed to be involved in the implementation and the success of the programme.

Table 2.1. Description of GMP programme

Author	Definition	Aim	Objective	Key stakeholders	Strategies
Feleke et al., (2017)	A preventative strategy comprising of growth monitoring (GM) in addition to promotion, serving as the core activity in an integrated child health and nutrition program.	Not indicated	Not indicated	Not indicated	Not indicated
Mangasaryan et al., (2011)	A strategy, process, an intervention, and a tool.	Targets at risk children for secondary interventions	Making the presence of malnutrition visible to caregivers and communities	Not indicated	Not indicated
WHO (2010)	As defined by UNICEF "the process of following the growth rate of a child in comparison to a standard, by periodic anthropometric measurements in order to assess growth adequacy and identify faltering in the early stage".	Not indicated	Not indicated	Not indicated	Not indicated
WHO (2009)	An essential nutritional intervention for under-five children.	Not indicated	Not indicated	Not indicated	Not indicated
Ganer et al., (2000)	Regular measuring, plotting and interpretations of child growth in order to counsel or take action when abnormal growth is detected.	To improve the child's health	Not indicated	Primary health care workers	Health education, access to basic health care

Ashworth et al., (2008)	A preventative and curative health intervention to reduce malnutrition and mortality as recognised worldwide.	Not indicated	<p>-Provide a diagnostic tool for health and nutrition surveillance of individual children and to investigate effective action in response to growth faltering</p> <p>-Teach mothers, families and health workers how diet and illness can affect child growth and thereby stimulate individual initiative and improved practices</p> <p>-Provide regular contact with primary health care services and so facilitate their utilisation.</p>	Not indicated	Not indicated
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WHO (1986)	Nutritional interventions that not only measure and chart the weight of children, but also uses information on physical growth to counsel parents to motivate actions that improve growth.	Not indicated	Not indicated	Not indicated	Not indicated
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2.4 Global practices regarding GMP

The Scaling up Nutrition (SUN) ensures that the first 1000 days is recognized internationally as the ‘window of opportunity’ for direct nutrition interventions (United Nations System Standing Committee on Nutrition (UNSCN), 2020). A supplementation for children aged 12 to 59 months, effective growth monitoring and promotion (GMP), infant feeding and maternal nutrition counselling and supplementation) are currently not adequate. The Department of Health Roadmap for Nutrition in South Africa 2013 – 2017 emphasises that nutrition components especially breast feeding and complementary feeding support and GMP are of key programme strategies are well defined, and that guidelines and key messages, norms and standards are widely available and used. GMP is a prerequisite for good child health, with Bilal et al., (2014) reporting that there is a difference between the purpose and the practices regarding its implementation. The GMP programme has been implemented in almost all developed and developing countries with its performance being dependant on GM practices, predominantly in terms of the type of growth charts and referral criteria being used. However, data on GM practices show important variations between and within countries in terms of the type of growth chart being used (Scherald, 2013). Gerein (2016), indicated that one of the most popular means of promoting child growth is to monitor it regularly, by weighing and recording measurements on a growth chart.

A global survey regarding the use and interpretation of growth charts was conducted, with findings demonstrating that GM forms an intrinsic part of paediatric care all over the world (de Onis, Blossner, Borghi, Frongillo, & Morris, 2004). Ashworth (2008) indicated that where GMP exists as a current strategy, it should be retained, while focusing on strengthening weaknesses and improving the programme to maximise its potential. In developed countries where the main purpose of GM among healthy children is screening to aid early diagnosis of serious health conditions, the use of the WHO growth charts may have an impact on GM practices (De Onis, 2012). In developing countries on the other hand, health workers monitor growth to detect and intervene when children have growth faltering, with anthropometric measurements commencing immediately

after birth until five years, while being conducted monthly for children younger than 24 months. In doing so, health workers interact with mothers by conducting health education and counselling, with the aim of generating adequate maternal action to promote child growth (UNICEF, 2008).

Bilal et al., (2014) reported that in Ethiopia, mothers are aware of the necessity for regular weight monitoring of their IYC, even though they do not comprehend this unless raised, as the importance of immunisation is mentioned more often by health workers. However, health workers seem to be more aware of GMP as they practice it according to international guidelines. The latter is in support of GMP practice that encourages mothers or parents to be well informed when it comes to the growth and development of their IYC as a source of empowering them with knowledge to become competent regarding appropriate child care, feeding and health seeking (Nikiema, Huybregts, Martin-Prevel, Donnen & Lanou et al., 2017). In addition, the Alma-Ata Declaration identified health workers as essential to Primary Health Care (PHC) to attain its key target of addressing unequal and inadequate health care (WHO, 2017).

2.5 Factors affecting GMP coverage

2.5.1 Developed countries

GMP is a preventative strategy, facilitating communication and interaction with mothers and caregivers to generate action regarding the promotion of IYC growth to facilitate the early detection of malnutrition or illness, while fostering healthy childhood development (UNICEF, 2008; UNICEF, 2001). Globally, GMP is regarded as the best method for assessing the health of children (UNICEF, 2013). The routine monitoring of weight and height as growth indicators, assists in the diagnosis of problems which might become increasingly problematic as the child grows older. In Belgium, irregular attendance of mothers for weighing sessions after completion of the immunisation schedule was observed. This was raised as a concern due to the lack of interest in GMP shown by caregivers, resulting in mothers using their own methods to evaluate growth and the

health of their children (Roberfroid, 2005). However, the attendance of GMP activities in developed countries mainly focus on completion of the immunisation schedule, rather than providing an opportunity for health workers to assess general health in children (Bilal et al., 2014).

2.5.2 Developing countries

Findings in developing countries also revealed that the attendance of GMP becomes irregular once the immunisation schedule is completed (Mapatano, 2008), even though GMP of children under two years is viewed as a key strategy for conducting counselling on exclusive breastfeeding, complementary feeding, hygiene and other health messages to mothers (USAID, 2008). It was observed that IYC whose mothers attended GMP clinics and received nutrition education, had better survival rates as opposed to those where mothers did not receive education (Sall & Sylla, 2005).

The primary benefits of GMP, especially in developing countries, centre around a reduction in the prevalence of underweight, morbidity and mortality among IYC under five years. In addition, mothers and caregivers are able to detect growth failure early and implement the necessary intervention (Ashworth et al., 2008). Current nutrition policy in SA, supports the prevention and management of malnutrition in early childhood and places its focus on the first 1000 days of life, considered to be crucial as a preventative rather than a curative approach to malnutrition, as positive outcomes are less likely when interventions are implemented too late (Bhutta, Das, Rizvi, Gaffey, Walker, Horton, Webb, Lartey, Black, The Lancet Integrated Nutrition Interventions Review Group & the Maternal & Child Nutrition study group, 2013). Therefore, the GMP programme can be viewed as having the potential for achieving policy goals, especially in developing countries.

In Afghanistan, GMP occurs in villages and homes, thereby facilitating regular attendance when compared to other developing countries, with GMP attendance being in excess of 50% of planned visits. The latter is associated with an improvement of the nutritional

status of IYC (Mayhew, Ickx, Stanekzai, Mashal & Newbrander, 2014). Similar findings were reported by Bilal et al., (2014) in Bangladesh, where the attendance of mothers for GMP appointments was high at 87%. In SA, studies have shown that the nutritional status of clinic attendees is not representative of the population, in that clinics do not reach those in greatest need. In addition, the high dropout rate at clinic-based GM programmes and a low coverage was also observed (Massyn, Day, Peer, Padarath, Barron & English, 2014; Coetzee & Ferrinho, 1994).

A Zambian study documented that all mothers/caregivers who received advice on GMP from health workers appreciated it and planned to put into practice what they were told. Nutrition counselling on feeding practices to improve IYC health was also given (Charlton et al., 2009). According to Gyampoh, Otoo and Aryeetey (2014), the consistent monthly interaction between mothers and health workers in Ghana as part of GMP not only provides knowledge, but also the support mothers need to implement recommended feeding practices and therefore nutritional status. A study conducted in Lesotho showed that mothers who understood the RTHC, attended clinics more often for GM and their IYC achieved a better immunisation status and weight gain compared to those who did not use the RTHC (Seutloali, Napoles & Ban, 2018; Asuzu, 1991).

Socio economic status and demographic characteristics are also linked to the nutritional status of children. A SA study conducted by May and Timaeus (2014), reported that wasting is more common among children whose mothers have very limited education. However, mothers who only attended primary school, are more likely to have underweight children than those who proceeded to secondary school. In SA, 80% of stunted children are found in households that are poor in terms of income, access to services and participation in the labour market (May & Timaeus, 2014; Hall, 2012). Contrary to the above, findings reported by Mashal (2008) in Madagascar, revealed that the majority of caretakers/mothers were illiterate, however their lack of education was not related to whether their children's nutritional status improved or not.

In other studies, irregular health facility attendance was related to the distance between the health facility and the caregiver's home (Ndao, 1992). In SA, a reduction in GMP turnout including immunisation, was related to a lack of information regarding the importance of GMP, caregivers being unable to visit clinics, parents being informed by PHC professional nurses to return on another day and being given incorrect dates, while in some cases, the distance to the clinic was also considered to be far (Corrigall, Coetzee & Cameron, 2008). The above findings are indicative of the fact that the RTHB is not used effectively as a curative, preventative and promotional tool in monitoring IYC health at public health care facilities and its success is dependent on the knowledge, dedication and cooperation of mothers, caregivers and health workers.

2.6 Barriers health workers face when implementing GMP

Based on available literature, the barriers health workers face in an attempt to implement GMP effectively, it would seem that challenges faced are related to a lack of knowledge and understanding of the programme, inadequate skills, inadequate training and supervision, and a lack of human and physical resources.

2.6.1 Introduction

GM, especially of IYC under five, is widely recognised as an essential element of primary health care and its potential lies in how it is used to diagnose a child with a nutritional or health problem (Ashworth, 2008). Anthropometric measurements are widely used to assess growth and identify groups of IYC with nutritional or health needs. The most frequently promoted method of GM is weighing and charting growth, since weight gain is believed to be the most sensitive indicator of growth (Lofti, 2014). Therefore, the interpretation of child's growth is based on anthropometric indicators and the cut-off points for classifying children according to varying degrees of undernutrition and overnutrition (De Onis & Blossner, 2003). The anthropometric indicators i.e. weight-for-age, weight-for-height, and height-for-age, allows the comparison of growth over time (Kitenge & Govendor, 2013). However, the interpretation of these indicators becomes a

challenge for the majority of nurses (Morley, 1994) due to factors such as lack of understanding and training. The screening of children requires accuracy in several sequential steps i.e. reading of the weight, plotting the age and weight on the growth chart and interpretation of the child's growth pattern, despite the fact that these activities are not accurately executed (Gopalan & Ghosh 1985). As a result, nurses are viewed as being of primary importance in achieving reduced child mortality due to their delivery of care and participation in policy making, thereby playing an important role in the global vision for increased well-being and better health of all IYC (Amieva & Ferguson, 2011). In addition, nurses are the largest group of health care professionals globally, providing nutrition advice, especially to new mothers (Bozzette & Posner, 2013).

2.6.2 Lack of knowledge and understanding

In developing countries, health workers have a poor understanding of growth curve reference charts, do not plot the weight of IYC in the RTHB during consultations, and demonstrate poor identification of children with malnutrition (Tarwa & De Villiers, 2007). A study conducted by Ashworth, Shrimpton and Jami (2008), revealed that a lack of understanding of the growth charts and its purpose by health workers, is a major reason of the ineffectiveness of GM. With the use of the WHO charts for monitoring growth and nutritional status, a lack of knowledge and skills in the use and interpretation of growth charts were reported (Abul-Fadi, Bagchi & Cheikh Ismail, 2010).

The knowledge of health workers regarding the use of growth charts, was studied by Ruel, Pelletier and Habicht (1991) in developing countries. Results showed that health workers found the growth charts confusing and that the area for plotting weight-for-age was too small, leading to inaccurate results. In SA, Harrison et al., (1998) reported that the RTHC was not used effectively in Cape Town and thus its curative, preventative and promotional benefits were lost. Similar findings were observed by Cloete, Daniels Jordaan and Derbyshire (2013), where a study highlighted that 55% of nurses did not have sufficient knowledge on how use the RTHB, and that their perception of the booklet may affect how effectively their knowledge is applied.

Although the practice of GMP may differ between countries, the suboptimal function of GMP is mainly due to a lack of participation by caregivers and poor understanding of the concept of GM by health workers (Roberfroid et al., 2005). A study conducted by Charlton et al., (2009) in Zambia, focused on the effectivity of GMP practices, documenting that the practices were not properly implemented. Kotecha and Singh (2012), conducted a study in urban slum areas of Bhavnagar, India, to determine the evaluation process and nutrition of children. It was observed that during GM, health messages were not given by health workers after vaccinating children. In addition, due to the inaccurate interpretation of the growth curve, inaccurate plotting of anthropometric measurements and a lack of understanding of the growth reference curves, health workers had an impact on the effectiveness of GMP. Another study conducted in India by Parmar, Parmar, Pandya and Mazumdar (2014), reported that GM was not conducted satisfactorily, with weight either not being plotted, or incorrectly plotted by health workers. Furthermore, GM was only done for children who visited the health facility for immunisation.

The gaps in the nutritional knowledge levels of health workers create a feeling of incompetency and in situation where counselling is provided its likely to be poor in content and non-factual (Gyampo, Otoo & Aryeetey, 2014). Findings regarding the relationship between health worker's nutritional knowledge and their working years experience have been inconsistent. Yalcin, Cihan, Gundodgu and Ocakci (2014), found no association between health worker nutritional knowledge and the number of working years' experience. Sharma and Jain (2014), reported that younger health workers with less working experience are more likely to have knowledge and obtain current information, integrate and use newly acquired information easily and this may improve their nutritional knowledge level. A recent study in Ghana conducted focusing on gaps in knowledge levels of health workers on recommended child feeding practices and GMP actions confirmed the observation that less experienced health workers who might have recently completed their training may be in a better position to remember some information from their nutrition courses Nsiah-Asamoah (2018). Furthermore, it was reported that more experienced health workers did not necessarily have nutrition

knowledge that is current, due to a lack of participation in refresher courses or workshops.

2.6.3 Inadequate skills

Studies conducted in developed and developing countries, reported that the majority of nurses did not have the necessary knowledge enabling them to correctly interpret growth curves, as well as detect malnutrition early in accordance with the RTHB and its purpose (Claeson & Waldman, 2008; Saloogee, 2007). The findings of a study conducted in Limpopo province, revealed that the knowledge of professional nurses regarding the interpretation of growth curves was poor. In addition, they did not know the meaning of the growth chart indices such as weight-for-age, weight-for-height and height-for-age (Kitenge & Govender, 2013). Ashworth et al., (2008) also reported that a lack of growth chart comprehension and its purpose, is the major reason why the GMP programme is not functioning optimally. Another SA study that focused on the assessment of the RTHB and its interpretation by health workers, also found that professional nurses do not understand how to use the weight-for-age chart (Harrison et al., 1998). Tarwa and De Villiers (2007) also reported that inaccurate plotting of weight may be as high as 80% at some facilities.

Gyampoh et al., (2014), reported that in Ghana, over half of the surveyed health workers had a lack of knowledge regarding the interpretation of child growth charts, and the majority could not adequately indicate the recommended actions based on growth patterns depicted on the growth chart of IYC. In Afghanistan, GMP services are offered by illiterate individuals at a community level, using cards that do not require the plotting of z-scores. As a result, measurement error occurs due to the change in weight-for-age in the course of the GMP programme that may not be identified (Mayhew et al., 2014). Challenges regarding the level of practical skills of health workers were also identified by Bilal et al., (2014). However, the major challenge was voluntary community workers who do not have the necessary skills, yet conduct activities as part of GMP. An Indian study documented similar results, due to the weighing and plotting of weight being done

inaccurately, as only 20% of health workers followed the correct procedure and techniques for GMP (Bhardwaj, Sharma, Raghav & Kumar 2016). Gerein (2016) indicated that a common error occurs when health workers fail to leave a blank space for each month the child was not weighed, giving a false positive impression of the child's growth due to inaccurate plotting of the measurements and interpretations resulting in inappropriate interventions.

2.6.4 Inadequate training and supervision

Despite the fact that GMP is performed by trained health workers, inadequate training in terms of GMP consultation and follow-up in the case of growth faltering, may result in inappropriate advice. In addition, supervision by PHC and district level staff which is necessary to improve the quality of GMP services is lacking, thereby resulting in GMP not being conducted optimally in India (Parmar, 2014). This finding is in agreement with that of a study conducted by Manhasn and Dogra (2012) in Kashmir India, where it was documented that inadequate knowledge of health workers can be attributed to the lack of quality GMP training and on the spot correction of mistakes by health worker supervisors. Poor health worker skills, inadequate supervision, a lack of knowledge regarding GMP and poor delivery of counselling were also mentioned by some authors (Ashworth et al., 2008; Pelto, Santos, Goncalves, Victoria, Martines & Habicht, 2004).

In an attempt to improve the effectivity of GMP, health workers and community health workers were trained on GMP and the management of undernutrition in Zambia. However, the training had little effect on the growth outcomes of undernourished children attending primary health care facilities over a threemonth period, and the weight-for-age measurements of children become very poor (Charlton et al., 2009). The lack of knowledge among health workers can be attributed to a lack of quality training. Bhardwaj et al., (2016) who conducted a study in Western Rajasthan, India, reported that the practice of GM by weighing children and plotting it on growth chart, was also poor among trained health workers, with only 20% following the techniques based on the training they received, possibly due to the absence of reinforcement and inadequate

supervision. Kotecha and Singh (2012), who also conducted a study in India, also observed that the components of GM namely child monitoring, on site correction and supervision, was being ignored when compared to giving immunisation.

In an Ethiopian study, Gebru, Baraki and Belay (2016), observed that follow up training was received by 84.4% of health workers and among those, 29.7% focused on the definition of GMP, its importance 28.5%, how to conduct GMP 26.6%, and how to use the result after weighing a child. Only 15.2% of health workers received follow up training on how to link the child with other programmes. The top three reasons why health workers did not conduct counselling during GMP, were lack of training on how to counsel (60%), work load (16.7%) and a lack of time (16.7%).

2.6.5 Lack of human and physical resources

A lack of resources also contributes to the suboptimal functioning of GMP. A study conducted in the Eastern Cape, SA, documented that nurses expressed their frustration regarding a lack of basic resources which had a negative impact on the quality of service delivery (Schoeman, Smuts & Faber, 2010). Furthermore, staff shortages, a lack of vaccines, high workloads, and a lack of equipment was also mentioned as challenges in other rural parts of South Africa such as in the Eastern Cape and Kwa-Zulu Natal (Schoeman et al., 2010).

A study conducted in five countries of the Eastern Mediterranean Region by Abul-Fadal (2010), also confirmed that inadequate training of health personnel, followed by poor understanding regarding the risk of overweight and inaccurate plotting of growth data, the poor condition of weighing scales due to a lack of maintenance, and negative attitudes of health workers were some of the barriers to optimal GMP experienced. In Ethiopia, it was reported that 39.1% of health workers used weight scales, 18.2% used height boards and 40.5% used MUAC tapes for GMP. It was also reported that the majority of equipment was in good working order, and based on self-reporting, health workers indicated that they know how to use the equipment and have the skills to do so. However, half of them

indicated that they need a refresher course, while 4.2% indicated that they don't know how to use available resources (Geburu et al., 2016). Zambia has a high IYC mortality rate with GMP being used as a key strategy to combat mortality and malnutrition. While nurses perceived GMP as being important, the shortage of professional staff and transport problems occurred frequently. In addition, insufficient documentation of child growth, failure of nursing staff to cooperate with mothers and relocation of mothers were factors that affected the ability of nursing staff to effectively implement GMP (Lundström & Österberg, 2016).

2.7 Barriers mothers face when participating in GMP

Based on published data, factors that prevent mothers and their offspring from gaining optimal benefits from GMP, is related to maternal/caregiver knowledge and perceptions.

2.7.1 Knowledge and perception of mothers/caregivers

GM forms an integral part of the Integrated Nutrition Program (INP) of DOH in SA with the aim of preventing and managing malnutrition. With regards to IYC, the INP aims to establish and strengthen sustainable GM practise at health facilities and in communities (Faber, Schoeman, Smuts, Adams & Ford-Ngomane, 2009). However, the understanding and perception of those responsible for its success, including mothers, may result in the lack of success of GMP. Ashworth *et al.*, (2008) described five activities linked to GMP namely: (i) weighing the child, (ii) plotting the child's weight on a growth chart, (iii) interpreting the growth chart, and (iv) discussing options with the caregiver and agreeing on further action, as well as evaluating the child's response. It is therefore important that both mothers and caregivers understand, and have the ability to interpret the growth curve, even if they have a low level of education or are illiterate (Ruel, Pelletier, Habicht, Maon, Chobokoane & Maruping, 1990).

GMP plays an important role in the early detection of malnutrition and illnesses in IYC. According to Schoeman et al., (2003,) in a semi-urban SA community, mothers' reasons

for taking their children to health facilities were childhood immunisation and ill health, with only 5% taking their children for health assessment or screening. A study conducted in Afghanistan, revealed that 85% of mothers or caregivers that bring children to a GMP programme held the belief that the programme would be helpful for the child. However, the remainder indicated that they did not believe that the GMP programme would be of value for their children (Mayhew, 2014). An Ethiopian study also showed that mothers' awareness of GMP is very poor when compared to immunisation (Bilal et al., 2014). It is therefore of interest to note that a review paper by Gerein (2016), indicated that the definition of GM has shifted from a health service-based therapeutic service provided to individuals to a community based participatory activity that stresses the importance of behaviour change by better informed mothers and resultant comprehensive community action designed to better address the fundamental causes of poor health.

A study conducted in Zambia, documented that despite the challenges related to GMP, mothers and caregivers had a positive attitude towards issues related to GMP as a way of improving their IYCs weight status. This allowed mothers the privilege of ownership of their children's health and the overall GMP programme (Charlton et al., 2009). A Nigerian study conducted by Sanusi and Gbadamosi (2009), reported that 65% of mothers were knowledgeable about GMP, however, only 7.5% regularly took their children to clinics for GM. Thus, showing that although the knowledge of mothers regarding GMP was good, their participation in the programme was very low. This could be detrimental to child nutrition and survival (Ruberfroid, Pelto & Kolsteren, 2007). However, Fikele et al., (2017), reported that the utilisation of GMP services was not related to maternal workload, knowledge about the GMP chart, birth order of the index child, household responsibilities and continuation after full immunisation.

2.8 Prevalence of IYC malnutrition

2.8.1 Global

Children are the most vulnerable victims of under-nutrition. Malnutrition is a common health concern in developing and developed countries in children who are under five years of age, accounting for 45% of global childhood deaths in 2011 (WHO, 2011).

The WHO developed universal growth standards to monitor IYC growth and development through anthropometric measurements for early detection of malnutrition (WHO, 2008). Weight-for-age of children 6 to 60 months, weight-for-length/height with a cut off of -3 z-scores and MUAC (<11.5 cm) are used to detect SAM (WHO, 2013; UNICEF, 2009). Black, Victoria, Walker, Bhutta Christian and de Onis (2013), estimates that under-nutrition, including stunting, wasting and deficiencies of vitamins and zinc along with sub-optimal breastfeeding practices, are responsible for 3.1 million annual childhood deaths in low income and middle income countries. Although the global number of childhood deaths remains high, tremendous strides towards reducing child and young adolescent mortality over the past few decades have been made.

The SDG targets and indicators have an indirect impact on child wellbeing, aiming to end all forms of hunger and malnutrition by 2030. The latter encapsulates the 2025 achievement of internationally agreed targets regarding stunting and wasting in children under the age of five years (Stats SA, 2016). The global under five mortality rate declined by 59% from 98 deaths per 1000 live births in 1990 to 39 in 2018 (UN Report, 2019). Furthermore, the global community recognises the urgent need to end preventable child deaths, making it an essential part of global goals and initiatives, including the United Nations Global Strategy for Women's, Children's and Adolescents Health (2016 – 2030) and the SDG (UNGSWCAH & SDG, 2019).

2.8.2 Developing countries

The majority of childhood deaths in developing countries are as a result of malnutrition with 80% being attributed to mild to moderate undernutrition rather than severe undernutrition (Pelletier, 1995). According to the UN Development Programme, more than 90 million children under five are severely underweight, with undernutrition seemingly on the increase in Africa (UN Report, 2019). IYC growth has a powerful effect on morbidity and mortality at every stage of the life span, with consequences continuing for the remainder of the individual's life (Copper, 2013). Musa et al. (2014), added that malnutrition has been identified as the most common nutritional disorder in developing countries and remains one of the most common causes of morbidity and mortality among children.

The proportion of children under five in developing countries who were underweight, is estimated to have decreased by 11% between 1990 and 2010 from 29% to 18% respectively. However, this improvement was deemed to be inadequate to meet the MDG target of halving the 1990 prevalence of underweight by 2015 (WHO, 2011). It was estimated that 150 million children under five are underweight and more than 20 million suffer from severe malnutrition, whereas 47 million are stunted in sub-Saharan Africa compared to Eastern and Southern Africa where 24 million children are stunted (UNICEF, 2008). Despite economic growth in developing countries, this has not translated into improved access to child health services, immunisation and maternal education since the prevalence of stunting across African countries has not decreased as expected (Norris, Wrottesley, Mohamed & Micklesfield, 2014). This suggests that growth faltering among children under five on the African continent remains a major public health problem for the majority of African countries.

To promote appropriate IYC practice in the majority of developing countries, some of the clinic-based nutrition interventions include vitamin A supplementation, GMP with the aim of identifying growth faltering (Agbozo, 2016), as well as the implementation of nutrition education and behaviour change communication (Begin & Aguayo, 2017).

However, GMP programmes have not been successful in reducing the prevalence of under-nutrition, despite it being viewed as one of the child survival strategies, as its implementation is not as effective as expected (Sanusi & Gbadamosi, 2009).

Barriers to the success of GMP include a lack of knowledge of both health workers and mothers, poor attitudes, a lack of support staff, resources and facilities, as well as motivation (Koh, Manias & Hutchnson, 2008). Historically, health workers have played a vital role in improving IYC health, especially during the first year of a child's life. This is not only related to GMP, but the promotion of appropriate infant nutrition (especially breastfeeding) and hygiene (Hjort, Solvesten, & Wust, 2017). Hence, appropriate knowledge and attitudes regarding GM of both health workers and mothers are necessary for adherence to guidelines. A study conducted in Ethiopia, revealed the existence of malnutrition with mortality rates varying annually. However, morbidity trends decreased from 2012 to 2014 and increased from 2014 to 2015, resulting in kwashiorkor occurring most frequently and being associated with the highest morbidity (Yohannes, Laelago, Ayele & Tamrat, 2017)

2.8.3 South Africa

In SA, malnutrition is associated with more than 60% of all childhood hospital deaths (Stephen, Bamford, Patric & Wittenberg, 2011). One in four SA children is chronically malnourished, having remained virtually unchanged since the early 1990s with the prevalence of stunting ranging from 27.4% in the SA Demographic and Health Survey (DHS) of 2003 to 21.5% in the SANHANES-1 of 2012 (Shisana et al., 2013). Despite SA identifying childhood nutritional status as an important concern since the country's transition to democracy, the priority given to the implementation of the GMP programme in order to improve child survival and development through early detection and prevention of malnutrition, remains a challenge as malnutrition still exists (May & Tiaeus, 2014). However, the Global Database on Childhood Growth and Malnutrition (GDCGM), showed that over the span of thirteen years (1995 to 2008), a deviation from the average

height of children under the age of five in SA slightly decreased from 28.7% to 23.9% (WHO, 2012). Hence, the extent of the abovementioned improvements in the prevalence of stunting, bears testimony to the fact that progress is being made towards reducing the prevalence of malnutrition in SA. In addition, Save the Children (2016), applauded SAs exceptional progress in reducing childhood stunting from 33% to 24% between 2004 and 2008 (Save the Children, 2016).

However, despite progress being made, the persistence of early childhood malnutrition in SA, the most developed economy in Sub-Saharan Africa, bears testimony to the challenges faced when dealing with malnutrition, in addition to it fuelling the burden of non-communicable diseases (Said-Mohamed, Micklesfield, Pettifor & Norris, 2015). In addition, the relatively unchanged prevalence of malnutrition reported by some, is reportedly related to inadequate care for women and children, as well as inadequate health services, especially in poor and rural households that are more likely to be social grant recipients (Devereux & Waidler, 2017).

According to SANHANES-1, children aged zero to three years have the highest prevalence of stunting with 26.9% of boys and 25.9% of girls being affected (Shisana et al., 2013). A study conducted by Yamauchi (2008) in KwaZulu-Natal, also documented a high prevalence of stunted children and the resultant impact it has on their education. In addition, even the WHO reported that the provinces most affected by stunting are the Eastern Cape and Limpopo Province (WHO, 2011). A study conducted by Kimani-Murage (2010), reported a high prevalence of stunting in SA, peaking at 32% among children one to two years of age. This was also observed by Chopra and Saunders (1997) indicating that in most areas of SA, the majority of children are undernourished either in terms of weight or height. Nannan, Norman, Hendricks, Dhansay, Bradshaw and the South African Risk Assessment Collaborating Group (2007), also concluded that underweight contributes to 12.3% of IYC deaths among children under five in SA.

In SA, GMP commences at six weeks post-delivery, when nurses start monitoring IYC growth and development for the early detection of growth faltering. Although GMP is

being conducted, it is not clear how well or effectively nurses are fulfilling this role (Berry, Biersteker, Dawes, Lake & Smith, 2013). A high prevalence of undernutrition in the form of thinness (25%), was reported among children in Gauteng, affecting 29% of boys and 22% of girls respectively. In addition, the prevalence of MAM at 17%, was particularly high among children aged six to nine years at 29%, compared to those who were younger than five years (Modjadji & Madiba, 2019).

2.9 Studies investigating the use of the RTHB for GMP in SA

The following studies reported in Table 2.2 were conducted in SA, with the aim of investigating the implementation of the RTHB for GMP. All the studies presented, documented challenges regarding the use of the RTHB, whether it be lack of understanding of the GMP process or related skills of nursing staff.

Table 2.2. Summary of studies investigated the use of RTHB for GMP in SA

Authors	General description					
	Study design	Target group	Sample size	Location	Variables Measured	Outcome
Naidoo et al., (2018)	Cross-sectional descriptive	Caregivers	318	Kalafong Provincial hospital	Anthropometric measurements Knowledge Attitude Practices	Incomplete documentation of health information on RTHB/RTHC
Blaauw et al., (2017)	Cross-sectional descriptive	Children Caregivers Health care workers	2442 children 2481 caregivers 270 health care workers	Tygerberg Academic hospital Cape Town	Anthropometric measurements Knowledge Attitude Practices	Poor knowledge and skills Lack of resources to measure height/length
Du Plessis et al., (2017)	Cross-sectional descriptive	Children Caregivers Health care workers	2442 children 2481 caregivers 270 health care workers	Western Cape Province	Anthropometric measurements Knowledge Attitude Practices	Implementation of HPMs in the RTHB apparent, despite HCWs understanding
Win (2016)	Mixed methods	Nursing staff	9 nurses 75 reviewed RTHB	West Rand rural clinics, Western Cape	Knowledge Perceptions	Poor utilisation of RTHB
Sibanda et al., (2016)	Descriptive exploratory Mixed methods	Caregivers Nursing staff	12 caregivers 30 nurses	Tzaneen	Knowledge Skills	Poor knowledge regarding frequency of GMP and infant feeding. Inadequate knowledge regarding RTHC

Cloete et al., (2013)	Cross-sectional descriptive Self-administered questionnaire	Nursing staff	44	Tygerberg sub-district, Cape Town	Knowledge Perceptions	Insufficient knowledge regarding RTHB
Kitenge and Govender (2013)	Cross-sectional descriptive Self-administered questionnaire	Nursing staff	128	Makhado sub-district, Limpopo Province	Knowledge Perceptions	Poor knowledge Incompetence regarding growth curve interpretation Unutilised immunisation sections
Kimani-Murage (2010)	Cross sectional descriptive Self-administered questionnaire	Children and adolescents 1 – 20 years	3511	Mpumalanga Province	Anthropometric measurements Pubertal assessment	Prevalence: stunting 32%, underweight 14% wasting 4 – 9% for boys and girls
Tarwa and De Villiers (2007)	Not mentioned	Health workers	300	Ga-Rankuwa, North of Pretoria	Use of RTHC	RTHC often not requested at clinic consultations. Child weight occasionally plotted. High number of respondents did not bring RTHC to consultation
Schoeman et al., (2003)	Not mentioned	Children Mothers Nurses	51 randomly selected RTHC	Western Cape	GM practices Health facility practices Preschool child coverage	Irregular and inaccurate measurement of weight/height, inaccurate plotting and interpretation of weight

Of the studies conducted to investigate the use of the RTHB in SA, the majority employed a cross-sectional descriptive study design with the minority employing mixed methods for data collection. Study participants included mothers/caregivers, nursing staff/health care workers and IYC, with study variables including knowledge, attitude, practices perceptions and skills.

Study results included inaccurate plotting and interpretation of weight and length/height, irregular plotting of weight, a lack of knowledge regarding the frequency of GMP, as well as inaccurate measurement of weight and length/height. A lack of equipment for measuring height/length was also noted, as was the fact that visits to health facilities for GMP were not always be accompanied by the RTHB.

2.10 Conclusion

The literature review highlighted the GMP programme as one of the global strategies employed for the reduction of malnutrition among children under five. It also provided an overview of its implementation in developed and developing countries, with emphasis on the African continent, sub-Saharan Africa and SA, reflecting on its success and barriers that are instrumental in preventing GMP from making a significant contribution to the reduction of morbidity and mortality among IYC. In addition, the global prevalence of malnutrition was reviewed, reflecting on current trends and attaining the SDG goals by 2030.

An overview of SA studies that have investigated the implementation of GMP, alluded to barriers such as inaccurate plotting and interpretation of weight and length/height and irregular plotting of weight by nurses and health care workers. Other aspects that require action, included a lack of knowledge regarding the frequency of GMP, as well the fact that growth parameters such as weight and length/height were not measured accurately.

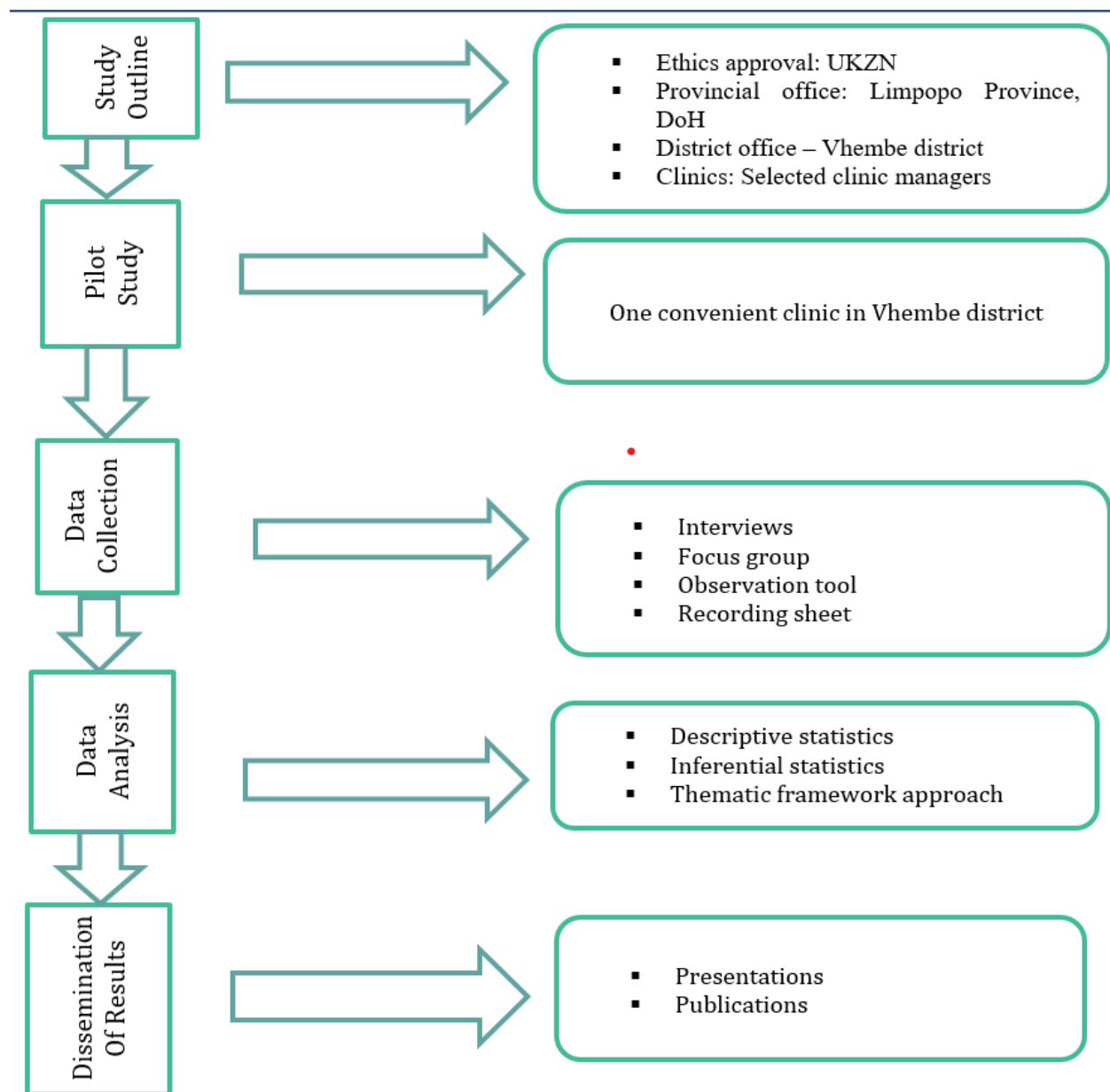
This chapter identified health facilities such as community-based clinics as facilities predominantly responsible for implementing the GMP programme. Hence, community health care workers and nurses are seen as the key to the successful implementation of the

programme, due to their interaction with mothers or caregivers of IYC, especially in relation to the delivery of GMP services.

CHAPTER 3: METHODS AND MATERIALS

3.1 Study outline

An overview of the procedures and methods employed to conduct the study is presented in Figure 3.1 below.



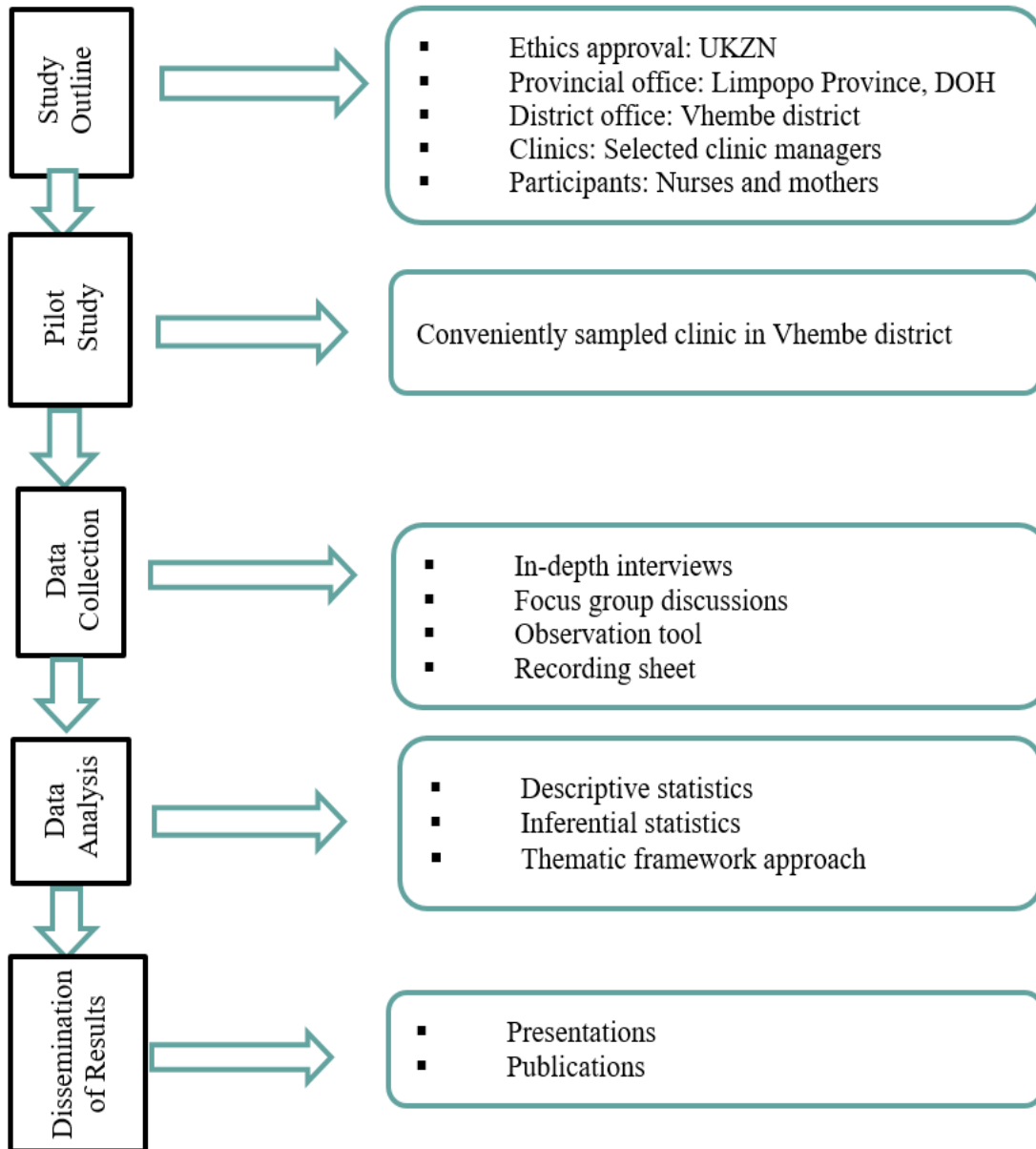


Figure 3.1: Study procedures and methods

3.2 Study design

3.2.1 Cross-sectional exploratory descriptive design

A cross-sectional study is defined as a type of observational study where the investigator measures the outcome and exposure among study participants, while at the same time, data is gathered from the study population at a given point in time. This is done so that the relationship of a particular target point and other variables of interest within the population

such as prevalence, can be studied (Leedy & Ormrod, 2016). Cross-sectional studies are relatively quick and cost effective to conduct, the prevalence of multiple variables can be measured and data for descriptive analysis is generated. However, this study design is unable to determine cause and effect and cannot be used to analyse behaviour over a period of time (Leedy & Ormrod, 2016).

In order to attain the study objectives, the study employed an exploratory descriptive design using mixed methods. Descriptive research is used to obtain information regarding the characteristics of an observed phenomenon, or exploring the possible correlation among two or more phenomena (Leedy & Ormrod, 2016; Kumar, 2011). Descriptive research methods can be cost effective, easy to administer and has the ability to sample a wide range of people (Leedy & Ormrod 2016). Polit and Beck (2018) reported that the usefulness of descriptive research is related to the fact that it increases the ability to analyse the relationship between the phenomena under investigation. Despite several important roles of descriptive research in medical research, limitations are associated with the absence of a clear, specific, and reproducible case definitions, and interpretations that overstep the data (Grimes & Schul, 2002). However, FGDs and observation of skills are widely used methods in exploratory research (Brink, 1998).

3.2.2 Mixed methods approach

In order to answer the research question, a mixed methods approach was used. That is, a combination of quantitative and qualitative data collection methods. A mixed methods approach was employed to develop a complete understanding of the research problem by converging quantitative and qualitative data and comparing the two databases, referred to as a convergent design (Creswell, 2014).

According to Creswell (2014), a mixed methods approach can be defined as a pragmatic worldview, with a collection of both quantitative and qualitative data sequentially in the study design. When using mixed methods, the researcher bases the inquiry on the assumption that collecting diverse types of data best provides a more complete understanding of a research problem than either quantitative or qualitative data alone.

Hence, the study begins with a broad survey in order to generalise results to a population and then, in a second phase, focuses on qualitative, open-ended interviews to collect detailed views from participants to help explain the initial quantitative survey (Creswell, 2014).

According to Palinkas, Aarons, Horwitz, Chamberlain, Hurlburt and Landsverk, (2011), the use of mixed method designs is viewed as preferable in implementation research because it provides a better understanding of research issues than either qualitative or quantitative approaches alone. Teddlie and Tashakkori (2003) add that in such designs, qualitative methods are used to explore and obtain depth of understanding regarding the reasons for success or failure to implement evidence based practice, or identify strategies for facilitating implementation. Quantitative methods on the other hand, are used to test and confirm hypotheses based on an existing conceptual model and obtain breadth of understanding of predictors of successful implementation (Teddlie & Tashakkori, 2003).

Quantitative data can be generated from a purposeful sampling strategy, while qualitative data can be generated from a probability sampling strategy, as each set of data is suited to a specific objective and each must adhere to a specific set of assumptions and requirements. However, with mixed methods, implementation lies in its ability to move beyond the confines of existing methodological approaches and develop innovative solutions to important and complex problems (Palinkas, Horwitz, Green, Wisdom, Duan & Hoagwood, 2015).

The exploratory nature of the study, is related to the fact that qualitative follow-up data was collected to understand the data at a more detailed level. According to Creswell (2014), explanatory sequential mixed methods is one in which the researcher first conducts quantitative research, analyzes the results and then builds on the results to explain them in more detail with qualitative research. It is considered explanatory because the initial quantitative data results are further explained with the qualitative data. It is considered sequential because the initial quantitative phase is followed by the qualitative phase. The two methods were used in the current study to enable a better understanding of different participants' point of view, especially because participants were not limited to sharing their

experiences regarding GMP. Hence, participants' knowledge and experience were first gathered using quantitative techniques, followed by qualitative methods to generate more information in order to achieve all study objectives. As quantitative techniques limit participant responses, qualitative techniques enable participants to freely express their opinions and experiences. Combining the two methods therefore generates data that enables a deeper understanding of the research problem and related study objectives. In the concluding chapter of the thesis, the qualitative and quantitative data was presented in an integrated way to showcase how both methods complemented one another in completion of this thesis.

3.3 Study population and geographic location

The study population included nursing staff and mothers of IYC under five years of age residing in Vhembe district, Limpopo Province. Vhembe District Municipality is located in the northern part of the Limpopo Province. It is comprised of four local sub-district/municipalities, namely: Musina, Collins Chabane, Thulamela and Makhado. The most commonly spoken languages are Tshivenda and Xi-Tsonga.

The district has a population of approximately 1 393 950, with 476 905 children aged zero to 14 years (Stats SA, Community Survey, 2016). Health services are delivered by one regional hospital, six district hospitals, one specialised psychiatric hospital, eight community health centres, 125 clinics and 16 mobile clinics. The types of clinics in Vhembe are mostly public facilities where they can be easily accessed by community members or accessible to public. Various services are covered such as geriatric services, ante-natal and post natal care, family planning and child health services which also integrate GMP programme etc. The GMP services in the clinics are provided by all categories of nurses on duty and depending on the capacity of the clinic one to two professional nurses always form part of team, however, they rotate on shifts.

Vhembe district covers a geographical area that is predominantly rural, and is characterised by a high rate of unemployment (53%) and poverty (32%). The area is faced with infrastructural backlogs for water, sanitation and electricity, that negatively impacts on the

health of communities. The poor road infrastructure influences reasonable response times for vehicles such as ambulances, mobile clinics and police vehicles. However, the district has fertile land and an agriculture sector which currently employs 22% of the labour force and contributes to 3% of the growth and development program (GDP). If well supported, the agricultural sector has the capacity to absorb more entrants into the labour market because it is labour intensive (The Local Government Handbook, 2017).

Figure 2.2 provides context regarding the location of Vhembe district, its sub-districts, as well as its location in the Limpopo province.

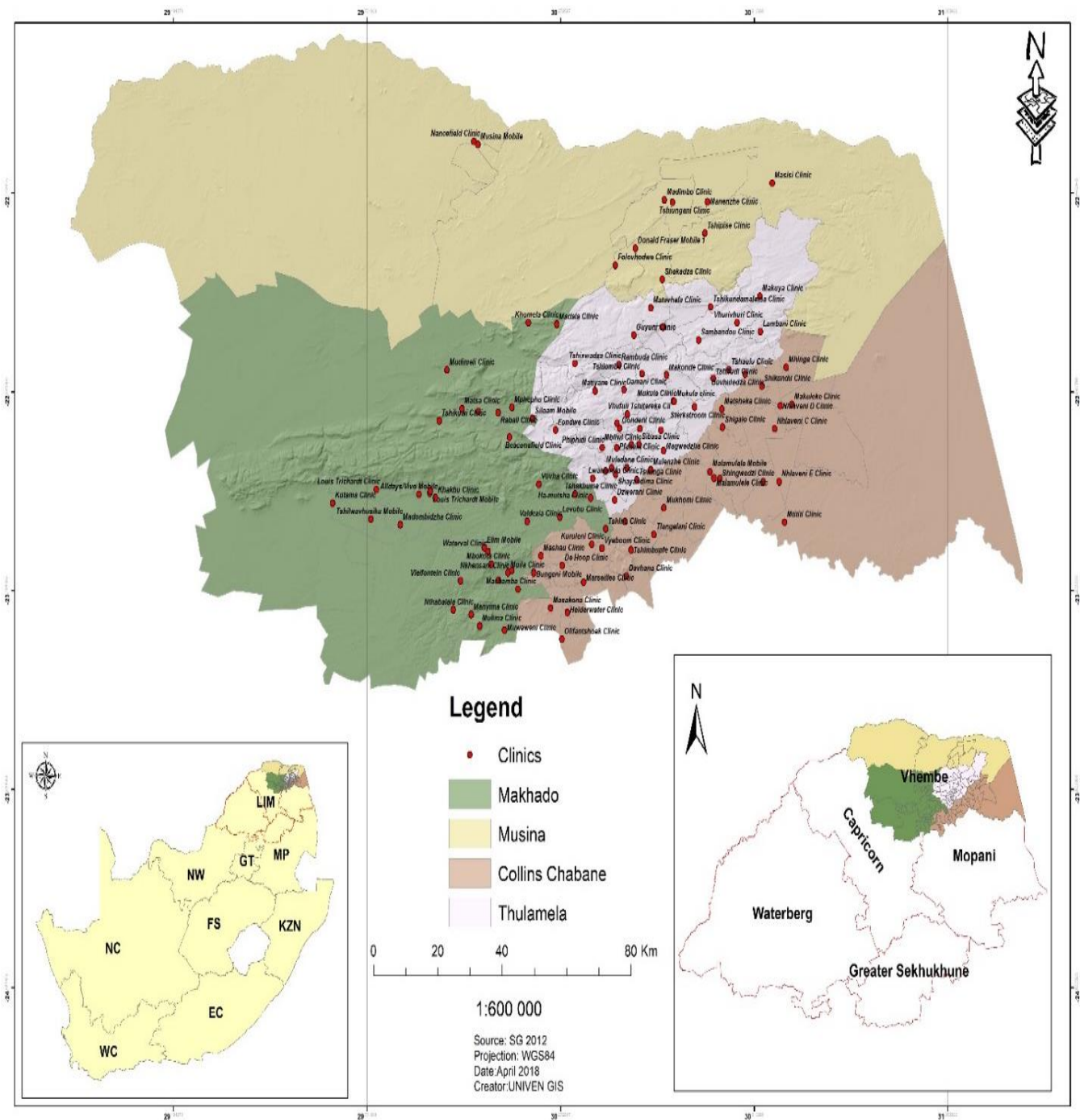


Figure 3.2: Clinics located in Vhembe district municipality

Source: Univen Geographic Information System (GIS), Surveyor General (SG) (2018)

3.4 Quantitative research approach

According to Leedy and Ormrod (2016), quantitative research involves looking at an amount or quantities of one or more variables of interest. The approach often follows the scientific method of data collection, using designs that allow various levels of confidence in making causal interpretation. As a result, it is used to answer questions about relationships among measured variables with the purpose of explaining, predicting and controlling phenomena. Quantitative findings are likely to be generalised to a whole population or a sub-population, as it involves the larger sample which is randomly selected (Shidur, 2017). However, regardless of its strength, quantitative research is unable to determine deeper underlying meanings and explanations, being referred to as the positivism that cannot account for how the social reality is shaped and maintained, or how people interpret their actions and that of others (Blaikie, 2007).

In the current study, knowledge, perceptions, skills and other socio-demographic variables of study participants were collected as quantitative data. In addition, study participants were observed to determine their ability to interpret plotted points of growth indicators and MUAC classifications.

To answer objective one, two and three, a quantitative research approach was used. According to Leedy and Ormrod (2016), quantitative research involves looking at an amount or quantities of one or more variables of interest. The approach often follows the scientific method of data collection, using designs that allow various levels of confidence in making causal interpretation. As a result, it is used to answer questions about relationships among measured variables with the purpose of explaining, predicting and controlling phenomena. Quantitative findings are likely to be generalised to a whole population or a sub-population, as it involves the larger sample which is randomly selected (Shidur, 2017). However, regardless of its strength, quantitative research is unable to determine deeper underlying meanings and explanations, being referred to as the positivism, that cannot account for how the social reality is shaped and maintained, or how people interpret their actions and that of others (Blaikie, 2007).

Based on the above, the knowledge, perceptions, skills and other socio-demographic variables of study participants were collected as quantitative data. In addition, study participants were observed to determine their ability to interpret plotted points of growth indicators and MUAC classifications.

3.4.1 Sampling techniques and procedures

Figure 3.3: outlines the sampling techniques and procedures employed in the current study.

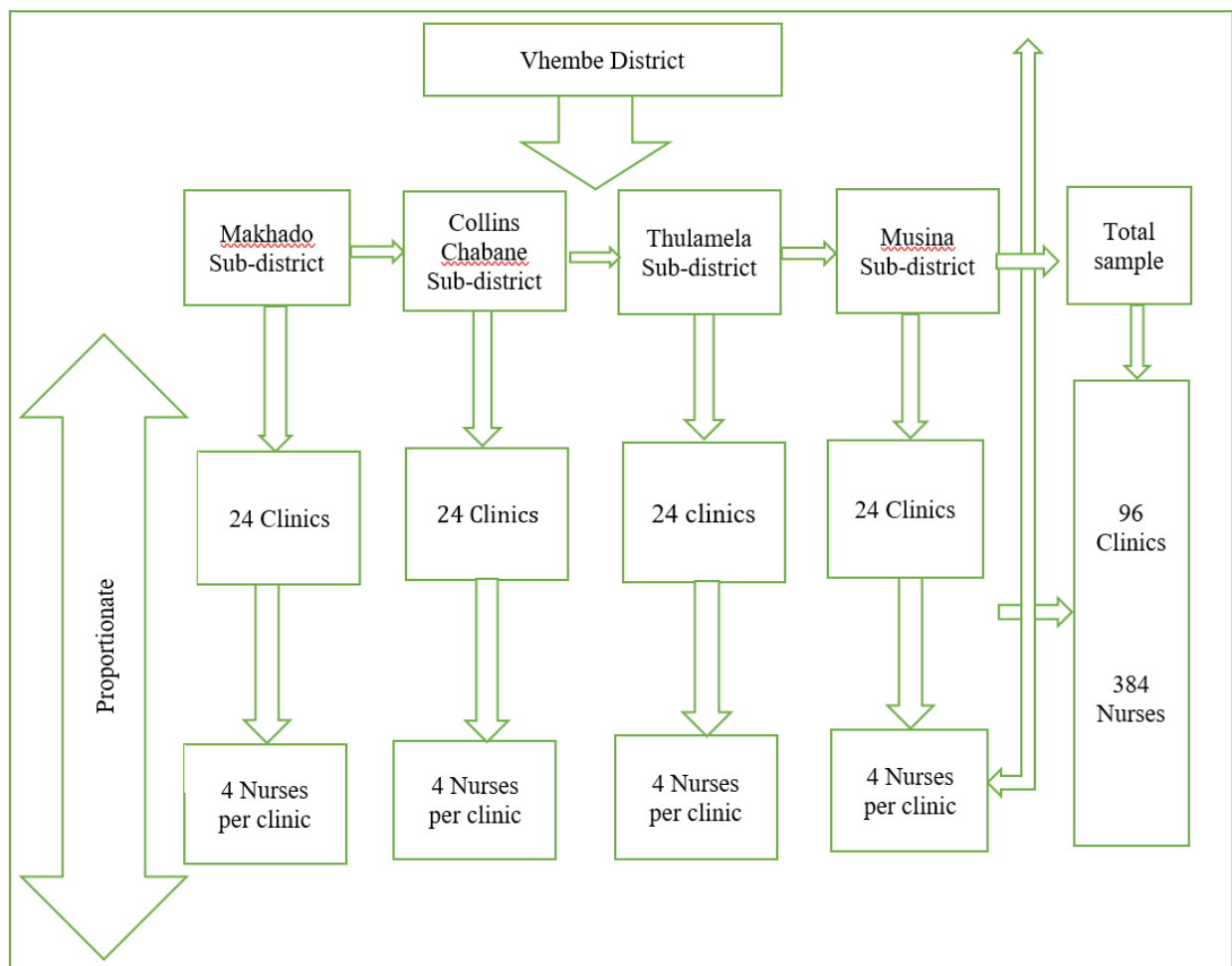


Figure 3.3: Schematic presentation of sampling techniques and procedures

The above schematic presentation outlines the sampling techniques and procedures employed (Figure 3.3). Vhembe district consists of four sub-districts that were all included in the study. A list of clinics located in each sub-district and the total number of nursing staff working in the district was obtained from Vhembe District Municipality. The total number of clinics in Vhembe district is 125, employing 2452 nursing staff (Vhembe District 2018). The sample size was calculated by means of proportionate random sampling per sub-district using the Slovin formula ($n = \frac{N}{1+Ne^2}$), (Stephine, 2018), where n represents the number of samples and N representing the total population, i.e. the total number of clinics in Vhembe district, with e being the margin of error set at 0.05.

To determine the number of clinics that had to be sampled in the district, the following calculation was done:

$$\begin{aligned}
 n &= N / (1 + Ne^2) \\
 &= 125 / (1 + 125*0.05^2) \\
 &= 125 / (1 + 125*0.0025) \\
 &= 125 / (1 + 0.3125) \\
 &= 125 / 1.3125 \\
 &= 95.238 \\
 &\rightarrow 96: \text{Total number of clinics to be sampled in Vhembe district.}
 \end{aligned}$$

Furthermore, the proportion of clinics that had to be sampled in each of the four sub-districts, was based on the total number of clinics that had to be included in the study sample. As a result, 24 clinics were sampled per sub-district.

The Slovin formula (Stephine, 2018) was also used to calculate the number of study participants (nursing staff) that had to be interviewed across the Vhembe district, where n represents the number of study participants and N represents the total population, i.e. the total number of nursing staff employed in Vhembe district, with e being the margin of error

set at 0.05. To determine the number of study participants to be sampled across the district, the following calculation was done:

$$n = N / (1 + Ne^2)$$

$$= 2425 / (1 + 2425*0.05^2)$$

$$= 2425 / (1 + 2425*0.0025)$$

$$= 2425 / (1 + 6.0625)$$

$$= 2425 / 7.0625$$

→ 343: Total number of study participants that had to be interviewed in Vhembe district.

Subsequently, the number of study participants that had to be interviewed per clinic, the study sample of 343 was divided by the number of clinics that had to be included in the study sample. This rendered four nursing staff per sampled clinic, amounting to 384 nurses. However, on the day of data collection, the number of study participants to be interviewed had to be adjusted, based on the number of available nursing staff as they worked in shifts.

Each clinic as per their respective sub-districts, was assigned a number provided by the researcher that was written on a piece of paper that was folded and placed into four containers representing the four sub-districts. To prevent bias, a neutral person was requested to label the sub-district containers using codes. Subsequently a fieldworker was asked to select 24 clinics per sub-district from three of the four containers. The clinics corresponding to the selected number were subsequently included in the study. As a result, 24 clinics were randomly sampled from three sub-districts, while all ten clinics in the smallest sub-district Musina, were selected, amounting to a total of 82 clinics.

3.4.2 Inclusion and exclusion criteria

3.4.2.1 Inclusion criteria

Nursing staff responsible for well-baby clinics at the sampled clinics were eligible for participation in the quantitative component of the study. Only biological mothers who were 18 years and older and brought an IYC younger than five years to the clinic on the day of data

collection, were eligible for inclusion. In addition, mothers had to be in possession of their IYCs Road to Health Booklet (RTHB) on the day of the clinic visit, and had to be SA citizens.

3.4.2 .2 Exclusion criteria

Mothers younger than 18 years were excluded for the following reasons: (i) they are usually not the primary caregivers of the child; and (ii) required parental consent for participation. Mothers and their IYC that did not permanently reside in the study area, as well as non-SA citizens were excluded. If the sampled mother brought a sick IYC to the clinic on the day of data collection, the mother-IYC pair were not eligible for participation, as they were unable to wait to be interviewed due to the prospect of emergency referral. Although there are many unemployed caregivers in the community that potentially would have been willing to participate, caregivers were excluded as caring for the IYC included in this study was not necessarily their primary responsibility, and decisions made by the caregiver are influenced by the biological mother. Visiting nurses, were also excluded from the study, as were nursing students who were doing an internship at the clinic to gain experience.

3.4.3 Recruitment of study participants

Every nurse who was responsible for GMP and was available on the day of data collection was identified and recruited by the primary investigator and field workers. Mothers with IYC who were attending GM on the day of data collection were recruited from the que after detailed study protocols were explained. Informed consent forms in Tshivenda/Xi-tsonga (local language used in Vhembe) was made available to potential participants. In addition, all mothers were given opportunity to read the consent form and ask for clarification from a researcher and fieldworkers before giving consent, while FGDs were conducted before GMP commenced. To confirm that the mother was the biological mother of the IYC, the RTHB was used to check the mother's name against her ID book, as the latter document must be brought to the clinic for registration purposes. Consenting nursing staff and mothers were provided with an informed consent form before interviews were conducted. This approach was followed at all clinics until the required number of study participants were recruited.

3.4.4 Development of research instruments

Two sets of research instruments were used for quantitative data collection, namely: (i) questionnaire for interviewing nursing staff (Appendix C), and (ii) the retrospective record for a five years SAM/MAM prevalence cases (Appendix D). All instruments were developed by the researcher in view of the research objectives and relevant literature. The content and relevance of the research instruments were reviewed by experts in the field of study and study supervisors. Although instruments were developed in English, they were subsequently translated into the two local languages (Tshivenda and Xitsonga), spoken in and around Vhembe district, by means of the back translation method. The Department of Linguistics at the University of Venda was consulted to assess the translated questionnaire from English to Tshivenda and Xitsonga.

3.4.4.1 Study variables

The study variables included the prevalence of SAM and MAM in the district and nursing staff and mothers' knowledge regarding GMP. Additional variables included the ability of nursing staff to interpret IYC growth indicators, an observation of the procedure being followed when measuring weight, length, height and MUAC, as well as their perceptions regarding GM. In addition, observation was conducted but nurse's skills were assessed by using a check list to generate more objective data. Interpretation of IYC growth indicators were done using the provided various growth chart which were having the shapes of the graphs and the cut off points.

Questionnaire

The fieldworker administered questionnaire conducted as an interviews with sampled nursing staff consisted of four sections. Section A was used to document socio-demographic characteristics, section B focused on perceptions regarding GMP assessed by means of a five point Likert scale, section C consisted of questions to determine knowledge regarding GMP by means of Multiple Choice Questions (MCQ's), while section D took the form of an observation tool for assessing study participants' skills when measuring weight, height/length, MUAC and the interpretation of growth indicators and MUAC classifications.

The skills forming part of GM that were observed by trained fieldworkers, included how IYC weight and height was measured, as well as communication and interaction with the IYC/mother in the course of GMP. Weight-for-length/height, weight-for-age and height-for-age growth charts were used to assess participants' ability to interpret z-scores related to these growth indicators. Furthermore, participants' ability to interpret MUAC classifications were also assessed.

Recording sheet for documenting the prevalence of SAM/MAM

Prevalence is regarded as the number of cases that exist in a population during a certain time period (WHO, 2012). Ward (2013), suggested that in order to provide prevalence rate estimates that are both reliable and generalisable, studies must include a sample large enough to capture most cases, in addition to being sufficiently distributed both geographically and sociologically to be representative of the general population. For the purpose of this study, annual data of SAM/MAM cases recorded for IYC under five was collected from clinic records for all selected clinics included in the study sample spanning over a period of five years.

3.4.5 Measures to ensure validity and reliability of data

3.4.5.1 Validity

According to Leedy and Ormrod (2016), the validity of a measuring instrument is the extent to which the instrument measures what it is actually intended to measure. Babbie and Mouton (2008) add that validity refers to the extent to which research conclusions are sound, as well as the level at which documented data adequately reflects the actual meaning of the concept under investigation.

Due to lack of gold standard measuring instruments, the following was done to ensure validity: Construct, content and face validity of the quantitative research instrument was ensured by developing it with reference to available research on the topic conducted internationally as well as nationally, in addition to expert input and pilot testing. The research instrument was translated from English into the local languages with the assistance

of the Department of Linguistics, University of Venda to enhance comprehension of the wording and phrases.

3.4.5.2 Reliability

Reliability refers to whether a particular technique, applied repeatedly to the same object, would yield similar results every time. However, it does not ensure accuracy or validity (Babbie & Mouton 2008). Polit and Beck (2018) add that reliability relates to the accuracy and consistency of information obtained in a study. An additional aspect of reliability is that it refers to the extent to which data is void of measurement error (Babbie & Mouton 2008).

Reliability of the research instrument was ensured by developing it with reference to available research on the topic conducted internationally as well as nationally, to ensure that relevant concepts and study variables were included, followed by expert input to ensure that core concepts were covered. Other measures that contributed to reliability included the extensive training of fieldworkers, pilot testing of the research instrument and the fact that it was fieldworker administered with IDIs conducted with each study participant.

To ensure consistency, the same team of field workers were used for data collection for the duration of the study for both the quantitative and qualitative phase. For nursing staff, the RTHB was used as a source of reference to determine participant knowledge regarding GMP.

3.4.6 Data collection

After obtaining permission to access clinics in Vhembe district from the Department of Health provincial and from district offices, data collection took place at sampled clinics. The researcher and one field worker was responsible for conducting focus group discussions at all sampled clinics. Two field workers were responsible for administering IDI with nursing staff, in addition to observing their skills regarding GMP. One field worker was responsible for collecting SAM/MAM statistics from clinic records. The purpose of the above was to enhance the reliability of the data collected by each group. However, the researcher monitored the data collection process in its entirety.

It was envisaged that data collection at each sampled clinic would take place over a period of two days, considering the number of nursing staff that had to be interviewed. The first day of data collection included interviews by fieldworker administered questionnaires with nursing staff and FGDs with mothers, as well as the collection of SAM/MAM statistics. Interviews were conducted with nursing staff at a location in the clinic that ensured privacy, followed by assessing their skills regarding the interpretation of growth indicators using an observation tool. The second day was only used if the study sample target was not reached and if the collection of SAM/MAM statistics was not completed. Hence every study participant was only interviewed and observed once. Participating mothers were only engaged with on one day per clinic, namely on the day clinics scheduled GMP services for IYC. Data collection took place on week days, as GMP is not conducted over weekends.

The researcher visited all clinics prior to the commencement of data collection, to enable a meeting with clinic management, and negotiate suitable dates for data collection. At these visits, the study aims, objectives and what is expected from study participants as part of the data collection process was also explained. Two days before the commencement of data collection, respective clinics were reminded about the date on which data collection will take place. Prior to participating in the study, nursing staff and mothers were given an informed consent form. Only those who gave informed consent were eligible for inclusion in the study sample.

3.4.6.1 Description of quantitative data collection

Interviews were conducted with four nursing staff per sampled clinic that were responsible for GMP on the day of data collection. Questions posed to study participants included socio-demographic characteristics, followed by determining counselling practices, barriers that prevented optimal GMP; perceptions, opinions and attitude towards GMP, as well as knowledge and skills and the ability to interpret growth charts. Nursing staff interviews were conducted in a quiet room so that participants felt comfortable with sharing their knowledge and experience. However, the observation of their skills was conducted while the nurse was taking anthropometric measurements of IYC. Monthly SAM/MAM statistics were documented as per on site clinic statistics using clinic records.

3.4.7 Fieldworker recruitment and training

Only individuals in possession of a BSc in Nutrition were recruited as fieldworkers due to their relevant knowledge and skills. This was especially applicable to their ability to conduct interviews and following the correct procedure when measuring weight, height/length and MUAC according to WHO standards. Subsequently four registered nutritionists showing interest in participating in the study as fieldworkers were identified. In addition, they were also fluent in Tshi-Venda and Xi-Tsonga, the most commonly spoken languages in the Vhembe district.

A training workshop conducted by the researcher was attended by all fieldworkers to enable them to become conversant with all aspects of the study. The training covered the following aspects: questionnaire administration, recording SAM/MAM statistics and conducting FGDs. Other aspects related to data collection such as clinic protocol included an introduction to the sister in charge on arrival, followed by the sister in charge introducing the researcher and field workers to other members of staff and mothers who brought their IYC for GMP. Fieldworkers were also trained on what was expected from them and study participants in the course of data collection.

Each fieldworker was given a package of data collection instruments including the translated versions of the research instrument into both Tshi-Venda and Xi-Tsonga. The researcher reviewed the content of the informed consent forms and research instruments with fieldworkers to ensure that they understood its content. Subsequently they were given an opportunity to ask for clarification to avoid misinterpretations, as well as to give input regarding the research instruments' content and/or data collection process.

During the training session, fieldworkers indicated that they required revision regarding the plotting of IYC weight and length/height on growth charts, as well as the interpretation thereof, in addition to the interpretation and classification of MUAC. As part of the process, the researcher used both the RTHB that is being phased out for boys and girls, as well as the current version being used. After training was conducted, field workers practiced using the

research instruments by interviewing each other and observing one another while taking anthropometric measurements of IYC of a similar age to those that were included in the study sample, as well as the interpretation of plotted points on the respective growth charts that were included in the research instrument.

A digital voice recorder for recording FGDs was used and the use of it practiced before piloting took place. To facilitate the data collection process, fieldworkers were given an opportunity to indicate their preference in terms of responsibilities during data collection. Some chose to interview nurses and observe their skills, while others chose to record statistics or serve as a facilitator for FGDs. This ensured consistency during data collection as each fieldworker focused on their preferred role throughout the data collection process.

3.4.8 Pilot study and pre-testing

A pilot study is the process of testing a new measuring instrument developed before administering it to the actual sample (Kumar, 2011). De Vos (2011), states that when conducting research, it is essential to conduct pre-testing as it helps to validate an instrument by administering it to a small group of participants from the intended population. According to the Meta Connects (2018), pre-testing is referred to as the opportunity of the researcher to see which questions work well, which questions sound strange, which questions can be eliminated and what needs to be added to enhance for the usefulness of the results.

Piloting and pre-testing was conducted at a conveniently situated clinic in Vhembe district. The purpose was to test the feasibility of the study, including the piloting of the research instruments for ease administration and to identify and deal with possible challenges that might compromise the data collection process. It was also conducted to determine whether nursing staff understood the questions included in the research instrument that fieldworkers administered in the form of an IDI. The FGD guide for mothers who have an IYC younger than five years, as well as the instrument designed for recording clinic SAM/MAM statistics was also piloted.

As part of the pilot study, 14 nursing staff were interviewed and two FGDs were conducted in which 15 mothers participated. SAM/MAM statistics of IYC under five years for the preceding three years were obtained from clinic records. However, the results obtained indicated that the SAM/MAM prevalence cases were assessed but not accurately recorded at clinic level since there was some missing data for certain months and years. Fortunately all data of assessed cases are submitted to the district to form part of DHIS.

Interviews

Interviews with nursing staff was conducted in a private room, where there were no patients present at the time to ensure privacy and avoid distractions. However, a mother with an IYC younger than five years was requested to be present in the room so that the nurses' anthropometric measuring and interpretation skills could be assessed. The majority of nurses were interviewed later in the day as they were occupied with various activities in the course of the morning.

SAM/MAM statistics

The identified clinic served three villages in the surrounding area. Therefore, the statistics recorded represented all IYC that were consulted in the three years prior to the day piloting took place. During the months when the recorded prevalence of SAM/MAM was higher, it was indicative of the months when the clinic held awareness campaigns related to Vitamin A or breastfeeding where SAM/MAM screening was also conducted to assess malnutrition, hence the number of IYC screened was higher.

The insight gained during piloting, helped to strengthen the validity of the research instrument used in the quantitative phase. For example, after piloting, question 3 related to "enrolled nurse and enrolled nursing assistant" (section A, Appendix C), was revised to read "staff nurse and nursing assistant". The addition of a "do not know" option regarding the interpretation of plotted points of growth indicators and the interpretation of MUAC classifications (Appendix D), was also done post piloting. In addition, piloting enabled the researcher to estimate the time spent on each interviews with nursing staff. Hence the pilot study enabled the identification and correction of research instrument errors, as well as

problem areas that could compromise the reliability and validity of study findings. However, data collected did not form part of the actual study.

3.4.9 Ethical considerations

Ethical approval to conduct the study was obtained from the Humanities and Social Sciences Research Ethics Committee (HSSREC) (Appendix G) and Biomedical Research Ethics Committee (BREC: Ref No. BE105/18) of the University of KwaZulu-Natal (Appendix H). Permission to access clinics and records related to the study objectives was sought from the Limpopo Provincial Office (Appendix I) and the Vhembe District Municipality (Appendix J) DOH. The study was also approved by the University of Venda Research and Publication Committee (RPC: SHS/18/NUT/25), since the researcher is funded by and employed by the institution (Appendix K). Subsequently the researcher visited Vhembe district municipal office to request a list of all the clinics in Vhembe district for inclusion in the proposed study sample. All participants, i.e. nursing staff and biological mothers of IYC under five years were asked to complete a written informed consent form prior to participation, following a detailed explanation of the study, its purpose and objectives by the researcher.

To ensure participant anonymity and confidentiality of collected data, each participant was allocated a code for identification purposes. Hence it would not be possible to trace data back to individual participants. Participants were informed that participation in the study was voluntary throughout the various phases of the study. In addition, they were assured that no punitive measure would be taken against those who decline participation at any stage of the study. In addition, no remuneration or other tangible incentives were given to motivate participation. Mothers that participated in FGDs, were also guaranteed anonymity by allocating a code for identification purposes to all of them instead of using names when collecting socio-demographic data. In addition, participants were advised not to mention their name or that of their child during FGDs.

To secure captured data, the researcher used encryption software to encode data. Access to the researcher's laptop and desktop were password protected, while the cabinet where hard

copies of data sets are stored were locked. As the research also involved the use of a digital voice recorder during FGDs, participant confidentiality and anonymity was ensured by keeping the digital voice recorder in a locked cabinet that only the researcher has access to.

3.4.10 Data capturing, processing and statistical analysis

3.4.10.1 Quantitative data analysis

Open-ended questions forming part of the quantitative phase of the study were converted into categorical variables. Where appropriate, categories containing similar variables were further collapsed to reduce the number of variables related to each open-ended question. After coding was completed, data was cleaned and entered into a Microsoft Excel spreadsheet. This was followed by importing the spreadsheet into the International Business Machines (IBM) Statistical Package for Social Sciences (SPSS) version 26 for analysis. Means and standard deviations were computed for continuous variables such as participant age, years working as a nurse and years working with GMP. A comparison between means was conducted with an Independent samples t-test, while correlations between continuous variables were done with Pearson's correlations. Frequency distributions were calculated for categorical variables, followed by Chi-square tests to determine the relationship between categorical variables. Time series analysis by means of ANOVA was used to analyse the prevalence of SAM/MAM across the five years for which clinic statistics were obtained. The normality of data was determined with the Kolmogorov-Smirnov-test.

3.5 Qualitative research approach

FGDs were used to collect qualitative data from mothers to determine their knowledge regarding GM and the barriers that prevent them from complying with GM attendance scheduled for their IYC. This research approach was used to address objective four.

Creswell (2014) explains that qualitative research is an approach used for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. As

a result, the research process includes emerging questions and procedures, with data typically collected in the participant's setting and data analysis inductively building from specific to general themes, followed by the researcher interpreting the meaning of the data. It is further stated that those who engage in this form of inquiry, support a way of looking at research that respect an inductive style, focusing on individual meaning, and the importance of rendering the complexity of a situation (Creswell, 2014).

According to Watson et al., (2008), qualitative research gathers verbal or observational data and the uniqueness of each participant's individual situation. The qualitative research approach (interpretivism) holistically understands the human experience in specific settings (Tsushima, 2015). Rahman (2017) adds that the qualitative research approach produces a detailed description of participants' feelings, opinions, and experiences; and interprets the meanings of their actions. However, Silverman (2010) argues that qualitative research approaches sometimes leave out contextual sensitivities, and predominantly focus on meanings and experiences. The phenomenological approach, for example, attempts to uncover, interpret and understand the participants' experience (Wilson, 2014; Tuohy et al., 2013).

3.5.1 Sampling and sampling size

Four clinics from each of the originally sampled clinics per sub-district for the purpose of conducting focus group discussions (FGDs), rendering a total of 16 clinics. Each FGD consisted of 6 to 14 mothers. The maximum number ensured that the focus group was manageable and that mothers were able to interact freely. To limit bias from occurring at a specific clinic or focus group, one focus group was conducted per clinic until data saturation was reached, followed by the researcher moving to the next randomly selected clinic within the same sub-district (Stewart et al., 2007). Data saturation was determined when participants started repeating the same information as it relates to the same question on the FGD interview guide. Vhembe has two dominant local language

used in all four sub-district, hence factors such as language used during the discussions was determined by the area where clinic visited on that day. In addition, both ethnic groups are able to speak and understand either language.

3.5.2 Development of focus group discussion guide

Open-ended and non-directive questions were used for the compilation of the FGD guide (Appendix E). This enabled mothers to express their understanding of GM and guided the sharing of knowledge and perceptions outside the constraints imposed by a close-ended questionnaire (Patton, 2002). Apart from gaging knowledge and perceptions, the FGD guide also served to determine the barriers mothers face that could result in noncompliance with the GM attendance scheduled of their IYC, as well as suggestions they might have for improving the effectivity of the GMP programme.

3.5.3 Pre-testing

Two FGDs were conducted with each consisting of seven to eight biological mothers of IYC brought to the clinic on the day of pilot testing. Some mothers were recruited while awaiting a consultations because once they had finished their consultation, they wanted to go home immediately. Before a FGD started, the researcher documented every mother's socio-demographic data after they signed an informed consent form. Pre-testing helped the researcher to strengthen the FGDs with mothers. This involved testing the research interview guide in conditions that were as similar as possible to the research, to identify glitches in the wording of questions, lack of clarity of instructions etc. In fact, anything that could impede the instrument's ability to collect data in an economical and systematic fashion was corrected

3.5.4 Trustworthiness of qualitative data

Streubert and Carpenter (2003), describe trustworthiness as establishing the validity and reliability of qualitative research with the aim to support the argument that the investigation's findings are worth paying attention to (Lincoln & Guba, 1985). The following

four criteria were used to measure the trustworthiness of the data: credibility, dependability, transferability and conformability:

Credibility is an evaluation of whether an investigation's results represent a credible conceptual explanation of the data drawn from the participants' original data (Lincoln & Guba, 1985). Hence credibility was ensured through the application of techniques such as extended engagement with participants, triangulation of data, clarifying researcher bias and in-member checks (Cresswell, 2016). The researcher spent sufficient time with participants to establish rapport, in addition to encouraging them to share their knowledge and perceptions freely, and interpreting growth charts without feeling threatened during interviews and observations.

According to Lincoln and Guba (1985), dependability shows that findings are consistent, and could be repeated by checking the consistency of the study process. Dependability of the study was addressed by following the same data collection process for all study participants, i.e. mothers and nursing staff. This included the sampling techniques employed, data collection tools and the administration of them by fieldworkers, as well as the observation methods as was previously described. Therefore, greater involvement of the researcher in the research process translates to a higher level of dependability of the study findings.

Transferability refers to the probability that the study findings have meaning to others in a similar situation. However, instead of the researcher, the potential user determines the finding's transferability (Streubert & Carpenter, 2003). Details regarding the study population, piloting, sampling, data collection, and statistical analysis were provided. As a result, future studies investigating a similar research problem while using a similar study population, will be able will be able to transfer the findings of the current study to a study of a similar population or individuals that share a similar geographic location and characteristics. Conformability is defined as a neutral criterion for measuring the trustworthiness of qualitative research, whereby data quality is evaluated in terms of its neutrality or objectivity, based on an agreement between two or more dependent persons (Lincoln & Guba, 1985). To address the concept of conformability, the researcher relied on

an independent audit of the research methods employed by expert input from a peer, in addition to that of the primary supervisor. In addition, an audit of data collection methods and recoded data for the qualitative phase of the study was conducted by a competent peer who listened to the audio recording of the researcher, in addition to comments made by fieldworkers during discussions to determine if the verbatim transcription of text was a true reflection of what study participants reported. In addition, each field worker listened to, and assessed another fieldworker's findings and interpretations.

3.5.5 Data collection

3.5.5.1 Description of qualitative data collection

FGDs were conducted with one group of mothers per sampled clinic. Discussions were based on semi-structured questions forming part of the FGD guide and were related to gauging insight of mother's knowledge and perceived or actual barriers that prevented them from complying with the clinic GMP visits. Each FGD with a duration of 40 to 45 minutes was recorded with a digital voice recorder and a note book to supplement the recording. Probing questions were also used to stimulate interaction between mothers and discussion. To ensure that participants concentrated on the discussion at hand, FGDs were conducted in a separate room at the clinic as per the researcher's request. Where clinics did not have the necessary space, the researcher identified an open shaded space such as a tree outside the clinic. The researcher was responsible for leading the discussions in all FGDs and the same field worker serving as scribe was responsible for taking notes for all group discussions, including non-verbal cues.

3.5.6 Qualitative data analysis

To facilitate qualitative data analysis, responses to FGDs were analysed using Atlas.ti software version 8.4. Qualitative data analysis consisted of preparing and organising verbatim transcripts for thematic analysis through a process of coding, condensing codes and presenting data in figures, tables, graphic linkages or in discussion (Creswell, 2014).

Focus group discussions were conducted in the local languages spoken by mothers and recorded with a digital voice recorder. The recorded information was then transcribed verbatim while arranging it into specific questions based on the FGDs and subsequently translating it into English using back translation in preparation for analysis. Analysis was conducted based on Figure 3.4 below, representing data-level work as the articulation of four sub-processes namely data segmentation, writing, coding and diagramming (Contreras, 2016). This approach employs two counter-acting forces namely fragmentation derived from segmentation and coding the data versus a process of integration derived from writing, diagramming linkages and relationships.

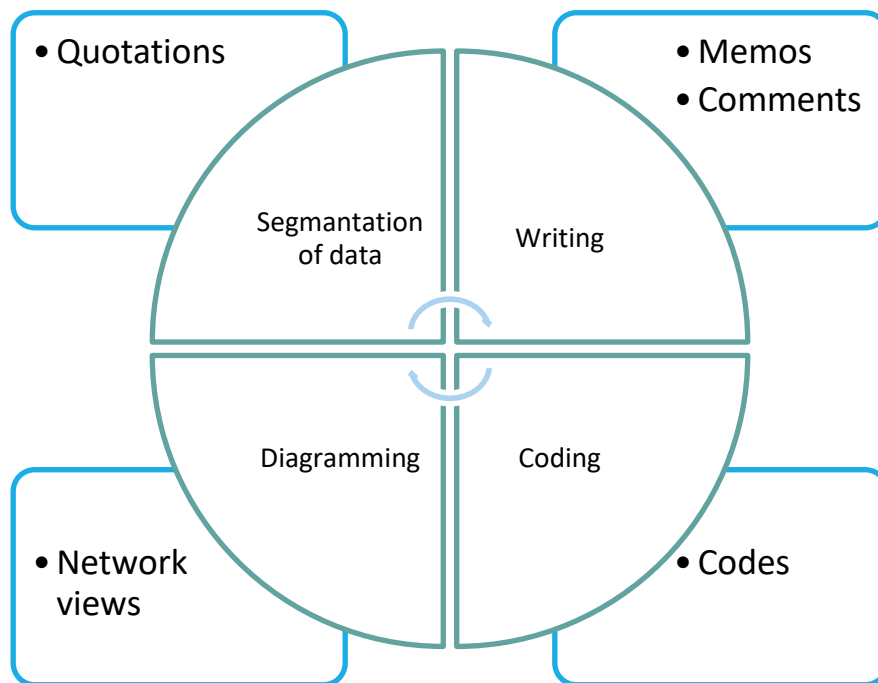


Figure 3.4: Presentation of data-level work as articulation of segmentation, writing, coding and diagramming.

Source: Contreras (2016)

Analysis of qualitative data is the science of examining raw data with the purpose of drawing conclusions around that information. Themes are arrangements across data sets that are

important in the description of a phenomenon and are associated with a specific research question (Babbie & Mouton, 2010). For the purpose of this study, the researcher used a thematic analysis framework approach to analyse data that emphasises pinpointing, examining, and recording patterns or themes within data (Babbie & Mouton, 2010). These themes become categories for analysis. Thematic analysis is accomplished through the process of coding in six phases to create established, meaningful patterns. These phases are: familiarisation with data, generating initial codes, searching for themes among codes, reviewing themes, defining and naming themes, and producing the final report. The researcher analysed the data following the six steps guide thematic analysis framework approach presented below (Elmar, 2015):



Figure 3.5: Phases to guide thematic analysis

Source (Elmar, 2015)

Step one: Narrative preparation through data transcription and re-reading, noting initial ideas. This is the step where the audio recorded data was transcribed verbatim from the local language into English. Both the recorded and hand written information compiled by the scribe was compared.

Step two: Going through the text again, underlining or highlighting words, phrases or sentences that are relevant to the research question.

Step three: Grouping different units with the same meaning into themes. In the current study, similar responses regarding the participants' description of their knowledge and challenges faced that prevent them from complying with the GMP schedule was categorised into themes and sub-themes

Step four: Giving appropriate titles to themes according to the content of each theme.

Step five: Discussing the relationship between themes, thereby presenting what the whole text portrays.

Step six: Once final themes were reviewed, the researcher began the process of writing the final report, summarising the final set of themes and sub-themes and presenting them in a table or similar structure where evidence from the text was given to illustrate the themes generated with a verbatim quote from the text (Smith, 2011). Language specialists from University of Venda Mathivha Centre and Department of English were consulted during the translation process.

3.6 Dissemination of research findings

The results of the current study were written up in the form of standalone papers (chapters four to seven). In addition, chapter eight was written up as a research report for DOH, outlining the main findings of the study as well as practical recommendations for improving the GMP programme in Vhembe district.

Hence, research papers referred to above, will be disseminated in the form of publications submitted to various relevant accredited peer reviewed journals, both nationally and internationally. Where the opportunity arises, the study findings will also be disseminated in the form of workshops and national/international conference presentations.

3.7 Conclusion

This chapter outlined the study process, sampling of clinics and participants, as well as methods and materials used for data collection. An outline was given of the analysis of both the quantitative and qualitative data with reference to the study objectives. The following chapters of study findings was presentation in a paper format. Papers were prepared based on the objectives of the study. All papers include abstract, introduction, methods, ethical considerations, results, discussion, conclusion, acknowledgement and references. Papers are aligned to the standard requirements of related journal to the field of study. The following table present how study objectives reported as stand alone papers:

Table 3.1 outlines the study objectives, related variables and statistical analysis employed:

Table 3.1: Study objectives, related variables and statistical analysis

Study objective	Related chapter	Variables	Statistical test
1. To determine the prevalence of SAM and MAM among IYC younger than five years attending government clinics in the Vhembe district.	Prevalence of SAM and MAM among IYC under five years attending government clinics in the Vhembe district, South Africa.	The prevalence of SAM and MAM was determined according to De Onis et al., (2018) cut-off values of public health significance.	Frequency distributions, time series analysis by means of ANOVA.
2. To determine the GMP related knowledge, perceptions and skills of nursing staff working at government clinics in the Vhembe district.	GMP knowledge, perception and skills of nursing staff employed at government clinics in the Vhembe district, South Africa.	Mean score of knowledge test with a score of $\leq 50\%$ indicative of a poor knowledge, 60 – 80% representing an adequate knowledge and that $> 80\%$ classified as an excellent knowledge. Determining the relationship between socio-demographic characteristics, knowledge, perceptions and skills.	Means, standard deviations, frequency distributions, Independent samples t-tests, Pearson correlations and Chi-square tests
3. To determine barriers to the effective implementation of GMP encountered by nursing staff working at government clinics in the Vhembe district.	Barriers to the effective implementation of GMP: Findings of an evaluation conducted at government clinics in the Vhembe district, South Africa.	Determining the relationship between socio-demographic characteristics, knowledge, perceptions, skills and perceived barriers.	Frequency distributions, Chi-square tests

<p>4.To determine the GMP related knowledge and barriers to complying of GMP services of mothers with IYC younger than five years attending government clinics in the Vhembe district.</p>	<p>Maternal knowledge and perceived barriers to the success of the Growth monitoring and Promotion programme in Vhembe district, South Africa</p>	<p>Determining maternal knowledge and perceived barriers</p>	<p>Thematic analysis, Atlas ti. computer software</p>
<p>5. To compile a report for the DOH, with relevant practical recommendations based on the study outcomes, with the potential of being used as a guideline to address problem areas related to GMP identified in the Vhembe district.</p>	<p>Improving the implementation of the GMP Programme in Vhembe district based on the knowledge, perceptions and skills of nursing staff and mothers collected with mixed methods research.</p>		<p>Not applicable</p>

Chapter 4: Growth Monitoring and Promotion Related Knowledge, Perceptions and Skills of Nursing Staff Working at Government Clinics in the Vhembe District, Limpopo Province, South Africa

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Abstract

Background: Growth monitoring and promotion (GMP) programme is viewed as important, due to its potential for addressing malnutrition among infants and young children (IYC) under five years. However, the knowledge, perceptions regarding GMP and skills required to conduct and interpret anthropometric assessments by nursing staff has been questioned, due to its impact on the successful implementation and outcomes of GMP.

Objectives: To determine the GMP related knowledge, perceptions and skills of nursing staff who work at government clinics in the Vhembe district.

Methods: A descriptive exploratory study using a quantitative approach was conducted at 82 randomly selected clinics of Vhembe district. The knowledge, perceptions and skills of 312 conveniently sampled nursing staff responsible for service delivery as part of the GMP programme was assessed with in depth interviews, including the observation of their skills level when conducting anthropometric assessments and ability to interpret growth indicators. Data was captured on an Excel spreadsheet and imported into the Statistical Package for Social Sciences (SPSS) version 26 for the calculation of means, standard deviations and frequency distributions of categorical variables. Independent samples t-tests were used to allow for comparison of continuous variables, Pearson correlations was used to explore the relationship between continuous variables and Chi-square tests were done to determine the relationship between categorical variables.

Results: Participant perceptions regarding GMP was positive, as the majority agreed or strongly agreed with the statements posed to determine their perceptions. Participant knowledge regarding GMP was suboptimal, with a mean knowledge score of 48.9% being attained, in addition to nearly 40% of participants scoring \leq 50%. Observations regarding their ability to follow the correct procedure when conducting GMP as well as accurately conducting anthropometric measurements was poor, with the highest correct score for subsections of this observation tool being 42% and the lowest being 2.9%. The ability to interpret growth indicators proved to be lower when compared to knowledge regarding GMP, with a mean score of 21.0%, in addition to 94.2% of participants obtaining a score \leq 50%.

Conclusion: Although nursing staff had positive perceptions regarding GMP, their knowledge regarding the programme, as well as their ability to accurately conduct anthropometric measurements was not up to standard. The same applied to their ability to interpret growth indicators. As participants were seemingly unaware of their inability to conduct GMP or inability to identify malnourished IYC, nursing staff employed at government clinics in Vhembe district should receive immediate training in order to improve their knowledge and skills regarding all aspects of the GMP programme.

Keywords: Growth monitoring, knowledge, perceptions, skills, and nursing staff.

Introduction

The World Health Organization (WHO) regards growth monitoring and promotion (GMP) as the programme that generates concrete information such as the measurement and charting of weight used to advise parents to take immediate action for the improvement of infant and young child (IYC) growth and development.¹ The GMP programme, encourages the periodic measurement of an IYC's weight, starting at birth, followed by the accurate recording thereof in the Road to Health Booklet (RTHB), in addition to the appropriate response to illness, while taking cognisance of the factors that influence the growth and development of children.²

The government of South Africa placed emphasis on the importance of accuracy and precision when conducting growth monitoring (GM) of children, by promoting that anthropometric measurements should be conducted accurately in order to identify growth faltering, and warn parents about failure to thrive, while teaching them about sound nutrition.³ According to the WHO the accurate interpretation of anthropometric measurements is important, as it provides important information by indicating whether measurements of IYC weight, length/height, mid-upper arm circumference (MUAC) and body mass index requires immediate intervention.⁴ Furthermore, WHO emphasised that the importance of accuracy, reliability, appropriateness and precision of skills and techniques when conducting GMP, as well as the importance of working in clinics to improve the quality of childcare and promotion for optimal growth is required.⁴ A study focussing on the importance of growth monitoring (GM), reported that screening children through GM, requires accuracy in several sequential steps including the reading of weight, plotting the age and weight on a growth chart and interpreting the growth pattern.⁶

Despite the implementation of the GMP programme, the ongoing high prevalence of malnutrition poses a question regarding the actual focus of the programme and its implementation.⁷ Globally, nurses are the largest group of health care professionals who provide nutritional advice, particularly to new mothers.⁸ As a result, nurses are viewed as a key element in achieving a reduced prevalence of IYC malnutrition through the delivery of care, as well as participating in policy making. This highlights the important role they play in the global vision of increased IYC well-being and better health worldwide, especially at community level.⁹ Unfortunately, nurse's practices regarding GMP have been questioned, with an indication by some that they are not capable of accurately identifying and therefore preventing malnutrition among IYC under five.^{10,11} Therefore the purpose of this study, was to explore and describe the GMP related knowledge, perceptions and skills of nursing staff in terms of their ability to accurately conduct and interpret IYC growth indicators in rural government clinics of Vhembe district, South Africa.

Methodology

Study design, population and sampling

For the purpose of this study, an exploratory descriptive study design was employed. According to the Vhembe district Human Resource Office, the district employed 2425 nursing staff working at clinics across the four sub-districts in 2018 (Vhembe district HR office, 2018). All nursing staff categories involved with GMP were recruited to participate in the study. The required sample size of participants that were recruited by means of convenience sampling, was calculated based on the number of nurses in Vhembe district by using the Slovin formula $\{n = N / (1 + Ne^2)\}$.¹²

The proportion of nurses interviewed per clinic, was influenced by the number of randomly selected clinics that were representative of the four sub-districts in Vhembe district. Hence, the intention was to interview four nursing staff per clinic, therefore, a minimum of five nursing staff were interviewed depending of the capacity of the clinic. However, on the day of data collection, this number was adjusted, due to the fact that nursing staff were scheduled to work in shifts.

Methods of data collection

Data was collected by trained fieldworkers who conducted interviews with each study participant. As part of the preparation process, the researcher used both the RTHB that is being phased out for boys and girls, as well as the current version being used to train all field workers so that they were well informed regarding what they were expected to observe. The majority of interviews were conducted in a private room at the sampled clinic, whereas available cubicles were used at clinics that did not have a suitable room available for the purpose of data collection. One to two nursing staff were interviewed at a given time, depending on the number of nurses available and responsible for GMP on the day of data collection. For the assessment of participants' skills when measuring weight, length/height and MUAC, a nursing staff member was accompanied by the researcher or field worker when moving from the private room or cubicle where the in interviews took place to vital signs stations where all anthropometric measurements were conducted. To improve the reliability

and validity of the data collection process, the same trained field workers were used for data collection, in addition to the primary investigator, for the duration of the study.

An observation checklist was used to determine nursing staff's skills while measuring weight, length/height and MUAC. The following growth indicators were used to assess nursing staff's ability to interpret growth indicators: weight-for-height (WHZ), length-for-age (LAZ), and weight-for-age Z-scores (WAZ). In addition, nursing staff also had to interpret various MUAC cut-offs that are used to determine nutritional status.

Data analysis

Data was captured by the researcher with the assistance of trained Nutritionist field workers. To enhance validity, the researcher captured data in an Excel spreadsheet for one sub-district before training the field worker on how to capture data. After data was captured in an Excel spreadsheet, it was imported into the Statistical Package for Social Sciences (SPSS) version 26 for the calculation of means, standard deviations and frequency distributions of categorical variables. This was followed by conducting independent samples t-tests test to facilitate the comparison of continuous variables, Pearson correlations for exploring the relationship between continuous variables and Chi-square tests to determine the relationship between categorical variables.

Ethical considerations

The study was approved by the Biomedical Research Ethics Committee BREC: Ref No. BE105/18 (BREC: Ref No. BE105/18) of the University of KwaZulu-Natal. The project was also registered by the University of Venda Research and Publication Committee (RPC: SHS/18/NUT/25). Approval was also sought from the Limpopo Provincial office and Vhembe district that issued letters, allowing data collection to take place at individual clinics. Prior to voluntary participation, participants signed informed consent in their first language.

Results

Study location

The Vhembe district, Limpopo Province consists of 125 primary health care clinics (Vhembe district, 2018). Table 4.1 provides an overview of the percentage of clinics surveyed per sub-district, as well as the number of nursing staff surveyed in each sub-district.

Table 4.1: Number of clinics and nursing staff surveyed per sub-district in Vhembe district

Variable	Percentage
Percentage of clinics surveyed in Vhembe district	65.6% (n=82)
Clinics surveyed per sub-district (N = 125)	
- Makhado (N = 38)	63.3% (n=24)
- Collins Chabane (N = 35)	68.6% (n=24)
- Thulamela (N = 42)	57.1% (n=24)
- Musina (N = 10)	100% (n=10)
Number of nursing staff surveyed per sub-district (N = 312)	
- Makhado	26.6% (n=83)
- Collins Chabane	31.4% (n=98)
- Thulamela	27.9% (n=87)
- Musina	14.1% (n=44)

From the above, it is evident that nearly two thirds of the clinics in the district (65.6%) were surveyed, ranging from 57.1% to 68.6% per sub-district. However, all the clinics in Musina sub-district were surveyed, due to it being the smallest of all sub-districts. Of the sample of nursing staff surveyed (N=312), the proportion sampled per sub-district ranged from 26.6% to 31.4%. Due to Musina being the smallest sub-district, the proportion of nursing staff sampled only contributed to 14.1% of the total study sample.

Socio-demographic characteristics and training of study participants

The socio-demographic characteristics of the study sample, as well as their training and follow-up training regarding GMP is presented in Table 4.2.

Table 4.2: Socio-demographic characteristics and training of study participants (N=312)

Variable	Mean ± SD	Frequency	P-Value
Age (years)	44.1 ± 9.3		
Gender			
- Male		10.9% (n=34)	
- Female		89.1% (n=278)	
Category of nursing staff (n=312)			
-Nursing assistant		26.0% (n=81)	
-Staff nurse		16.9% (n=53)	
-Clinical nurse practitioner		21.5% (n=67)	
-Professional nurse		35.6% (n=111)	
How long have you been working as a nurse (years)?	15.3 ± 9.6		
How long have you been working with GMP (years)?	12.0 ± 8.8		
Mean difference been working as a nurse and working with GMP			0.000 #
Where did you receive training on GMP? (n=311)			
- Nursing college		37.6% (n=116)	
- University		9.6% (n=29)	
- DOH workshops		13.5% (n=41)	
- At clinic by Dietitian/Nutritionist		2.1% (n=6)	
- At clinic by colleague		9.9% (n=30)	
- Never received training		2.5% (n=7)	
- Nursing college and DOH		5.3% (n=16)	
- At a hospital		7.0% (n=21)	
- Nursing college and at clinic by colleague		3.4% (n=10)	
- Combination of cited options		9.1% (n=36)	
Who trained you on the use of the RTHB and GMP? (n=310)			
- Colleague		27.4% (n=85)	
- Dietitian/Nutritionist		14.2% (n=44)	
- Lecturer		38.4% (n=119)	
- Colleague and lecturer		10.4% (n=33)	
- Combination of cited options		9.6% (n=29)	
Which aspects were covered during your training? (n=312)			
- Plot points for growth indicators		2.2% (n=17)	
- Interpreting growth indicators		0.3% (n=1)	
- Identify growth problems with plotted points		1.3% (n=4)	
- Procedures for taking anthropometric measures		3.2% (n=10)	
- Immunisation		1.6% (n=5)	
- Combination of the above options		69.2% (n=216)	
- Combination of the above options excluding immunisation		9.3% (n=29)	
- Other combinations of cited options		8.7% (n=40)	
Where did you receive refresher training regarding GMP and using the RTHB? (n=309)			

- In-service training/workshop		47.9% (n=148)	
- Health centre		9.1% (n=28)	
- At the clinic by dietitian		9.7% (n=30)	
- Various combinations of the above		11.3% (n=35)	
- Not offered/never attended		20.1% (n=62)	
- Nutritionist/Hospital/Clinic nurse		1.9% (n=6)	
How often do you receive refresher training regarding GMP and the RTHB? (n=312)			
- Annually		28.5% (n=89)	
- Monthly		10.5% (n=33)	
- Twice since I started working		1.6% (n=5)	
- Weekly		4.7% (n=15)	
- Once after some years		20.7% (n=65)	
- Quarterly		8.3% (n=26)	
- Twice per year		14.1% (n=44)	
- When there is a need		10.9% (n=34)	
- Twice per month		1.0% (n=3)	
What type of support do you receive regarding GMP and the RTHB? (n=312)			
- Support visit by dietitian		52.9% (n=165)	
- Support visit by nutritionist		11.3% (n=35)	
- Support from district		18.6% (n=58)	
- Workshops/training		17.2% (n=54)	
Where do you receive such support? (n=312)			
- At the clinic		78.1% (n=244)	
- At the health centre		6.0% (n=19)	
- At district or local area		10.6% (n=33)	
- At a hospital		5.3% (n=17)	

Dependent sample T-Test

From the above table it is evident that the study sample had a mean age of 44.1 ± 9.3 years and were predominantly female (89.1%; n=278). The majority were professional nurses 35.6% (n=111), followed by nursing assistants 26.0% (n=81). Participants were very experienced with the mean number of years working as a nurse being reported as 15.3 ± 9.6 years, followed by the mean number of years working with GMP being 12.0 ± 8.8 years. A dependent sample t-test was conducted to compare the mean number of years study participants worked as a nursing staff member to the mean number of years they worked with GMP. A highly significant p-value at a 95% confidence interval ($p < 0.000$) indicated a significant difference between years worked as a nurse, as opposed to years working with GMP. The majority of participants received their training regarding GMP at a nursing college (37.6%; n=116), followed by workshops offered by the Department of Health (DOH) (13.5%; n=41). Nearly 4/10 (38.4%) were trained on the use of the RTHB and GMP by a lecturer, followed by a colleague (27.4%).

Aspects covered in the course of participant training included a combination of plotting points for growth indicators and interpreting them, identifying growth problems, procedures for taking anthropometric measurements and immunisation for 69.2% of those surveyed. Although in-service training/workshops, followed by training at the clinic by a dietitian, at health centres and a combination of these options were reported as a source of refresher training regarding GMP by 47.9%, 9.7%, 9.1% and 11.3% respectively, it was documented that 20.1% of the study sample was never offered and/or never attended refresher training. The latter is of importance, considering that the mean number of years working with GMP was reported to be 12 years.

Regarding the frequency of refresher training, the majority reported receiving it on an annual basis (28.5%), followed by once after some years (20.7%) and twice per year (14.1%). It is therefore evident that the lack of refresher training and infrequent nature of it, seemingly also affects close to 20% of the study sample.

Support regarding GMP was predominantly offered by dietitians, followed by the district and workshops or other training on offer at 52.9%, 18.6% and 17.2% respectively, with 78.1% of the support being offered at the clinic, followed by district level or a local area at 10.6%.

Health education given to mothers when visiting clinics for GMP

When attending primary health care clinics for GMP, mothers are given health education by nursing staff. The content and scope of these messages are reported in Table 4.3 below, however, only major trends are reported.

Table 4.3: Health education given to mothers by nursing staff (N=312)

Question	Frequency
Do you give education on infant and young child feeding?	
- Yes	59.0% (n=184)
- No	41.0% (n=128)
Health education topics	
Predominant content of IYC feeding education (n=189)	
- Importance of balance diet/nutritious foods	42.9% (n=81)
- Introduction of complementary foods after 6 months	29.1% (n=55)
- Encourage breast feeding	7.4% (n=14)
- Danger of mixed feeding	4.8% (n=9)
- Feeding options	4.8% (n=9)
- Danger of giving herbal/traditional medicines	0.1% (n=2)
- Feeding underweight children	0.1% (n=2)
Predominant other health topics covered (n=312)	
- HIV testing	5.4% (n=17)
- Child development	10.3% (n=32)
- Nutrition education regarding underweight IYC	5.8% (n=18)
- Exclusive breastfeeding for six months	67.0% (n=209)
- Encourage mothers to read RTHB	7.1% (n=22)
- Personal hygiene	16.7% (n=52)
- Importance of immunisation	42.3% (n=132)
- Attending GMP for IYC under five years	18.3% (n=57)
- Signs of malnutrition	3.8% (n=12)
- Preparing ORS	7.1% (n=22)
- Importance of well-baby clinic	4.2% (n=13)
- Family planning	6.1% (n=19)
- Taking care of infants	4.5% (n=14)
- Prevention of communicable diseases	6.1% (n=19)
- Danger signs and milestones	6.4% (n=20)
Frequency of health education	
Frequency of health education (n=312)	
- Every visit in groups or individually	78.5% (n=245)
- In groups	3.5% (n=10)
- Weekly	11.5% (n=35)
- Twice a week	7.1% (n=22)

Nearly 6/10 (59.0%) of participants reported that they provide education on IYC feeding. Key messages included the importance of a balanced diet/nutritious foods (42.9%), followed by the introduction of complementary foods beyond six months of age (29.1%). The content of other health messages given included the practice of exclusive breastfeeding for six months (67.0%), followed by the importance of immunisation (42.3%) and the attendance of GMP for IYC under five years (18.3%). The majority (78.5%) of participants reported that they conducted health education at every visit,

whether it be in groups or individually, followed by those who conducted it weekly (11.5%) or twice a week (7.1%).

Nursing staff perceptions regarding GMP

To determine participant perceptions regarding GMP, participants documented their responses on a four point Likert scale ranging from “strongly agree” to “strongly disagree”. These responses are presented in Table 4.4.

Table 4.4: Participant perceptions regarding GMP (N=312)

Statement	Strongly agree	Agree	Disagree	Strongly disagree
GMP is important for IYC health	87.2% (n=272)	12.5% (n=39)	0.3% (n=1)	-
I am motivated to do GMP	76.0% (n=237)	23.7% (n=74)	0.3% (n=1)	-
I do GMP just because I am given the responsibility	26.9% (n=84)	19.67% (n=61)	32.1% (n=100)	21.5% (n=67)
It is easy to understand the z-scores when interpreting growth indicators	59.0% (n=184)	33.3% (n=104)	6.4% (n=20)	0.01% (n=4)
It is easy to identify IYC suffering from SAM/MAM	73.4% (n=229)	24.0% (n=75)	2.2% (n=7)	0.003% (n=1)
Giving feedback to the mother after assessing an IYCs growth is important	84.9% (n=264)	14.5% (n=45)	0.003% (n=1)	0.003% (n=1)
I always try to motivate mothers to regularly bring IYC to the clinic for GMP	77.2% (n=241)	20.8% (n=65)	0.006% (n=2)	0.01% (n=4)
Performing GMP properly is time consuming	16.7% (n=52)	20.8% (n=65)	28.5% (n=89)	33.7% (n=105)
Both weight and length/height should be measured at each clinic visit	53.5% (n=167)	31.4% (n=98)	12.2% (n=38)	2.9% (n=9)
MUAC must be measured every three months	62.8% (n=196)	28.2% (n=88)	6.4% (n=20)	2.6% (n=8)
The clinic has all the necessary equipment required for GMP	44.6% (n=139)	21.2% (n=66)	23.1% (n=72)	11.2% (n=35)
The equipment available for GMP is in good working order	43.3% (n=135)	24.4% (n=76)	21.8% (n=68)	10.6% (n=33)
Mothers understand the importance of bringing their IYC to the clinic for GMP	38.8% (n=121)	46.5% (n=145)	11.5% (n=36)	3.2% (n=10)
I have sufficient knowledge and skills on using the RTHB effectively	60.9% (n=190)	32.1% (n=100)	6.4% (n=20)	0.6% (n=2)
I am of the opinion that GMP are vital services offered by clinics	74.7% (n=233)	22.1% (n=69)	2.2% (n=7)	1.0% (n=3)

Participants’ attitude towards GMP proved to be positive, as was illustrated by the majority strongly agreeing with the statements “GMP is important for IYC health”

(87.2%), “I am motivated to do GMP” (76.0%), “I am of the opinion that GMP are vital services offered by clinics” (74.7%) and disagreeing, as well as strongly disagreeing with the statement “I do GMP just because I am given the responsibility” at 32.1% and 21.5% respectively. In addition, participant perceptions regarding their GMP knowledge proved to be positive, with the majority indicating that: “It is easy to understand the z-scores when interpreting growth indicators”, “It is easy to identify IYC suffering from SAM/MAM” and “I have sufficient knowledge and skills on using the RTHB effectively” with 59.0%, 73.4% and 60.9% respectively indicating that they strongly agreed with these statements. When it came to participant perception regarding the skills required to conduct GMP effectively, 84.9% strongly agreed that it is very important to give feedback to the mother after assessing an IYCs growth, despite results reported in the latter part of this paper that a positive perception does not necessarily translate into practice when conducting GMP. Participant perceptions regarding knowledge, translated into the majority strongly agreeing that “MUAC must be measured every three months” (62.8%) and that “Both weight and length/height should be measured at each clinic visit” (53.5%). In addition, 77.2% of participants strongly agreed that they always try to motivate mothers to regularly bring IYC to the clinic for GMP, while 46.5% strongly, followed by very strongly (38.8%) agreed that mothers understand the importance of bringing their IYC to the clinic for GMP, despite the contrary being reported in the qualitative paper where FGDs were conducted with participating mothers (Chapter 7). The majority of participants held the perception by strongly agreeing that the clinic has the necessary equipment required for GMP (44.6%) and that the equipment available for GMP is in good working order (43.3%). A third of participants (33.7%) strongly disagreed that performing GMP properly is time consuming. It is possible that this perception was held due to the fact that participants did not follow the correct procedure when conducting GMP as is illustrated in Table 4.6.

Nursing staff knowledge regarding GMP

Nursing staff knowledge regarding GMP was determined by posing ten multiple choice questions with each option having five options to choose from. The percentage of participants who gave the correct response to each question is presented in Table 4.5.

Table 4.5: Participant responses to multiple choice questionnaire assessing GMP knowledge (N=312)

Question	Correct response per question
What is GMP?	60.6% (n=189)
What are the tools used for GMP?	73.4% (n=229)
What are the IYC growth indicators?	45.2% (n=141)
How often should IYC growth be monitored?	26.9% (n=84)
A child should be weighed naked if ...	49.4% (n=154)
A child should be weighed with minimal clothes (vest etc) if ...	35.3% (n=110)
Weight-for-height chart indicates?	23.1% (n=72)
Weight-for-age chart indicates?	70.5% (n=220)
Height-for-age chart indicates?	48.4% (n=151)
What do you do before you start taking weight measurements?	56.7% (n=177)
Knowledge scores	
Mean \pm SD	4.89 \pm 1.87
Mean percentage attained	48.9 \pm 18.72%
Knowledge category	
- Poor (score \leq 50%)	39.4% (n=123)
- Good (score \geq 50% - 74%)	51.0% (n=159)
- Excellent (score \geq 75%)	9.6% (n=30)

Participants seemed to be most knowledgeable about the tools used for GMP (73.4%), followed by what a weight-for-age chart is indicative of (70.5%) and what is meant by GMP (60.6%). Although the majority of participants had positive perceptions regarding their GMP knowledge (Table 4.4), their knowledge scores proved differently, with the mean knowledge score obtained being 48.9%. In addition, nearly 40% of participants had a poor knowledge score of \leq 50%. Considering the fact that participants reported to have worked with GMP for 12.0 ± 8.8 years, it was therefore evident that their knowledge was not optimal.

Nursing staff skill observation regarding the measurement of weight, length/height and MUAC

In order to gauge participants' skills, they were observed while conducting GMP. Where clinics lacked equipment such as a stadiometer, they used fieldworker's equipment.

Table 4.6: Nursing staff skill observation regarding measurement of weight, length/height and MUAC (N=312)

Skills to be observed	
Observation	Percentage
Greeting and scale preparation	
Was IYC and mother greeted? - Yes - No	35.9% (n=112) 64.1% (n=200)
Was explanation given to mothers regarding the process of GMP to be followed? - Yes - No	23.4% (n=73) 76.3% (n=238)
Weight	
Was weight measured? - Yes - No	42.0% (n=131) 57.7% (n=180)
Was the scale placed on a flat, level surface? - Yes - No	39.1% (n=123) 60.6% (n=189)
Was the weight reading checked and readjusted to zero? - Yes - No	39.1% (n=122) 60.9% (n=190)
Was the IYC positioned in the centre of the scale? - Yes - No	37.8% (n=118) 62.2% (n=194)
After the weight reading was stable, was it recorded to the nearest 100g? - Yes - No	38.8% (n=121) 61.2% (n=191)
Was the weight read and announced in addition to the assistant repeating the value for verification and recording it immediately thereafter? - Yes - No	38.8% (n=121) 61.2% (n=191)
Was the infant weighed naked (<1 year)? - Yes - No	22.4% (n=70) 77.6% (n=242)
Was the child weighed with minimal clothes e.g. vest if > 1 year? - Yes - No	20.5% (n=64) 79.5% (n=248)
Was the IYC weighed wearing all clothes? - Yes	16.0% (n=50)

- No	84.0% (n=262)
Was weight correctly plotted on the growth chart in RTHB?	
- Yes	28.8% (n=90)
- No	71.2% (n=222)
Were IYC requiring referral i.e. severely wasted (-3 z-scores) identified?	
- Yes	26.6% (n=83)
- No	73.4% (n=229)
Height/length	
Was height/length measured?	
- Yes	12.2% (n=38)
- No	87.8% (n=312)
Was correct procedure followed when measuring height for children older than ≥ 2 years and/or those taller than 85cm by placing stadiometer on a stable level surface?	
- Yes	5.4% (n=17)
- No	94.6% (n=295)
Was the child's shoes and head-gear removed and/or braids undone?	
- Yes	2.9% (n=9)
- No	97.1% (n=303)
Was the child placed on the stadiometer standing upright in the middle of the board with heels, buttocks, shoulders and head pressed firmly against the board while the observer positioned the head and cursor?	
- Yes	3.5% (n=11)
- No	96.5% (n=301)
Was the measurement read and announced to the nearest 0.1cm?	
- Yes	3.8% (n=12)
- No	96.2% (n=300)
Was the measurement recorded and repeated by the person taking the measurement to make sure it was correctly heard?	
- Yes	3.5% (n=11)
- No	96.5% (n=301)
Was the correct procedure followed for measuring IYCs length in children < years and/or shorter than 85cm by placing the measuring board horizontally on a flat, level surface?	
- Yes	4.2% (n=13)
- No	95.8% (n=299)
Was the IYCs shoes and head-gear removed?	
- Yes	5.5% (n=17)
- No	94.5% (n=294)
When measuring recumbent length, was the IYC placed face up in the middle of the board?	
- Yes	5.8% (n=18)
- No	94.2% (n=294)
Was the nurse assistant allowed to hold the sides of the IYCs head and position it until it touched the head board?	
- Yes	4.8% (n=15)
- No	95.2% (n=297)

Was the nurse assistance allowed to hold the IYCs knees together while pressing down with the soles of the feet being positioned flat on the foot piece, and toes pointing upwards at right angles? - Yes - No	4.8% (n=15) 95.2% (n=297)
Did the measurer immediately remove the child's feet from having contact with the foot board with one hand while holding the footboard securely in place with the other? - Yes - No	4.8% (n=15) 95.2% (n=297)
Was the measurement read and recorded? - Yes - No	5.1% (n=16) 94.9% (n=296)
Was height/length correctly plotted on RTHB? - Yes - No	5.1% (n=16) 94.9% (n=296)
MUAC	
Was MUAC measured? - Yes - No	10.9% (n=34) 89.1% (n=278)
Was the mother asked to remove any clothing covering the child's left arm? - Yes - No	9.9% (n=31) 90.1% (n=281)
Was the midpoint on the left upper arm estimated? - Yes - No	10.9% (n=34) 89.1% (n=278)
Was the arm straightened with the tape wrapped around the arm at midpoint? - Yes - No	10.3% (n=32) 89.7% (n=280)
Did the tape measured used for measuring MUAC have the appropriate tension around the child's arm? - Yes - No	9.9% (n=31) 90.1% (n=281)
When the MUAC tape was correctly positioned, and with the correct tension, was the measurement read to the nearest 0.1cm? - Yes - No	10.3% (n=31) 89.7% (n=281)
Was the measurement immediately recorded? - Yes - No	10.9% (n=34) 89.1% (n=278)
Feedback to the mother	
Was feedback regarding weight, length/height and MUAC given to the mother? - Yes - No	24.7% (n=77) 75.3% (n=235)

Based on the observation of participants' GMP skills, several trends became apparent. Regarding the procedure followed before and after anthropometric measurements were conducted, the majority of mothers and their children were not greeted (64.1%), neither were they given an explanation of the GMP process that will followed (76.3%). In addition, 75.3% did not receive feedback following the completion of growth monitoring. This finding proved to be contradictory to the fact that 85.4% of the study sample strongly agreed that giving feedback to a mother after assessing an IYCs growth is very important. It is therefore not surprising that only 38.8% of participants strongly agreed that mothers understand the importance of GMP, followed by 46.5% who agreed with the same statement.

When it came to observations regarding weight monitoring, 42.0% of participants indicated that IYC weight is measured, despite 96.5 % reporting that they do have scales in their respective clinics (see Chapter 5). In addition, it was evident that for the majority of participants, the procedure followed for measuring weight possibly rendered inaccurate values as scales were not placed on a flat, level surface (60.6%), the child was not positioned in the centre of the scale (62.2%), after the weight reading was stable, it was not recorded to the nearest 100g in addition to the child standing unaided (61.2%). Neither was the weight read and announced in addition to the assistant repeating the value for verification and recording it immediately thereafter (61.2%). In addition, infant younger than one year were not weighed naked (77.6%), whereas young children older than a year were not weighed wearing minimal clothing in 79.1% of observations, with 16.1% being weighed wearing all their clothes.

Only 17.1% of participants reported having access to a stadiometer, while an infantometer was only available to 1.6% of participants (see Chapter 5). It is therefore not surprising that 87.8% of participants reported not measuring length/height. In addition, it is possible that due to participants not having access to equipment for measuring length/height, the vast majority did not follow the correct procedure for taking these anthropometric measurements.

To illustrate the above, the following observations of study participants were recorded. When measuring height of children older than two years of age and/or those taller than 85cm, the stadiometer was not placed on a stable level surface (94.6%), neither was the child's shoes and head-gear removed (97.1%) or the child positioned on the stadiometer standing upright with heels, buttocks, shoulders and head pressed firmly against the board while the observer positioned the head and cursor (96.5%). In addition, the measurement was not read and announced by 96.2% of participants. Other sources of measurement error were related to the fact that the measurement was not recorded and repeated by the person taking the measurement to make sure it was correctly heard (96.5%).

When it came to following the correct procedure for measuring IYC length in children younger than two years and/or shorter than 85cm, the infantometer was not placed on a flat level surface by 95.8% of participants. Furthermore, the IYCs shoes and head-gear was not removed before taking the measurement, nor was the IYC placed in the middle of the length board by 94.5% and 94.2% of participants respectively. In addition, the nurse assistant was not allowed to hold the sides of the IYCs head and position it until it touched the head board (95.2%), nor was the nurse assistant allowed to hold the IYCs knees together while pressing down with the soles of the feet being positioned flat on the foot piece, and toes pointing upwards at right angles (95.2%). The participant did not immediately remove the child's feet from having contact with the foot board with one hand while holding the foot board securely in place with the other in 95.2% of observations or read and recorded the measurement in 94.9% of observations.

Nearly 9/10 (89.1%) participants measured MUAC, with 64.4% having access to a MUAC tape and 59.0% having a tape measure (see Chapter 5). Inaccuracies regarding the measurement of MUAC were illustrated by the mother not being asked to remove clothing covering the child's left arm in 90.1% of observations, the midpoint on the left upper arm not being estimated by 89.1% of participants, and the IYCs arm not being straightened with the tape wrapped around the arm at midpoint in 89.7% of observations. Other

inaccuracies regarding the measurement of MUAC were related to the tape measure being used not having the appropriate tension around the child's arm in 90.1% of observations, the measurement not being read to the nearest 0.1cm in 89.7% of observations and the measurement not being immediately recorded in 89.1% of observations.

Nursing staff's ability to interpret plotted points for growth indicators

To determine nursing staff's ability to interpret plotted points for growth indicators on the respective WHO growth charts, eight examples of growth charts with plotted points representing various anthropometric indices were given to study participants to interpret, in order to determine their ability to interpret various z-scores. The growth charts showed to participants, covered three indicators used for assessing the growth status of IYC namely WAZ, LAZ and WL/HZ, in addition to MUAC with different cut off points. Table 4.7 depicts the number of participants who were able to correctly interpret the respective growth charts, as well as the most frequent incorrect interpretations give for the respective plotted z-scores.

Table 4.7: Nursing staff's interpretation of various growth indicators (N=312)

Question	Percentage
Correctly interpreted weight-for-age (WAZ) < -3 z-scores? <ul style="list-style-type: none"> - Yes - No - Don't know 	<p>15.7% (n=49)</p> <p>82.1% (n=256)</p> <p>2.2% (n=7)</p>
Most frequent incorrect interpretations for WAZ < -3 z-scores: <ul style="list-style-type: none"> - Underweight - Not growing well - Severe malnutrition 	<p>12.4% (n=168)</p> <p>2.2% (n=30)</p> <p>0.9% (n=12)</p>
Correctly interpreted length-for-age (LAZ) -3 to < -2 z-scores <ul style="list-style-type: none"> - Yes - No - Don't know 	<p>36.2% (n=113)</p> <p>44.9% (n=140)</p> <p>18.9% (n=59)</p>
Most frequent incorrect interpretations for LAZ <ul style="list-style-type: none"> - Underweight - Not growing well/poor growth - Normal growth/growing well 	<p>3.6% (n=49)</p> <p>2.3% (n=31)</p> <p>1.8% (n=24)</p>
Correctly interpreted weight-for-length (WL/HZ) -2 to < -1 z-scores <ul style="list-style-type: none"> - Yes - No - Don't know 	<p>13.8% (n=43)</p> <p>66.7% (n=208)</p> <p>19.6% (n=61)</p>

Most frequent incorrect interpretations for WL/HZ	
- Underweight	5.0% (n=68)
- Not growing well	2.9% (n=39)
- Stunted	2.5% (n=34)
Correctly interpreted length-for-age (LAZ) -1 to + 1 z-scores	
- Yes	38.5% (n=120)
- No	44.6% (n=139)
- Don't know	17.0% (n=53)
Most frequent incorrect interpretations for LAZ	
- Growing well/right	4.7% (n=63)
- Stunted/stunting	1.6% (n=22)
- Obese/obesity	1.0% (n=13)
Correctly interpreted weight-for-age (WAZ) > +1 to < + 2 z-scores	
- Yes	4.5% (n=14)
- No	85.6% (n=267)
- Don't know	9.9% (n=31)
Most frequent incorrect interpretations for WAZ	
- Normal/right/growing well	34.6% (n=106)
- Overweight	25.2% (n=77)
- Obesity	17.0% (n=52)
Correctly interpreted MUAC of < 11.5cm	
- Yes	18.9% (n=59)
- No	57.4% (n=179)
- Don't know	23.7% (n=74)
Most frequent incorrect interpretations for MUAC	
- Underweight	3.9% (n=53)
- Not growing well/poor growth	2.7% (n=36)
- Malnutrition	1.6% (n=21)
Correctly interpreted MUAC of between 11.5cm and 12.5cm	
- Yes	13.2% (n=41)
- No	60.1% (n=187)
- Don't know	26.7% (n=83)
Most frequent incorrect interpretations for MUAC	
- Normal/growing well/right	8.5% (n=115)
- In between/border line	0.9% (n=12)
- Moderate underweight/slightly underweight/middle	0.9% (n=12)
Correctly interpreted MUAC of 12.5cm or more	
- Yes	29.5% (n=92)
- No	45.6% (n=142)
- Don't know	25.0% (n=78)
Most frequent incorrect interpretations for MUAC	
- Obese/obesity/fat	4.4% (n=60)
- Right/good/growing well/well-nourished/healthy	3.7% (n=50)
- Overweight	2.6% (n=35)
Interpretation of growth indicators	
Mean ± SD correct interpretation of growth indicators (n=232)	2.26±1.412
Mean percentage attained	21.0±19.6%
Knowledge category (n=312)	
- Poor (score ≤ 50%)	94.2% (n=294)
- Good (score > 50% - 74%)	3.2% (n=10)
- Excellent (score ≥ 75%)	2.6% (n=8)

When it came to the interpretation of growth charts, length-for-age (LAZ) -3 to < -2 z-scores was interpreted correctly by the highest percentage of participants, even though it only applied to 38.5% of participants. This was followed by a depiction of length-for-age (LAZ) -3 to < -2 z-scores that was correctly interpreted by 36.2% of participants. It would therefore seem that the study sample were best able to interpret chronic malnutrition such as stunting. The next highest percentage related to the correct interpretation of a growth parameter was for a MUAC of 12.5cm or more by 29.5% of study participants. However, only 18.9% and 13.2% of participants were able to correctly interpret a MUAC of < 11.5 cm and a value between 11.5cm and 12.5cm as indicators of severe acute malnutrition (SAM) and moderate acute malnutrition (MAM) respectively.

As a scale was the piece of equipment the majority of clinics surveyed had access to (see Chapter 5), it was surprising that the least number of participant (4.5%) were able to correctly interpret a weight-for-age (WAZ) z-score of $> +1$ to $< +2$ z-scores. The ability to correctly interpret a weight-for-age (WAZ) < -3 z-scores and a weight-for-length (WL/HZ) between -2 to < -1 z-scores was also poorly interpreted, as only 17.7% and 13.8% of participants were respectively able to interpret these values correctly.

When looking at the general trend where participants indicated that they did not know how to interpret a particular growth indicator, the highest percentage (26.7%) was recorded for an inability to interpret a MUAC of between 11.5cm and 12.5cm. Where participants interpreted a particular growth parameter incorrectly, it would seem that interpretation most often reported was underweight for weight-for-age (WAZ) < -3 z-scores, weight-for-length (WL/HZ) between -2 to < -1 z-scores, MUAC of < 11.5 cm and length-for-age (LAZ) between -3 to < -2 z-scores at 12.4%, 5.0%, 3.9% and 3.6% respectively. Normal/growing well/right was most often incorrectly interpreted for weight-for-age (WAZ) between $> +1$ to $< +2$ z-scores, a MUAC of between 11.5cm and 12.5cm and length-for-age (LAZ) between -1 to $+1$ z-scores at 34.6%, 8.5% and 4.7% respectively.

Although the majority of participants strongly agreed that that it was easy to understand z-scores when interpreting growth indicators (59%), that it is easy to identify IYC suffering from SAM/MAM (73.4%) and that they have sufficient knowledge and skills on how to use the RTHB effectively (60.9%) (Table 4.5), their ability to interpret growth indicators proved differently, with a mean score (out of eight) of 2.26 ± 1.412 , translating into a mean percentage $21.0 \pm 19.6\%$. In addition, 94.2% of participants obtained a score $\leq 50\%$. Considering the fact that participant reported to have worked with GMP for 12.0 ± 8.8 years, it was evident that their ability to interpret growth indicators was poor.

Relationship between study variables

Correlations between continuous variables

Significant correlations between continuous variables are reported in Table 4.8.

Table 4.8: Significant correlations between continuous variables (N=312)

Variable	r	P-value #
Age versus experience working as nurse (years)	0.714	0.000
Age versus experience working with GMP (years)	0.612	0.000
Age versus knowledge regarding GMP	-0.156	0.006
Experience working as a nurse versus experience working with GMP	0.782	0.000
Experience working as nurse versus ability to interpret growth indicators (score)	0.145	0.027
Knowledge regarding GMP (percentage) versus ability to interpret growth indicators (percentage)	0.251	0.000

Pearson correlation

Highly significant ($p=001$) positive correlations were documented for participant age versus experience working as a nurse ($r = 0.714$; $p<0.000$) and age versus experience working with GMP ($r = 0.612$; $p<0.000$), as well as experience working as a nurse versus experience working with GMP ($r=0.782$; $p<0.000$). These findings imply that the older participants were, the more years they had spent working as a nursing staff member, had more experience working with GMP and that this translated into the positive correlation between years working as a nurse versus years working with GMP.

However, the significant negative correlation between participant age and knowledge regarding GMP, indicated that the older participants were, the less their knowledge regarding GMP. This finding is not surprising, seeing that over 20% of participants reported that they never received refresher training since qualifying or never attended such ongoing training opportunities (see Table 4.2). However, the positive correlation between experience working as a nurse and ability to interpret growth indicators as a score out of eight, rendered a positive correlation ($r=0.145$; $p=0.027$) albeit not highly significantly. However, a significant positive correlation was documented for knowledge regarding GMP and the ability of participants to interpret growth indicators if both mean values were expressed as percentages ($r=0.251$; $p<0.000$).

Significant differences between variable means

The significant differences between means are reported in Table 4.9.

Table 4.9: Significant difference between means

Variables	P-value#
Mean difference between years working as a nurse and working with GMP	0.000
Mean difference between participant knowledge regarding GMP and ability to interpret growth indicators	0.000

Independent samples t-test

Although participants had been working as nursing staff for 15.3 ± 9.6 years, there was a significant difference between years working as a nurse and years' experience working with GMP. A significant difference was also documented between the mean percentage scored for knowledge regarding GMP and the ability to interpret growth indicators, as the mean percentage obtained for the former was 48.9%, whereas a mean of 21.0% was obtained for the ability to correctly interpret growth indicators. The implication of the latter being that knowledge regarding the process of GMP does not necessarily translate into the ability to interpret growth indicators.

Relationship between categorical variables

Significant relationships between categorical variables are reported in Table 4.10

Table 4.10: Significant relationships between categorical variables

Variable	P-value#
Category of nursing staff and knowledge regarding GMP	0.011
Category of nursing staff and where did you receive your training on GMP	0.000

Chi-square

Seeing that nursing staff surveyed ranged from professional nurses to nursing assistants, clinical nurse practitioners and staff nurses, it was not surprising to detect a significant difference between the category of nursing staff surveyed, where they received their training regarding GMP and knowledge regarding GMP.

Discussion

The purpose of the study was to determine the GMP related knowledge, perceptions regarding GMP, and the ability of nursing staff to accurately conduct anthropometric measurements and interpret growth indicators of IYC under five years of age. The 312 nursing staff surveyed from 82 clinics representative of four sub-district in Vhembe district, were predominantly female professional nurses followed by nursing assistants with a mean age of 44.1 ± 9.3 years.

Regarding training received on GMP, the majority of participants reported to have received their training from a nursing college, followed by workshops offered by DOH and training from a colleague at a clinic. The significant negative correlation between participant age and knowledge regarding GMP, creates the impression that being older was related to having a lower level of knowledge regarding GMP. However, the positive correlation between experience working as a nurse and ability to interpret growth indicators, proved differently. Furthermore, a positive correlation was found between knowledge regarding GMP and the ability to interpret growth indicators. However, younger health workers with less work experience are more likely to have knowledge and obtain current information, integrate and use newly acquired information easily.¹³ The latter in turn, may improve their level of nutritional knowledge. On the other hand, found no association between health worker

nutritional knowledge and the number of working years' experience.¹⁴ As the mean age of participants in the current study sample was 44.1 years and the mode was 41 years, the relationship between participant age and knowledge requires further investigation.

The majority of nutrition-related messages participants shared with mothers, were related to a balanced diet/providing the infant with nutritious foods and introducing complementary foods after six months. Other health messages were related to the promotion of exclusive breastfeeding for six months, the importance of immunisation and the attendance of GMP by IYC younger than five years. In support of the current findings, USAID emphasised the fact that the promotion of GMP among IYC under two years is viewed as a key intervention to deliver counselling on exclusive breastfeeding and complementary feeding, hygiene and other health messages to mothers through counselling, group talks, demonstrations and follow-up home visits.¹⁵ These health messages in turn, equip mothers to respond to malnutrition as the primary contributor to global under five mortality.¹⁶ The frequency of health education was reported as being conducted at every GMP visit, whether it be to individual mothers or in groups. However, the minority of participants indicated that health education was conducted weekly or twice a week. The health messages given by study participants were echoed by mothers that participated in FGDS (reported in Chapter 7). This was especially evident for messages that were related to the importance of taking IYC to a clinic for GMP, the importance of measuring weight and height as indicators of IYC growth, and the prevention of disease through immunisation.

In the current study, participants has a positive perception regarding the importance of GMP for child health and that GMP are vital services. As health workers play a vital role in improving IYC health, especially during the first year by documenting and reporting on how they promote proper infant nutrition and hygiene, these findings were encouraging.¹⁷

Although the majority of study participants obtained a score of more than 50% for knowledge regarding GMP, it was followed by 39.4% obtaining a score of $\leq 50\%$. Their observed skills while conducting GMP, accuracy with which anthropometric measurements were conducted and ability to interpret growth indicators was poor. This was evident, from

the fact that for the interpretation of growth indicators, including MUAC cut-off values, 94.2% of participants obtained a score of $\leq 50\%$. These findings are a cause for concern, as it places the spotlight on whether individual cases of MAM and SAM in Vhembe are identified and whether the necessary corrective action is being implemented. A study conducted in Capricon, LimpopomProvince also revealed that health workers are aware which clinical signs to look for when they suspected that a child might be suffering from malnutrition, although their responses lacked specific details¹⁸. A Zambian study also reported that nursing staff perceived GMP as important, however, insufficient documentation regarding IYC growth was one of the factors that affected the effective implementation of GMP by nursing staff.¹⁹ A study conducted in India, reported that the practicing GMP by weighing IYC followed by plotting it on a growth chart, was poor among trained health workers, with only 20% following the techniques related to the training they received on GM.²⁰ Local studies in South Africa also alluded to the fact that health workers had poor knowledge and skills when it came to conducting anthropometric measurements, as well as being unable to accurately plot and interpret growth indicators.^{21,22}

Conclusion

The study findings indicated that nursing staff had positive perceptions regarding GMP and that their knowledge regarding the programme was fair. However, their ability to accurately conduct anthropometric measurements on IYC under five years of age was not up to standard. Furthermore, their ability to interpret growth indicators based on plotted points on a growth chart was extremely poor. In light of the significant difference between mean scores obtained for knowledge regarding GMP and the ability to correctly interpret growth indicators, it became apparent that for the purpose of this study, knowledge regarding GMP did not translate into the ability to accurately conduct anthropometric measurements or the ability to interpret them as growth indicators. It was evident that participants were not aware of their inability to conduct GMP, nor their inability to identify malnourished IYC, as was showcased by the majority strongly agreeing or agreeing with statements used to determine their perceptions regarding GMP. In addition, irrespective of the nursing staff member's title, they were all expected to conduct GMP. In light of the above information, it is

recommended that nursing staff should only be utilised as per their level of training and skills as this could influence the accuracy with which GMP is conducted. These findings are cause for concern, seeing that it has an impact on the identification of malnourished IYC in Vhembe district, as well as the timely implementation of corrective action. It is therefore important for nursing staff working at government clinics in Vhembe district to receive immediate, as well as ongoing refresher training to improve their knowledge and skills regarding all aspects of the GMP programme. Should the latter not be possible, the full potential of the programme in addressing the prevalence of IYC malnutrition in the district, will never be realised.

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Chapter 5: Perceived Barriers to the Effective Implementation of Growth Monitoring and Promotion of Nursing Staff at Clinics in the Vhembe District, Limpopo Province, South Africa

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Abstract

Background: Nurses are of primary importance in achieving reduced child mortality due to their delivery of care, thereby playing an important role in the increased well-being and better health of infants and young children (IYC). They are also the largest group of health care professionals that provide nutrition advice, especially to new mothers. However, there is a paucity of data regarding the barriers nursing staff face when implementing the growth monitoring and promotion (GMP) programme.

Setting: The study population consisted of nursing staff involved in the delivery of GMP services in the four sub-districts of Vhembe district, Limpopo Province.

Objective: To determine the perceived barriers experienced by nursing staff that have a potential impact on the effective implementation of GMP at government clinics in the Vhembe district.

Methods: A descriptive exploratory study employing interviews was conducted with study participants comprising of a convenience sample of 312 nursing staff representing 82 randomly selected clinics.

Results: The majority of study participants (96.5%) used a baby scale for the assessment of IYC weight, followed by the use of a MUAC tape measure and stadiometer. The predominant challenges experienced by study participants that could serve as barriers to the optimal implementation of the GMP programme in the district, included noncompliance of mothers

with the services offered as part of the GMP programme, followed by a shortage of vaccines, as well as a lack of anthropometric equipment. The remedial action suggested by the majority of participants, was the daily delivery of health talks to mothers, as well as health authorities providing the necessary anthropometric equipment, in addition to a regular supply of vaccines to all health facilities in the district.

Conclusion: Study participants experienced numerous challenges and barriers that have an impact on the optimal implementation of GMP. However, the extent of the challenges and barriers experienced, were seemingly related to the location of an individual clinic. The predominant challenges reported included noncompliance of mothers with GMP services, while the daily delivery health talks to mothers was indicated as the primary remedial action to negate the challenge.

Keywords: Perceived barriers, clinics, growth monitoring and promotion, nursing staff

Introduction

Globally, 6.9 million infants and young children (IYC) under five died in 2011, with 33% of the mortality being directly linked to malnutrition.¹ The high prevalence of acute and chronic malnutrition, namely one in every three preschool children, is well documented [United Nations Standard Committee on Nutrition].² In addition, it has been proven that malnutrition in IYC results in psychological problems such as impaired mental and physical development, reduced educational attainment, increased morbidity, as well as more time and money spent on taking care of sick children due to frequent morbidity.³ To promote appropriate IYC health and well-being, several strategies have been implemented in child health facilities including the growth monitoring and promotion (GMP) programme that incorporates the use of nutrition education and behaviour change communication.⁴

Unfortunately the economic growth in developing countries has not translated into improved access to child health services, immunisation and maternal education, since the prevalence of malnutrition in African countries has not decreased as expected.⁵ This suggests that growth faltering among IYC under five is still a major public health problem for the majority of African countries. In the majority of developing countries, some of the nutrition

interventions provided at clinic level includes vitamin A supplementation, child weighing and charting of weight-for-age z-scores, as well as identification of growth faltering.⁶

This study was conducted to determine the perceived barriers experienced by nursing staff that have a potential impact on the effective implementation of GMP at government clinics in the Vhembe district.

Materials and methods

A descriptive exploratory study employing interviews was conducted with study participants comprising of a convenience sample of 312 nursing staff representing 82 government clinics across the four sub-districts of Vhembe district. The sampled clinics provide GMP services for IYC. Hence, nursing staff that are responsible for GMP were recruited on the day of data collection. Prior to data collection, the research instrument was piloted at a clinic which is within the district, however, the clinic did not form part of the actual study sample.

All participants signed informed consent before being interviewed. Confidentiality was ensured by allocating each participant a code for identification purposes. Data collection was conducted by the researcher and trained Nutritionist fieldworkers who administered the research instrument privately with individual participant at a time ~~in the form of an IDI~~. The instruments were translated to Tshivenda and Xi-Tsonga which is the local language in Vhembe district. The language practitioners were consulted to aid the translation process. Questions related to challenges and perceived barriers experienced during the implementation of GMP were posed as open-ended questions that were subsequently converted into categorical variables. The researcher monitored the data collection process to ensure that participant responses were adequately documented.

For ease of presentation and interpretation, categorical variables were grouped together where similar concepts were reported, thus rendering fewer variables. The data was subsequently captured in Excel, followed by importing the spreadsheet into the Statistical

Package for Social Sciences (SPSS) version 26 for the calculation of frequency distributions. Tables were used to present the findings.

Ethical considerations

An application to request permission to conduct the study was submitted to the Department of Health, Limpopo Provincial office and Vhembe district Department of Health after receiving ethics approval from the Biomedical Research Ethics Committee BREC: Ref No. BE105/18 (BREC: Ref No. BE105/18) of the University of KwaZulu-Natal. The project was also registered by the University of Venda Research and Publication Committee (RPC: SHS/18/NUT/25).

Results

Available equipment for conducting GMP at surveyed clinics

Table 5.1 provides an overview of the available equipment used for GMP at the clinics included in the study sample. The data was based on what was reported by study participants and not observations made by the researcher or fieldworkers.

Of the 82 clinics surveyed, scales for weighing IYC were not available at all of them, as 96.5% of study participants reported the availability of a baby scale. MUAC tape measures were reported as being available by less than two thirds of nursing staff surveyed (64.4%). A source of great concern was the virtual absence of stadiometers and infantometers, reported to be available by 17.0% and 1.6% of nursing staff respectively. The implication of the abovementioned findings being that the measurement of weight-for-age is not possible at all clinics, whereas the measurement of height/length-for-age is only possible at the minority of clinics surveyed. In addition to the availability of equipment, it was reported that in some clinics, they were not in a good condition or not working at all.

Table 5.1 Reported equipment used for conducting GMP at surveyed clinics (N=312)

Variable	Frequency
Equipment used for GMP	
- Baby scale	96.5% (n=301)
- MUAC tape measure	64.4% (n=201)
- Stadiometer	17.0% (n=53)
- Tape measure	51.0% (n=26)
- BMI charts	8.3% (n=26)
- Infantometer	1.6% (n=5)

Perceived barriers experienced by nursing staff when conducting GMP and possible remedial action for implementation to overcome these challenges

While conducting GMP at primary health care clinics, nursing staff experience many challenges that have the potential to impact on service delivery. The reported challenges were based on individual nurse's opinion regarding the success of GMP. In addition, some nursing staff working at the same clinics had similar concerns, depending on the area within the sub-district where the clinic was situated.

Table 5.2 provides an overview of the predominant challenges experienced, based on the responses to an open-ended question that were converted into categorical variables and then collapsed into fewer variables to illustrate general themes. In addition, these challenges can also be viewed as factors that contribute to the development of MAM/SAM among members of the community that these clinics in Vhembe district serve. From the table below, it is clear that the majority of nursing staff surveyed (54.8%; n=171) were of the opinion that the predominant challenge to the successful implementation of the GMP programme, was that mothers/caregivers do not bring their IYC to the clinic for regular follow-up. The practice of mixed feeding/early introduction of solids and other inappropriate feeding practices also proved to be a challenge, as was reported by nearly a quarter (23.1%) of study participants. This was followed by a shortage of vaccines, dealing with malnourished IYC and scales used for GMP that are not in working order or not available at 19.2%, 18.3% and 17.3% respectively.

Table 5.2: Predominant barriers and challenges experienced by nursing staff when conducting GMP (N=312)

Variable	Frequency
What, if any are the challenges encountered during GMP?	
- Mothers default on regular clinic attendance	54.8% (n=171)
- Mixed feeding/early introduction of solids	23.1%(n=72)
- Shortage of vaccines	19.2% (n=60)
- Malnourished IYC	18.3% (n=57)
- Scale not working/not available	17.3% (n=54)
- Staff shortages	5.4% (n=17)
- Mothers do not adhere to health messages	4.3% (n=13)
- Mothers do not understand/read the RTHB	3.5% (n=11)
- Mothers visit the clinic without RTHB	3.5% (n=11)
- Mothers do not take care of their children	3.5% (n=11)
- Inadequate breastfeeding	3.2% (n=10)
- Mothers arriving late for GMP services	2.6% (n=8)
- Overfeeding	2.2%(n=7)
- IYC with diarrhoea	2.2% (n=7)
- Mothers are rude to nursing staff	1.9% (n=6)
- Inability to detect underweight of IYC	1.3% (n=4)
- Nursing staff not following correct procedure for weighing	1.3% (n=4)
- Referral to dietician at clinic or hospital not done	1.3% (n=4)
- Shortage of supplements	1.3% (n=4)
- Mothers refusing IYC to be tested for other diseases	1.0% (n=3)
- Mothers refusing to undress IYC	1.0% (n=3)
- Transport problems of mothers/caregivers	1.0% (n=3)
- IYC not reaching their milestones	0.6% (n=2)
- Overcrowding resulting in a lack of privacy	0.6% (n=2)
- Mothers not aware that sick IYC must not be immunised	0.6% (n=2)

Table 5.3 provides an overview of study participant opinions regarding the relevant remedial action to be taken to overcome the barriers and challenges faced by nursing staff when conducting GMP. These opinions were also based on participant responses to an open-ended question that were converted into categorical variables.

Table 5.3: Remedial action suggested by nursing staff to overcome the barriers and challenges experienced when conducting GMP (N=312)

Variable	Frequency
What do you think can be done to resolve the identified challenges regarding the implementation of GMP?	
- Daily health talks must be given	28.5% (n=89)
- Ensure that vaccines do not run out	15.4% (n=48)
- Supply enough equipment for GMP	15.1% (n=47)

- Conduct awareness campaigns	13.5% (n=42)
- Re-enforce health education of mothers	11.2% (n=35)
- Provide supplementation	11.5% (n=35)
- Promote a balanced diet	11.2% (n=35)
- Emphasise exclusive breastfeeding	5.4% (n=17)
- Provides supplementation for underweight IYC	5.4% (n=17)
- More staff must be hired	5.1% (n=16)
- Mothers must take clinic health talks seriously	5.1% (n=16)
- Home-based cares to educate mothers on child care and use of RTHB	5.1% (n=16)
- Provide ongoing training for nursing staff	2.9% (n=9)
- Supply food to those who cannot afford it	2.2% (n=7)
- Mobile clinics sent to farms and rural areas	2.2% (n=7)
- Government to provide food supplements	2.2% (n=7)
- Ongoing clinic visits by dietitians	1.9% (n=6)
- Conduct follow-up of IYC that are not gaining weight	1.9% (n=6)
- Use media for education such as radio slots	1.9% (n=6)
- Involve traditional healers in the promotion of GMP	1.9% (n=6)
- Conduct home visits	1.6% (n=5)
- Encourage a balanced diet for IYC	1.3% (n=4)
- Provide treatment for malnutrition	1.3% (n=4)
- Emphasise the importance of immunisation	3.5% (n=4)
-	
- Emphasise the importance of breastfeeding and disadvantages of mixed feeding	1.3% (n=4)
- Home-based cares to identify neglected children	1.3% (n=4)
- Provision of RTHB to those that do not have	1.0% (n=3)
- Initiate support groups	1.0% (n=3)
- Dedicate more time to health talks	1.0% (n=3)
- Emphasise the importance of well-baby clinics	1.0% (n=3)
- Visit pre-schools to check if children are immunised	1.0% (n=3)
- Educate mothers on the importance of attending well-baby clinics	1.0% (n=3)
- GMP must also be conducted over weekends	1.0% (n=3)
- Nursing staff must be patient with rude mothers	1.0% (n=3)
- Promote home gardens	1.0% (n=3)
- Baby tea and juice should not be sold	0.6% (n=2)
- Educate mothers about dangers of mixed-feeding	0.6% (n=2)

Although participant responses covered a wide range of suggested remedial activities and interventions that could be implemented to address the barriers to optimal implementation of the GMP in the Vhembe district, only interventions suggested by more than one participant was included in the above table. Due to the fact that 18.3% of nursing staff surveyed indicated that health education is not conducted on a daily basis in their respective clinics (see Chapter 4), it was noted that the majority of participants (28.5%; n=89) suggested that health education should be conducted on a daily basis. This was followed by 15.4% of participants indicating that it should be ensured that clinics do not

run out of vaccines. Field notes made by the researcher documented the fact that some clinics ran out of vaccines during the period that data collection took place. This resulted in mothers and other caregivers not bringing IYC to the clinics in question for GMP. In addition, 13.5% of participants recommended that awareness campaigns should be conducted to increase an awareness of the importance of GMP, while 11.2% indicated that re-enforcing the health message given to mothers is worthy of consideration. As was reported in Table 5.1, many clinics lack the necessary, in addition to functional equipment for conducting GMP. It is therefore not surprising that 15.1% of participants suggested that the necessary equipment for conducting GMP should be made available.

Discussion

The WHO developed growth standards to monitor IYC growth and development through anthropometric measurements to facilitate the early detection of malnutrition.⁷ In all primary health care centres, anthropometric assessment should commence immediately after birth and continue until a young child is five years old. Furthermore, it should be conducted monthly for children younger than 24 months.⁸ As part of the GMP programme, health workers are responsible for monitoring IYC growth, detect growth faltering and intervene where necessary. Hence every health facility offering GMP services, are expected to have a functional anthropometric equipment for growth monitoring purposes. These include a baby scale, infantometer, stadiometer and MUAC tape measure as per the RTHB recommendation for the assessment of growth and development in children. However, a lack of anthropometric equipment at health facilities impairs the ability to offer optimal GMP services.

The findings of this study revealed that only 96.5% of clinics surveyed had a baby scale. However, lack of basic equipments in different primary health centers revealed barriers of GMP implementation identified in this current study and other studies. A study conducted in the Eastern Cape, South Africa (SA), documented nurse's frustration regarding a lack of basic resources which negatively influenced the quality of service delivery.⁹ The lack of infantometers and stadiometers reported by several clinics implies that length-for-age and

height-for-age is not determined at these facilities, as only 17% of surveyed clinics indicated that they have equipment of this nature. However, the availability of equipment does not imply that it is functional or being used, as some nursing staff reported that although they have scales, it is not in working order. Similar challenges were also reported by Schoeman⁹, who documented staff shortages, a lack of vaccines, high workloads and lack of equipment at clinics in the Eastern Cape. In Mopani district, South Africa, all the clinics were reported to have weighing scales for infants, except for one clinic, where both the adult and baby scales were out of order, unfortunately, the researcher did not check the accuracy of the scales¹⁰.

Despite several challenges being encountered and barriers to service delivery being expressed, study participants suggested numerous remedial actions to be implemented in order to overcome the barriers and challenges experienced when conducting GMP. The remedial action reported by the majority of participants, was that there was a need to conduct daily health talks to mothers (28.5%). An Ethiopian study conducted amongst health workers, reported that a scale was used by 39.1% of participants, while 18.2% used a stadiometer for measuring length. In addition, 40.5% usually used a MUAC tape and it was reported that the majority of equipment was in good working order. As per a self-report, health workers indicated that they know how to use the available equipment and have the skills to use them. However, half of them indicated that they required a refresher course, while 4.2% indicated that they did not know how to use the available resources.¹¹ In the current study, participants also reported the use of baby scales (96.5%), followed by a MUAC tape measure (54.4%) and length/height measurements (17%). However, the predominant use of baby scales when compared to other equipment used for GMP was indicated.

Zambia, a developing country where the IYC mortality rate is high, also implements GMP as a key strategy to combat child mortality and malnutrition. Apart from nurses perceiving GMP as important, a shortage of professional staff and a lack of transport was reported to be a frequent occurrence, as was insufficient documentation of child growth, failure of mothers to cooperate and relocation that were all reported to have an impact on the effective implementation of GMP.¹² Similar findings were documented in the current study, where 54.8% of study participants highlighted the noncompliance of mothers in bringing their IYC

to clinics for GMP. However, as was reported in Chapter 7 mothers no longer took their children for GMP in one municipality due to a shortage of vaccines. However, only 19.2% of participants reported a shortage of vaccines as a barrier to the success of GMP in the current study, with 15.4% suggesting that the government must ensure that there is an adequate supply of vaccines at clinics. In addition, it was also suggested that visits to pre-schools must be conducted to access IYC that are not brought to clinics for GMP.

Apart from numerous remedial actions being suggested by participating nurses that were sampled at clinics that were included in the study sample, only 2.9% suggested the on-going training of health professionals dealing with GMP. A study conducted in five countries of the Eastern Mediterranean Region by Abul-Fadal¹³, also confirmed that a lack of adequate training of health personnel, followed by a lack of understanding of the risk of overweight and inaccurate plotting of growth data had an impact on the optimal implementation of GMP. In addition, the poor condition of weighing scales due to a lack of maintenance and negative attitudes of health workers were also some of the barriers that had an impact on GMP service delivery. In the current study, nursing staff reported that amongst themselves, a major challenge is was the fact that the correct procedure for weighing is not being adhered to. In addition, the majority of available anthropometric equipment was not in good working order.

Conclusion

It is evident that there are numerous challenges and barriers that have an impact on the optimal implementation of GMP in the Vhembe district. However, it would seem that the extent of challenges and barriers experienced, is dependent on the location where individual clinics are situated, as well as the sub-district under which they fall. The predominant challenges reported by study participants included noncompliance of mothers with GMP services, a shortage of vaccines and a lack of anthropometric equipment. In addition, the importance of delivering daily health talks to mothers, was the predominant remedial action suggested by study participants, as it was thought to serve as motivation to mothers to comply with the GMP schedule, irrespective of whether vaccines were available.

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Chapter 6: Prevalence of Severe Acute Malnutrition and Moderate Acute Malnutrition Among IYC Under Five Years Attending Government Clinics in the Vhembe District, South Africa

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Abstract

Background: The Global Nutrition Report indicated that despite the introduction of growth monitoring and promotion (GMP), the prevalence of children suffering from malnutrition in the Limpopo Province was 69.9%. It was also reported that Limpopo province is one of the provinces in need of interventions to address the prevalence of severe acute malnutrition (SAM) and moderate acute malnutrition (MAM).

Objective: To determine the prevalence of SAM and MAM among infants and young children (IYC) under five years attending government clinics in Vhembe district.

Setting: The study was conducted in the four sub-districts of Vhembe district, Limpopo Province of South Africa.

Methods: A secondary analysis of raw data obtained from 82 randomly selected clinics spanning across the four sub-districts was used to determine the prevalence of SAM and MAM among IYC. Data spanning from 2014 to 2018 for each of the respective clinics was obtained from the clinic data capturing officers. Permission to access clinic data was sought from the Limpopo provincial and Vhembe district offices. Descriptive statistics were used to calculate means, standard deviations and frequency distributions, while one-way ANOVA was conducted to compare the mean prevalence of SAM/MAM from 2014 to 2018.

Results: When comparing the prevalence of SAM/MAM across the five years of study on a month-to-month basis, it was not possible to identify a trend. In addition, there was a

statistically significant difference ($p < 0.000$) between the mean prevalence of SAM/MAM from 2014 to 2018. Similar results were obtained when the 2017 data set was removed from the analysis due to missing variables when compared to other years for which data was obtained.

Conclusion: Based on the annual prevalence of SAM and MAM obtained for the district over a five year period, it is evident that accuracy of the data requires further scrutiny, especially when interpreted against the back drop of the suboptimal knowledge regarding GMP, skills when conducting anthropometric assessments and ability to interpret growth indicators reported elsewhere (see Chapter 4).

Keywords: Government clinics, children, prevalence of SAM, mortality, Vhembe district.

Introduction

Malnutrition remains a serious public health problem, globally affecting millions of people, especially infants and young children (IYC) under five years in developing countries.¹ Furthermore, it is directly or indirectly responsible for 60% of the 10.9 million annual childhood deaths.² An estimated 25 to 35 million IYC under five suffer from severe acute malnutrition (SAM), with 13 million residing in sub-Saharan Africa.³ A high mortality rate is reported among children with SAM,⁴ with kwashiorkor being the most frequently reported type of SAM carrying the highest prevalence of co-morbid diseases.⁵ However, 27% of children in Africa suffer from moderate acute malnutrition (MAM).⁶

In primary health care facilities, a mid-upper arm circumference (MUAC) of less than 115 mm or a weight-for-height z-score (WHZ) of less than minus three is recommended for the identification of SAM among IYC under five.⁷ A cross sectional survey conducted in Somalia confirmed that MUAC is more useful when determining muscle mass in children, apart from screening for malnutrition.⁸ The World Health Organisation (WHO) recommends the use of the above cut-offs to identify IYC suffering from SAM through the growth monitoring and promotion (GMP) programme that was implemented as a screening procedure for the early detection of any growth and development disorders and implementation of the necessary interventions.⁹

However, despite GMP being implemented as an intervention programme, an estimated 19 million children younger than five years globally suffer from SAM, of whom more than 800 000 die annually.¹⁰ It is therefore not surprising that in South Ethiopia malnutrition remains one of the greatest common causes of morbidity and mortality among children all over the world.² In Burkina Faso, the majority of children under age of five that were diagnosed with SAM on admission to hospital were younger than two years¹¹. Hence the high prevalence of malnutrition despite the implementation of GMP, serves as a barrier to the achievement of the Sustainable Development Goal (SDG) of reducing child mortality.

In African countries, the severity of malnutrition is showcased by growth faltering among children under five and remains a major public health problem with the prevalence being higher in rural than urban areas.¹² An Ethiopian study also documented that the prevalence of malnutrition among children under five was unacceptably high.¹³ The South African Demographic and Health Survey (SADHS) documented that children younger than 18 months are mostly affected by wasting rather than stunting or underweight.¹⁴ Similar to other low and middle-income countries like Russia, China and Brazil, South Africa (SA) has reported a high prevalence of underweight, especially in households located in rural communities.¹⁵ This is in support of the findings by SANHANES-1 that previously reported how one in four SA children are chronically malnourished and that the Limpopo province has a high prevalence of malnutrition, especially underweight and wasting.¹⁶ Wasting, characterised by WHZ, was reported to be higher in rural areas at 4.9% and among commercial farm children (4.2%) when compared to children in informal urban areas (2.1%) and urban dwellers at 2.6%.¹⁷ A study that focused on the double burden of malnutrition among school going children in an urban SA area, revealing the persistence of acute malnutrition, with undernutrition being one of the identified problems.^{18,19} The above mentioned does not only reflect the high prevalence of malnutrition in Africa per se, but in SA as well.²⁰

Materials and methods

The present study was conducted in four sub-districts of the Vhembe district, situated in the northern part of the Limpopo Province with 476 905 children aged between 0 to 14 years

(StatsSA, Community Survey, 2016). Vhembe district is categorised as a rural based district, with many villages located in rural areas and some being surrounded by farms. In addition, there are many people from foreign countries such as Zimbabwe that reside in Vhembe.

To determine the prevalence of SAM and MAM in the district, 82 clinics were randomly sampled to represent the 125 clinics situated in Vhembe district. However, as one of the four sub-districts only has a few clinics, they were all included in the study sample. All the clinics in Vhembe are required to submit data to the District Health Information System (DHIS) on a monthly basis. As a result, the raw data serving as an indicator of SAM/MAM in the district was obtained via the clinic data manager. A few officers indicated that they did not have Wi-Fi connection allowing them the ability to access data. The few clinics that had resident dietitians reported that they did not have access to all the records. As a result, a five-year prevalence spanning from 2014 to 2018 was requested from DHIS to determine the estimated prevalence of SAM and MAM in the district as a five year period was deemed adequate to generate data that is both reliable and generalisable. Thereafter, the monthly clinic statistics were recorded on a recording sheet designed for the purpose of this study.

Microsoft Excel was used to capture data that was subsequently imported into the Statistical Package for Social Science (SPSS) version 26 for analysis. The prevalence of SAM was estimated in line with the WHO cut off values at a level of public health significance as per Table 6.1 (de Onis et al., 2018). Descriptive statistics were used to calculate means, standard deviations and frequency distributions, while one-way ANOVA was conducted to compare the mean prevalence of SAM/MAM from 2014 to 2018.

Table 6.1. Cut-off values to determine prevalence of SAM/MAM at a level of public health significance

Indicator	Prevalence cut-off values for public health significance	Interpretation
Stunting	<2.5% 2.5 to <10% 10 to <20% 20 to <30% ≥30%	very low low medium high very high
Wasting	<2.5% 2.5 to <5% 5 to <10% 10 to <15% ≥15%	very low low medium high very high
Overweight	<2.5% 2.5 to <5% 5 to <10% 10 to <15% ≥15%	very low low medium high very high

Source: de Onis et al. (2018)

Ethical consideration

The study was approved by the Biomedical Research Ethics Committee BREC: Ref No. BE105/18 (BREC: Ref No. BE105/18) of the University of KwaZulu-Natal. The project was also registered by the University of Venda Research and Publication Committee (RPC: SHS/18/NUT/25). An application to conduct research from Vhembe district was submitted to Limpopo Provincial office. The written approval letter was then submitted to Vhembe district HRD office and the district also provided a written approval to allow data to be collected from selected clinics.

Results

A retrospective annual SAM/MAM incidence for the Vhembe district, based on monthly statistics, was collected for IYC under five years of age for the period spanning 2014 to 2018. Instead, only the cases identified during clinic visit were recorded. In addition, the records did not indicate the age or sex of the IYC diagnosed as malnourished.

The prevalence of SAM/MAM presented in Table 6.2 indicates the district wide prevalence on a monthly, as well as annual basis. The results show significant variation in the prevalence of cases recorded on a monthly, as well as annual basis.

A number of SAM and MAM cases were recorded for 2014 (n=144) and 2015 (n=120) respectively. However, as of 2016, the recorded number of cases decreased dramatically, while in 2017, there were certain months where not a single case was recorded. This resulted in very few cases (n=19) being reported when compared to other years. In addition, this discrepancy illustrates a concern around the recording of identified cases by nursing staff. Furthermore, considering the unrealistic statistics recorded for 2017, as well as the fluctuating annual, as well as monthly incidence of SAM/MAM across the five years surveyed, the reliability and validity of available data is brought into question.

Table 6.2: Incidence of SAM and MAM in the Vhembe District from 2014 – 2018

Incidence Month	Year				
	2018	2017	2016	2015	2014
-January	4% (n = 2)	32% (n = 6)	8% (n = 6)	13% (n = 16)	5% (n = 7)
-February	11% (n = 5)	16% (n = 3)	10% (n = 9)	5% (n = 6)	8% (n = 11)
-March	13% (n = 6)	42% (n = 8)	5% (n = 4)	9% (n = 11)	30% (n = 43)
-April	13% (n = 6)	5% (n = 1)	4% (n = 3)	10% (n = 12)	8% (n = 11)
-May	7 % (n = 3)	-	17% (n = 14)	3% (n = 4)	1% (n = 1)
-June	15% (n = 7)	-	14% (n = 11)	13% (n = 16)	4% (n = 6)
-July	7 % (n = 3)	5% (n = 1)	4% (n = 3)	7% (n = 8)	2% (n = 3)
-August	2% (n = 1)	-	17% (n = 14)	6% (n = 7)	8% (n = 11)
-September	13% (n = 6)	-	4% (n = 3)	10% (n = 12)	7% (n = 10)
-October	7% (n = 3)	-	8% (n = 6)	16% (n = 19)	18% (n = 26)
-November	7% (n = 3)	-	8% (n = 6)	3% (n = 3)	6% (n = 9)
-December	1% (n = 1)	-	1% (n = 1)	5% (n = 6)	4% (n = 6)
Annual cases	46	19	80	120	144

The annual incidence of SAM/MAM across the five years for which data was collected, is presented in Figure 6.1.

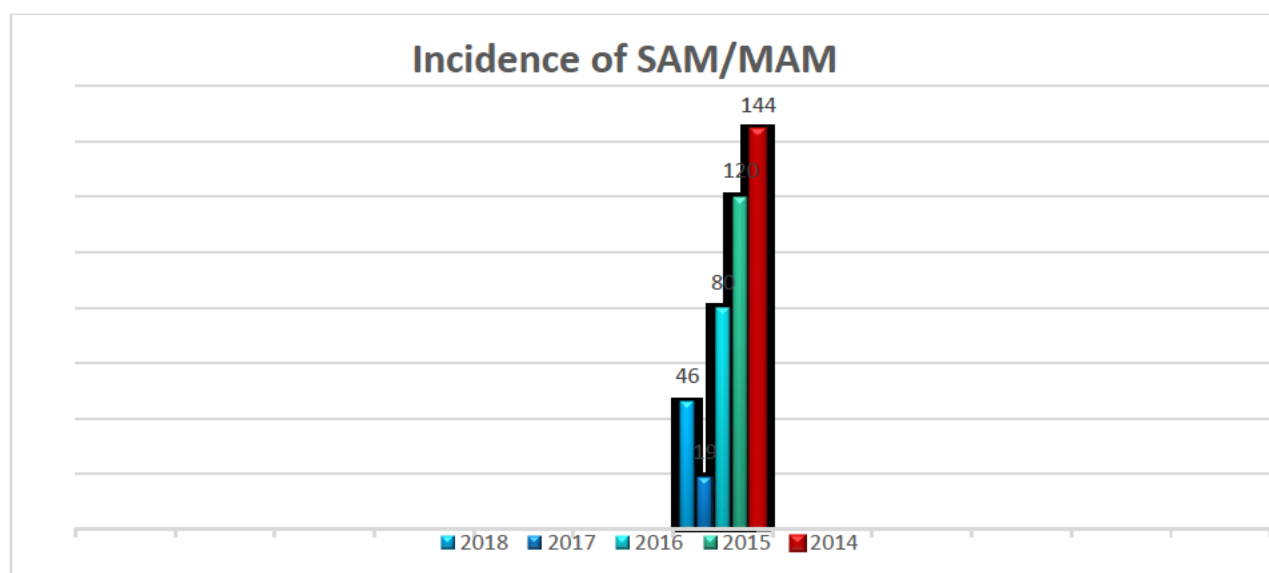


Figure 6.1: Incidence of SAM and MAM in Vhembe district from 2014 – 2018

Table 6.3 shows that there was a highly significant ($p < 0.000$) difference in the incidence of SAM/MAM within the Vhembe district over the five year period studied. The level of significance remained the same when the 2017 data was excluded from dataset. However, apart from the fact that the incidence differed significantly, no further inferences can be made due to the cross-sectional nature of the data set. The wide 95% confidence interval (CI) is also indicative of the fact that there was high variability in the data set.

Table 6.3: Mean incidence over time of SAM/MAM in the Vhembe district

Time period	Mean \pm SD	Minimum	Maximum	95% CI for Mean		P - value#
				Lower bound	Upper bound	
2014 - 2018	81.8 \pm 51.4	19	144	18.01	145.59	<0.000
2014-2016, 2018*	97.5 \pm 43.3	19	144	28.59	166.41	<0.000

*2017 data excluded due to missing data

#One-way ANOVA

Discussion

Children under five years of age are at risk of developing malnutrition, especially undernutrition, with outcomes that include diarrhoea, malaria, and pneumonia if not detected early and the appropriate interventions not implemented timeously.²¹ In SA, malnutrition is associated with more than 60% of all childhood deaths occurring in hospitals.²² It was reported that one in four SA children are chronically malnourished, with the prevalence remaining virtually the same since the early 1990s. The prevalence of stunting ranged from 27.4% in the SA Demographic and Health Survey (SADHS) of 2003 to 21.5% in the SANHANES-1 of 2012.¹⁶

Both weight-for-height z-score (WHZ) and MUAC are recommended to identify severely malnourished children for treatment.²³ The two indicators are also recommended for screening of severely and moderately malnourished children.⁹ Furthermore, MUAC has been considered as valid and simple screening tool for identifying SAM in children under five years of age.²⁴

Although the study aim was to document the incidence of SAM and MAM of children younger than five years in rural clinics of Vhembe district, the clinic records provided, did not distinguish between children diagnosed with SAM and MAM, as it was merely recorded as children under five suffering from malnutrition. It was therefore not possible to gauge the age of the IYC, or whether malnutrition was identified based on weight-for-height/length z-scores or with MUAC cut-offs.

Recent results from nineteen Somalia cross-sectional surveys conducted from 2007 to 2016, showed that age, sex and stunting status of children play a role in the likelihood of them being diagnosed as acutely malnourished, depending on the indicator being used.⁹ An Ethiopian study was conducted to determine the prevalence of, and risk factors associated with the development of malnutrition among children under five years of age, with several sociodemographic, socioeconomic, child health, sanitary conditions and feeding practices appearing to be significant predictors of the nutritional status of children.¹³

The targets and indicators forming part of the Sustainable Development Goals (SDG) that have an indirect impact on child wellbeing, indicated that by 2030, all forms of malnutrition must end. This includes achieving the internationally agreed upon 2025 targets related to stunting and wasting in children under the age of 5 years.¹⁸ Due to the uncertain accuracy of the five year prevalence of SAM/MAM investigated in this study, it is unclear whether Vhembe district is making progress towards reducing the incidence of malnutrition based on the implementation of GMP, as data reported in Chapter 4, provided evidence that of the 312 nursing staff surveyed across the district, their knowledge regarding GMP, skills when conducting anthropometric assessments and ability to interpret growth indicators are suboptimal. In addition, about 20% reported to having received/not attending refresher training since they completed their formal training.

To underscore the above, a nutrition education intervention conducted among children aged three to six years of age in the Limpopo province, documented that no change in the incidence of stunting, underweight and wasting in either the experimental or control groups a year after the intervention was implemented, was not found.²⁵ The fact that the national database on child health, including growth monitoring statistics needs to be updated, should serve as a good motivation for health workers at ground level (health clinics) to keep accurate information, such as correct weight data and this can only be achieved if health workers take readings correctly and capture the data in such a way that it accurately reflects the health and nutritional status of the children²⁶.

Although SA has given priority to the improvement of childhood nutritional status in an attempt to improve child survival and development through early detection and prevention of malnutrition,²⁷ the current study was unable to determine whether progress has been made in Vhembe district over a five year period ending in 2018.

Malnutrition was identified as the most common nutritional disorder in developing countries and remains one of the most common causes of morbidity and mortality among children.²⁸ It was highlighted that the difficulties encountered when addressing malnutrition in SA, despite it being hailed as the most developed sub-Saharan country in Africa, as

malnutrition among IYC persists.²⁹ Similar observations have been made in the Somali region of Ethiopia, where the prevalence of under nutrition among IYC remains a public health problem.³⁰

Conclusion

Despite the implementation of strategies such as GMP in SA clinics to combat malnutrition among IYC under five, the incidence of malnutrition in rural areas remains high. Due to the inconclusive nature of the data reported, as well as the factors that could have influenced the reliability and validity thereof, further investigation into the incidence of SAM and MAM in Vhembe district, as well as the factors that influence not only the incidence, but the reliability of data being generated is recommended. This raises the question of whether there were in fact no SAM/MAM cases identified in certain months, whether the cases were not recorded by nursing staff or whether the ability of nursing staff to screen for SAM and MAM in the district is an aspect requiring further investigation. In addition, it is recommended that records pertaining to malnutrition should include IYC sex and age, as this would shed further light on how the problem can be addressed in the district.

Acknowledgement

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Chapter 7: Maternal Knowledge and Perceived Barriers to The Success of the Growth Monitoring and Promotion Programme in Vhembe District, South Africa

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Abstract

Background

In developing countries, growth monitoring and promotion (GMP) has been reported as an unsuccessful intervention for the reduction of undernutrition due to the exclusion of mothers from the process.

Objective

To determine maternal knowledge of, and perceived barriers to attending government clinics for GMP of their infants and young children (IYC) younger than five years in the Vhembe district.

Method

A qualitative exploratory design, using focus group discussions (FGDs) with mothers at clinics representing the four sub-districts in Vhembe district was conducted. Of the 16 randomly sampled clinics (four per district), data saturation was reached after conducting nine FGDs with a total of 83 purposively sampled mothers with the mean age of 29± 6.53 years per focus group. FGDs were audio recorded by a facilitator, with a scribe taking notes to document non-verbal cues. The recording of each FGD was transcribed verbatim into the local language, followed by back translation into English. Thematic analysis was conducted using Atlas.ti software version 8.4, while maternal sociodemographic characteristics were analysed using the Statistical Package for Social Sciences (SPSS) version 26. Means and

standard deviations were calculated for continuous variables, while frequency distribution were used to report categorical variables.

Results

The primary reason why mothers took their IYC to clinics was immunisation. Mothers' poor compliance with the follow-up schedule of the GMP programme, nurses' commitments regarding the programme and available government services including a lack of resources that included immunisations, were reported as barriers to the successful implementation of the GMP programme. Although the majority of mothers reported to have knowledge regarding the importance of growth monitoring (GM) of their IYC, some mothers indicated that they are not familiar with what GMP services entail, neither its importance.

Conclusion and recommendations

Mothers of IYC that make use of GMP in Vhembe district have knowledge regarding the importance of the programme. However, there are several factors that discourage them optimally utilising the services of clinics offering the GMP programme. These findings highlight the need for nursing staff, clinics and the Department of Health to address the barriers mothers alluded to, as it has the potential to impact on the aims and success of GMP in the district.

Keywords: Barriers, knowledge, mothers, infants and young children, growth monitoring and promotion.

Introduction

Globally, growth monitoring and promotion (GMP) is conducted to prevent malnutrition, as the annual infant and young child (IYC) mortality rate attributed to malnutrition is approximately six million.¹ According to the United Nations Children's Fund (UNICEF), the first five years of a child's life is the most critical period for growth and development and if GMP is not optimally implemented, it might results to malnutrition.² However, it would be great if you have a reference for it. IYC mortality is a global priority, with the Sustainable Development Goals of the United Nations aiming to end all preventable deaths of children under five by 2030.³ For many, access to affordable quality health care is determined by

geographic location. As a result, many IYC die from easily preventable and treatable cause due to a lack of access to health care.⁴

The South African National Integrated Policy for Early Childhood Development (ECD) 2015, predominantly draws on existing policies and regulations that have an impact on IYC under five, in addition to their mothers/caregivers.⁵ While the policy recognises parental duties and that of families as the primary caregivers of children, it also emphasises that the implementation of early childhood rights are highly dependent on the availability and capacity of resources to parents and families. In support of the latter, South Africa has focused on strengthening the health system since 2015 to deliver better services for children, by documenting good practices and advocating for a national scale – up.^{2,5}

Maternal knowledge of and perceptions regarding GMP plays a critical role when it comes to mothers utilisation of GMP services as they are also directly involved in achieving optimal health of their children.⁶ The SA health care approach encourages the transfer of knowledge and skills from health workers to communities and individuals to enable community solutions to malnutrition and childhood diseases.⁷ An exploratory study regarding GMP conducted in Belgium, included an international panel of district medical officers. Following which, it was documented that the suboptimal functioning of GMP was mainly due to the lack of primary health care facility attendance of caregivers and their poor understanding of the concept growth monitoring (GM).⁸ In Afghanistan 85% of mothers or caregivers that bring children to a GMP programme held the belief that the programme would be helpful for the child.⁹ However, the remainder indicated that they did not believe that the programme would be helpful for their children. A study conducted in Ethiopia found that mothers' awareness of GMP is very poor when compared to immunisation.¹⁰ Despite the challenges related to GMP, a Zambian study that included mothers and caregivers, found that mothers had a positive attitude towards to GMP as a way to improve their children's weight status.¹¹

A review paper reported that the definition of GM has shifted from a health service-based therapeutic service provided to individuals to a community-based participatory activity that stresses behaviour change of better informed mothers and eventually comprehensive

community action designed to better the fundamental causes of poor health.¹² However, a Ghanaian study indicated that parents and families need to be sensitised regarding the role of GM in promoting child health, even after completion of the immunisation schedule by recognising and utilising the complementary role of community volunteers in increasing availability and accessibility of GMP services. Based on the high prevalence of malnutrition in the Limpopo province regardless the GMP programme offered,¹³ a qualitative study using focus group discussions (FGDs) was designed to explore maternal knowledge and perceived barriers to the success of the GMP programme among IYC under five years in Vhembe district, South Africa.

Methodology

Research Approach

A qualitative exploratory study was conducted in the four sub-districts (Makhado, Thulamela, Musina and Collins Chabane) of the Vhembe district municipality of Limpopo province, South Africa. Twenty-four clinics were randomly sampled from each of the sub-districts, while all ten clinics in the smallest sub-district (Musina) were selected for inclusion in the quantitative phase of the study. This was followed by random selection of four clinics from the pool of randomly selected clinics per sub-district for the purpose of conducting focus group discussions (FGDs) rendering 16 clinics in total. A FGD consisting of 6 to 14 mothers was conducted at each of the sampled clinics until data saturation was reached.

Figure 1 illustrates the proposed number of FGDs to be conducted in each of the four sub-districts in Vhembe district versus the actual number conducted after data saturation occurred

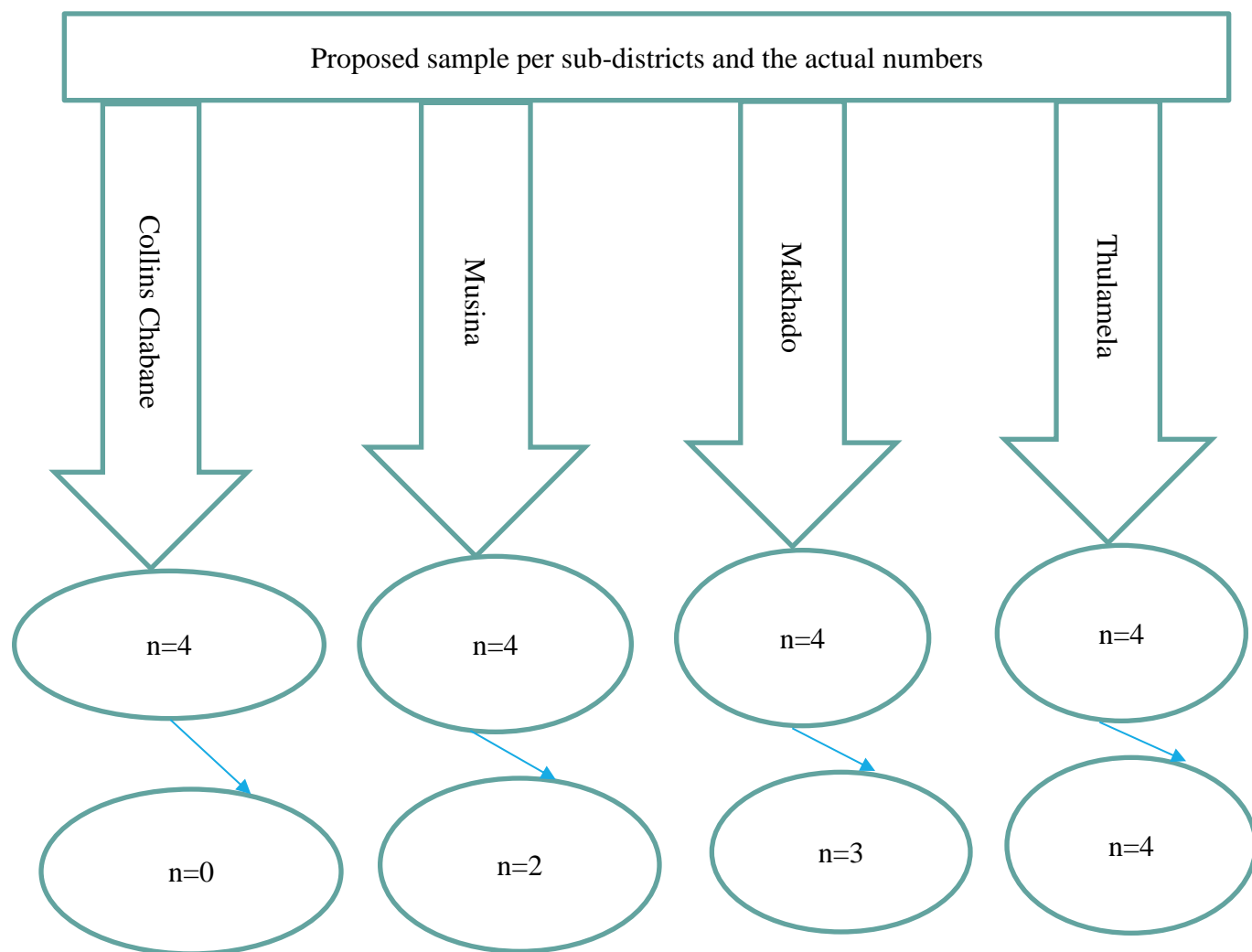


Figure 7.1: Proposed sampling approach versus the actual number of focus groups conducted per sub-district

Population and Sampling

Participating mothers were predominantly Tshivenda and Xi-Tsonga speaking, as these are the predominant languages spoken in the district, at 69% and 27% respectively.¹⁴ Mothers from other ethnic groups could communicate in either of the two languages as it was the vernacular of their spouses or colleagues. All biological mothers of the IYC who brought their children to a particular clinic for GMP were recruited using purposive sampling if they met

the study's inclusion criteria. Exclusion criteria included mothers who were younger than 18 years or mothers who had speech and/or hearing impairments. The researcher acknowledges the selection bias of excluding mothers who do not take their children to the clinic from the study since their perceptions regarding GMP was not heard.

Although it was proposed that mothers will be recruited for FGDs from all sub-districts in Vhembe district municipality, FGDs were conducted in only three sub-districts. This was due to a shortage of vaccinations at clinics in the Collins Chabane sub-district, resulting in large numbers of mothers no longer taking their IYC to clinics in the sub-district for GMP during the study period. Data saturation was reached after conducting nine FGDs that included 83 mothers. The number of mothers per FGD ranged from 6 to 14.

Trustworthiness

The validity of the study findings was ensured by establishing trustworthiness. This was addressed by adhering to the criteria that include credibility, dependability, transferability and conformability.¹⁵ Credibility was ensured by conducting FGDs until data saturation was reached, while dependability was assured by training field workers to serve as focus group (FG) facilitators and scribes in addition to them having experience in conducting interviews for research purposes and having an honours degree in the field of nutrition. Transferability was ensured by providing a detailed description of the research approach employed, thereby enabling other researchers to utilise the findings of the current study to that of a similar study conducted amongst the population or individuals with a similar geographic background and characteristics to that of the current study sample. Conformability was ensured as the researcher and field worker who was responsible for acting as scribe listened to and observed participants to ensure that the findings reflected what participants reported, thereby confirming the study results.

Data collection

A semi-structured FGD guide was used to guide FG discussions, while a structured fieldworker administered questionnaire was used to document participant socio-demographic information. FGDs at the sampled clinics were conducted early in the morning

with mothers who were willing to participate. After mothers signed informed consent, the primary investigator facilitated the FGDs. All discussions were recorded with a digital voice recorder, while a scribe documented field notes. FGDs were conducted in Tshivenda or Xitsonga, depending on the language most frequently spoken in the area where the clinic was located. This enabled mothers to feel at ease, while expressing their opinions freely. To enable further discussion, probing questions were used for clarification, as well as gain an understanding of what mothers were saying. Each FGD had a duration of 30 to 60 minutes.

Ethical Principles

Permission for conducting the study was obtained from the Limpopo Province Department of Health, Vhembe district and clinic managers of sampled clinics. To ensure participant anonymity, each participant was given a code for identification purposes. Prior to participation, each participant signed informed consent after the study purpose and objectives were explained to them. The study protocol was approved by the Biomedical Research Ethics Committee (BREC: Ref No. BE105/18) of the University of KwaZulu-Natal. The project was also registered with the University of Venda Research and Publication Committee (RPC: SHS/18/NUT/25).

Data analysis

Maternal socio-demographic data was coded and analysed using the Statistical Package for Social Sciences (SPSS) version 26. The mean and standard deviation was calculated for continuous variables such as maternal age, while frequency distributions were calculated for categorical variables per sub-district. FGDs were transcribed verbatim from the recording of discussions with a digital voice recorder. This was followed by translating the transcripts from the local languages into English. To enhance the quality of data analysis, Atlas ti. (version 8.4) was utilised to support thematic analysis where themes and subthemes emerged as described by Tesch and Smith.^{16,17} The transcribed translated documents were typed up as word documents, followed by listening to the audio recordings to edit responses where necessary. Thereafter the text was uploaded into Atlas ti. computer software where data was compared and classified into similar responses as themes (categories) and sub-themes. Data coding was done for each theme or sub-themes, followed by the researcher

manually engaging with transcripts by reading the text while identifying mother's quotations as they related to emerging themes and sub-themes. Subsequently codes were used to generate networks or linkages as schematic illustrations and diagrams.

Results

Maternal socio-demographic characteristics

Eighty-three mothers with IYC less than five years aged 19 to 48 years with a mean age of 29 ± 6.53 participated in the study. Table 1 presents the socio-demographic characteristics of mothers per sub-district. The majority of mothers (54.2%) were aged between 25 – 35 years. When compared to other sub-districts, the greatest number of mothers were from Thulamela sub-district (54.2%). Data regarding level of education, shows that the majority of mothers from all sub-district ceased their education at a secondary level (59.0%), while 38.6% completed tertiary education. Nearly eight out of ten mothers (79.5%), were unemployed, with 57.8% depending on a child support grant across all sub-districts with the remainder having additional sources of income provided by a husband and parents.

Table 7.1: Maternal characteristics of those participating in FGDs per sub-district (N=83)

Variable	Makhado (n=24)	Thulamela (n=45)	Musina (n=14)	Total (N=83)
Age category (years)				
- 19 – 24	6% (n=5)	14.5% (n=12)	4.8% (n=4)	25.5% (n=21)
- 25 – 35	14.5% (n=12)	31.3% (n=26)	8.4% (n=7)	54.00% (n=45)
- 36 – 59	8.4% (n=7)	8.4% (n=7)	3.6% (n=3)	20.5% (n=17)
- Mean ± SD				29.0 ± 6.53
Level of education				
- Primary	-	-	1.2% (n=1)	1.2% (n=1)
- Secondary	19.3% (n=16)	31.3% (n=26)	8.4% (n=7)	59.0% (n=49)
- Tertiary	9.6% (n=8)	21.7% (n=18)	7.2% (n=6)	38.6% (n=32)
- Never attended	-	1.2% (n=1)	-	1.2% (n=1)
Occupation				
- Domestic worker	-	-	1.2% (n=1)	1.2% (n=1)
- Police	-	1.2% (n=1)	-	1.2% (n=1)
- Educator	-	-	1.2% (n=1)	1.2% (n=1)
- Nurse	-	1.2% (n=1)	-	1.2% (n=1)
- Self employed	1.2% (n=1)	2.4% (n=2)	2.4% (n=2)	6.0% (n=5)
- Not employed	25.3% (n=21)	44.6% (n=37)	9.6% (n=8)	79.5% (n=66)

- Retail	2.4% (n=2)	2.4% (2)	2.4% (n=2)	7.2% (n=6)
- Community health worker	-	1.2% (n=1)	-	1.2% (n=1)
- Cleaner	-	1.2% (n=1)	-	1.2% (n=1)
Source of income				
- Child support grant	16.9% (n=14)	34.9% (n=29)	6.0% (n=5)	57.8% (n=48)
- Husband	4.8% (n=4)	8.4% (n=7)	7.2% (n=6)	20.4% (n=17)
- Parents	2.4% (n=2)	4.8% (n=4)	1.2% (n=1)	8.4% (n=7)
- Social grant	-	-	1.2% (n=1)	1.2% (n=1)
- Child support grant and husband	3.6% (n=3)	1.2% (n=1)	-	4.8% (n=4)
- Child support grant, parents and social grant	1.2% (n=1)	-	-	1.2% (n=1)
- Child support grant, husband and parents	-	2.4% (n=2)	-	2.4% (n=2)
- Child support grant and parents	-	1.2% (n=1)	1.2% (n=1)	2.4% (n=2)
- Child support grant and social grant	-	1.2% (n=1)	-	1.2% (n=1)

Maternal knowledge regarding GMP and perceived barriers to attending GMP services

The FGD guide consisted of two groups of themes depicted in Table 2. The first theme focused on maternal knowledge regarding GMP, while the other was related to perceived barriers that prevent mothers from attending GMP services.

Table 7.2: Overview of the FGDS arranged in themes and sub-themes reflecting maternal knowledge and perceived barriers towards GMP of IYC younger than five years

Themes	Sub-themes
1. GMP knowledge of mothers with IYC younger than five years	1.1 Understanding the importance of measuring weight and height.
	1.2 Health messages received from clinic staff/nurses during GMP visits.
	1.3 Support received from nurses in relation to IYC growth patterns.
2. Perceived barriers to attending GMP services	2.1 Reasons why mothers do not comply with the given GMP clinic schedule of IYC.
	2.2 Mother's proposals on how to resolve identified barriers.

Theme 1: Mothers with IYC younger than five years knowledge regarding GMP

Sub-theme 1.1: Mothers understanding of the importance of measuring weight and height of IYC younger than five years

Figure 2 below, presents mothers' understanding of the importance of measuring IYC weight and height. The frequency of mothers' opinions regarding the sub-theme under discussion is also indicated. Findings revealed that the majority of mothers understood the importance of taking their IYC to a clinic for monitoring of their weight and height at GMP services for the prevention of disease. The main diseases alluded to during discussions with various FGs included measles and HIV infection. In addition, several mothers were interested in the fact that their IYC are immunised/receive injections when they visit the clinic for weight and height monitoring. Very few mothers mentioned that they take their IYC to the clinic for GM or assessment whether their children are healthy or growing appropriately.

One mother's understanding was:

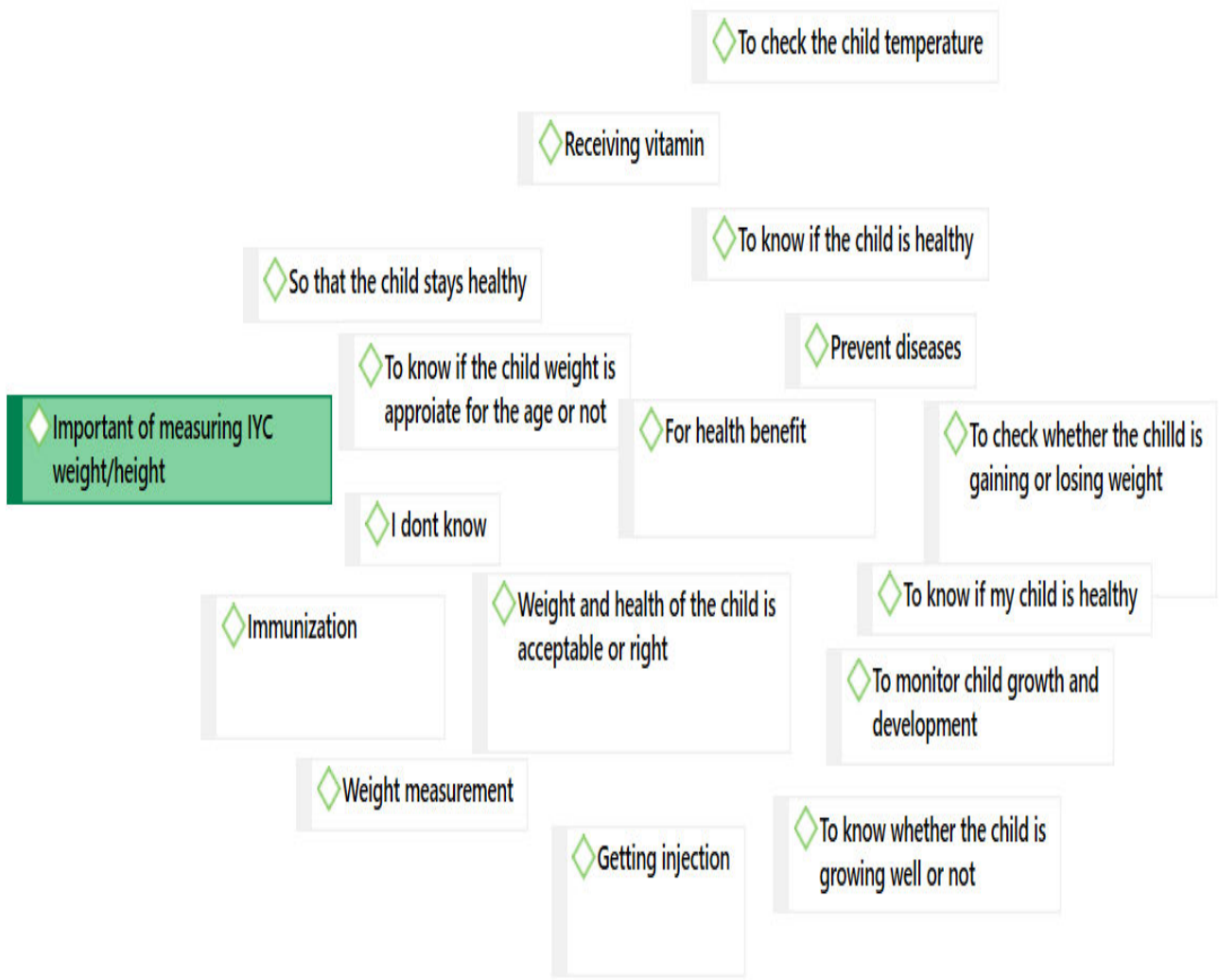
"Measuring a child weight and length/height is important for a child to me as a mother so that I know if the child is healthy and how the weight of the child" (FGD3, M1).

In support of the previous mother, another mother from the same FG group added:

"I bring my child to clinic so that I know the weight of the child and to know if my child is healthy and the child must be immunised" (FGD7, M1).

However, a mother from another FG said:

"It is about receiving injection to prevent diseases on children and to know if my child is healthy and to check whether the child is gaining or losing weight" (FGD2, M2).



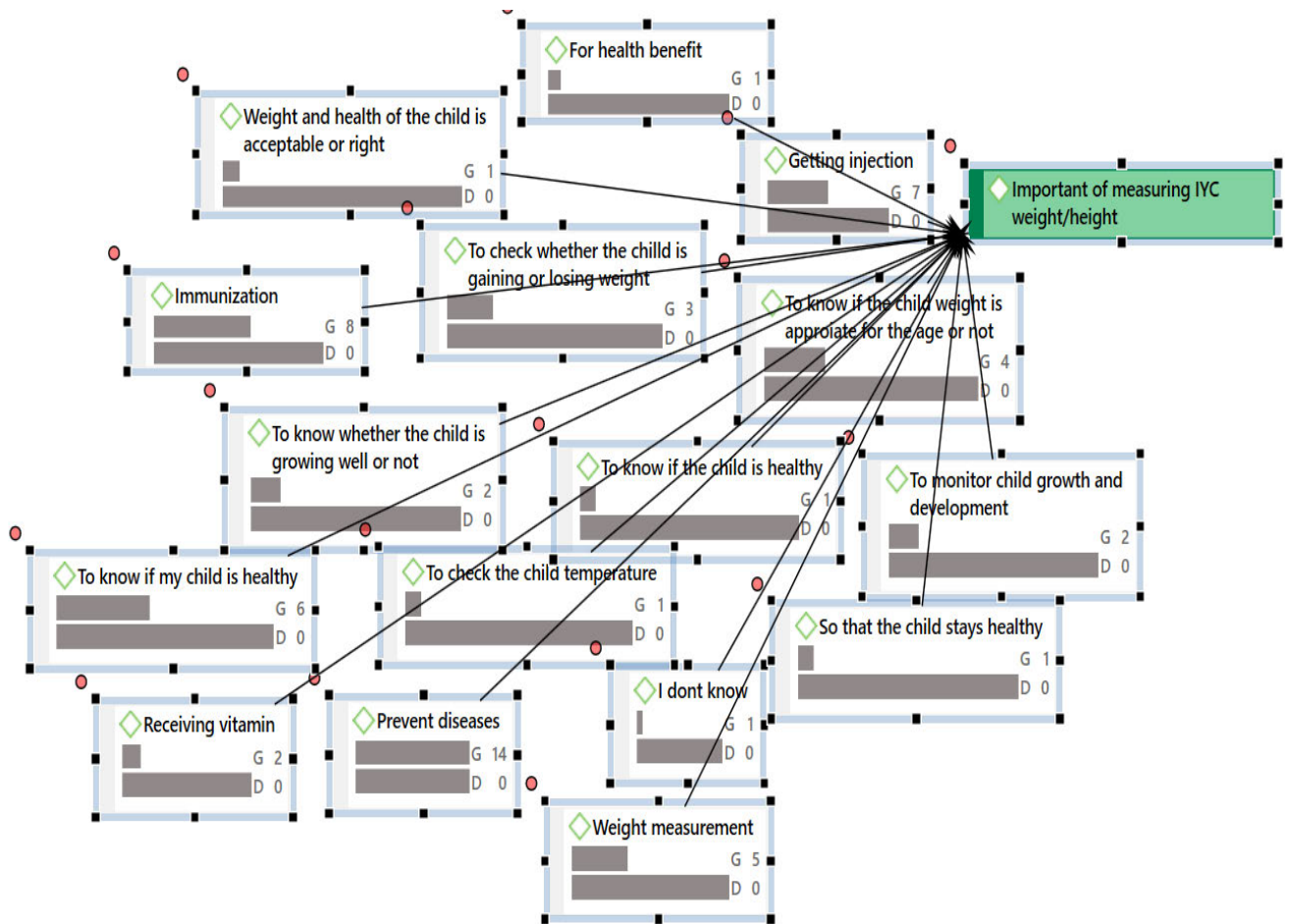


Figure 7.2: Network depicting mothers’ understanding of the importance of measuring IYC weight/height as part of GMP services

*G – number of mothers who had similar understandings

*D – document number

Sub-theme 1.2: Health messages received at clinics during GMP visits

Findings indicated that mothers received health messages on numerous topics when visiting clinics with their IYC for GMP. Topics included IYC feeding, with the emphasis on the importance of exclusive breastfeeding, appropriate time for the introduction of complementary feeding, hygiene and sanitation, positioning of the baby while breastfeeding, disease prevention and how to follow instructions in the RTHB for preparation of the Oral Rehydration Solution (ORS) for the management of diarrhoea. These messages are illustrated in Figure 3.

Although some mothers indicated that they were never exposed to health messages during clinic visits, they were of the opinion that it depended on the nursing staff who were delivering the GMP services on the day of visit, as some nurses are willing to give health talks, while others do not provide any health education. During the FGDs, a few mothers indicated that it was the first time they were visiting the clinic for GMP with their new born infants, as a result they have not been exposed to health messages as yet. Furthermore, other mothers explained that nurses normally start giving health talks at 7:30 before they start rendering GMP services. Hence those who have never received health education attributed it to the fact that despite the purpose of the clinic visit being GMP, they always arrived late and therefore missed the health talks given by nursing staff.

Regarding the above, one mother remarked:

“Nurses teach us about breastfeeding, they tell us that breastmilk is healthy compared to formula milk, so mothers must not admire those who are giving their children formula milk because children who are formula fed are usually not healthy” (FGD1, M4).

A mother from another FG added:

“Nurses said a child who eats complementary foods does not breastfeed a lot, it result in a baby sleeping a lot and fail to get enough time to breastfeed because the child stomach will be full of porridge” (FGD4, M4).

Sharing information received from nursing staff, one mother from FG six said:

“Although I have never done it, what I learned is when preparing ORS when the child body temperature rise or other diseases, you count teaspoons of sugar and add with salt in one litre then give the child to drink, therefore if the child is vomiting or having diarrhoea it will stop” (FGD6, M2).

Another mother from FG eight reflected on the advice given by nursing staff adding that:

“GMP services are not supposed to be missed because it is important for monitoring the child health so that they know how the child is growing” (FGD8, M6).



Figure 7.3: Summary of health messages received during GMP services

Sub-theme 1.3: Support received from nursing staff in relation to IYC growth patterns

Throughout FGDs, mothers highlighted the fact that for those with mental impediments, nurses would write their return date on the RTHB and informed them of the date when they had to bring their IYC back to the clinic for GMP. In addition, nurses requested that mothers without mental impediments should remind those with a mental illness to bring their IYC to the clinic for GMP, especially if they are given the same return date.

However, a mother from the first FG group remarked:

“I haven’t got any support from nurses at the clinic” (FGD1, M5).

Figure 4 below depicts the support given to mothers by means of group health talks facilitated by nurses and where necessary, individual advice given to mothers.

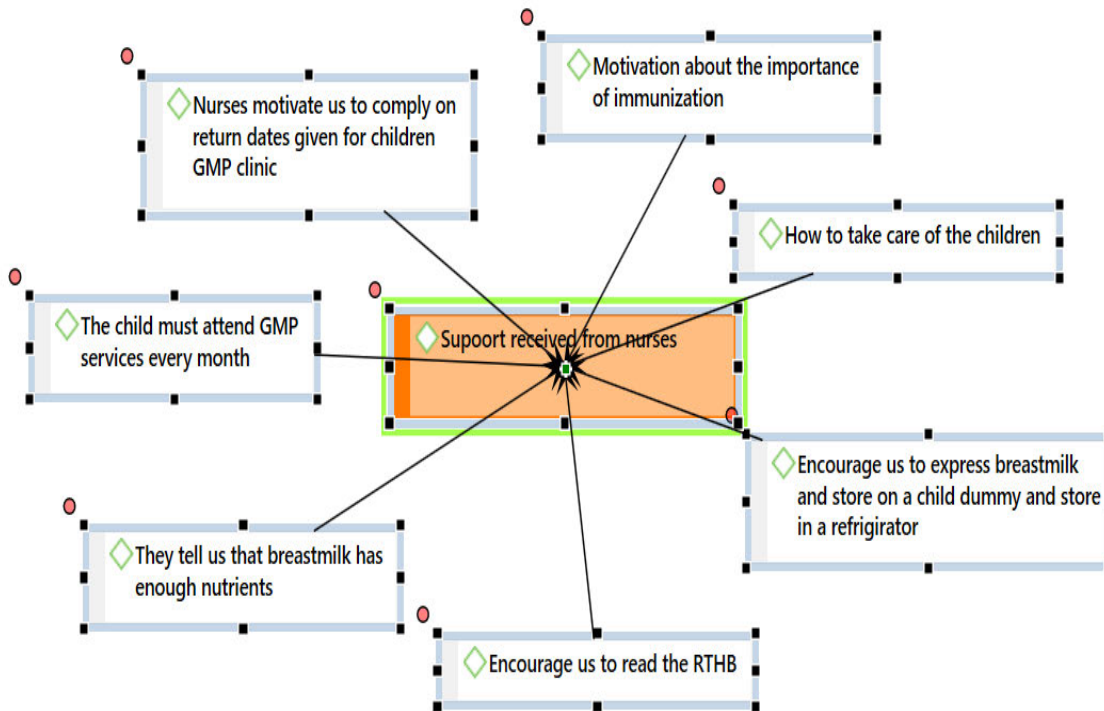


Figure 7.4: Maternal support in the form of health talks received from nursing staff during clinic visits for GMP services

Theme 2: Perceived barriers to attending GMP services

Sub-theme 2.1: Reasons why mothers do not comply with the given GMP clinic schedule of their IYC

The findings presented in Figure 5 provides an overview of why mothers do not comply with the clinic visit schedule for GMP of their IYC under five years.

When discussing the reasons why she does not comply with the clinic schedule, one mother from the first FG remarked:

“Sometimes it is because of undermining the GMP services given to children at the clinic and sometimes is due to laziness because I know that today my child is not going to receive an

injection and the time I will come when nurses will ask why did you fail to bring a child on the scheduled date and I will then come up with excuses such as I was busy” (FGD1, M2).

A mother from another FG added the following insight:

“The problem with the mother is when nurses write a return date on the RTHB, they put it inside the child bag and never open it again to see what is written inside” (FGD8, M1).

Another mother from the same FG added:

“When mothers are not at home due to work or while still at school they tend to forget telling the person taking care of the child such as a granny that she must take the child to a clinic for GMP on the scheduled date” (FGD1, M1).

However, a mother from another FG expressed her dissatisfaction with the GMP services delivered by clinic staff:

“Myself I am not satisfied with the GMP services, like now we have arrived early in the morning and it has been a very long time while we are sitting here in the que without getting assistance from nurses, what we are seeing nurses doing is just going up and down while we are waiting for them and they are not telling us the reasons why are they not helping us and as a result we end up leaving the clinic around 14h00, as children will start feeling hungry and as mothers we get tired as well” (FGD4, M4).

A mother from the same FG added:

“Ever so often nurses are so slow, we end up sitting here in the ques for a long time and as patients we end up feeling hungry and after a long time they will tell us that there are no vaccinations and they don’t even bother taking the weight of my child and as for me I use transport to come to the clinic I must come back on another day using my money, and that always influence me to skip the GMP service because I know when I come to clinic I will not get any help” (FGD9, M4).

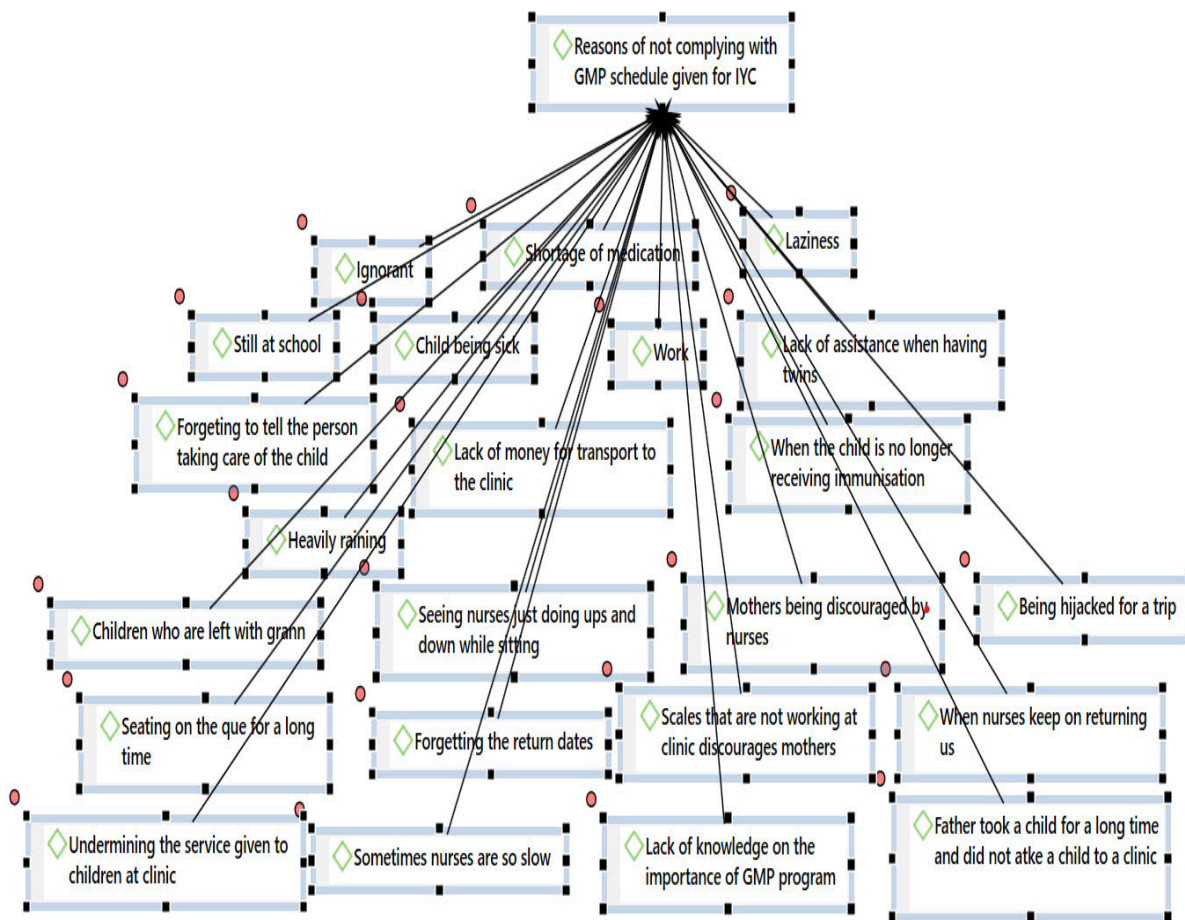


Figure 7.5: Network providing an overview of mothers’ reasons for not complying with the GMP schedule of their IYC

Sub-theme 2.2: Mothers proposals on how to resolve identified barriers regarding the GMP schedules

The majority of mothers who participated in this study gave suggestions on how the GMP services can be improved, as well as indicating who should take responsibility for these improvements. Figure 6 illustrates how mothers think the implementation of GMP services can be improved, in addition to the role nursing staff can play, as well as the role of the government itself. It was worth noting that during FGDs, mothers did not only blame nursing staff and the government for their infrequent attendance of GMP services. Instead, they showed introspection by looking at themselves as a group of stakeholders who are

contributing to the failure of the GMP programme and in doing so, are placing the health and wellness of their IYC that are at a vulnerable stage of the life span in jeopardy.

Regarding a potential solution, a mother from the first FG group said:

“It means that as mothers we must make sure that we check the RTHB most frequently and also check the return date scheduled for a child GMP services. Thereafter, remind the person taking care of the child while you’re at work” (FGD1, M2).

A frustrated mother from the same FG said:

“Nurses must help people and stop the issue of going up and down and playing with their phones. They must give themselves time with patients. Today I arrived here at 8h30 a bit late from other days where I was arriving early, however, I have not been assisted. The service is poor and in order to resolve this issue the government must hire more staff or the available staff must work on time” (FGD2, M2).

A mother from another FG four added to the issue of nursing staff engaging with their cellphones by saying:

“Nurses must tell whoever is calling, that I am at work, I will call you later when I am free” (FGD2, M4).

Another frustrated mother said:

“I am talking from experience, in this clinic there are shortage of immunisation which makes us to even to come three to four times to the clinic and not get immunisation injections. For example, when a child is supposed to receive a 9 months injection, you may come here and find that it is not there and your child will end up receiving injection when he is 11 months old, there are no medication and it must be delivered on time” (FGD5, M1).

A mother from the same FG added:

“To better the situation, I think they must use sms like they do with mom-connect where they remind a mother to attend ANC so they must do the same to remind mothers about taking a child to clinic GMP service” (FGD7, M1).

Another angry mother said:

“The other thing is nurses after tea time they spend a lot of time just relaxing and chatting while we are just seated here. What is the clinic manager or supervisor duty? And what is the importance of service to patients? Because this nurses are hired in order to treat us. What I am trying to say is whoever supervising nurses must try to monitor the service” (FGD9, M7).

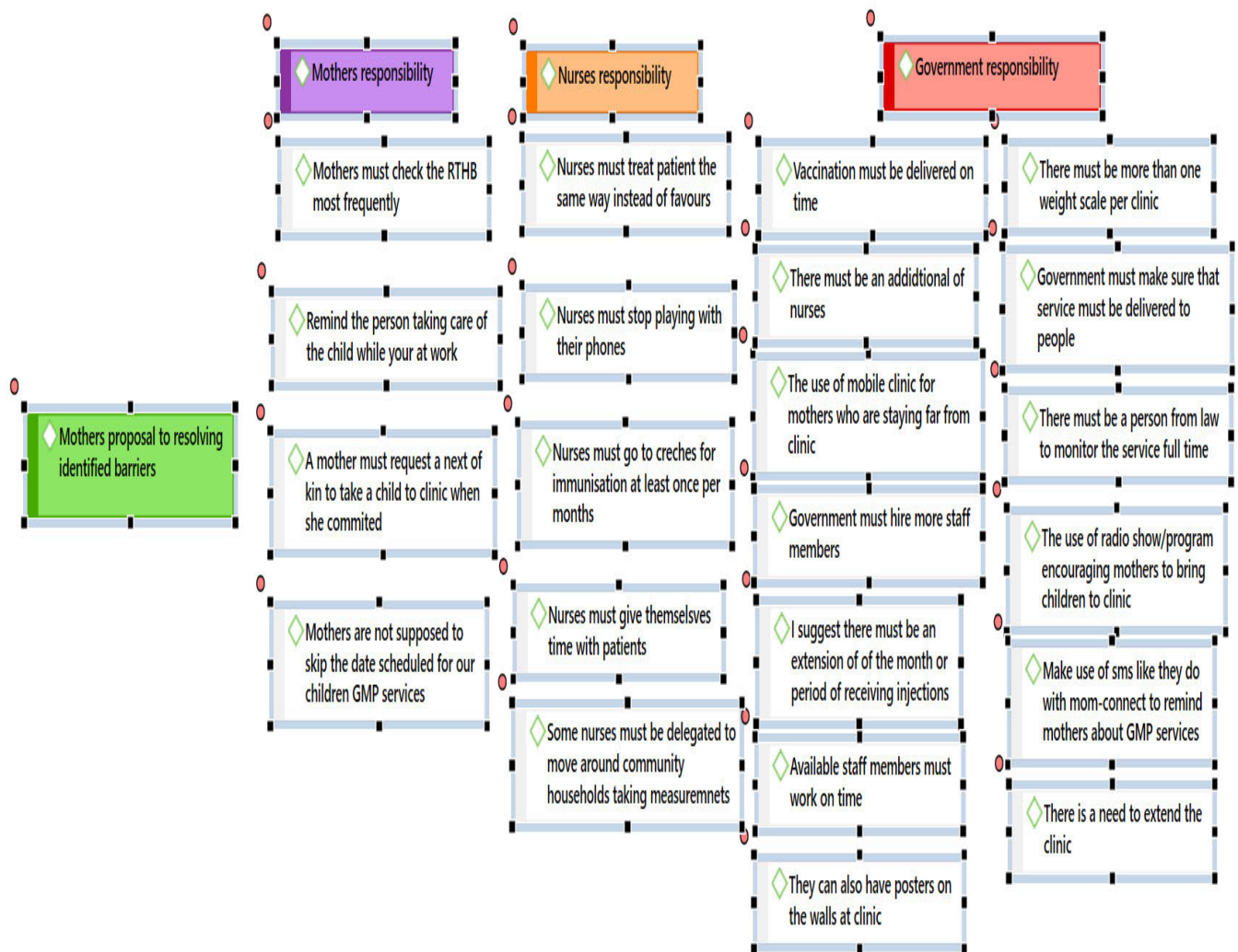


Figure 7.6: Flow diagram illustrating mothers’ proposed solution to the problems they experience with GMP services, as well as stakeholders that need to be accountable

Discussion

The assessment of mothers' socio-demographic characteristics revealed that while the majority of mothers only completed a secondary level of school education and were unemployed, it was not possible to determine whether their level of education had an impact on their understanding of GMP or influenced their perceptions regarding the programme, especially when it came to the importance of measuring IYC weight and height. It is however worth noting that all mothers, including those who had tertiary level education or were professionally employed, shared a similar understanding of and experience regarding GMP.

The Vhembe district has a lower employment rate at 24% when compared to the 39% of the Limpopo province, as well as the national of rate of 30 %.¹⁴ The primary source of income for the majority of mothers in the study sample (57.8%), was a child support grant, with social grants contributing up to 42% of household income in poor families, thereby making social grants the most important source of income.¹⁴ The high level of unemployment in the study sample, could have contributed to mothers not having the privilege of taking their IYC to the respective clinics for GMP.

It was evident that mothers knew that it is important to take their IYC to the clinic for GMP, despite the fact that some were not familiar with the reasons why it is important. In addition, the majority of mothers understood the importance of measuring weight and height as indicators of IYC growth, as well as the prevention of disease through immunisation. As a result, mothers did not want to skip the scheduled date for their IYCs immunisation. Ever since the Millennium Summit took place in 2000, immunisation has been regarded as a primary driving force behind efforts to meet the Millennium Development Goals (MDGs) that includes the reduction of mortality among children under five years old.¹⁸ After the setting of the MDGs, the Sustainable Development Goal (SDG) number three also focuses on optimal health and well-being for all people, which in turn, will ensure healthy lives and promote well-being for all at all ages, thus including GMP of IYC as it plays a vital role in reducing the prevalence of morbidity and mortality.³ However, the problem regarding GMP being faced by the Vhembe district Department of Health, is that there are mothers who lack

knowledge regarding the importance of why IYCs growth should be monitored or why it is essential that they should be immunised.

The findings of the current study confirmed that irrespective of the challenges and frustrations with the GMP programme mothers experience they comply with the GMP services of their IYC while they are still receiving immunisations. However, it is cause for concern where mothers reported that despite arriving timeously, early morning health talks where not always given at clinics, thereby not allowing them the opportunity to benefit from the health messages given as part of the group education targeting mothers/caregivers with IYC. It is vital for IYC growth and development to be monitored closely, so that early corrective measures can be implemented to ensure normal growth.¹⁸ However, by not equipping mothers with health messages that emphasise the importance of GMP services, the effectivity of the GM programme is being undermined. In addition, maternal and caregiver laziness that contributes to IYC not being taken to the clinic on a regular basis, also impacts on the effectivity of the GMP programme.

A study conducted in Greater Tzaneen South Africa (SA), also reported that mothers do not value the importance of their role in GM.¹⁹ Furthermore, it was also observed that the majority of parents in India, are not interested in sending their IYC for weekly or monthly GM sessions, as they either forget or were preoccupied with daily chores.²⁰ Similarly, a study conducted among district medical officers as part of an international panel on GMP, reported a positive relationship between knowledge regarding GMP and increased attendance of the GMP programme.²¹ In Ethiopia, a lack of appropriate knowledge about GMP and indigenous understanding of child health and growth, contributed to low GMP programme attendance by mothers.²² The above illustrates that regardless of the country being assessed or the services being rendered at health facilities, mothers are always able to justify why their IYC are not taken to health facilities for regular GMP.

The delays caused by long ques and the shortage of vaccinations at clinics were also cited as factors contributing to mothers being apathetic and discouraged from complying with GMP services and follow-up visits at clinics. In Ethiopia it was documented that the utilisation of

the GMP programme by mothers has remained inadequate due to a lack of resources such as shortage of vaccines making it possible that these factors may contribute to the incomplete immunisation schedule of IYC ²². In support of the above, it has also been observed that the success of GMP is dependent on the knowledge, dedication and cooperation of mothers, caregivers and health workers in greater Tzaneen SA. ¹⁹ Mothers included in the current study, suggested that the implementation of the GMP programme can be strengthened in Vhembe district if mothers fully engage with the programme, with nursing staff serving as primary service providers. In addition, local government should promote the services offered by the GMP programme at both primary health care centres and at community level such as day care centres and through the use of mobile clinics.

Conclusion

The study findings confirmed that the majority of mothers with IYC younger than five years in Vhembe district have knowledge regarding the importance of regularly taking their IYC to clinics for participation in the GMP programme, especially for weight monitoring to prevent disease. However, it was also noted that there are mothers that do not value the importance of GMP services, in addition to those that do not have an idea of what the main purpose of taking IYC to clinic for GMP services is. Although several health messages are delivered and support is given by nurses when conducting health talks at various clinics in the district, some mothers indicated that they have never received health education at certain clinics. In addition, numerous challenges were encountered by mothers when visiting clinics, serving as deterrents to regular clinic attendance for GMP. Hence findings of the current study documented the need for interventions to enhance the effectivity of the programme in the Vhembe district, by focusing on mothers, nursing staff and the Department of Health (government) in terms of addressing identified challenges regarding GMP programme.

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Chapter 8: Recommendations for Improving the Implementation of the Growth Monitoring and Promotion Programme in Vhembe District Based on Recommendations from Nursing Staff and Participating Mothers

REPORT OF GROWTH MONITORING AND PROMOTION PROGRAMME FOR
INFANTS AND YOUNG

CHILDREN (IYC) YOUNGER THAN FIVE YEARS:

DEPARTMENT OF HEALTH (DOH): VHEMBE DISTRICT

CHALLENGES AND RELATED RECOMMENDATIONS REGARDING THE IMPLEMENTATION
OF THE GROWTH MONITORING PROGRAMME IN VHEMBE DISTRICT BASED
RECOMMENDATIONS FROM NURSING STAFF AND PARTICIPATING MOTHERS

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1. Introduction

The main purpose of compiling this report, was to communicate the findings of a study that investigated the efficacy of the growth monitoring and promotion (GMP) programme in clinics representative of the four sub-districts in Vhembe district, Limpopo province. For the purpose of the study, 312 nursing staff working with GMP at 82 government clinics across the district and 82 biological mothers with infants and young children (IYC) that make use of the services offered by the GMP programme were consulted.

Hence, participants' opinions on what is hindering the success of the service rendered by the GMP programme and suggested recommendations for improvement of the programme is reported. To generate data, 82 government clinics representative of the four sub-districts in Vhembe district (Thulamela, Makhado, Collins Chabane and Musina) were surveyed between September 2018 and June 2019 as is depicted in Figure 8.1.

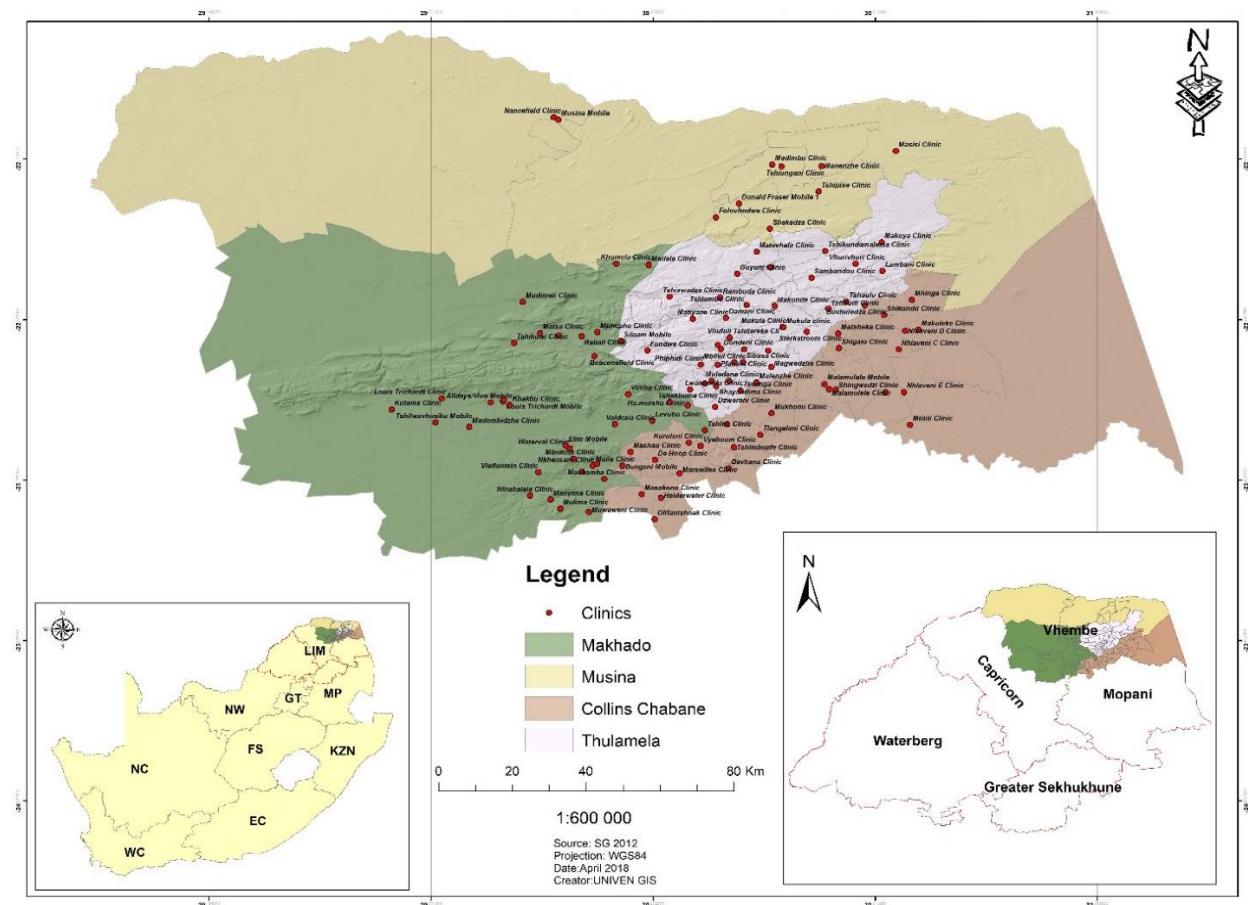


Figure 8.1: Map of Vhembe district showing clinics in the four sub-districts

Vhembe district covers a geographical area that is predominantly rural, and is characterised by a high unemployment rate (53%) and poverty (32%). Health services are delivered by one regional hospital, six district hospitals, one specialised psychiatric hospital, eight community health centres, 125 clinics and 16 mobile clinics. The district has a population of approximately 1 393 950, with 476 905 children aged zero to 14 years (Stats SA, Community Survey, 2016). The area needs to contend with infrastructural backlogs for water, sanitation and electricity, that negatively impacts on the health of communities. The poor road infrastructure influences reasonable response times for vehicles such as ambulances, mobile clinics and police vehicles. However, the district has fertile land and an agriculture sector currently employing 22% of the labour force, while contributing to 3% of the Growth and Development Program (GDP) (The Local Government Handbook, 2017).

2. Research objectives

To compile a report for the Department of Health (DOH), including recommendations based on the study outcomes, with the potential of being used as a guideline to address problem areas related to GMP identified in Vhembe district.

3. Research questions

- What are nursing staff concerns and recommendations for improving the efficacy of the GMP programme?
- What are mothers' recommendations for improving the efficacy of GMP activities?

4. Methodology

This study was an exploratory cross-sectional descriptive study employing mixed methods. Quantitative methods included in depth interviews that were conducted with nursing staff at randomly selected government clinics, while focus group discussions (FGDs) were conducted with the biological mothers of IYC under five.

The descriptive quantitative component of the study was employed to identify the challenges nursing staff face while conducting GMP, as well as their recommendations for addressing these challenges. Qualitative methods in the form of FGDs were conducted with eligible mothers to identify the challenges they face that prevent them from optimally utilising the services offered as part of the GMP programme, as well as recommendations regarding what can be done to overcome these challenges.

The study sample included 312 nursing staff working with GMP at government clinics and 82 biological mothers of IYC under five years of age that utilise the services of clinics offering GMP.

Questions included in the IDIs conducted with nursing staff were related to personal experience gained while working with the GMP programme. FGDs were conducted with one group of mothers per sampled clinic, with discussion guides consisting of semi-structured questions that were related to gauging insight regarding mothers' knowledge and perceived or actual barriers that prevented them from complying with the clinic GMP visits. Probing questions were used to stimulate interaction between mothers and discussion. To ensure that participants concentrated on the discussion at hand, FGDs were conducted in a separate room at the clinic or at open shaded space such as a tree outside the clinic.

5. Participant socio-demographic characteristics

The socio-demographic characteristics of nursing staff and mothers of IYC under five that participated in the study are presented in Table 8.1.

Table 8.1: Socio-demographic characteristics and level of education of study participants

Nursing staff (N=312)		
Variable	Mean ± SD	Frequency
Age (years)	44.1 ± 9.3	
Gender		
- Male		10.9% (n=34)
- Female		89.1% (n=278)
Category of nursing staff		
-Nursing assistant		26.0% (n=81)
-Staff nurse		16.9% (n=53)
-Clinical nurse practitioner		21.5% (n=67)
-Professional nurse		35.6% (n=111)
How long have you been working as a nurse (years)?	15.3 ± 9.6	
How long have you been working with GMP (years)?	12.0 ± 8.8	
Where did you receive training on GMP? (n=311)		
- Nursing college		37.6% (n=116)
- University		9.6% (n=29)
- DOH workshops		13.5% (n=41)
- At clinic by Dietitian/Nutritionist		2.1% (n=6)
- At clinic by colleague		9.9% (n=30)
- Never received training		2.5% (n=7)
- Nursing college and DOH		5.3% (n=16)
- At a hospital		7.0% (n=21)
- Nursing college and at clinic by colleague		3.4% (n=10)
- Combination of cited options		9.1% (n=36)
Mothers (N=83)		
Variable	Mean ± SD	Frequency
Age (years)	29.0 ± 6.53	
Number of participants per sub-district		
- Makhado		28.9% (n=24)
- Thulamela		54.2% (n=45)
- Musina		16.9% (n=14)
Level of education		
- Primary		1.2% (n=1)
- Secondary		59.0% (n=49)
- Tertiary		38.6% (n=32)
- Never attended		1.2% (n=1)
Occupation		
- Domestic worker		1.2% (n=1)
- Police		1.2% (n=1)
- Educator		1.2% (n=1)
- Nurse		1.2% (n=1)
- Self employed		6.0% (n=5)
- Unemployed		79.5% (n=66)
- Retail		7.2% (n=6)
- Community health worker		1.2% (n=1)
- Cleaner		1.2% (n=1)

From the above it is evident that apart from having a mean age of 44.1 years, the majority of nursing staff recruited from 82 randomly selected clinics representing the four sub-districts

of Vhembe district were female (89.1%), worked as professional nurses (35.6%) followed by being a nursing assistant (26.0%) and had been working as a nursing staff member for a mean number of 15.3 years. In addition, they had been working with GMP for a mean number of 12 years. The majority received their training on GMP from a nursing college (37.6%), followed by 13.5% who received training at workshops offered by DOH. Mothers who participated in FGDs had a mean age of 29.0 years and were sampled from three of the four sub-districts in Vhembe. The majority had a secondary school level of education (59.0%), followed by tertiary education (38.6%) and were unemployed (79.5%).

6. Experiences of nursing staff and mothers

Both nursing staff and mothers shared their experiences regarding the GMP programme, as well as activities that are necessary for the successful implementation thereof. Similarities regarding the challenges faced by the two respective groups were noted. This is a source of concern, as these challenges have a direct impact on programme success, especially in terms of curbing IYC malnutrition. To illustrate the above, the shortage of vaccines at certain clinics were reported by both nursing staff and mothers, as was the availability of scales that were in good working order. Table 8.1 provides an overview of the daily challenges encountered during the delivery of GMP, in addition to a suggestion regarding the stakeholders that can make a significant contribution towards solving these challenges. Furthermore, the potential impact of these challenges on IYC under five are noted in event of them not being addressed.

Table 8.2: Predominant challenges regarding GMP reported by nursing staff and mothers

Challenges experienced by nurses	Responsible stakeholders	Potential impact
-Mothers default on regular clinic attendance	Mother	Inadequate GMP contributing to malnutrition
-Mixed feeding/early introduction of solid foods	Mother	Increased susceptibility to diarrhoea and related malnutrition
-Shortage of vaccines	DOH	Increased susceptibility to communicable diseases

		resulting in fever and malnutrition
-Scales not working/not available	DOH	Inability to conduct growth monitoring and identify malnutrition
-Staff shortages	DOH	Inability to conduct GMP effectively
-Mothers do not adhere to health messages	Mother	Suboptimal IYC health contributing to malnutrition
-Mothers do not understand/read the RTHB	Nursing staff	Lack of motivation to comply with GMP and regular clinic attendance
-Mothers visit the clinic without RTHB	Mothers	Inability to conduct GMP effectively
-Mothers do not take care of their children	Mothers	Malnourished IYC
-Inadequate breastfeeding	Mothers	Malnourished IYC
Challenges experienced by mothers	Responsible stakeholders	Potential impact
-Shortage of vaccines	DOH	Increased susceptibility to communicable diseases resulting in fever and malnutrition
-Work	Mothers	Inability to optimally comply with GMP
-Still at school	Mothers	Inability to optimally comply with GMP
-Mothers being discouraged by nursing staff	Nursing staff	Suboptimal compliance with GMP
-Lack of knowledge regarding importance of GMP	Nursing staff	Suboptimal compliance with GMP
-Broken clinic scales discourage mothers	DOH	Inability to conduct GMP effectively
-Nurses keep on returning mothers and some does not give their full attention to mothers because they were on their cell phones	Nursing staff	Suboptimal compliance with GMP
-Lack of knowledge regarding the importance of GMP	Nursing staff	Suboptimal compliance with GMP
-Lack of transport money for clinic attendance	Government	Suboptimal compliance with GMP
-Extensive waiting time before GMP consultation	DOH and nursing staff	Suboptimal compliance with GMP

Based on the challenges experienced by nursing staff, it was apparent that the majority of responsible stakeholders that are able to address these challenges are mothers (60%), followed by the DOH at 30%. However, the predominant potential impact was related to IYC malnutrition, whether it be directly or indirectly.

When it came to challenges experienced by mothers, it was interesting to note that the majority of responsible stakeholder were either nursing staff and a combination of nursing staff and DOH, with the predominant potential impact being related to suboptimal maternal compliance with GMP.

It is therefore evident that when it came to addressing the challenges experienced by nursing staff, mothers were the stakeholders that could play an important role in addressing these, while nursing staff and DOH were the stakeholders that could play a role in addressing the challenges experienced by mothers. This highlights the fact that because the challenges that have an impact on the effective implementation of GMP are multifactorial, an engagement with various stakeholders is required to address IYC malnutrition.

7. Recommendations made by nursing staff

Table 8.2 outlines the recommendations made by nursing staff in order to address the challenges experienced with the implementation of the GMP programme. Although participant recommendations were numerous, only recommendations and therefore remedial action that could be implemented to address the challenges experienced by $\geq 5\%$ of study participants are reported.

Table 8.3: Recommendations made by nursing staff to resolve challenges experienced with the implementation of the GMP programme

Variable	Frequency
What do you think can be done to resolve the identified challenges regarding the implementation of GMP?	
- Daily health talks must be given	28.5% (n=89)
- Ensure that vaccines do not run out	15.4% (n=48)
- Supply enough equipment for GMP	15.1% (n=47)
- Conduct awareness campaigns	13.5% (n=42)
- Re-enforce health education of mothers	11.2% (n=35)
- Provide supplementation	11.5% (n=35)
- Promote a balanced diet	11.2% (n=35)
- Emphasise exclusive breastfeeding	5.4% (n=17)
- Provides supplementation for underweight IYC	5.4% (n=17)
- More staff must be hired	5.1% (n=16)
- Mothers must take clinic health talks seriously	5.1% (n=16)

- Home-based carers to educate mothers on child care and use of RTHB	5.1% (n=16)
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Due to the fact that the majority of challenges experienced by nursing staff identified mothers of IYC under five as the responsible stakeholders, and the fact that challenges experienced by mothers identified nursing staff and the DOH as primary stakeholders, it is encouraging to note that the most frequently cited recommendation made by nursing staff, was that health talks should be conducted on a daily basis (28.5%). This recommendation ties in with the recommendations that maternal health education should be reinforced (11.2%), that a balanced diet should be promoted (11.2%), and that exclusive breastfeeding should be emphasised (5.4%). As health talks were not conducted on a daily basis at some of the clinics surveyed, and that they serve as a meaningful way in which some of the challenges regarding the implementation of the GMP programme can be addressed, this form of remedial action is strongly supported.

Despite the fact that the delivery of IYC immunisations forms one component of the GMP programme, it was a challenge reported by both nursing staff and mothers. However, seeing that IYC immunisations are a primary driver for clinic attendance of many mothers, its shortage leaves mothers feeling despondent towards the GMP programme. Should vaccines therefore be unavailable, it reduces the frequency of mothers bringing their IYC for GMP even more. Hence the recommendation that it should be ensured that vaccines do not run out made by 15.4% of nursing staff, should be addressed as a matter of urgency, as it not only affects the frequency with which IYC participate in GMP, but also increases their risk of contracting communicable diseases that could have a negative impact on their nutritional status.

As it is not possible to conduct growth monitoring (GM) without the necessary functional equipment, it is essential that this recommendation made by 15.1% of the study sample should be addressed as a matter of urgency, to avoid malnourished IYC from going undetected.

Drumming up community support with the regular implementation of awareness campaigns as was recommended by 13.5% of the study sample, will foster community engagement with and support of GMP, by highlighting its importance as well as the need for regular GM of IYC, irrespective of whether they are due for an immunisation. Hence, awareness campaigns of this nature have the ability to enhance maternal compliance with the programme, as well as reduce the level of apathy showcased by some mothers, as was illustrated by the fact that 5.1% of participants recommended that mothers should be encouraged to take health talks seriously.

The provision of supplementation as was recommended by 11.5% of the study sample, as well as the fact that supplementation should be made available for underweight IYC (5.4%), can only be implemented if IYC are screened for malnutrition, found to be eligible and their mothers are issued with the appropriate supplementary foods. Hence, this recommendation is closely linked to other recommendations made.

The employment of more staff recommended by 5.1% of participants, as well as the fact that home-based carers should educate mothers on child care and the use of the RTHB (5.1%), are human resources matters that should be addressed at district and provincial level.

8. Recommendations made by mothers

The recommendations for improvement of the GMP programme made by mothers of IYC under five are illustrated in Figure 8.2, clearly outlining the aspects where corrective action must stem from mothers, nursing staff and the government.

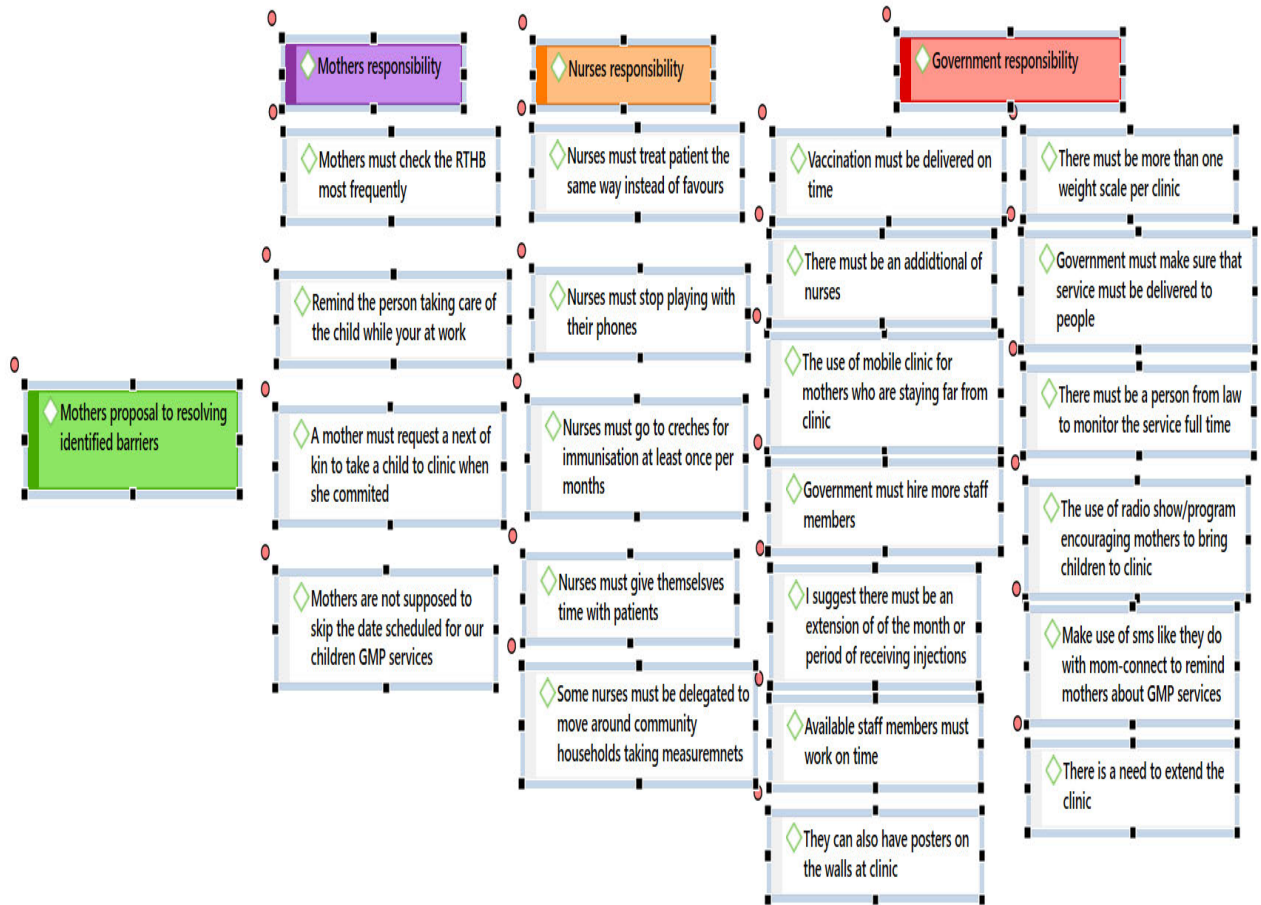


Figure 8.2: Recommendations for improvement of GMP in Vhembe made by mothers

Based on the above figure, mothers' recommendations regarding the best way to address the challenges they experienced with the GMP programme can be summarised as follows: Mothers should check the return date on the RTHB to ensure that IYC are taken to the clinic for GMP timeously; service delivery by nursing staff should be improved, in addition to more nursing staff being hired; a steady supply of vaccinations should be ensured and mothers should be sent a reminder sms regarding an upcoming GMP visit scheduled for their IYC.

9. Proposed recommendations for clinics, districts and government

- Clinics

Clinics are health facilities which are based at community level and they serve different villages around. Hence clinic staff members end up having a good relation with

community members and able to link one family to the other. Given the current challenges identified from this study, the clinics as primary health facility are able identify health problems and corrected at an early stage. With regards to GMP programme, having supervisors focusing or dealing with programme and child health issues may help the government to implement the programme successfully. As a results, more mothers may start to comply as health education will be delivered on daily basis and the formation of support groups for mothers who are having challenges may be easily solved.

- District

The district office at they monitor what is happening at a community level, they must ensure that all equipments needed for GMP are available and on good conditions at all times. Officers who monitor primary health facilities must perfume some supporting visits to staff members at clinic level. Additionally, in-service training on recent information about GMP must be organized more often especiaaly for nurses who have received training long time ago while still at college or university.

- Government

Trained staff members who will be having GMP as one their scope of practice must be hired at clinics and district level to monitor the success implementation of the programme. Enough funds must also be allocated at each government financial year to deal with all challenges encountered with GMP programme including the shortage of vaccination, equipments, training etc. Since there is no specific polify focusing on GMP, information emphasising how GMP must be implimented need to form part of the INP guidelines.

10. A review of current government policies and guidelines in place about GMP programmes in SA and districts

Growth monitoring and promotion is an intervention strategy to reduce mortality among children which is incorporated as part of the South African INP. According to the SADHS (1998/2002), every child under 5 years should have a RTHB to monitor their growth, immunisation status,

vitamin A supplementation status and other vital health indicators. Based on WHO growth standards, GMP purpose is to use RTHB as the nutrition intervention and as an opportunity to strengthen and improve the success of GMP. The current study findings revealed that all IYC are given RTHB, immediately after delivery and nurses are of the opinion that GMP has important value for child growth and development hence it is mandatory that its part of each PHC survives. Unfortunately, the GMP is reported not to be successfully implemented in different PHC as it should, leading to missed opportunities due to failure to detect early growth faltering; growth monitoring not linked to counselling on infant and young child feeding; and a weak growth promotion component (DoH, 2013). In support of this statement, the findings of this study especially with the unrecorded incidence cases in some months and years, mothers who reported that they haven't received health education during their GMP visit shows that there are still a lot of challenges that need to be addressed concerning the implementation of the programme. UNICEF (2007) emphasise that GMP is based on the "triple A" cycle of assessment, analysis and action and it needs to reach all children from birth to 10 24 months and needs to include a community component, with defined links and referral pathways to PHC facilities. Information generated from participants of the study revealed the difficulties in applying all the "triple A" in most rural health facilities due to barriers raised such as shortage of equipments, more workload, shortage of staff, ignorant to comply with follow-up schedule by mothers, misplacement of the original RTHB etc. In addition, plotting and interpretation of the growth indices to determine child growth and development also pose some difficulties in identifying whether the child is at risk of malnutrition or if the child urgently needs referral (UNICEF, 2007).

11. Conclusion

Although nursing staff and mothers had varying experiences regarding the challenges they faced with the GMP programme serving as barriers to the optimal implementation thereof, it was evident that to address these challenges, nursing staff and DOH played a primary role in addressing the challenges experienced by mothers and visa versa.

Corrective measures recommended by nursing staff included the delivery of health talks on a daily basis, a continued supply of vaccines, availability of functional equipment to conduct

GM, the regular implementation of awareness campaigns, provision of supplementation to malnourished IYC and the recruitment of more staff. Mothers should check the return date on the RTHB to ensure that IYC are taken to the clinic for GMP. The corrective measures to be employed by mothers were related to an improvement of service delivery by nursing staff, recruiting more nursing staff, having a steady supply of vaccinations, as well as mothers receiving a reminder sms regarding an upcoming GMP visit scheduled for their IYC.

From the above, it is clear that further research should be conducted to identify barriers to the optimal implementation of GMP, and that appropriate interventions should be implemented to address the challenges experienced by both nursing staff and mothers in Vhembe district.

12. Acknowledgements

The authors would like to thank the DOH of Limpopo Province and Vhembe district for granting permission to access government clinics in order to conduct the study. Nursing staff and mothers who were willing to participate in this study are also thanked for the valuable contribution they made towards the potential improvement related to the delivery of the GMP programme in Vhembe district. The University of Venda staff capacity development are thanked for funding this study and all activities undertaken. Without their support this study aims and objectives would not have been achieved.

Chapter 9: Conclusion and Recommendations

9.1 Introduction

Globally, GM has been advocated as one of the key strategies for promoting IYC survival at a primary health care level, by serving as an excellent tool for assessing growth and development (de Onis, Blossner, Borghi, Frongillo, & Morris, 2004; Ashworth, Shrimpton, Jamil, 2008; Haymond, Kappelgaard, Czernichow, Biller, Takano & Kiess, 2013). This enables the early detection of changes in nutritional status that justify appropriate intervention by health care professionals to ensure that growth continues uninterrupted (Bhan & Ghosh, 1986; Ghosh, 1986). Although GM is seen as an essential component of well-baby clinics in developed countries, in developing countries, health workers monitor growth to detect and intervene when children have growth faltering (de Onis & Blossner, 2003).

In order to comply with UNICEF recommendations and international agencies such as the WHO, the SA government has invested billions of Rand in the GMP programme, due to the fundamental role it plays in the strategy to combat IYC malnutrition (Global Nutrition Report, 2015). Despite the implementation of this strategy, shortfalls in the implementation of GM at health care facilities have been described for decades (Chopra & Sanders, 1997; Baraki, Gebru & Belay 2016). While studies have primarily focused on aspects such as the feasibility and usefulness of GM, its relevance and effectiveness in promoting IYC nutrition and health have not been adequately studied (Griffiths & Rosso, 2007). In addition, available data does not give a satisfactory indication of the effectivity of GM. As a result, nutrition and health programme planners in developing countries consider GM as ineffective in its potential for contributing to child survival and development (Bilal et al., 2014).

A local study documented that after completion of the childhood immunisation schedule at nine months, health care facility attendance for GM declines (Schoeman, Dhansay, Fincham, Kunneke, & Benade, 2003). Moreover, underweight that often peaks after 18 months, as well as stunting, often go undetected due to irregular clinic attendance, poor GM and health facility practices (Harrison, Hees, Harker & Mann, 1998). These sentiments were echoed by

the findings of the NFCS 2005, reporting that children one to three years of age are more likely to be affected by stunting and underweight as opposed to older children (Labadarios, Steyn, & Maunder, 2008). Factors such as irregular clinic attendance, poor GM at health facilities, poor monitoring and promotion activities such as nutrition education and low coverage have questioned the effectiveness of GM (UNICEF, 2008). Data generated by SANHANES-1 2012, documented that 21.6% of children under five are stunted, 2.5% are wasted and 5.5% are undernourished (Shisana, Labadarios, Rehle, Simbayi, Zuma, Dhansay, Reddy, Parker, Hoosain, Naidoo, Hongoro, Mchiza, Steyn, Dwane, Makoe, Maluleke, Ramlagan, Zungu, Evans, Jacobs, Faber & SANHANES-1 Team, 2013).

It has been projected that under the most likely circumstances, about 135 million children under the age of five in developing countries will be malnourished by 2020 (de Onis, Blossner, & Borghi, 2012). Children suffering from SAM, seem to be at a higher risk of mortality than those who are undernourished (Schoeman, 2003). Although the Limpopo Province has been reported as being one of the provinces with the highest prevalence of malnutrition (Labadarios, Steyn, & Maunder, 2008), the incidence and prevalence of malnutrition in the rural district of Vhembe is unknown. In 2011, it was reported that 5.4 million people resided in the Limpopo Province, of which 1.3 million were living in the Vhembe district (StatsSA, 2012). However, despite the fact that the prevalence of malnutrition is documented at individual health facilities in Vhembe, there are no published papers documenting the prevalence of SAM or MAM in the district or its sub-districts. Moreover, there is a lack of SA studies that have investigated the GMP related knowledge, perceptions regarding GMP, skills when conducting anthropometric assessments of IYC and ability to interpret growth indicators among nursing staff working at government clinics, coupled with the knowledge and perceptions of mothers using mixed methods (Schoeman et al., 2003; Tarwa & De Villiers, 2007; Kimani-Murage, 2010; Cloete et al., 2013; Kitenge & Govender, 2013; Sibanda et al., 2016; Win, 2016; Blaauw et al., 2017; Du Plessis et al., 2017; Naidoo et al., 2018).

Hence, the above posed the following research question: What is the GMP related knowledge, perceptions and skills of (i) nursing staff; and (ii) mothers with IYC younger than five years

at selected clinics in the rural area of Vhembe district, Limpopo Province that could serve as potential barriers to the successful implementation of GMP in the district, and therefore addressing the documented prevalence of SAM and MAM?

9.2 Study design

Due to the exploratory nature of this cross-sectional descriptive study using explanatory sequential mixed methods, hypothesis were not formulated.

9.3 Study aim and objectives

The study aimed to determine the GMP related knowledge, perceptions and skills of (i) nursing staff; and (ii) mothers with IYC younger than five years at selected clinics in the rural area of Vhembe district, Limpopo Province, through mixed methods research in order to address the prevalence of SAM and MAM.

To realise the study aim, the following objectives and their related chapters as was presented in this thesis, were formulated:

- To determine the GMP related knowledge, perceptions and skills of nursing staff employed at government clinics in the Vhembe district:
Chapter 4 - GMP knowledge, perceptions and skills of nursing staff employed at government clinics in the Vhembe district, South Africa.
- To determine barriers to the effective implementation of GMP encountered by nursing staff who work at government clinics in the Vhembe district:
Chapter 5 - Barriers to the effective implementation of GMP: findings of an evaluation conducted at government clinics in the Vhembe district, South Africa.
- To determine the prevalence of SAM and MAM among IYC under five years attending government clinics in the Vhembe district:
Chapter 6 - Prevalence of SAM and MAM among IYC under five years attending

government clinics in the Vhembe district, South Africa.

- To determine the GMP related knowledge and barriers to complying of GMP services of mothers with IYC under five years attending government clinics in the Vhembe district:

Chapter 7 - Maternal knowledge and perceived barriers to the success of the growth monitoring and promotion programme in Vhembe district, South Africa.

- To compile a report for the DOH, with relevant practical recommendations based on the study outcomes, with the potential of being used as a guideline to address problem areas related to GMP identified in Vhembe district:

Chapter 8 - Recommendations for improving the implementation of the Growth Monitoring and Promotion Programme in Vhembe district based on recommendations from nursing staff and participating mothers.

9.4 Main findings

Nursing staff's had positive perceptions regarding the GMP. However, their knowledge regarding GMP was suboptimal, with a mean knowledge score of 48.9% being attained, in addition to nearly 40% of participants scoring $\leq 50\%$. Observations regarding their ability to follow the correct procedure when conducting GMP as well as accurately conducting anthropometric measurements was poor, with the highest correct score for subsections of this observation tool being 42%. Participant ability to interpret growth indicators proved to be lower when compared to knowledge regarding GMP, with a mean score of 21.0%, in addition to 94.2% of participants obtaining a score $\leq 50\%$.

The predominant challenges experienced by study participants that could serve as barriers to the optimal implementation of the GMP programme in the district included noncompliance of mothers with the services offered as part of the GMP programme, followed by a shortage of vaccines, as well as a lack of anthropometric equipment. The remedial action suggested by the majority of participants, was the daily delivery of health talks to

mothers, as well as health authorities providing the necessary anthropometric equipment, in addition to a regular supply of vaccines to all health facilities in the district.

When comparing the prevalence of SAM/MAM across the five years of study on a month-to-month basis, it was not possible to identify a trend. In addition, there was a statistically significant difference ($p < 0.000$) between the mean prevalence of SAM/MAM from 2014 to 2018. Similar results were obtained when the 2017 data set was removed from the analysis due to missing variables when compared to other years for which data was obtained.

The primary reason why mothers took their IYC to clinics was immunisation. Their poor compliance with the follow-up schedule of the GMP programme, nurses' commitment to the programme and the availability of resources including vaccines, were reported as barriers to the successful implementation of the GMP programme. The majority of mothers had knowledge regarding the importance of GM for their IYC. However, some indicated that they are not familiar with what GMP services entail, neither its importance.

Although nursing staff and mothers had varying experiences regarding the challenges they faced with the GMP programme that could serve as barriers to the optimal implementation thereof, it was evident that to address these challenges, nursing staff and DOH played a primary role in addressing the challenges mothers faced and visa versa.

9.4 Study limitations

The limitations associated with a cross-sectional design is acknowledged, especially related to its inability to determine cause and effect (Leedy & Ormrod, 2016). Furthermore, time and cost constraints resulted in each of the 82 randomly sampled government clinics spanning across four sub-districts, only being visited once or twice. As a result, it is highly likely that not all nursing staff working with GMP at the respective clinics were included in the study sample due to them working in shifts.

Due to the absence of data for 2017 and the highly significant difference in the prevalence of MAM/SAM documented over the five year period for which data was collected from clinic records, it was not possible to determine the prevalence of SAM/MAM across the four sub-districts surveyed, or for that matter Vhembe district. In addition, the assumption was made that the available clinic records are inaccurate, due to the poor GMP related knowledge, suboptimal skills when conducting IYC anthropometric measurements and inability to interpret growth indicators documented for the 312 nursing staff that were surveyed.

As data collection took place during the week, the majority of biological mothers who participated in the study were unemployed. As a result, many working mothers and those that were completing their schooling were excluded. The study sample for the qualitative phase also only included the biological mothers of IYC under five. However, seeing that caregivers are responsible for taking care of IYC that are either orphaned or whose mothers work or are completing their schooling, their insights could have proved to be valuable had they been included in the study sample.

9.5 Recommendations for future research

To build on the results that were documented for the current study, further community- as well as clinic-based research is recommended with study participants including mothers, caregivers and nursing staff that were unable to participate in this study.

In addition, a study of this nature should not be limited to Vhembe district, but to other districts in Limpopo province, seeing that the Global Nutrition Report (2015) documented that despite the introduction of GMP, the prevalence of IYC malnutrition in the Limpopo Province was 69.9%. In addition, Malnutrition in SA (2012) also reported that the Limpopo province is one of the provinces in need of interventions to address the prevalence of MAM/SAM, despite the implementation of GMP in the area as a global strategy to combat malnutrition (SANHANES-1, 2012). The NDP together with the SDGs goals are to reduce the prevalence of child mortality as indicated in chapter one, however, the findings of the current

study supported by some literature shows that there are gaps and challenges that need to be carefully addressed in order to achieve the government goals.

9.6 Policy recommendations

The current study identified the following barriers that could compromise the optimal outcome of the GMP programme in Vhembe district: a lack of functional anthropometric equipment for conducting GM, a lack of ongoing training of nursing staff regarding all aspects of GMP, staff shortages, infrequent delivery of health messages by nursing staff to mothers, a shortage of vaccines in certain clinics, as well as the absence of reminder SMS text messages to improve mother and caregiver compliance with the GMP programme. In addition, regular awareness campaigns regarding the importance of the GMP programme for IYC health and prevention of malnutrition should be conducted at clinic, as well as community level, utilising media such as radio. Furthermore, it is apparent that the documentation of MAM/SAM statistics at clinic level is not optimal, neither accurate.

To address the abovementioned barriers, it is recommended that the necessary policies should be put in place at district and/or provincial level, in order to address these, in an attempt to optimise the outcome of the GMP programme.

9.7 Conclusion

Although nursing staff had positive perceptions regarding GMP, their knowledge regarding the programme, as well as their ability to accurately conduct anthropometric measurements was not ideal. The same applied to their ability to interpret growth indicators. As participants were seemingly unaware of their inability to conduct GMP or inability to identify malnourished IYC, nursing staff employed at government clinics in Vhembe district should receive immediate training in order to improve their knowledge and skills regarding all aspects of the GMP programme. In addition, nursing staff should only be utilised according to their level of training and skills, this could influence the accuracy with which GMP is conducted.

Study participants experienced numerous challenges and barriers that have an impact on the optimal implementation of GMP. However, the extent of the challenges and barriers experienced, were seemingly related to the location of an individual clinic.

Based on the annual prevalence of MAM/SAM obtained for the district over a five year period, it is evident that accuracy of the data requires further scrutiny, especially when interpreted against the back drop of the suboptimal knowledge regarding GMP, skills when conducting anthropometric assessments and ability to interpret growth indicators documented for nursing staff.

Mothers of IYC that make use of GMP in Vhembe district have knowledge regarding the importance of the programme. However, there are several factors that discourage them optimally utilising the services of clinics offering the GMP programme. These findings highlight the need for nursing staff, clinics and the Department of Health to address the barriers mothers alluded to, as it has the potential to impact on the aims and success of GMP in the district.

When triangulating the data generated by the quantitative and qualitative phase of the study, the comments made by mothers were in line with what was documented for the nursing staff and it became evident that although nursing staff and mothers had varying experiences regarding the challenges they faced with the GMP programme serving as barriers to the optimal implementation thereof, it was evident that to address these challenges, nursing staff and the Department of Health played a primary role in addressing the challenges experienced by mothers at a community level and visa versa.

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APPENDIX A: INFORMED CONSENT FORMS – ENGLISH VERSION

Appendix A1: Information Sheet and Consent to Participate in Research – Nurses (English version)

Good morning/day

My name is Tshifhiwa Cynthia Mandiwana (student number: 215081523), a PhD in Human Nutrition student registered with the University of KwaZulu – Natal, Dietetics and Human Nutrition within the school of Agricultural, Earth and Environmental Sciences. The title of my research project is: “Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa”.

My contact details are as follows:

Principal investigator:

Tshifhiwa C Mandiwana, MSc, RN (HPCSA)
Department of Nutrition
School of Health Sciences
University of Venda
Tel: 015 962 8952
Cell: 072 821 7956
Email: tshifhiwa.mandiwana@univen.ac.za

You are hereby invited to participate in a research project that aims to evaluate the effectiveness of the growth monitoring programme in health facilities around Vhembe district.

Why have you been invited to participate?

As a nurse, you are in the best position to tell us about the knowledge you have with regard to growth monitoring and your perception regarding the role growth monitoring plays in relation to the incidence of SAM and MAM cases at your health facility. Your opinion is very

important to us as it would assist in an improvement of growth monitoring practices, which in turn would result in improving infant and young child growth, health and well-being.

What procedures will be involved in this research?

You will be required to complete a short questionnaire for which there are no right or wrong answers. In addition, you will be asked to explain or interpret examples of the growth charts in the Road to Health Booklet to assess your skills. You will notice that you will not be required to write your name on the questionnaire. In other words, your response will be treated as anonymous as you will only be identified via a code allocated to you.

Will you receive any money or gifts for participating in the study?

You will not receive any money or gifts for participating in this study. However, there are a few other things we would like you to know:

Ethics:

This research project was approved by the UKZN Biomedical Research Ethics Committee (BREC) to ensure that the research complies with ethical standards. Should you wish to contact them, the contact details are as follows:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
University of KwaZulu-Natal
Private Bag X54001,
Durban, 4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2602486 – Fax: 27 31 2604609
Email: BREC@ukzn.ac.za

- Your information will be kept confidential as we will only be able to identify your questionnaire with a number.

- You will not directly benefit when you participate in this study. However, the information can be used in the development of intervention strategies that will help in the improvement of growth monitoring practices.
- You have the right to withdraw from the study at any stage without any negative consequences

By signing below, Ihave been informed about the study and agree to participate in this study entitled: Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa.

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am comfortable. I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is voluntary and I have not been pressurised to participate.
- If I have any further questions/concerns or queries related to the study, I understand that I may contact the researcher and UKZN Biomedical Research Ethics Administration office.

Signed at (place)on (date).....2018

.....
Signature of participant

.....
Signature of witness

Appendix A2: Information Sheet and Consent to Participate in Research – Mothers **(English version)**

Good morning/day

My name is Tshifhiwa Cynthia Mandiwana (student number: 215081523), a PhD in Human Nutrition student registered with the University of KwaZulu – Natal, Dietetics and Human Nutrition within the school of Agricultural, Earth and Environmental Sciences. The title of my research project is: “Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa”.

My contact details are as follows:

Principal investigator:

Tshifhiwa C Mandiwana, MSc, RN (HPCSA)
Department of Nutrition
School of Health Sciences
University of Venda
Tel: 015 962 8952
Cell: 072 821 7956
Email: tshifhiwa.mandiwana@univen.ac.za

You are hereby invited to participate in a research project that aims to evaluate the effectiveness of the growth monitoring programme in health facilities around Vhembe district.

Why have you been invited to participate?

As a mother who is receiving advice from nurses with regard to growth monitoring when bringing your child to the clinic for assessment, you are the best person to tell us whether you understand the information you receive and whether you think growth monitoring is important for your child’s development and growth. In addition, we will also request that you to share with us the factors that prevent you from bringing your child to the clinic for

growth monitoring. Your opinion is very important to us because it would assist in improving growth monitoring practices which in turn would result in improving infant and young child growth, health and well-being.

What procedures will be involved in this research?

You will be required to participate in a focus group discussion where you and other mothers will be sharing your knowledge with regard to growth monitoring and the factors that prevent you from complying with the growth monitoring attendance scheduled for your child. We would not be able to identify you as a person, as every time you speak, you will only introduce yourself with a number and not your name. In other words, we would not know which person spoke about a specific question that members of the group had a conversation about.

Will you receive any money or gifts for participating in the study?

You will not receive any money or gifts for participating in this research. However, there are a few other things we would like you to know:

Ethics:

This research project was approved by the UKZN Biomedical Research Ethics Committee (BREC) to ensure that the research complies with ethical standards. Should you wish to contact them, the contact details are as follows:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
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University of KwaZulu-Natal
Private Bag X54001,
Durban, 4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2602486 – Fax: 27 31 2604609
Email: BREC@ukzn.ac.za

- Your information will be kept confidential as we will only be able to identify your discussion of the questions by means of the code allocated to you.

- You will not directly benefit when you participate in this study. However, the information can be used in the development of intervention strategies that will help in the improvement of growth monitoring practices.
- We will use a tape recorder to record our conversation with regards to the knowledge you have on growth monitoring and the factors that prevent you from taking your infant or young child to a health facility for growth monitoring.
- You have the right to withdraw from the study at any stage without any negative consequences

By signing below, Iagree to participate in this study entitled: Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa.

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am comfortable. I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is voluntary and I have not been pressurised to participate.
- If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher and UKZN Biomedical Research Ethics Administration office.

Signed at (place)on (date).....2018

.....
Signature of participant

.....
Signature of witness

TSHIVENDA VERSION

APPENDIX A1: FOMO YA THENDELANO YO LIVHISWAHO KHA MUONGI

Ndi matsheloni/masiari

Nxe Tshifhiwa Cynthia Mandiwana (student number: 215081523), ndi mutshudeni odi waliselaho ngudo dza PhD kha muhasho wa Human Nutrition na University ya KwaZulu – Natal, Dietetics and Human Nutrition ure fhasi ha davhi la Agricultural, Earth and Environmental Sciences. Ndi tama u ita thoduluso yo sedzaho kha thoho i tevhelaho: “Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa”.. Zwi dodombedzwa zwa vhudavhidzani ndi zwi tevhelaho:

Mutodulusi na ndila dza vhudavhidzani:

Tshifhiwa C Mandiwana, MSc, RN (HPCSA)
Department of Nutrition
School of Health Sciences
University of Venda
Tel: 015 962 8952
Cell: 072 821 7956
Email: tshifhiwa.mandiwana@univen.ac.za

Vha khou rambiwa uvha tshipida tsha thandela ya thoduluso yo sedzaho kha zwa kushumele kwa mbekanyamushumo ya “growth monitoring and promotion” kha vhana vha minwaha ire fhasi ha mitanu, kha tshitiriki tsha Vhembe.

Ndi nga mini vho rambiwa u dzhenelela?

Sa muongi, vha kha maimo a avhudi uri vhari talutshedze ndivho yavho malugana na kualutshele kwa nwana, na kuvhonele kwavho malugana na mivhigo ya SAM/MAM (khwashu). Mihumbulo yavho ndi ya ndeme nahone ido thusa khau khwinisa kushumele kwau tola nyaluwo ya nwana, zwi isaho kha u khwinisa mutakalo wa lushie khathihi na vhuvha ha nwana.

Ndi afhio maga ane vha tea u a tevhela kha iyi thoduluso?

Vhaxo tea u fhindula mbudziso pfufhi dzine khadzo a huna phindulo dzisi dzone kana dzire dzone. Vhaxo humbelwa u sumbedzisa ku shumisele kwavho kwa bugu ya tshikalo ya nwana (RTHB) uri ri kone u vhona ndivho yavho. Ngauralo, vhaxo tea uzwi limuwa uri a vhangatei u nwala dzina lavho kha bambiri la mbudziso. Izwo zwi sia risa koni u zwiqivha uri ndi ufhio muongi o fhindulaho mbudziso dzifhio, ngauri muthu muñwe na muñwe udo taluswa nga dzinomboro kana khoudu.

Huna malamba khau fhindula dzi mbudziso?

Ahuna zwifhiwa kha uvha tshipiqa tsha ngudo idzi. Hone-ha, ri tama uvha divhadza hezwi:

Ndango:

Thoduluso iyi ido newa thendelo nga tshigwada tsha mulayo tshine tsha langa zwa thoduluso ya vhlondolavhathu ya University ya KwaZulu-Natal Biomedical Research Ethics Committee (BREC) u khwathisedza uri khumbelo ya thoduluso yo tangedzwa. Arali vhana dzangaelo la u vhudzisa, vhangatei vha kwama kha vhudavhidzani vhutevhelaho:

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University of KwaZulu-Natal

Private Bag X54001, Durban, 4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2602486 – Fax: 27 31 2604609

Email: BREC@ukzn.ac.za

- Mafhungo avho ado dzula o vhlungea nahone hanga bviselwi nnda sa izwi phindulo dzavho dzi tshi divhea nga dzinomboro.
- A vha nga wani zwifhiwa nga uvha tshipiqa tsha ngudo idzi. Hone-ha, mafhungo avho ado shumiswa khau bveledza ndila dzau khwinisa kushumele kwa mbekanyamushumo yau tola nyaluwo ya nwana.
- Vhana ndugelo dza u divvisa kha ngudo idzi husina u thithisa tshithu.

Nga u saina afho fhasi, nne.....ndi khou tenda uvha tshipida tsha thoduluso ire nga fhasi ha thoho i tevhelaho: "Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa"..

Nne ndiri:

- Ndo vhala nahone ndia pfesesa kana ndo vhalelwa mafhungo a thoduluso iyi nahone nga luambo lune nda lupfesesa. Ndovha na tshikhala tshau vhudzisa mbudziso hune ndasi pfesese nahone mbudziso dzanga dzo fhindulwa nga ndila yavhudi.
- Ndi azwi pfesesa uri u dzhenelela kha thoduluso iyi ndi nga lutamo lwanga nahone azwi kombetshedzwi.
- Arali ndina dzinwe mbudziso kana u sa faresa zwavhudi malugana na thoduluso iyi, ndia pfesesa uri ndinga kwama mutodulusi navha ofisi ya UKZN Biomedical Research Ethics Administration.

Tsaino yo itea (fhethu):nga (dvh) 2018

.....

Tsaino nga muongi

.....

Tsaino nga thanzi

APPENDIX A2: FOMO YA THENDELANO YO LIVHISWAHO KHA MME

Ndi matsheloni/masiari

Nxe, Tshifhiwa Cynthia Mandiwana (student number: 215081523), ndi mutshudeni oḁi nwaliselaho ngudo dza PhD kha muhasho wa Human Nutrition na University ya KwaZulu – Natal, Dietetics and Human Nutrition ure fhasi ha davhi la Agricultural, Earth and Environmental Sciences. Ndi tama u ita thoduluso yo sedzaho kha thoho i tevhelaho: “Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa”. Zwi dodombedzwa zwa vhudavhidzani ndi zwi tevhelaho:

Muḁodulusi na ndila dza vhudavhidzani:

Tshifhiwa C Mandiwana, MSc, RN (HPCSA)
Department of Nutrition
School of Health Sciences
University of Venda
Tel: 015 962 8952
Cell: 072 821 7956
Email: tshifhiwa.mandiwana@univen.ac.za

Vha khou rambiwa uvha tshipiḁa tsha thandela ya “Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa” yo sedzaho kha zwa kushumele kwa mbekanyamushumo ya “growth monitoring and promotion” kha vhana vha miḁwaha ire fhasi ha miḁanu, kha tshiḁiriki tsha Vhembe.

Ndi nga mini vho rambiwa u dzhenelela?

Sa muthu ane uya wana ngeletshedzo ubva kha vhaongi malugana na kualutshele kwa nwana musi vha tshi ḁisa nwana tshikaloni, zwi sia vha muthu wa ndeme uri talutshedza arali vhatshi pfesesa mafhungo ane vha vhudzwa one, nahone vhaya vhona mafhungo a tshikalo a vhuḁogwa kha kualutshele kwa nwana. Nga nḁha ha izwo, rido dovha ra humbela uri vha ri kovhela na zwithu zwine zwa vha thithisa u ḁisa nwana tshikaloni uri a ḁoliwe kualutshele.

Mihumbulo yavho ndi ya ndeme nahone ido thusa khau khwinisa kushumele khau tola nyaluwo ya nwana, zwi isaho khau khwinisa mutakalo wa lushie khathihi na vuvha ha nwana.

Ndi afhio maga ane vha tea u a tevhela kha iyi thoduluso?

Vhado tea u dzhenelela khau nyambedzano ine vhone na vhanwe vho mme vhado kovhelana ndivho malugana na tshikalo tsha vhana, khathihi na zwithu zwine zwa vha kundisa u tevhela nzudzanyo dzo tiwaho dzau disa vhana tshikaloni. Vhado tea uzwi limuwa uri ari nga tei u nwala dzina lavho kha bambiri la mbudziso. Izwo zwi sia risa koni u zwidivha uri ndi ufhio mubebi o fhindulaho mbudziso dzifhio, ngauri muthu muwe na muwe udo taluswa nga dzinomboro kana khoudu. Nga manwe maipfi, ari nga koni nau talusa uri ndi mubebi ufhio o dzhenelelaho kha nyambedzano.

Huna malamba khau fhindula dzi mbudziso?

Ahuna zwifhiwa kha uvha tshipida tsha ngudo idzi. Hone-ha, ri tama uvha divhadza hezwi:

Ndango:

Thoduluso iyi ido newa thendelo nga tshigwada tsha mulayo tshine tsha langa zwa thoduluso ya vhulondolavhathu ya University ya KwaZulu-Natal Biomedical Research Ethics Committee (BREC) u khwathisedza uri khumbelo ya thoduluso yo tangedzwa. Arali vhana dzangaelo la u vhudzisa, vhang vha kwama kha vhudavhidzani vhutevhelaho:

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Tel: 27 31 2602486 – Fax: 27 31 2604609
Email: BREC@ukzn.ac.za

- Mafhungo avho ado dzula o vhulungea nahone hanga bviselwi nda sa izwi phindulo dzavho dzi tshi divhea nga dzinomboro.

- A vha nga wani zwifhiwa nga uvha tshipiḁa tsha ngudo idzi. Hone-ha, mafhungo avho aḁo shumiswa khau bveledza nḁila dzau khwinisa kushumele kwa mbekanyamushumo yau ḁola nyaluwo ya ḁwana.
- Riḁo shumisa ku radio kwau rikhoda maipfi musi ri kha nyambedzano ngaha ndivho yavho kha kualutshele kwa ḁwana, na zwithu zwine zwavha kundisa u ḁisa vhana kiliniki tshikaloni.
- Vhana ndugelo dza u ḁibvisa kha ngudo idzi husina u thithisa tshithu.

Nga u saina afho fhasi, nḁe.....ndi khou tenda uvha tshipiḁa tsha ḁhoḁuluso ire nga fhasi ha thoho ya: Kushumele kwa mbekanyamushumo ya “Environmental Sciences. Ndi tama u ita ḁhoḁuluso yo sedzaho kha ḁhohe i tevhelaho: “Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa”.

Nḁe ndiri:

- Ndo vhala nahone ndia pfesesa kana ndo vhalelwa mafhungo a ḁhoḁuluso iyi nahone nga luambo lune nda lupfesesa. Ndovha na tshikhala tshau vhudzisa mbudziso hune ndasi pfesese nahone mbudziso dzanga dzo fhindulwa nga nḁila yavhuḁi.
- Ndi a zwi pfesesa uri u dzhenelela kha ḁhoḁuluso iyi ndi nga lutamo lwanga nahone azwi kombetshedzwi.
- Arali ndina dzinwe mbudziso kana u sa faresa zwavhudi malugana na ḁhoḁuluso iyi, ndia pfesesa uri ndinga kwama muḁoḁulusi navha ofisi ya UKZN Biomedical Research Ethics Administartion.

Tsaino yo itea (fhethu):nga (ḁuvha) 2018

.....
Tsaino nga mme

.....
Tsaino nga thanzi

APPENDIX A2: FOMO YA PFUMELELANA LEYI KONGOMEKE KA MHANI

Avuxeni/I nhlekani

Mina Tshifhiwa Cynthia Mandiwana (Student Number 215081523), Ndzi muchudeni loyi anga ti tsarisela tidyondzo ta PHD ka muhaxu wa Human Nutrition na University ya KwaZulu-Natal, Diabetics and Human Nutrition leyi nga hasi ka rhavi ra xikolo xa Agricultural, Earth and Environmental Science, Nhlokomhaka ya vulavisisi bya mina I "Evaluation of the Effectiveness and related Factors of growth monitoring and promotion Programme of children younger than five years in Clinics of Vhembe District, Limpopo Province, South Africa.

Tindlela letihinga khumbanaka hi tona hi leti landzelaku:

Mulavisisi nkulu:

Tshifhiwa C Mandiwana, MSc, RN(HPCSA)

Department of Nutrition

School of Health Science

University of Venda

TEL: 015 962 8952

CELL: 072 821 7956

Email: tshifhiwa.mandiwana@univen.ac.za

Marhambiwa ku nghenelela eka vulavisisi lebyi byinga kongoma naku " Evaluate the effectiveness of the growth monitoring programme in health Facilities around Vhembe District"

Hikwalahoka yini mi rhambiwa ku nghenelela?

Tani hi Mhani loyi a kumaka switsundzuxo ku suka ka Vaongori mayelana na malangutelo ya makulelo ya n'wana loko mi tisa n'wana n'wina a kliniki kuta kamberiwa. Mi munhu wa nkoka swinene kuhi byela loko mi twisisa voxokoxoko lebyi mi byi kumaka na loko

miehleketa leswaku malangutelelo ya makulelo ya n'wana mana nkoka kaku kula ka n'wana., ku tatisa ka leswi, hita tlhela himi kombela leswaku mi avelana na hina hi swilo leswi swimi tsandzisaku ku tisa n'wanaaxikalwini, Mavonelo ya n'wina mana nkoka ka hina hikuva mata pfuna kaku antswisa malangutelelo ya makuleloya n'wana leswiswingata pfuna kaku antswisa makulelo, Rihanyu na vukahle bya n'wana.

Xana hi swihi swilo leswi mingata languteriwa kuswi endla kavulavisisi lebyi?

Mita languteriwaku nghenelelaka mbulamburisano laha n'wina navan'wana vo Mhani minga tava mikha miavelana vutivi bya n'wina mayelana na malangutelo ya makulelo ya n'wana na swilo leswi swimi tsandzisaku ku tisa vana van'wina axikalwini tani hi laha mitsaleriwaka hikona hi Vaongori, A hinge swikoti kumi vona tanihi munhu hikuva nkarhi wun'wanina un'wani loko mi vulavula, mitati tivisa hi nomboro hayi hi vito ra n'wina. Hi marito man'wana ahinga swikoti ku tiva leswaku hi wihi munhu loyi anga vulavula hi xivutiso xihi ka ntlawa lowu minga van a mbulamburisano.

Xana mita kuma malikumbe tinyiko ka kunghenelelaka vulavisisilebyi ke?

A minga kumi mali kumbe tinyiko ka ku nghenelela ka n'wina ka vulavisisi lebyi, kambe kuna swilo swintsongo leswi hi rhandzaku leswaku miswi tiva.

Milawu:

Vulavisisi lebyi byi pfumeleriwile hiva KZN Biomedical Research Ethics Committee (BREC) ku tivisisaeswaku vulavisisi lebyi byi fambisiwa na tindlela ta Milawu. Loko kuve Minga tsakela kuti hlanganisa na vona, Tindlela to hlangana na vona hileti landzelaku:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
University of KwaZulu-Natal
Private Bag X54001,
Durban, 4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 260 2486
Fax: 27 31 260 4609
Email: BREC@ukzn.ac.za

Vuxokoxokobya n'wina byita vekiwa laha byinga hlayiseka byinga voniwi hi manina mani tani hileswi hinga ta kota ku vona phepha ro hlamusela ka rona hi nambara. Ami nga kumi tinyiko kuva xiphemu va vulavisisi lebyi, kumbe voxokoxoko lebyi byita tirhisiwa kaku kuma tindlela taku ngehenela leti tingata pfuna ku antswisa matirhelo ya ma langutelo ya xikalo xa n'wana.

Hita tirhisa xikandziyisamarito rikhoda loko hiri ka mbulamburisanohi vutivi bya nwina hi makuriselo ya n'wana na swilo leswi swimi tsandzisaku ku tisa vana a kliniki a xikalwini. Mina pfumelelo waku huma eka vulavisisi lebyi ka xiphemu xin'wana na xin'wanalaha ku nga taka kungari na swisala ndzhaku.

Hiku sayina laha hansi, mina..... Ndzi hlamuseriwile hi vulavisisi lebyi na kona ndza pfumela ku ngehenela ka vulavisis lebyi nga hasi ka nhloko mhaka leyi : Evaluation of the Effectiveness and related Factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe District, Limpopo Province, South Africa.

Mina ndziri:

Ndzihlayile kumbe ndzi hlayeriwilevuxokoxoko lebyi byo pfumelelana wo ngehenela na kona yi tsariwile hi ririmi leri ndziri twisisaku, Ndzive na nkarhi waku vutisa swivutiso naswona swivutiso swa mina swihlamuriwile hi vuendzi. Ndza swi twisisa leswaku kuteka xiphemu ka vulavisisi lebyi I hiku navel aka mina na konaahiku sindzisiwa. Loko kuve ndziva na swivutiso swin'wana kumbe swiphiquho mayelana na vulavisisi lebyi, Ndza swi twisisaleswaku ndzi ngati hlanganisa na mulavisisi na vaka UKZN Biomedical Research Ethics Administration Office.

Sayino wu humelele (Ndzawu).....Hi (siku).....2019

.....
Sayino wa mungheneleri

.....
Sayino wa Mbhoni

APPENDIX B: LETTER TO REQUEST PERMISSION – ENGLISH VERSION

To: The Provincial Department of Health (Research Committee)
Limpopo Province
Polokwane, 0699

From: Ms. TC Mandiwana
PhD student - UKZN

Date: 08 June 2018

Dear Sir/Madam

RE: Application for permission to conduct research in Vhembe district clinics

My name is Tshifhiwa Cynthia Mandiwana (student number: 215081523), a registered PhD in Human Nutrition student with the University of KwaZulu – Natal, Dietetics and Human Nutrition within the school of Agricultural, Earth and Environmental Sciences. I wish to conduct research project titled: *“Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa”*. I therefore request your office to grant me permission to conduct this research project in Vhembe district clinics. A copy of my research proposal and letter of ethics approval are enclosed for your perusal.

My study promoters are Dr. Suna Kassier (Senior Lecturer – Dietetics and Human Nutrition – University of KwaZulu-Natal) and Professor Frederick Veldman (Head of Department – Department of Dietetics – Sefako Makgatho Health Sciences). For more information contact the researcher, Tshifhiwa C Mandiwana @ tel: 015 962 8952/cell: 072 821 7956: tshifhiwa.mandiwana@univen.ac.za.

Thanking you in advance.

Yours sincerely

.....
Mandiwana TC

KHETHEKANYO B: TSHIVENDA VERSION

Kha: The Provincial Department of Health (Research Committee)

Limpopo Province

Polokwane, 0699

Ubva: Ms. TC Mandiwana

PhD student - UKZN

Datumu: 08 June 2018

Aa/Ndaa!

RE: Khumbelo ya thendelo ya u ita thoduluso kha kiliniki dza tshitiriki tsha Vhembe

Nxe, Tshifhiwa Cynthia Mandiwana (campus ID: 215081523) ndi humbela thendelo kha ofisi yavho yau ita thandela ya thoduluso kha tshitiriki tsha Vhembe. Zwa zwino ndo di nwalisa sa mutshudeni wa PhD kha tshi imiswa tsha pfunzo dza ntha tsha KwaZulu-Natal kha muhasho wa zwa mutakalo. Thoho ya thoduluso ndi: "Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa". Mbekanyamushumo ya kutshimbidzele kwa thoduluso, khathihi na lunwalo lwa thendelo ubva kha tshi imiswa tsha pfunzo zwo katelwa hanefha uri vha kone uzwi vhona.

Vha tshi toda inwe ndivho malugana na thoduluso iyi vha kwama mutodulusi, Tshifhiwa C Mandiwana kha 015 962 8952 kana 072 821 7956 kana tshifhiwa.mandiwana@univen.ac.za

Ndia livhuwa.

.....

Mandiwana TC

APPENDIX C: INSTRUMENTS - ENGLISH VERSION – APPENDIX C1: QUESTIONNAIRE

Title of research project: Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa.

Instructions:

- I would like to thank you for agreeing to participate in this study. The information that you will provide will remain confidential.
- Please note that there's no right or wrong answer.
- If you do not understand a question, please ask me to clarify it for you.

Date of interview:

Participant code:

Section A: Demographic information of a nurse

1. Name of the clinic under Makhado sub-district

Mashamba clinic	1	
Nkhensani clinic	2	
Riverplaats clinic	3	
Sereni clinic	4	
Mbhokota clinic	5	
Muwaweni clinic	6	
Waterval clinic	7	
Mpheni clinic	8	
Manyima clinic	9	
Vleifontein clinic	10	
Muila clinic	11	
Tshino clinic	12	
Ha-Mutsha clinic	13	
Levubu clinic	14	
Valdezia clinic	15	
Wayeni clinic	16	
Phadzima clinic	17	
Tshikuwi clinic	18	
Phephu clinics	19	
Straighthardt clinic	20	
Kutama clinic	21	
Madimbidzha clinic	22	
LTT PHC Clinic	23	

Midoroni clinic	24	
-----------------	----	--

2. Name of the clinic Under Collins Chabane sub-district

De Hoop clinic	1
Kurhuleni clinic	2
Manavhela clinic	3
Tlangelani clinic	4
<i>Mhinga local area</i>	
Mhinga clinic	5
Matiyane clinic	6
Makuleke clinic	7
Shikundu clinic	8
Nghezimane clinic	9
Nthlaveni D clinic	10
<i>Mphambo local area</i>	
Mulenzhe clinic	11
Mavambe clinic	12
Mukhomi clinic	13
Malamulele clinic	14
Matsheka clinic	15
<i>Shingwedzi local area</i>	
Shingwedzi clinic	16
Nthlaveni E	17
Mtititi clinic	18
Peninghotsa clinic	19
<i>Tiyani local area</i>	
Tiyani clinic	20
Masakona clinic	21
Helderwater clinic	22
Marseilles clinic	23
Davhana clinic	24

3. Name of the clinic under Thulamela sub-district

Khakhu clinic	1
Fondwe clinic	2
Murangoni clinic	3
Madala clinic	4
Tshixwadza clinic	5
Mutale CHC	6
Thengwe clinic	7
Tshikundamalema clinic	8
Rambuda clinic	9
Tshiombo clinic	10
Tshaulu clinic	11

Makuya clinic	12
Lambani clinic	13
Dzingahe clinic	14
Thohoyandou CHC	15
William Eadie CHC	16
Sterkstroom clinic	17
Tshivhase – Thondo clinic	18
Shayandima clinic	19
Muledane clinic	20
Tswinga clinic	21
Dzwerani clinic	22
Lwamondo clinic	23
Tshisaulu clinic	24

4. Name of the clinic under Musina sub-district

Musina clinic	1
Madimbo clinic	2
Manenzhe clinic	3
Masisi Clinic	4
Mulala clinic	5
Nancefield clinic	6
Shakadza clinic	7
Tshipise clinic	8
Tshiungani clinic	9
Folovhodwe clinic	10

5. Age

.....

6. Gender

Male	1	
Female	2	

7. Category of nursing staff

Nursing assistant	1	
Staff nurse	2	
Clinical nurse practitioner	3	
Professional nurse	4	

Other, specify

.....

8. How long have you been working as a nurse?

.....

9. How long have you been working in the Growth Monitoring and Promotion section of the clinic?

.....

10. Where did you receive training on Growth Monitoring and Promotion?

Nursing college	1	
University while studying	2	
Department of Health workshops	3	
At clinic by Dietician/Nutritionist	4	
At clinic by a colleague	5	
Never trained	6	

Other, specify

.....

11. Who trained you on the use of Road to Health Booklet in addition to Growth Monitoring and Promotion training you received before?

Colleague	1	
Dietician/Nutritionist	2	
Lecturer	3	

Other, specify

.....

12. Which aspects were covered during your training?

Plot points for growth indicators	1	
Interpreting growth indicators	2	
Identify growth problems from plotted points	3	
Procedures of taking measurements	4	
Immunisation	5	

Other, specify

.....

13. Where do you receive refresher training regarding Growth Monitoring and Promotion and the use of the Road to Health Booklet?

District office workshops	1	
Provincial office workshops	2	
Health center	3	

Not offered	4	
Never attended	5	
Clinic by dietician	6	

Other, specify

.....

14. How often do you receive refresher training regarding Growth Monitoring and Promotion and the use of the Road to Health Booklet?

.....

15. What type of support do you receive in terms of Growth Monitoring and Promotion?
 E.g. support visit, training etc.

.....

16. Where do you receive such support and how often is support given?

.....

17. Which health messages do you normally give to mothers who visit the clinic for Growth Monitoring and Promotion?

.....

18. How often is the message given?

.....

19. What type of equipment do you use during Growth Monitoring and Promotion?

.....

20. What, if any, are the challenges you encounter during Growth Monitoring and Promotion?

.....

.....
.....
.....

21. What do you think can be done to resolve the identified challenges?

.....
.....
.....
.....
.....
.....
.....
.....
.....

Section B: Perception of Growth Monitoring and Promotion

Statements	Possible answers			
	1.Strongly agree	2.Agree	3.Disagree	4.Strongly disagree
22. GMP is important for infant and young child health				
23. I am motivated to do GMP				
24. I do GMP just because I am given the responsibility				
25. It is easy to understand the cut off point (Z-scores) when interpreting growth indicators				
26. It is easy to identify children suffering from SAM/MAM				
27. Giving feedback to the mother after assessing a child's growth is very important				
28. I always try to motivate a mother who does not regularly bring her child to the clinic for growth monitoring to do so				
29. Performing growth monitoring and promotion properly is time consuming				
30. Both weight and length/height should be measured at each clinic visit				
31. MUAC must be measured every 3 months				
32. The clinic has all the necessary equipment required for GMP				
33. The equipment available for growth monitoring and promotion is in good working order				
34. Mothers understand the importance of bringing their infant and young child to the clinic for GMP				
35. I have sufficient knowledge and skills on how to use the Road to Health Booklet effectively				
36. I am of the opinion that growth monitoring and promotion are vital services offered by clinics.				

Section C: Growth Monitoring and Promotion Knowledge test questions

Questions	Possible answers from which participants can choose				
	1.	2.	3.	4.	5.
37. What is Growth Monitoring and Promotion?	Health promotion, assessment of growth and development	Immunization	Screening for health problems and referral	Measuring of the child at regular intervals, plotting of weight/height on a graph enabling one to see growth changes and advise the mother	All of the previously mentioned points
38. What are the tools used for Growth Monitoring and Promotion?	Wight scale	RTHB, MUAC tape measure, weight and height/length measuring equipment	RTHB, weight and height/length measuring equipment	RTHB	RTHB and measuring equipment
39. What are the infant and young child growth indicators?	Weight-for-age	Weight-for-length/height and weight-for age	BMI-for-age	Height-for-age, weight-for-age and weight-for-height/length	Weight-for-length
40. How often should an infant/young child's growth be monitored?	Every month until two years	Only when the child must receive immunisation	Every month until five years	Every month until one year then every two months until two years and every six months thereafter	Every month until a child complete immunisation
41. A child should be weighed naked if...	If it is not cold	If the scale is clean	<1 year	>1 year – 5 years	From birth until five years
42. A child should be weighed with minimal clothes (vest etc.) if...	If it is cold	If the scale is not clean	<1 year	>1 year – 5 years	From birth until five years
43. Weight-for-height chart indicates	Wasting	Stunting	Underweight	Normal growth	I don't know
44. Weight-for-age chart indicates	Stunting	Normal growth	Underweight	Wasting	I don't know
45. Height-for-age chart indicates	Normal growth	Stunting	Wasting	Underweight	I don't know
46. What do you do before you start taking weight measurements	I check if the scale is working and is calibrated? (calibration)	I just put the child on the scale and read the weight	I check if the surface area is flat on which the scale is placed and if	I check if the scale is at zero	Options one to four

**the weight
reading is at
zero and
calibrated**

APPENDIX D: OBSERVATION TOOL FOR WEIGHT, HEIGHT AND MUAC

Skills to observe during weight, height and MUAC measuring process

Skills to observe

1. Yes 2. No

Greetings and scale preparations

47. Child and mother greeted
48. Explanation given to the mother regarding the process before taking measurements of the infant/young child

Weight

49. Weight measured
Correct procedure of measuring **weight** followed
50. Place the electronic scale on a flat, level surface

51. Check and readjust the weight reading to zero
52. Make him/her stand on the middle of the scale's surface/put her/him on a scale
53. When the child is settled and the weight reading is stable record the weight to the nearest 100g. Make sure that nobody holds the child during weighing and that the child stands freely without holding onto anything

54. Read and announce the value from the scale. The assistant should repeat the value for verification and record it immediately

55. Child weighed naked (<1 year – infant)
56. Child weighed with minimal clothes (vest etc. >1 year → 5 years – children)
57. Child weighed with all clothes
58. Weight correctly plotted on RTHB
59. Identify infant/children who need referral in terms of being severely wasted (-3)

Height/length

60. Height/length taken

Correct procedure of taking **height** followed (This measurement is taken **for children two years and above** and/or for those taller than 85 cm)

61. Set the measuring board vertically on a stable level surface

62. Remove the child's shoes and any head-covering

63. Place the child on the measuring board, standing upright in the middle of the board. The child's heels and knees should be firmly pressed against the board by the assistant while the measurer positions the head and the cursor. The child's head, shoulders, buttocks, knees and heels should be touching the board.

64. Read and announce the measurement to the nearest 0.1cm.

65. Record and repeat the measurement to the measurer to make sure it has been correctly heard

Correct procedure of measuring **length** followed (This measurement is taken for **children under two years of age** and/or for those who are shorter than 85 cm. Check the child's birth date from official documentation e.g. health card, immunization card, birth certificate provided by the caregiver)

66. Place the measuring board horizontally on a flat, level surface

67. Remove the child's shoes and any head covering.

68. Place the child so he/she is lying down and face up in the middle of the board
69. Allow the assistant to hold the sides of the child's head and position the head until it is touching the head board.
70. Allow the measurer to place his/her hands on the child and firmly hold the child's knees together while pressing down. The soles of the feet should be flat on the foot piece, toes pointing up at right angles
71. The measurer should immediately remove the child's feet from contact with the footboard with one hand while holding the footboard securely in place with the other
72. Read and record the measurement
73. Height/length correctly plotted on RTHB

MUAC

74. MUAC taken (measured from 6 months until 5 years)

Correct procedure of taking **MUAC** followed

75. Ask the mother to remove any clothing that may cover the child's left arm. If possible, the child should stand erect and sideways to the measurer;
76. Estimate the midpoint of the left upper arm (arrow 6);
77. Straighten the child's arm and wrap the tape around the arm at the midpoint. Make sure the numbers are right side up. Make sure the tape is flat around the skin (arrow 7);
78. Inspect the tension of the tape on the child's arm. Make sure the tape has the proper tension (arrow 7) and is not too tight or too loose (arrows 8 and 9);
79. When the tape is in the correct position on the arm with correct tension, read the measurement to the nearest 0.1 cm (arrow 10);
80. Immediately record the measurement.

Feedback to the mother

81. Feedback regarding weight and length/height and MUAC given to the mother

Skills in interpreting plotted points for growth indicators (WHO Child Growth Standards, 2009)

Instructions for fieldworkers:

- The following are plotted points for growth indicators i.e weight-for-age, length-for-age and weight-for-length
- Request a nurse to identify growth problems and interpret plotted points below looking at the plotted points
- For example, looking at weight-for-age compared to the median, does this child have a problem? If so, what is the problem?
- While a nurse is interpreting the graphs, complete a table below
- *Use provided sheet for growth indicators and MUAC interpretations

82. Correctly interpreted Weight-for-age (WAZ) <-3SD

Yes	1
No	2
Do not know	3

82.1 Specify

83. Correctly interpreted Length-for-age (LAZ) -3SD to <-2SD

Yes	1
No	2
Do not know	3

83.1 Specify

84. Correctly interpreted Weight-for-length (WL/HZ) -2SD to <-1SD

Yes	1
No	2
Do not know	3

84.1 Specify

85. Correctly interpreted Length-for-age (LAZ) -1SD to +1SD

Yes	1
No	2
Do not know	3

85.1 Specify

86. Correctly interpreted Weight-for-age (WAZ) >+1SD to <+2SD

Yes	1
No	2
Do not know	3

86.1Specify

87. Correctly interpreted MUAC of < 11.5cm

Yes	1
No	2
Do not know	3

87.1Specify

88. Correctly interpreted MUAC of between 11.5cm and 12.5 cm

Yes	1
No	2
Do not know	3

88.1Specify

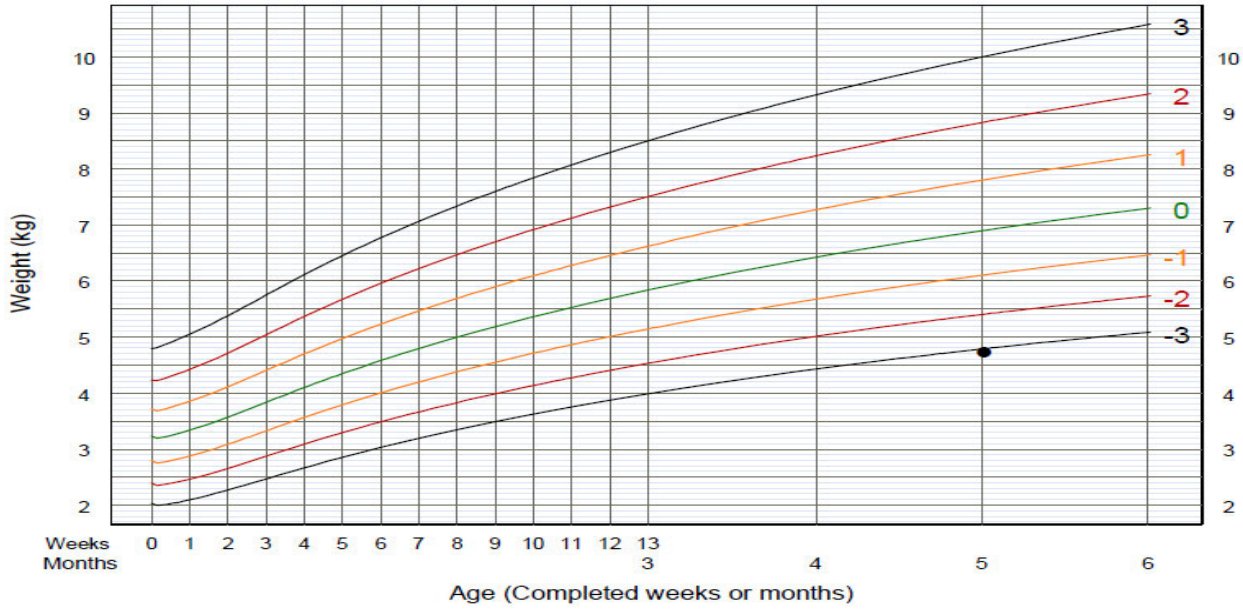
89. Correctly interpreted MUAC of 12.5cm or more

Yes	1
No	2
Do not know	3

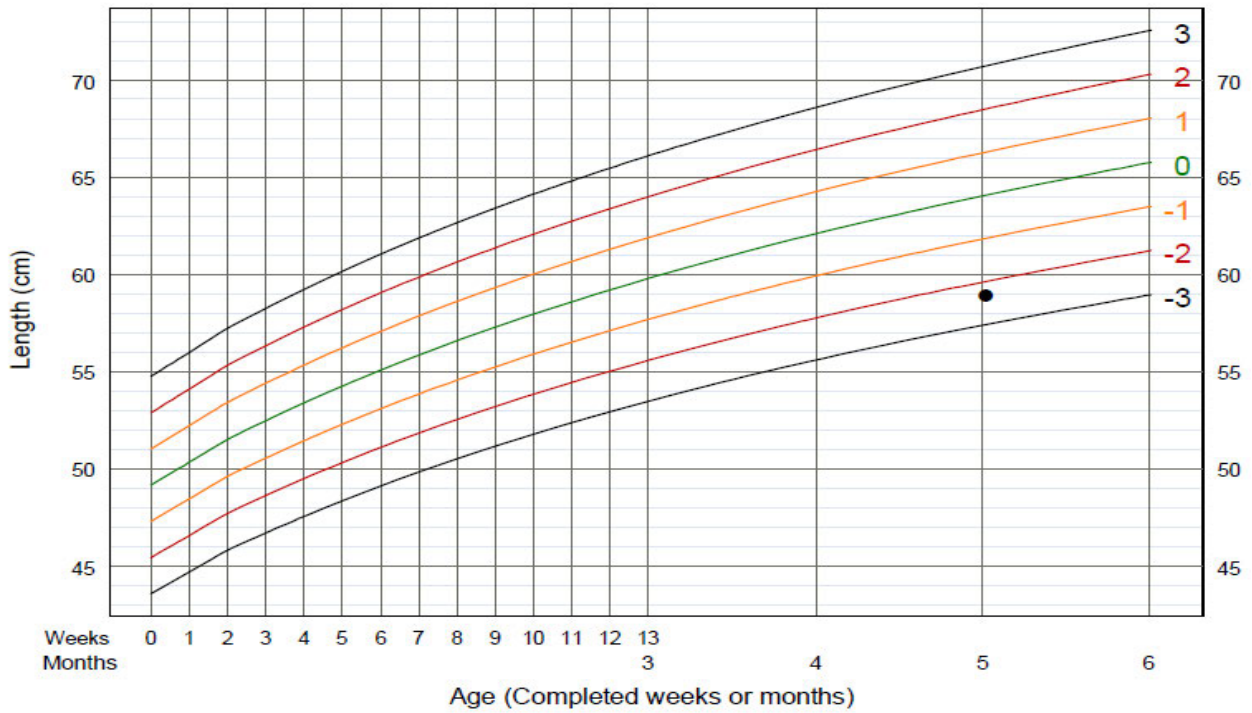
89.1Specify

APPENDIX D: OBSERVATION TOOL FOR WEIGHT, HEIGHT AND MUAC - SEPARATE SHEET

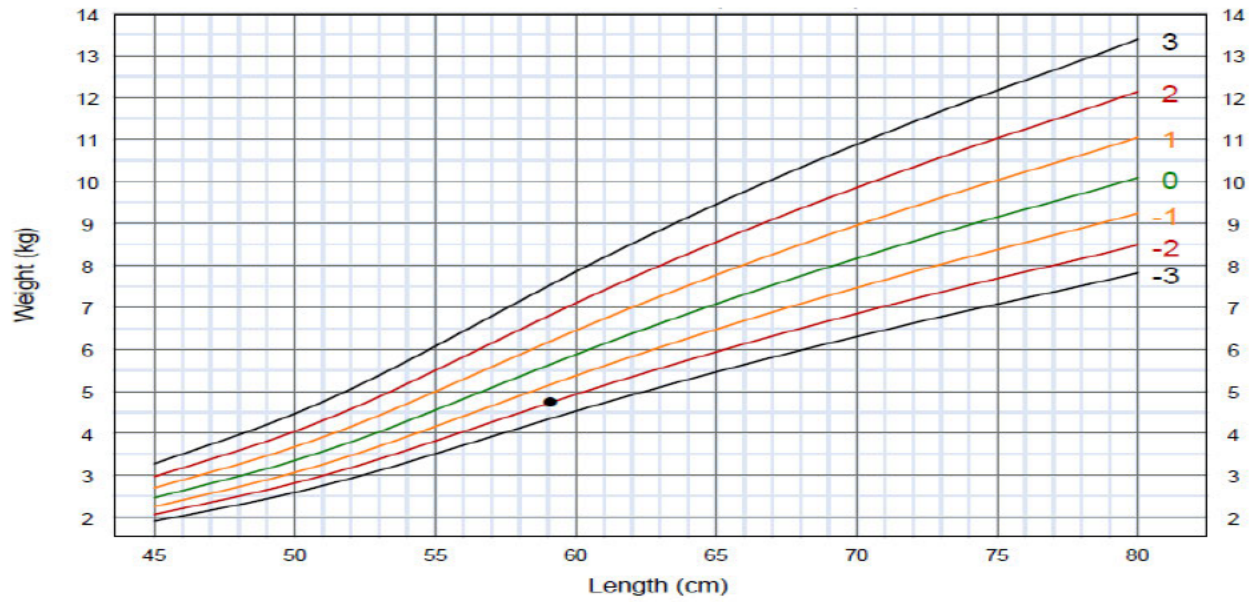
82. Weight-for-age (WAZ)



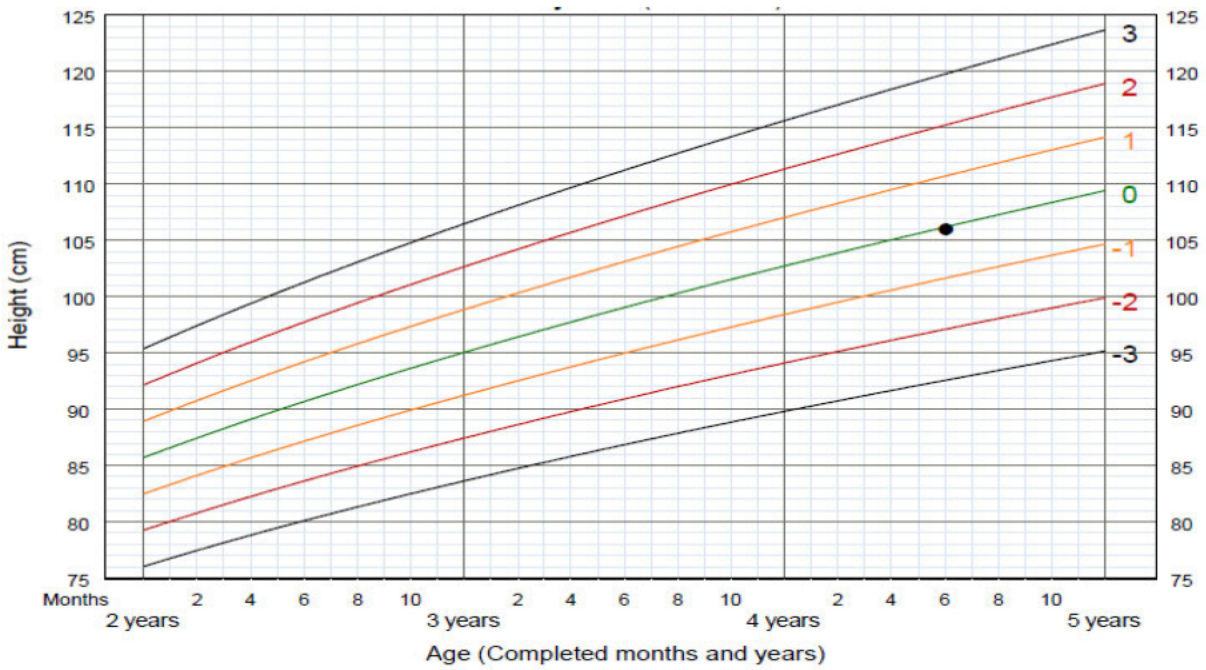
83. Length-for-age (LAZ)



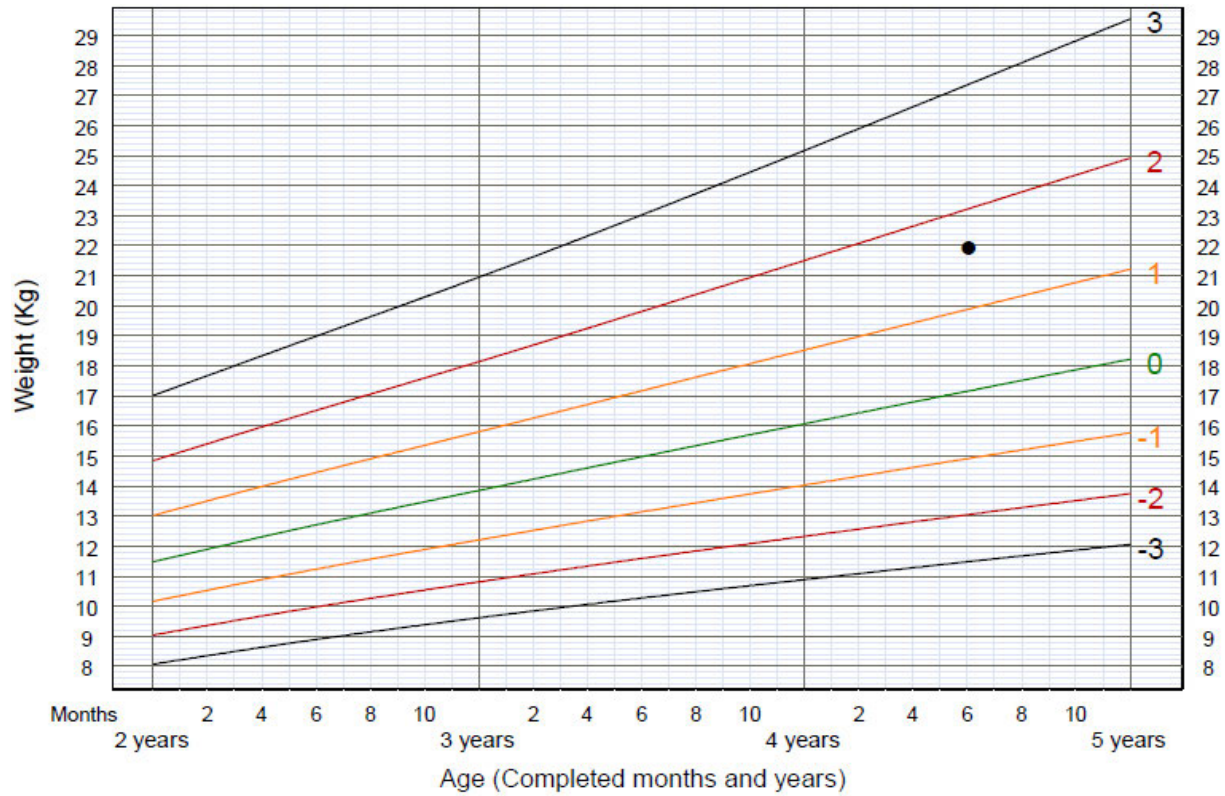
84. Weight-for-length (WL/HZ)



85. Length-for-age (LAZ)



86. Weight-for-age (WAZ)



Interpret the following MUAC classifications

Classification	Interpretation	Do not know
87. Less than 11.5 cm		
88. Between 11.5 cm and 12.5 cm		
89. At 12.5 cm or more		

APPENDIX E: SAM/MAM STATISTICS RECORDING SHEET

Date of data collection:

90. Name of the clinic under Makhado sub-district

Mashamba clinic	1	
Nkhensani clinic	2	
Riverplaats clinic	3	
Sereni clinic	4	
Mbhokota clinic	5	
Muwaweni clinic	6	
Waterval clinic	7	
Mpheni clinic	8	
Manyima clinic	9	
Vleifontein clinic	10	
Muila clinic	11	
Tshino clinic	12	
Ha-Mutsha clinic	13	
Levubu clinic	14	
Valdezia clinic	15	
Wayeni clinic	16	
Phadzima clinic	17	
Tshikuwi clinic	18	
Phephu clinics	19	
Straighthardt clinic	20	
Kutama clinic	21	
Madimbidzha clinic	22	
LTT PHC Clinic	23	
Midoroni clinic	24	

91. Name of the clinic Under Collins Chabane sub-district

De Hoop clinic	1
Kurhuleni clinic	2
Manavhela clinic	3
Tlangelani clinic	4
<i>Mhinga local area</i>	
Mhinga clinic	5
Matiyane clinic	6
Makuleke clinic	7
Shikundu clinic	8
Nghezimane clinic	9
Nthlaveni D clinic	10

<i>Mphambo local area</i>	
Mulenzhe clinic	11
Mavambe clinic	12
Mukhomi clinic	13
Malamulele clinic	14
Matsheka clinic	15
<i>Shingwedzi local area</i>	
Shingwedzi clinic	16
Nthlaveni E	17
Mtiti clinic	18
Peninghotsa clinic	19
<i>Tiyani local area</i>	
Tiyani clinic	20
Masakona clinic	21
Helderwater clinic	22
Marseilles clinic	23
Davhana clinic	24

92. Name of the clinic under Thulamela sub-district

Khakhu clinic	1
Fondwe clinic	2
Murangoni clinic	3
Madala clinic	4
Tshixwadza clinic	5
Mutale CHC	6
Thengwe clinic	7
Tshikundamalema clinic	8
Rambuda clinic	9
Tshiombo clinic	10
Tshaulu clinic	11
Makuya clinic	12
Lambani clinic	13
Dzingahe clinic	14
Thohoyandou CHC	15
William Eadie CHC	16
Sterkstroom clinic	17
Tshivhase – Thondo clinic	18
Shayandima clinic	19
Muledane clinic	20
Tswinga clinic	21
Dzwerani clinic	22
Lwamondo clinic	23
Tshisaulu clinic	24

93. Name of the clinic under Musina sub-district

Musina clinic	1
Madimbo clinic	2
Manenzhe clinic	3
Masisi Clinic	4
Mulala clinic	5
Nancefield clinic	6
Shakadza clinic	7
Tshipise clinic	8
Tshiungani clinic	9
Folovhodwe clinic	10

**Prevalence of SAM and MAM recording sheet for Infants and Young Children under
five years of age**

Year	Months												Total
	1.Jan	2.Fe b	3.Mar	4. Apr	5.Ma	6. Jun	7. Jul	8. Aug	9. Sept	10. Oct	11. Nov	12. Dec	
94. 2018	SAM&MAM												
	Total												
	assessed												
95. 2017	SAM&MAM												
	Total												
	assessed												
96. 2016	SAM&MAM												
	Total												
	assessed												
97. 2015	SAM&MAM												
	Total												
	assessed												
98. 2014	SAM&MAM												
	Total												
	assessed												

APPENDIX F: FOCUS GROUP INTERVIEW GUIDE

Title of research project: Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa.

Instructions:

- I would like to thank you for agreeing to participate in this study. The information that you will provide will remain confidential.
- Please feel free share with us all the knowledge and experience you have with regard to growth monitoring until there are no more new facts that are reported in the discussion. Please note that there are no right or wrong answer.

Inclusion criteria:

Only biological mothers who are ≥ 18 years and have an Infant and Young Child (IYC) younger than 5 years will be included in the study. Only mothers of IYC who are in possession of a Road to Health Booklet (RTHB) and are visiting a clinic for GMP on the day of data collection will be eligible for participation in the study. All mothers must be South African citizens in order to qualify for participating in the study.

Date of interview:

Participant code:

Section A: Socio-demographic characteristics of the mothers

99. Name of the clinic under Makhado sub-district

Mashamba clinic	1	
Nkhensani clinic	2	
Riverplaats clinic	3	
Sereni clinic	4	
Mbhokota clinic	5	
Muwaweni clinic	6	
Waterval clinic	7	
Mpheni clinic	8	
Manyima clinic	9	
Vleifontein clinic	10	
Muila clinic	11	
Tshino clinic	12	
Ha-Mutsha clinic	13	
Levubu clinic	14	
Valdezia clinic	15	
Wayeni clinic	16	
Phadzima clinic	17	
Tshikuwi clinic	18	
Phephu clinics	19	
Straighthardt clinic	20	
Kutama clinic	21	
Madimbidzha clinic	22	
LTT PHC Clinic	23	
Midoroni clinic	24	

100. Name of the clinic Under Collins Chabane sub-district

De Hoop clinic	1
Kurhuleni clinic	2
Manavhela clinic	3
Tlangelani clinic	4
<i>Mhinga local area</i>	
Mhinga clinic	5
Matiyane clinic	6
Makuleke clinic	7
Shikundu clinic	8
Nghezimane clinic	9
Nthlaveni D clinic	10
<i>Mphambo local area</i>	

Mulenzhe clinic	11
Mavambe clinic	12
Mukhomi clinic	13
Malamulele clinic	14
Matsheka clinic	15
<i>Shingwedzi local area</i>	
Shingwedzi clinic	16
Nthlaveni E	17
Mtiti clinic	18
Peninghotsa clinic	19
<i>Tiyani local area</i>	
Tiyani clinic	20
Masakona clinic	21
Helderwater clinic	22
Marseilles clinic	23
Davhana clinic	24

101. Name of the clinic under Thulamela sub-district

Khakhu clinic	1
Fondwe clinic	2
Murangoni clinic	3
Madala clinic	4
Tshixwadza clinic	5
Mutale CHC	6
Thengwe clinic	7
Tshikundamalema clinic	8
Rambuda clinic	9
Tshiombo clinic	10
Tshaulu clinic	11
Makuya clinic	12
Lambani clinic	13
Dzingahe clinic	14
Thohoyandou CHC	15
William Eadie CHC	16
Sterkstroom clinic	17
Tshivhase – Thondo clinic	18
Shayandima clinic	19
Muledane clinic	20
Tswinga clinic	21
Dzwerani clinic	22
Lwamondo clinic	23
Tshisaulu clinic	24

102. Name of the clinic under Musina sub-district

Musina clinic	1
Madimbo clinic	2
Manenzhe clinic	3
Masisi Clinic	4
Mulala clinic	5
Nancefield clinic	6
Shakadza clinic	7
Tshipise clinic	8
Tshiungani clinic	9
Folovhodwe clinic	10

103. Mother's age group

104. Level of education

Primary school	1	
Secondary	2	
Tertiary	3	
Never attended school	4	

105. Occupation

Domestic worker	1	
Police	2	
Educator	3	
Nurse	4	
Self employed	5	
Not employed	6	

Other, specify

.....

106. Other source of income

Child support grant	1	
Husband	2	
Parents	3	
Social grant	4	

Other, specify

.....

107. Marital status

Unmarried	1	
Married	2	
Divorced	3	
Widowed	4	

108. Number of children

.....

Focus group discussion guide

Topic	Discussion
Introduction	Facilitator and scribe's names
Topic of interviews	We would like to talk to you today about your experiences with regard to growth monitoring at the clinic you take your infant/young child to for immunisation and weighing. There are no right or wrong answers to any of the questions.
Aim of focus group and responses	We are trying to document your knowledge and experience with the growth monitoring and promotion programme in order to determine the possible reasons why mothers do not take their infants and young children to the clinic for weighing and the measurement of height/length so that we can make recommendations for the future planning of similar programmes.
Talking to one another	As we will be having a discussion, it will be good if only one person speaks at a time so that your discussion can be documented accurately
Explaining note-taking and tape recording	A research assistant will be taking notes during our discussion to facilitate analysis of the content of our discussion. A tape recorder will be used to ensure that your responses are recorded correctly.
Confidentiality	This discussion is confidential and we will not use any names in the research report or any other subsequent publication of the results.
Check understanding	Does everyone understand?
Clarification needed	Do you have any questions?

Section B: Discussion topics

109. Please share with us your understanding as to why it is important to measure the weight and length/height of infants and young children?
110. What type of advice/information do you receive when you visit the clinic for your child growth monitoring? (Probe: in what way, tell me more, would you)
111. What is your experience regarding the support you get from nurses in relation to your Infant and Young Children's (IYC) growth pattern? (Probe: in what way, tell me more, would you explain further, can you please give me an example)
112. What could be the reasons why mothers do not take their infants and young children to the clinic as often as they should? (Probe: challenges/reasons of not bringing a child to clinic regularly)
113. What do you think can be done to resolve the identified challenges?

TSHIVENḐA VERSION – TSHIPIDḐA TSHA VHURARU (C): BUDZISO DZA MUONGI

Thoho ya ṭhoḑuluso: “Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa”.

Ndaela:

- Ndi tama u vha livhuwa vho tenda uri vhavhe tshipidḐa tsha ṭhoḑuluso iyi. Mafhungo ane vhaḑo ri nea one aḑo dzula e a tshiphiri.
- Vha limuwe uri a huna phindulo yo khakheyaho na i songo khakheyaho.
- Arali vha sa pfesesi, ndi hambela uri vha nkhumbele ndi ṭalutshedze hafhu nga ndila i pfesesyaho.
- A vhapfe vho vhofoholowa u kovhelana na rine ndivho ine vha vha nayo malugana na ṭola ku alutshela.

Duvha ḑa mbudziso:

Khoutu ya muongi:

1. Dzina ḑa kiliniki Fhasi ha Makhado sub-district

Mashamba clinic	1	
Nkhensani clinic	2	
Riverplaats clinic	3	
Sereni clinic	4	
Mbhokota clinic	5	
Muwaweni clinic	6	
Waterval clinic	7	
Mpheni clinic	8	
Manyima clinic	9	
Vleifontein clinic	10	
Mula clinic	11	
Tshino clinic	12	
Ha-Mutsha clinic	13	
Levubu clinic	14	
Valdezia clinic	15	
Wayeni clinic	16	
Phadzima clinic	17	
Tshikuwi clinic	18	
Phephu clinics	19	
Straighthardt clinic	20	
Kutama clinic	21	
Madimbidzha clinic	22	
LTT PHC Clinic	23	
Midoroni clinic	24	

2. Dzina la kliniki Fhasi ha Collins Chabane sub-district

De Hoop clinic	1
Kurhuleni clinic	2
Manavhela clinic	3
Tlangelani clinic	4
<i>Mhinga local area</i>	
Mhinga clinic	5
Matiyane clinic	6
Makuleke clinic	7
Shikundu clinic	8
Nghezimane clinic	9
Nthlaveni D clinic	10
<i>Mphambo local area</i>	
Mulenzhe clinic	11
Mavambe clinic	12
Mukhomi clinic	13
Malamulele clinic	14
Matsheka clinic	15
<i>Shingwedzi local area</i>	
Shingwedzi clinic	16
Nthlaveni E	17
Mtititi clinic	18
Peninghotsa clinic	19
<i>Tiyani local area</i>	
Tiyani clinic	20
Masakona clinic	21
Helderwater clinic	22
Marseilles clinic	23
Davhana clinic	24

3. Dzina la kliniki Fhasi ha Thulamela sub-district

Khakhu clinic	1
Fondwe clinic	2
Murangoni clinic	3
Madala clinic	4
Tshixwadza clinic	5
Mutale CHC	6
Thengwe clinic	7
Tshikundamalema clinic	8
Rambuda clinic	9
Tshiombo clinic	10
Tshaulu clinic	11
Makuya clinic	12

Lambani clinic	13
Dzingahe clinic	14
Thohoyandou CHC	15
William Eadie CHC	16
Sterkstroom clinic	17
Tshivhase – Thondo clinic	18
Shayandima clinic	19
Muledane clinic	20
Tswinga clinic	21
Dzwerani clinic	22
Lwamondo clinic	23
Tshisaulu clinic	24

4. Dzina la kliniki Fhasi ha Musina sub-district

Musina clinic	1
Madimbo clinic	2
Manenzhe clinic	3
Masisi Clinic	4
Mulala clinic	5
Nancefield clinic	6
Shakadza clinic	7
Tshipise clinic	8
Tshiungani clinic	9
Folovhodwe clinic	10

5. Miñwaha

6. Mbeu

Munna	1	
Mufumakadzi	2	

7. Khethekanyo ya vhuongi

Nursing assistance	1	
Staff nurse	2	
Clinical nurse practitioner	3	
Professional nurse	4	

Zwiñwe vho, avha zwi bule

.....

8. Ndi tshikhala tshingafhani musi vha tshi khou shuma sa muongi?

.....

9. Ndi tshikhala tshingafhani musi vha khou shuma kha zwa GMP?

.....

10. Vho wana ngafhi pfunzo ngaha tshikalo na kualutshele kwa n'wana?

Kholegini ya vhuongi	1	
Yunivesithi musi ndi mutshudeni	2	
Kha ngudo dzo newaho ngavha muhasho wa mutakalo	3	
Nga Dietician/Nutritionist	4	
Kha mushumisani	5	
Athi athu vhuya nda funzwa	6	

Zwiṅwe vho, avha zwi bule

.....

11. Ndi nnyi avha neaho ngudo dza kushumisele kwa bugu ya tshikalo ya n'wana (RTHB) nga nṅa ha izwo zvevha gudiswa murahu?

Kha mushumisani	1	
Dietician/Nutritionist	2	
Kha lecturer	3	

Munwe vho, avha zwi bule

.....

12. Ndi zwipiḽa zwifhio zwo katelwaho musi wa ngudo dzavho?

U pulota girafu ya tsumba nyaluwo kha n'wana	1	
U ṽalutshedza girafu ya tsumba nyaluwo kha n'wana	2	
U wanulusa thaidzo dza kualutshele ubva kha phoindi dzo pulotiwaho	3	
Zwine zwa tevhelwa musi wa tshikalo	4	
Zwoṽhe zwo bulwaho afho nṅṅa	5	

Zwinwe vho, avha zwi bule

.....

13. Vha wana ngafhi ngundo dza mvusuludzo ngaha tshikalo, kualutshele na kushumisele kwa RTHB?

Kha ofisi dza tshitiiriki	1	
Kha ofisi dza vundu	2	
Adzi itiwi	3	
Athi athu uya	4	

Zwinwe vho, avha zwi bule

.....

14. Vha wana ngudo dza mvusuludzo lungana malugana na tshikalo na kualutshele kwa nwana?

Lu thihi kha n̄waha	1	
Murahu ha mīnwaha mivhili	2	
Tshīnwe tshifhinga	3	

Zwinwe vho, avha zwi bule

.....

15. Ndi thikhedzo de ine vha i n̄waha malugana na tshikalo na kualutshele kwa nwana?

.....

.....

16. Iyo thikhedzo vha i wana ngafhi? Hone lungana?

.....

17. Ndi milaedza de ine vhai nea vho mme musi vho dalela kiliniki lwa u disa n̄wana tshikaloni?

.....

.....

.....

.....

.....

18. Milaedza iyo i newa lungana?

.....
.....

19. Ndi zwickalo de zwine vha shumisa musi wa tshikalo na u tola kualutshele kwa nwana?

.....
.....
.....

20. Ndi dzifhio khaedu dzine vha tangana nadzo musi vha khou shuma zwa tshikalo or GMP?

.....
.....
.....
.....
.....
.....

21. Ndi maga afhio ane vha vhona atshi nga thusa u tandulula khaedu dze vha bula afhio ntha?

.....
.....
.....
.....
.....

Khethekanyo ya vhuvhili (B): Kuvhonele kwa muongi kha Growth Monitoring and Promotion

Fhungo

Khonadzeo dza phindulo

**1.Ndi a 2.Ndi a 3.Athi 4.Athi
tenda nga tenda tendi tendi lwa
maanda tshothe**

- 22. GMP ndiya ndeme kha mutakalo wa vhana vhaṭuku
- 23. Ndina dzangalelo ja u shuma na vhana musi ndi kha GMP
- 24. Ndi shuma kha GMP nga uri ndo newa vhuḍifhinduleli honoho

25. Zwo leluwa u pfesesa mitaladzi (Z-scores) i sumbedzaho ku alutshele kwa n̄wana
26. Zwo leluwa u topola n̄wana are na SAM/MAM
27. U nea mme muvhigo nga murahu ha u tola n̄wana ndi zwa ndeme
28. Ndi dzulela u nea t̄hūt̄huwedzo mubebi asa d̄isiho n̄wana tshikaloni uri a d̄ise n̄wana tshikaloni
29. U ita zwa GMP nau u nea t̄hūt̄huwedzo zwi dzhia tshifhinga tshilapfu
30. Tshileme na vhulapfu zwi tea u kaliwa misi yōthe musi ho dalelwa kiliniki
31. MUAC u tea u pimiwa nga murahu ha mīnwedzi miraru mīnwe na mīnwe
32. Kiliniki ina zwikalo zwōthe zwi t̄odeaho kha zwa GMP
33. Zwikalo zwire hone zwi kha tshiimo tshavhudi
34. Vho mme vhaya pfesesa vhūt̄hogwa ha u d̄isa vhana kiliniki tshikaloni
35. Ndi na vhukoni kha ku shumisele kwa bugu ya vhana ya tshikalo
36. Ndi na lutendo uri tshumelo ya tshikalo nau t̄ola kualutshele kwa vhana I nekedzwaho nga kiliniki ndiya ndeme

Khethekanyo ya vhuraru (C): Mbudziso dza u linga ndivho ya GMP kha muongi

Mbudziso

Khonadzeo dza phindulo dzine vhangana nanga khadzo

	1.	2.	3.	4.	5.
37. Growth Monitoring and Promotion zwi amba mini?	Ndi nguda mutakalo na u t̄ola nyaluwo ya n̄wana	U haela	U t̄ola mutakalo u si wavhūdi na u fhirisela n̄wana ho teaho	Ndi u kala n̄wana misi yōthe, u pulota tshileme na vhulapfu u itela u kona u vhona tshanduko kha ku alutshele kwa n̄wana na u eletshedza mme	Zwōthe zwo bulwaho afho murahu
38. Ndi zwi shumiswa zwifhio zwi t̄odeaho kha GMP?	Tshikalo tsha	Bugu ya tshikalo, theiphi yau pima MUAC, tshikalo tsha tshileme na vhulapfu	BMI zwi tshi linganywa na mīnwaha	Bugu ya tshikalo	Bugu ya tshikalo na tshikalo tsha tshileme
39. Ndi dzi fhio tsumbo dza ku alustehele kwa n̄wana?	Weight-for-age	Weight-for-length/height na weight-for age	Mutaladzi wa u sumba u aluwa	Height-for-age, weight-for-age na weight-for-height	Athi d̄ivhi

40. Ndi lini hune n̄wana a tea u iswa tshikaloni?	N̄wedzi muñwe na muñwe u swika miñwaha mivhili	Musi n̄wana a tshi tea u wana ñeleṭe dza u haeliwa	N̄wedzi muñwe na muñwe u swika miñwaha mitanu	N̄wedzi muñwe na muñwe arali n̄wana a fhasi ha miñwaha mivhili nga murahu lu ngavha na luthihi kha miñwedzi miraru	N̄wedzi muñwe na muñwe u swika n̄wana a tshi fhedza ñeleṭe dza u haeliwa
41. N̄wana u tea u kaliwa e fhedzi musi?	Arali hu sa rotholi	Arali tshikalo tsho kuna	A fhasi ha n̄waha muthihi	Ubva kha n̄waha swika kha miṭanu	muthihi u
42. N̄wana u tea u kaliwa o ambara zwi leluwaho musi?	Arali hu tshi rothola	Arali tshikalo tshi songo kuna	A fhasi ha n̄waha muthihi	Ubva kha n̄waha swika kha miṭanu	muthihi u
43. Weight-for-height zwi sumba?	Wasting	Stunting	Underweight		
44. Weight-for-age zwi sumba?	Stunting	Wasting	Underweight		
45. Height-for-age zwi sumba?	Underweight	Stunting	Wasting		
46. Vha ita mini phanḁa ha musi vha tshi kala n̄wana?	Ndi a lavhelesa arali tshikalo tshi khou shuma zwavhuḁi (calibration)	Ndi soko vhea n̄wana kha tshikalo nda dzhia tshileme	Ndi lavhelesa arali fhasi ho linganela nahone tshikalo tshi kha gumba	Ndi lavhelesa uri tshikalo tshikha gumba naa	Izwo zwo bulwaho afho murahu

TSHIPIḌA TSHA VHUNA (D): FOMO YA U LAVHELESA VHUKONI

Vhukoni vhu no tea u lavheleswa musi vha khou pima tshileme na vhulapfu ha ḡwana

Vhukoni vhu no tea u lavheleswa

1. Ee 2. Hai

Ndumeliso na u lugisela tshikalo

47. U lumeliswa ha mme na ḡwana

48. Ṭhalutshedzo i nekedzwa mme malugana na zwino tevhedzwa hu tshi kaliwa ḡwana

Tshileme

49. Tshileme tsho pimiwa

Maitelo o teaho au pima tshileme o tevhedzwa

50. Tshikalo tsho vhewa fhasi nahone fhethu ho linganelaho

51. U sedzulusa nau vhea tshikalo kha gumba

52. U vhea ḡwana kha vhukati ha tshikalo

53. Musi ḡwana na tshikalo zwono dzudzanyea, avha ḡwale tshileme tsha ḡwana uya kha 100g. Avha zwi jiele nzhele uri ahuna ano fara ḡwana musi vha tshi khou kala tshileme, ḡwana u tea u ima ene mune asongo fara tshithu

54. U vhala nau divhadza mvelelo ubva kha tshikalo. Muongi muthusi u tea u dovholola mveleo hu u khwaṭhiedza a kona u ḡwala na zwezwo.

55. ḡwana o kaliwa e fhedzi (fhasi ha ḡwaha muthihi – lutshetshe)

56. ḡwana o kaliwa na zwiambaro zwo linganelaho (vese na zwiḡwe. ḡwaha muthihi uya kha mitanu)

57. ḡwana o kaliwa ana zwiambaro

58. Tshileme tsho ḡwaliwa zwone kha bugu ya tshikalo

59. U kona u ṭalisa ḡwana a teaho u fhiriselwa phanda ho lavheleswa tshileme tshire kha -3

Vhulapfu vhuno pimiwa ḡwana o ima/o eḍela

60. Vhulapfu ho pimiwa musi ḡwana o ima/o eḍela

Maitelo o teaho a u pima **vhulapfu ha ḡwana o ima** o tevhelwa (u piwa hohu hu itwa kha vhana vhare na miḡwaha mivhili uya kha miṭanu kana vhare nṭha ha 85 cm)

61. U dzudzanye tshikalo fhethu ho linganelaho nahone husa dzinginyei

62. U bvule zwienda kana zwire kha ṭhoho ya ḡwana

63. U vheya ḡwana kha tshikalo, o ima zwavhuḍi vhukati hatsho. Milenzhe ya ḡwana i tea u kwama na tshikalo. Ṭhoho, mahaḍa, maraho, na milenzhe wi tea u kwama tshikalo.

64. U vhala na u divhadza vhulapfu uya kha 0.1 cm

65. U ḡwala nau dovholola u khwaṭhisedza uri zwo pfala na

Maitele o teaho a u pima **vhulapfu ha n̄wana o edela** o tevhedwa (U pima hohu hu itwa kha n̄wana are fhasi ha miñwaha mivhili kana are na 85 cm. U lavhelesa ðuvha la mabebo a n̄wana ubva kha bugu yawe ya tshikalo kana sethifikheithi tsha mabebo)

66. U vhea tshikalo fhethu ho linganelaho nahone husa dzinginyei

67. U bvula n̄wana zwiambaro na zwire kha t̄hoho

68. U eðedza n̄wana vhukati ha tshikalo, tshifhaṭuwo tsho lavhelesa n̄ṭha

69. U tendela muongi muthusi atshi fara n̄wana nga matungo ha t̄hoho ayi dzudzanya u shuka i tshi kwama tshikalo

70. U tendela mupimi atshi vhea tshanda tshawe kha milenzhe ya n̄wana zwavhuḍi atshi tsikeledzeala fhasi. Zwirethe zwi tea u linganela, zwikunwe zwo lavhelesa n̄ṭha

71. Mupimi u tea u bvisa milenzhe ya n̄wana nga tshihadu nga tshanda tshithihi, tshinwe tshanda o fara tshipida tsha tshikalo tsha milenzheni zwavhuḍi

72. U vhala na u n̄wala vhulapfu

73. Vhulapfi ha u ima kana ha u edela ho n̄walwa zwo ne kha bugu ya tshikalo

MUAC

74. MUAC wo pimiwa (hu pimiwa ubva kha vhana vhare na miñwedzi ya rathi u swika kha miṭanu

Maitele o teaho a u pima MUAC o tevhezwa

75. U humbela mme uri abvule n̄wana zwiambaro zwine zwanga vala tshanda tsha monde. Arali zwi tshi konadzea, n̄wana u tea u ima zwavhuḍi asa tsukunyei nga thungo ya mupimi

76. U anganyela vhukati ha tshanda tsha monde (musevhe 6)

77. U onyolosa tshanda tsha n̄wana khathihi na u tshi ambatha theipi ya u pima vhukati ha tshanda. Nomboro dza theipi dzi tea uvha nga thungo ya n̄ṭha. Theipi i tea uvha yo dzula zwavhuḍi kha lukanda (musevhe 7)

78. U lavhelesa uri theipi yo dzula nga ndila de kha tshanda. U lavhelesa uri theipi yo dzudzanyea (Musevhe 7), nahone a yongo pata kana u leluwesa kha tshanda tsha n̄wana (musevhe 8 na 9)

79. Musi theipi yo dzudzanyea kha tshanda nahone I songo pata kana u leluwesa, u vhala mvelelo uya kha 0.1 cm (musevhe 10)

80. U rikhoda mvelelo na zwezwo

Muvhigo u nekedzwa mme

81. Muvhigo malugana na tshileme, vhulapfu kana MUAC zwo țalutshedzwa mme

Vhukoni kha u topola SAM/MAM – mitaladzi i sumbaho nyaluwo (WHO Child Growth Standards, 2006)

Instructions for fieldworkers:

- Zwi tevhelaho ndi dzi poiti dzo pulotiwaho u sumba kualutshele i.e weight-for-age, length-for-age and weight-for-length
- Avha humbele muongi a t̄aluse thaidzo kha kualutshele na t̄halutshedzo ngaha poiti dzo pulotiwaho
- Sa tsumbo, vho lavhelesa weight-for-age vhatshi vhambedza na median, uyu n̄wana u vhonala ana thaidzo na? arali zwo ralo, thaidzo ndi mini?
- Musi muongi a tshi khou nea t̄halutshedzo, avha d̄adze zwikhala zwire afho fhasi

Thalutshedzo ngaha ku pulotele kwa kualutshele (WHO, 2009)

Khethekanyo ya Z-score	WAZ				WLZ				LAZ			
	T̄halutshedzo	1.Ee	2.Hai	3.Thi zwi divhi	T̄halutshedzo	1.Ee	2.Hai	3.Athi zwi divhi	T̄halutshedzo	1.Ee	2.Hai	3.Athi zwi divhi
82. <-3SD	Severely underweight				Severely wasted				Severely stunted			
83. . -3SDto<-2SD	Underweight				Wasted				Stunted			
84. 80. -2SDto<-1SD	Mild underweight				Mild wasted				Mild stunted			
85. 81.-1SDto+1SD	Normal WAZ				Normal WLZ				Normal length			
86. 82. >+1SDto<+2SD	Possible growth problem				Possible risk of overweight				Normal length			
+2SDto<+3SD	Possible growth problem				Overweight				Normal length			
>+3SD	Possible growth problem				Obese				Above normal			

*Avha shumise bambiri yo nekedzwaho u t̄alutshedza ngaha dzi poiti dzo pulotiwaho

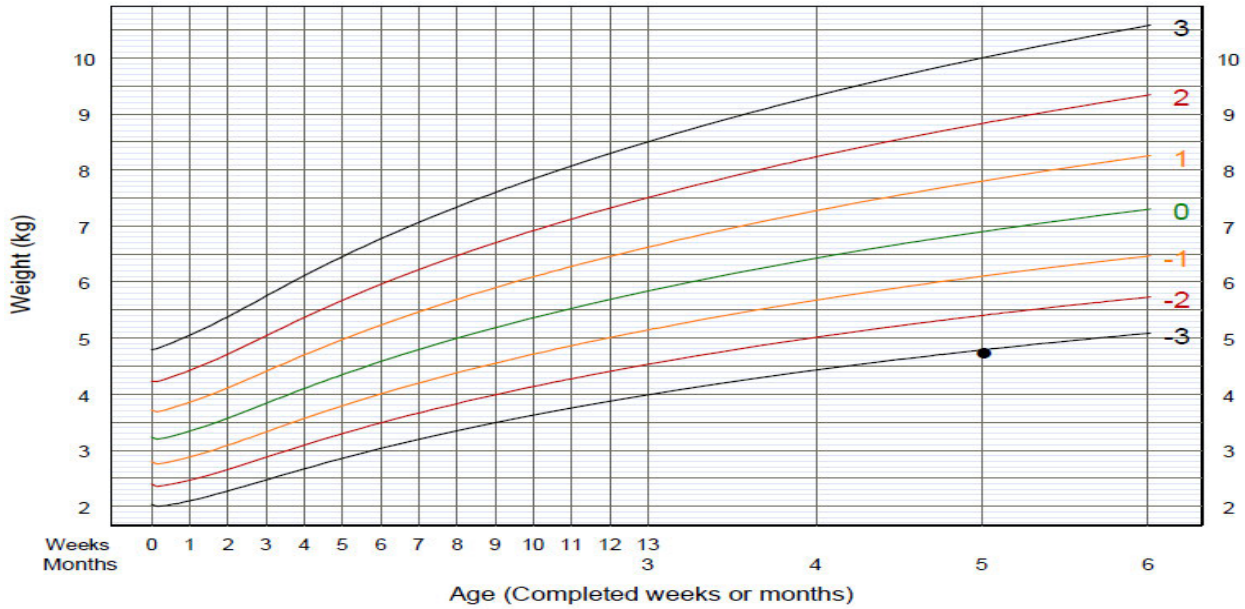
Thalutshedzo nga ha MUAC

Khethekanyo	Thalutshedzo	1.Ee	2.Hai	3. Athi zwi divhi
87. Less than 11.5 cm	SAM (refer urgently)			
88. Between 11.5 cm and 12.5 cm	MAM (manage as in IMCI guidelines)			
89. At 12.5 cm or more	NAM			

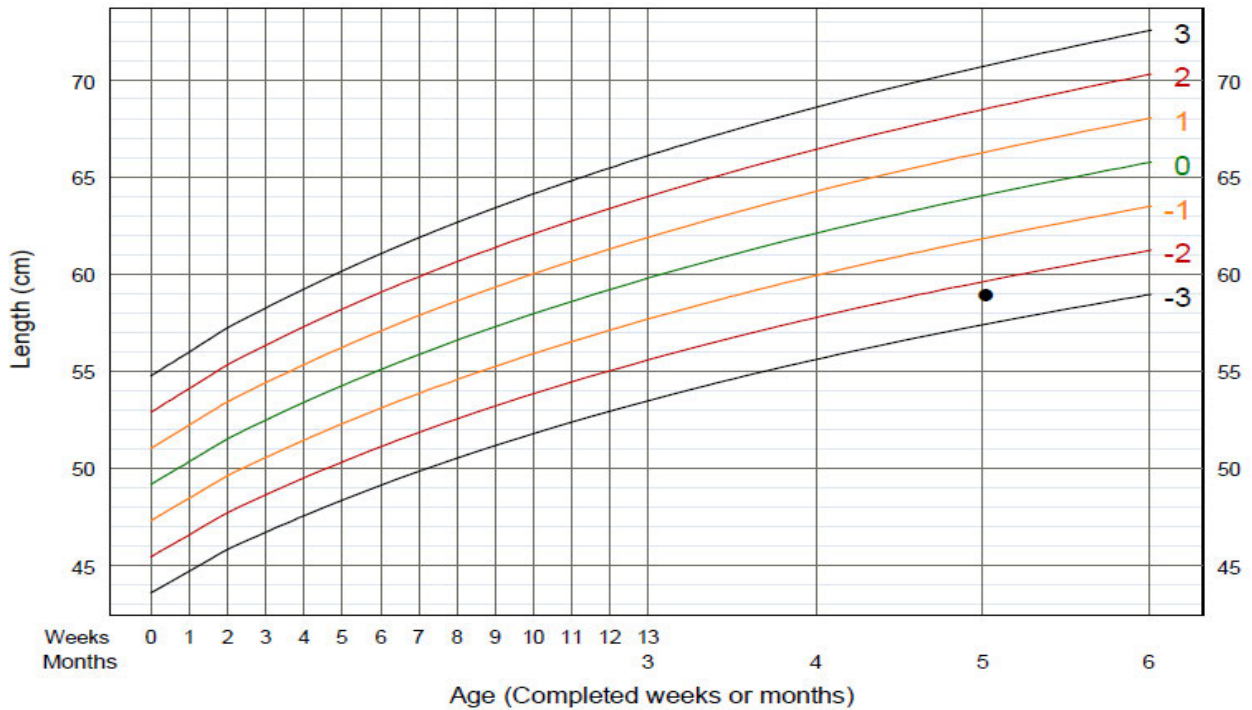
***Avha shumise bambiri yo nekedzwaho u thalutshedza nga ha MUAC**

TSHIPIḌA TSHA VHUNA (D): BAMBIRI ḌO KHETHELWAHO U ḌOLA VHUKONI HAU ḌALUTSHEDZA POITI DZO PULOTIWAHO

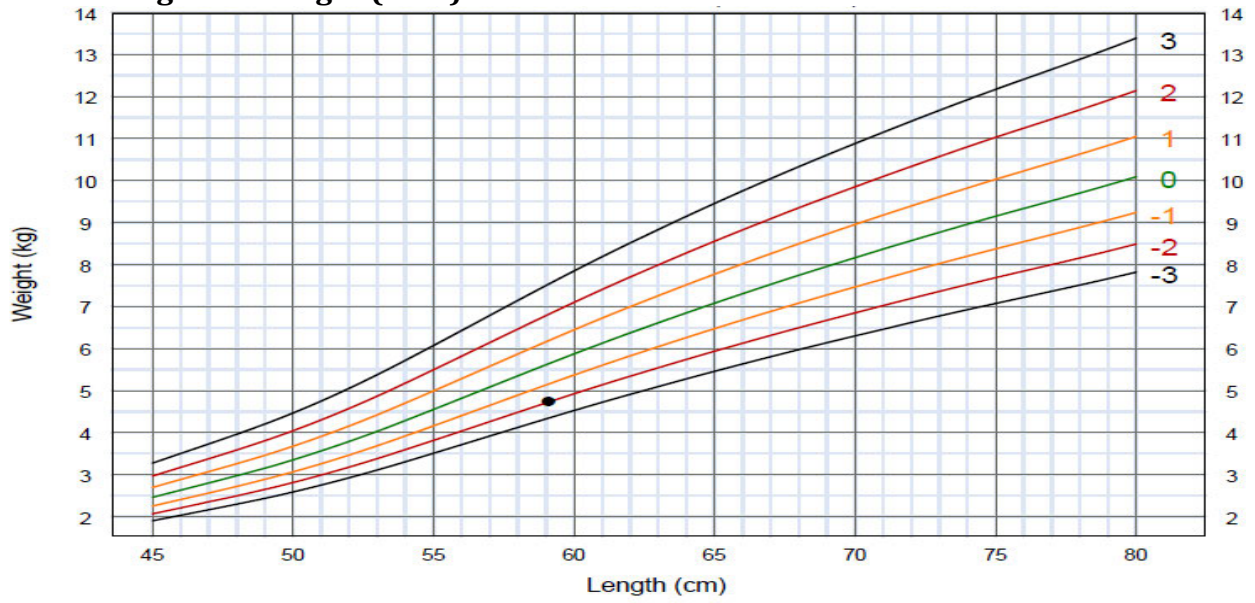
82. Weight-for-age (WAZ)



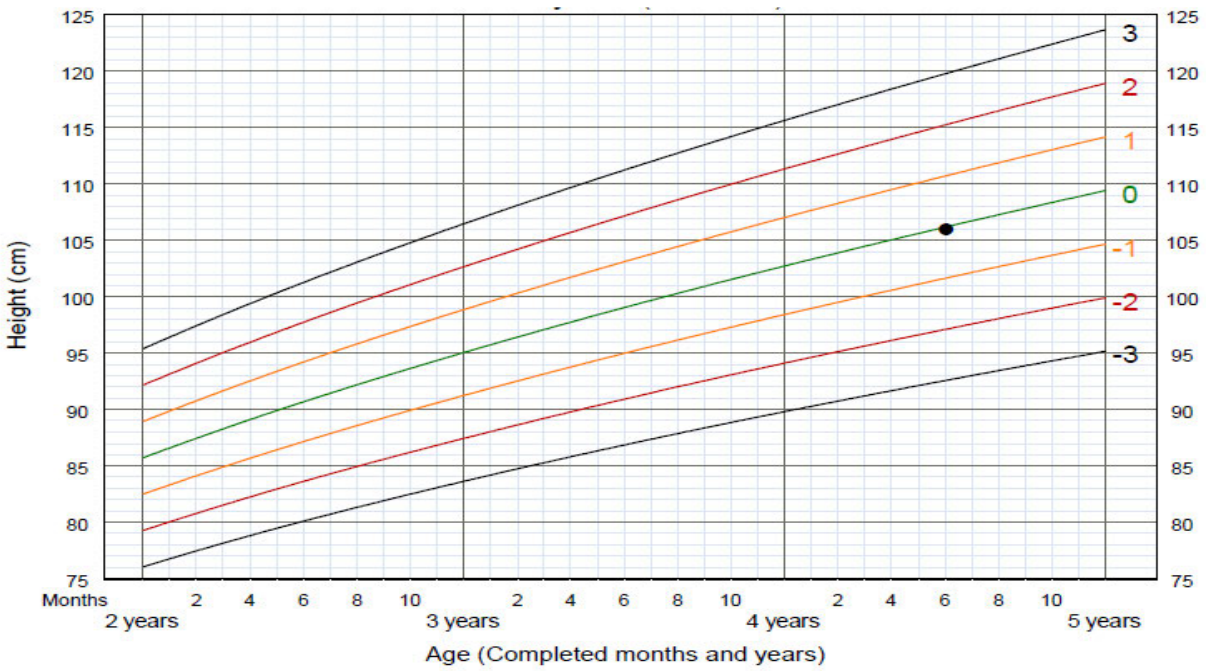
83. Length-for-age (LAZ)



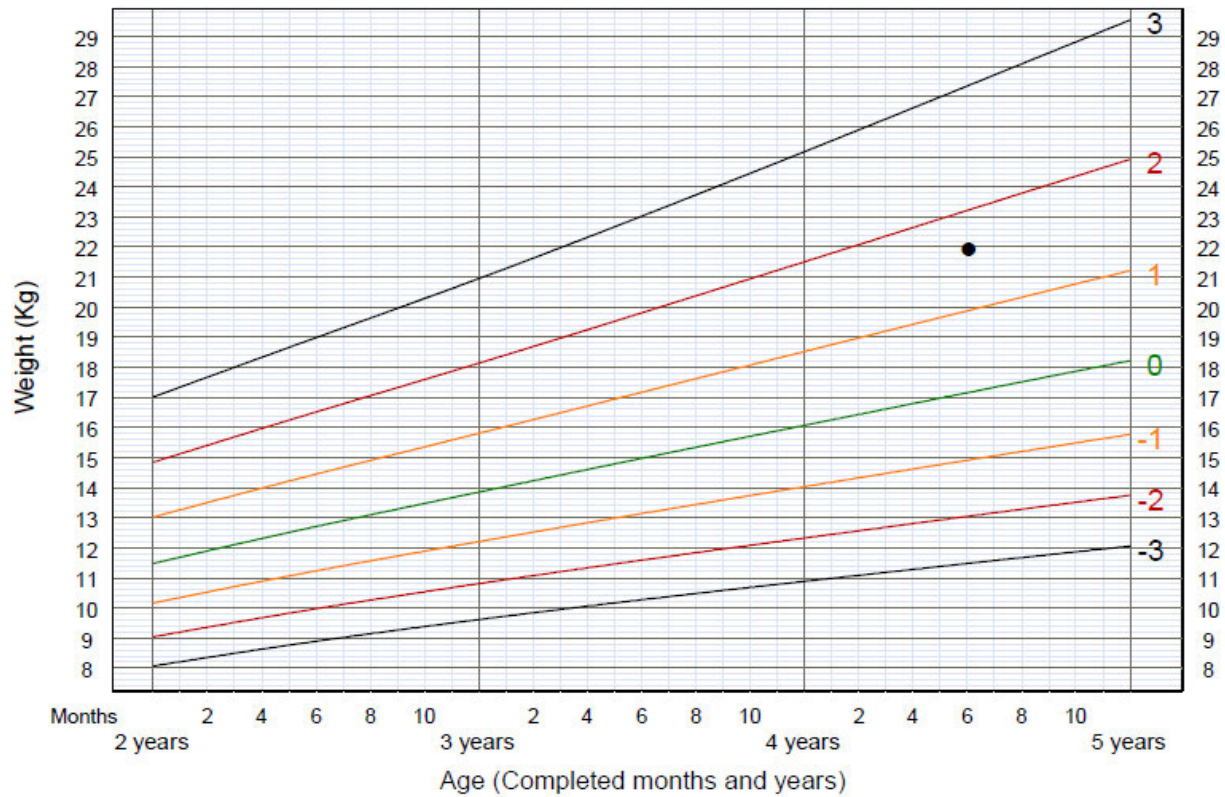
84. Weight-for-length (WLZ)



85. Length-for-age (LAZ)



86. Weight-for-age (WAZ)



Avha țalutshedze zwitevhelaho

Khethekanyo

- 87.. Less than 11.5 cm
- 88.. Between 11.5 cm and 12.5 cm
- 89. At 12.5 cm or more

1. Thalutshedzo

2. Athi zwi divhi

**TSHIPIḂA TSHA VHUTANU (E): FHETHU HA U RIKHODA SIḂATISITIKI TSHA SAM/MAM
- LWA MIḂWAHA MIḂANU**

ḂthoḂo ya Ḃthodulusso: Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa.

Ḃuvha Ḃau dalela kiḂiniki:

90. Dzina Ḃa kiḂiniki Fhasi ha Makhado sub-district

Mashamba clinic	1	
Nkhensani clinic	2	
Riverplaats clinic	3	
Sereni clinic	4	
Mbhokota clinic	5	
Muwaweni clinic	6	
Waterval clinic	7	
Mpheni clinic	8	
Manyima clinic	9	
Vleifontein clinic	10	
Muila clinic	11	
Tshino clinic	12	
Ha-Mutsha clinic	13	
Levubu clinic	14	
Valdezia clinic	15	
Wayeni clinic	16	
Phadzima clinic	17	
Tshikuwi clinic	18	
Phephu clinics	19	
Straighthardt clinic	20	
Kutama clinic	21	
Madimbidzha clinic	22	
LTT PHC Clinic	23	
Midoroni clinic	24	

91. Dzina Ḃa kiḂiniki Fhasi ha Collins Chabane sub-district

De Hoop clinic	1
Kurhuleni clinic	2
Manavhela clinic	3
Tlangelani clinic	4
<i>Mhinga local area</i>	

Mhinga clinic	5
Matiyane clinic	6
Makuleke clinic	7
Shikundu clinic	8
Nghezimane clinic	9
Nthlaveni D clinic	10
<i>Mphambo local area</i>	
Mulenzhe clinic	11
Mavambe clinic	12
Mukhomi clinic	13
Malamulele clinic	14
Matsheka clinic	15
<i>Shingwedzi local area</i>	
Shingwedzi clinic	16
Nthlaveni E	17
Mtiti clinic	18
Peninghotsa clinic	19
<i>Tiyani local area</i>	
Tiyani clinic	20
Masakona clinic	21
Helderwater clinic	22
Marseilles clinic	23
Davhana clinic	24

92. Dzina la kliniki Fhasi ha Thulamela sub-district

Khakhu clinic	1
Fondwe clinic	2
Murangoni clinic	3
Madala clinic	4
Tshixwadza clinic	5
Mutale CHC	6
Thengwe clinic	7
Tshikundamalema clinic	8
Rambuda clinic	9
Tshiombo clinic	10
Tshaulu clinic	11
Makuya clinic	12
Lambani clinic	13
Dzingahe clinic	14
Thohoyandou CHC	15
William Eadie CHC	16
Sterkstroom clinic	17
Tshivhase – Thondo clinic	18
Shayandima clinic	19
Muledane clinic	20

Tswinga clinic	21
Dzwerani clinic	22
Lwamondo clinic	23
Tshisaulu clinic	24

93. Dzina la kliniki Fhasi ha Musina sub-district

Musina clinic	1
Madimbo clinic	2
Manenzhe clinic	3
Masisi Clinic	4
Mulala clinic	5
Nancefield clinic	6
Shakadza clinic	7
Tshipise clinic	8
Tshiungani clinic	9
Folovhodwe clinic	10

Khethekanyo ya u rikhoda SAM/MAM siṭaṭisitiki tsha vhana vhare fhasi ha miṅwaha mitanu

Year	Months												Total
	1.Jan	2.Feb	3.Mar	4. Apr	5.Ma	6. Jun	7. Jul	8. Aug	9. Sept	10. Oct	11. Nov	12. Dec	
94. 2018	SAM/ MAM												
95. 2017	SAM/ MAM												
96. 2016	SAM/ MAM												
97. 2015	SAM/ MAM												
98. 2014	SAM/ MAM												

99. Khonadzeo dza zwivhangi zwa SAM/MAM

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.....

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100. Mivhundu ya tsini ine ya wana tshumelo fhanu

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.....

TSHIPIḌA TSHA VHUTANU NA VHUTHIHI (F): MBUDZISO DZO LIVHISWAHO KHA MUBEBI

Thoho ya thoduluso: Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa.

Ndaela:

- Ndi tama u vha livhuwa vho tenda uri vhavhe tshipiḌa tsha thoduluso iyi. Mafhungo ane vhaḍo ri nea one aḍo dzula e a tshiphiri.
- Vha limuwe uri a huna phindulo yo khakheaho na i songo khakheaho.
- Arali vha sa pfesesi, ndi humbela uri vha nkhumbele ndi talutshedze habe nga ndila i pfeseseaho.
- A vhapfe vho vhotholowa u kovhelana na rine ndivho ine vha vha nayo yothe malugana na tshikalo na kualutshele kwa vhana

Maga a u dzhenelela:

Mme ane avha na minwaha ya 18 a dovha avha na nwana are fhasi ha minwaha miḵanu uḍo tendelwa u vha tshipiḌa tsha thoduluso iyi. Vho mme vhothe vha no do dzhenelela vha tea uvha vhe vha dzulapo vha Afurika Tshipembe.

Duvha la mbudziso:

Khoudu ya mme:

Khethekanyo ya u thoma (A): Demographic information ya mme

101. Dzina la kliniki Fhasi ha Makhado sub-district

Mashamba clinic	1	
Nkhensani clinic	2	
Riverplaats clinic	3	
Sereni clinic	4	
Mbhokota clinic	5	
Muwaweni clinic	6	
Waterval clinic	7	
Mpheni clinic	8	
Manyima clinic	9	
Vleifontein clinic	10	
Mula clinic	11	
Tshino clinic	12	
Ha-Mutsha clinic	13	
Levubu clinic	14	
Valdezia clinic	15	
Wayeni clinic	16	
Phadzima clinic	17	
Tshikuwi clinic	18	
Phephu clinics	19	
Straighthardt clinic	20	
Kutama clinic	21	
Madimbidzha clinic	22	
LTT PHC Clinic	23	
Midoroni clinic	24	

102. Dzina la kliniki Fhasi ha Collins Chabane sub-district

De Hoop clinic	1
Kurhuleni clinic	2
Manavhela clinic	3
Tlangelani clinic	4
<i>Mhinga local area</i>	
Mhinga clinic	5
Matiyane clinic	6
Makuleke clinic	7
Shikundu clinic	8
Nghezimane clinic	9
Nthlaveni D clinic	10
<i>Mphambo local area</i>	

Mulenzhe clinic	11
Mavambe clinic	12
Mukhomi clinic	13
Malamulele clinic	14
Matsheka clinic	15
<i>Shingwedzi local area</i>	
Shingwedzi clinic	16
Nthlaveni E	17
Mtiti clinic	18
Peninghotsa clinic	19
<i>Tiyani local area</i>	
Tiyani clinic	20
Masakona clinic	21
Helderwater clinic	22
Marseilles clinic	23
Davhana clinic	24

103. Dzina la kliniki Fhasi ha Thulamela sub-district

Khakhu clinic	1
Fondwe clinic	2
Murangoni clinic	3
Madala clinic	4
Tshixwadza clinic	5
Mutale CHC	6
Thengwe clinic	7
Tshikundamalema clinic	8
Rambuda clinic	9
Tshiombo clinic	10
Tshaulu clinic	11
Makuya clinic	12
Lambani clinic	13
Dzingahe clinic	14
Thohoyandou CHC	15
William Eadie CHC	16
Sterkstroom clinic	17
Tshivhase – Thondo clinic	18
Shayandima clinic	19
Muledane clinic	20
Tswinga clinic	21
Dzwerani clinic	22
Lwamondo clinic	23
Tshisaulu clinic	24

104. Dzina la kliniki Fhasi ha Musina sub-district

Musina clinic	1
Madimbo clinic	2
Manenzhe clinic	3
Masisi Clinic	4
Mulala clinic	5
Nancefield clinic	6
Shakadza clinic	7
Tshipise clinic	8
Tshiungani clinic	9
Folovhodwe clinic	10

105. Minwaha ya mme

.....

106. Ngundo dza n̄tha

Ngundo dza fhasi	1	
Sekhondari	2	
Gudedzi la n̄tha	3	
Athingo jena tshikolo	4	

107. Mushumo

Mushumi wa nduni	1	
Ndi pholisa	2	
Mudededzi/kadzi	3	
Muongi	4	
Ndi to dishuma	5	
Athi shumi	6	

Zwinwe vho, avha bule

.....

108. Vha wana ngafhi manwe a masheleni

Mundende wa nwana	1	
Mukalaha wanga	2	
Vhabebi	3	
Mundende wanga	4	

Zwinwe vho, avha bule

.....

109. Tshiimo kha mbingano

Thongo malwa	1
Ndo malwa	2
Ro fhambana	3
Ndo lovhelwa	4

110. Nomboro ya vhana

.....

Thoho	Nyambedzano
Marangaphanda	Muvhudzisi a lumelisana na vhabebi.
Thoho ya mafhungo	Kha d̄uvha ɭa namusi, ri tama uri ri ambe ngaha tshenzhemo yavho malugana na tshikalo na kualutshele kwa n̄wana.
Tshipikwa tsha nyambedzano	Ahuna phindulo ire yone na i si yone kha mbudziso dzothe. Ri khou lingedza u kuvhanganya tshenzhemo yavho malugana na mbekanyamushumo khathihi na mbuno dza uri ndingani vho mme vhatshi pfuka tshikalo uri ri kone u n̄wala zwino tea u itiwa hu u itela tshifhinga tshid̄aho.
Nyambedzano	Musi ri tshi dovha ri kha nyambedzano iyi, zwi dovha zwavhudi arali ha amba muthu muthihi nga tshifhinga u itela uri phindulo dzavho dzi kone u vhulungea zwavhudi.
Thalutshedzo ngaha u n̄wala mafhungo ano do ambiwa na u rikhoda	Muthu ane a khou thusa kha thoḁuluso u dovha a khou n̄wala mafhungo avho musu wa nyambedzano, hu u itela uri a kone u kuvhanganya mafhungo othe. Radio ya u recorder ido shumiswa uri ri wane mafhungo o fhelelaho.
Tshiphiri	Nyambedzano i d̄ovha ya tshiphiri nahone ari nga shumisi dzina ɭa muthu kha thoḁuluso iyi na musu hu tshivho anḁadziwa mawanwa.
U lavhelesa kupfesesele	Vhathu vhothe vho pfesesa?
Thodea ya inwe thalutshedzo	Vha na dziinwe mbudziso?

Khethekanyo ya vhuvhili (B): thoho dza nyambedzano

105. Ri humbela uri vha kovhelane na rine ndivho yavho malugana na tshikalo tsha n̄wana na vhuḁhogwa ha u isa n̄wana kiliniki

107. Ndi dzifhio nyeletshedzo kana mafhungo ane vha a wana musu vho dalela kiliniki u isa n̄wana tshikaloni? (Probe: nga ndila de, avha thalutshedze nga vhuḁdalo, avha neye na tsumbo etc.)

108. Ndi ifhio tshenzhemo yavho malugana na vhaongi zwi tshi livhana na thikhedzo kha kualutshele kwa n̄wana? (Probe: nga ndila de, avha thalutshedze nga vhuḁdalo, avha neye na tsumbo etc.)

109. Ndi zwifhio zwikhukhuliso zwine vha tangana nazwo zwi kundisaho uri vha d̄ise n̄wana tshikaloni? (Probe: nga ndila de, avha thalutshedze nga vhuḁdalo, avha neye na tsumbo etc.)

110. Ndi maga afhio ane vha vhona atshinga thusa u tandulula khaedu dze vha bula afho nthava?

**APPENDIX G: ETHICAL CLEARANCE – HUMAN AND SOCIAL SCIENCES RESEARCH
ETHICS COMMITTEE (HSSREC)**



20 June 2017

Ms TC Mandiwana (SN 215081523)
School of Agricultural, Earth and Environmental Sciences
College of Agriculture, Engineering and Science
Pietermaritzburg Campus
UKZN
Email: tshifhiwa.mandiwana@unjven.ac.za kassiers@ukzn.ac.za
Frederick.veldman@smu.ac.za

Dear Ms Mandiwana

RE: PERMISSION TO CONDUCT RESEARCH

Gatekeeper's permission is hereby granted for you to conduct research at the University of KwaZulu-Natal (UKZN), towards your postgraduate degree, provided Ethical clearance has been obtained. We note the title of your research project is:

"Evaluation of the effectivity and related factors of the growth monitoring and promotion programme (GMP) of children younger than five years at clinics in Vhembe district, Limpopo Province, South Africa".

It is noted that you will be constituting your sample by handing out questionnaires, and/or conducting interviews with nurses and mothers of IYC on the Vhembe District, Limpopo Province.

Please ensure that the following appears on your notice/questionnaire:

- Ethical clearance number;
- Research title and details of the research, the researcher and the supervisor;
- Consent form is attached to the notice/questionnaire and to be signed by user before he/she fills in questionnaire;
- gatekeepers approval by the Registrar.

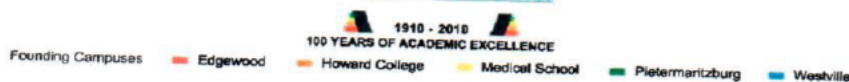
You are not authorized to contact staff and students using 'Microsoft Outlook' address book. Data collected must be treated with due confidentiality and anonymity.

Yours sincerely


**MRS MOKOENA
REGISTRAR**

Office of the Registrar

Postal Address: Private Bag X54001, Durban, South Africa
Telephone: +27 (0) 31 260 8005/2206 Facsimile: +27 (0) 31 260 7824/2204 Email: registrar@ukzn.ac.za
Website: www.ukzn.ac.za



Appendix H: ETHICAL CLEARANCE – BIOMEDICAL RESEARCH ETHICS COMMITTEE (BREC)



Ms TC Mandiwana (215081523)
School of Agricultural, Earth and Environmental Sciences
College of Agriculture, Engineering and Science
Tshifhiwa.mandiwana@univen.ac.za

Dear Ms Mandiwana

Protocol: Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa. Degree: PhD
BREC Ref No: BE105/18

EXPEDITED APPLICATION: APPROVAL LETTER

A sub-committee of the Biomedical Research Ethics Committee has considered and noted your application received on 02 February 2018.

The study was provisionally approved pending appropriate responses to queries raised. Your response received on 02 May 2018 to BREC letter dated 11 April 2018 has been noted by a sub-committee of the Biomedical Research Ethics Committee. The conditions have been met and the study is given full ethics approval. Please ensure that site permissions are obtained and forwarded to BREC for approval before commencing research at a site.

This approval is valid for one year from 08 June 2018. To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2015), South African National Good Clinical Practice Guidelines (2006) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at <http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx>.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The sub-committee's decision will be RATIFIED by a full Committee at its next meeting taking place on 10 July 2018.

We wish you well with this study. We would appreciate receiving copies of all publications arising out of this study.

Yours sincerely

Professor V Rambiritch
Chair: Biomedical Research Ethics Committee

cc supervisor: Kassiers@ukzn.ac.za co supervisor: Frederick.veldman@smu.ac.za

Biomedical Research Ethics Committee
Professor V Rambiritch (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Telephone: +27 (0) 31 260 2486 Facsimile: +27 (0) 31 260 4600 Email: brec@ukzn.ac.za
Website: <http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx>



APPENDIX I: LIMPOPO PROVINCIAL GOVERNMENT - DEPARTMENT OF HEALTH



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

Enquiries: Stander SS (015 293 6650)

Ref: LP_

Mandiwana TC
University of Kwazulul Natal
Private Bag X54001
Durban, 4000

Greetings,

RE: Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa

The above matter refers.

1. Permission to conduct the above mentioned study is hereby granted.
2. Kindly be informed that:-
 - Research must be loaded on the NHRD site (<http://nhrd.hst.org.za>) by the researcher.
 - Further arrangement should be made with the targeted institutions, after consultation with the District Executive Manager.
 - In the course of your study there should be no action that disrupts the services, or incur any cost on the Department.
 - After completion of the study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
 - The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
 - The above approval is valid for a 3 year period.
 - If the proposal has been amended, a new approval should be sought from the Department of Health.
 - Kindly note, that the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated.

Head of Department

20/06/2018
Date

Private Bag X9302 Polokwane
Fidel Castro Ruz House, 18 College Street, Polokwane 0700. Tel: 015 293 6000/12. Fax: 015 293 6211.
Website: <http://www.limpopo.gov.za>

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APPENDIX J: VHEMBE DISTRICT – DEPARTMENT OF HEALTH



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

**DEPARTMENT OF HEALTH
VHEMBE DISTRICT**

Ref: S5/6
Enq: Muvuri MME
Date: 30 July 2018

Dear Sir/Madam

PERMISSION TO CONDUCT RESEARCH ON "The evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of the Vhembe District, Limpopo Province, South Africa" Mandiwana T.C

1. The above matter refers.
2. Your letter received on the 30/07/2018 requesting for permission to do research in our facilities is hereby acknowledged.
1. The District has no objection to your request.
2. You are however advised to make the necessary arrangements with the facilities concerned.
3. Wishing you success in your endeavor.

.....
CHIEF DIRECTOR

.....
DATE

31/7/2018

Private Bag X5009 THOHOVANDOU 0950
OLD parliamentary Building Tel (015) 962 1000 (Health) (015) 962 4958 (Social Dev) Fax (015) 962 2274/4623
Old Parliamentary Building Tel: (015) 962 1848, (015) 962 1852, (015) 962 1754, (015) 962 1001/2/3/4/5/6 Fax (015) 962 2373, (015) 962 227

The heartland of Southern Africa – development is about people!

APPENDIX K: UNIVERSITY OF VENDA PROJECT REGISTRATION NUMBER

Memorandum

To: Director- Finance
Cc: **Ms. TC Mandiwana**
School: **Health Sciences**
Department: **Nutrition**
Date : **25 September 2018**

Application for Staff project registration
Project number: SHS/18/NUT/25
Student / Staff No: 200572
Institute: University of Venda

The Research and Publication Committee has approved project registration for **Ms Mandiwana** (Staff No: 200572).

RPC has noted that no funds were requested for the project.

Project title: **Evaluation of the effectiveness and related factors of the growth monitoring and promotion programme of children younger than five years in clinics of Vhembe district, Limpopo Province, South Africa.**

Please take note of the above project number which should be quoted on all correspondences regarding this particular project.

Thank you

Senior Prof. **SE EROGEE**
Director: **Research and Innovation**

- N.B: This grant is subject to the following conditions. The grantee shall;
- Provide the RPC with a quarterly (End March, June, September, December) progress report and financial balance sheet
 - The grantee shall on completion of the research project complete a final progress report and financial balance sheet

I understand the conditions of the grant

Signature of the Recipient:

Date: **03/10/18**

