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Mambulu-Chikankheni, Faith Nankasa

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THE MANAGEMENT OF CHILDREN WITH SEVERE ACUTE MALNUTRITION IN THE NORTH WEST PROVINCE OF SOUTH AFRICA

FAITH NANKASA MAMBULU-CHIKANKHENI

A thesis submitted to the Faculty of Health Sciences, University of the Witwatersrand, in fulfilment of the requirements for the degree of
Doctor of Philosophy

Johannesburg, October2021

Supervisor: Professor John Eyles

Co-supervisor: Dr Prudence Ditlopo

Co-supervisor: Dr Wiedaad Slemming

DECLARATION

This thesis is submitted in an integrated narrative format approved by the Faculty of Health Sciences, published manuscripts are included.

I, Faith N. Mambulu-Chikankheni, declare that this thesis is my original work. It is being submitted for the degree of Doctor of Philosophy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University. I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong. I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.

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Signature:



Faith N. Mambulu-Chikankheni

15th October 2021

PUBLICATIONS ARISING FROM THE THESIS

1. **Mambulu-Chikankheni, F. N.,** Eyles, J. & P. Ditlopo. (2018). Exploring the Role of Community Health Work within South Africa's Healthcare and Referral for Children with Severe Acute Malnutrition. *Health & Social Care in the Community*; DOI: 10.1111/hsc.12595.
2. **Mambulu-Chikankheni, F. N.,** Eyles, J., Ditlopo, P. & E. Eboreime (2017). A Critical Appraisal of Guidelines Used for Management of Severe Acute Malnutrition in South Africa's Referral System. *Health Research Policy and Systems*; DOI: https://doi.org/10.1186/s12961-017-0255-z

PRESENTATIONS ARISING FROM THE THESIS

1. **Mambulu-Chikankheni, F. N.,** Eyles, J., & Ditlopo, P. (2018). Understanding and Resolving Factors Influencing the Management of Severe Acute Malnutrition within South Africa's Referral Systems: A Need for Multi-Level Action. ***Fourth Global Symposium on Health Systems Research***. International Conference. Liverpool, England, October 8-12, 2018. (Poster presentation)
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3. **Mambulu-Chikankheni, F. N.,** Eyles, J., & Ditlopo, P. (2017). Exploring The Role of Community Health Work within South Africa's Healthcare Referral Systems for Children with Malnutrition. ***First Community Health Workers Symposium.*** International, Kampala, Uganda, 21st to 23rd February 2017. (Oral presentation)
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5. **Mambulu, F. N.,** Eyles, J., & Ditlopo, P. (2016). Lessons from the Healthcare Referral Systems for Children with Severe Acute Malnutrition in South Africa's National Health Insurance (NHI) Pilot Subdistrict. ***2016 Public Health Association of South Africa Conference.*** National Conference. East London, Gauteng, South Africa. September 19– 22, 2016. (Oral presentation)

ABSTRACT

Background: Since the 1980s, the World Health Organization (WHO) has been developing guidelines to prevent and manage Severe Acute Malnutrition (SAM). However, globally, SAM remains a public health problem partly due to the poor implementation of WHO guidelines. In 2018, SAM accounted for approximately 17 million incidences of morbidity and was associated with nearly half of the 5.3 million under-five children deaths globally. In South Africa (SA), although SAM was associated with 31% of all audited 2016/2017 under-five children deaths, co-morbidities such as HIV and other infectious diseases contribute to the high prevalence of morbidity and mortality in children with SAM. Despite South Africa adopting the 2002 hospital level and 2005 primary healthcare (PHC) WHO guidelines, it still experiences high SAM related mortality. Studies on the implementation of SAM guidelines report problematic practices and factors leading to those practices at PHC and hospital levels while neglecting to focus on the referral and community health care services. This thesis set out to fill this gap by exploring how the adopted South African SAM guidelines inform health workers in district health system level to manage severely malnourished children. Specifically, I focused on SAM diagnosis, stabilisation before and during referral, inpatient management, and follow-up within a sub-district healthcare referral system of North West Province in South Africa.

Methods: Guided by a policy analysis triangle framework, a case study design was used to gain an in-depth understanding of the implementation of SAM guidelines in everyday contexts by uncovering boundaries between the phenomena (implementation practices) and its context (underlying factors). Two sub-districts in the North West Province were selected for this study. The research was carried out at the following

referral levels: sub-district hospitals (n=2), emergency service stations (n=2), PHC facilities (n=5) and Community Health Workers (CHWs) programmes (n=5). A series of three studies were conducted to address the objectives of this thesis. In the first study an appraisal of four SAM guidelines used or adapted to South African referral levels was conducted. The appraisal was complemented by five key informant interviews, which were carried out to elicit the comprehensiveness of SAM guidelines in SA. The second study explored SAM guidelines implementation and related factors within the referral system using primary data which was collected using in-depth interviews with 39 health workers at various levels of the referral system, a review of 40 patient records, appraisals of nine facilities using a standardised checklist and 10 practice observations. The third study focused on the role of CHWs in serving children with SAM using a review of 20 patient records and 15 in-depth interviews with CHWs and their supervisors. Thematic content analysis was used to analyse qualitative data from interviews, observations and appraisals. The quantitative data from patient records were analysed through aggregation to elicit guidelines administered per under-five children served at the facility level.

Results: This thesis found that the SAM guidelines used in South Africa had clear objectives to enhance their implementation adequately and inform PHC and hospital levels. However, the guidelines to inform processes during SAM referrals were unclear. The reviewed guidelines documents also lacked additional tools like monitoring/audit criteria to complement implementation. There were discrepancies in SAM diagnosis, non-compliance to SAM management guidelines, and varying referral mechanisms during implementation. Some of the factors that influenced these practices included inadequate clinical skills among health workers, inconsistent supervision and monitoring, unavailability of sub-district specific referral policies and tools to support

implementation. Suboptimal national policies to support the availability of therapeutic food for children with SAM and reliable referral transport also influenced SAM management practices. Regarding CHWs, they identified and referred SAM cases, but did not offer curative services of stabilisation before the referral and treatment of mild cases. Such limitations resulted from restrictive CHW policies, inadequate training, lack of supportive supervision and essential resources.

Conclusion: My thesis reveals that due to an emphasis on inpatient management over PHC management and community-based prevention, there was a lack of continuity of care for children with SAM within the sub-district healthcare referral system. The absence of referral policies specific to a sub-district and aligned to SAM were underlying contributors to the dysfunctional state of SAM referral systems. Referral policies should be revised to address the needs specific to sub-districts. For instance, the scope of community and PHC levels should aggressively emphasize SAM prevention by prioritising the treatment of mild cases and provision of continuous care supported by clear records of care given. The use of a policy analysis triangle framework was essential in understanding that the SAM guidelines implementation practices were influenced by the content, which informed the practices, implementers' attributes and contextual factors. The need to revise policy limitations on therapeutic food for children with SAM and curative guidelines of mild cases for CHWs was identified. The two aspects limited the capacity of lower referral levels to manage mild cases of SAM. The need for continuous training, provision of job aids and using aids to monitor implementation practices are recommended as potential solutions to limited health workers' skills. In addition, creating supportive environments like continuously

financing SAM management activities and auditing referrals systems to ensure ideal implementation practices could help improve SAM implementation gaps.

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ABBREVIATIONS

CCM: Community Case Management

CHW: Community Health Worker

CMAM: Community Management of Acute Malnutrition

DCST: District Clinical Specialist Teams

F100: Special therapeutic formula for the malnourished children (Therapeutic food for Phase II 100 kcal/100ml)

F75: Special therapeutic formula for the malnourished children (starter for Phase I 75 kcal/100ml)

IMCI: Integrated Management of Child Illness

LMICs: Low- and Middle-Income Countries

MDGs: Millennium Development Goals

MUAC: Mid-Upper Arm Circumference

NDoH: National Department of Health

NHI: National Health Insurance

OTL: Outreach Team Leaders

PHC: Primary Health Care

RUTF: Ready to Use Therapeutic Food

SA: South Africa

SAM: Severe Acute Malnutrition

SDGs: Sustainable Development Goals

SSA: Sub-Saharan Africa

UHC: Universal Health Coverage

WBOTs: Ward Based Outreach Teams

WHO: World Health Organisation

WHZ: Weigh for Height Z-Score

PREFACE

Being exposed to serving orphaned and HIV exposed young children in rural Malawi; the interest to explore the possibilities of preventing malnutrition deaths in rural settings was ignited. My involvement with malnutrition has ranged from preventing, screening, assisting management of uncomplicated cases, and continuing care for cases discharged from Nutrition Rehabilitation Units (NRUs). It all began in 2007 as part of the requirements for a Nutrition course offered by the Home Economics Department at the University of Malawi-Chancellor College. I conducted anthropometric assessments and planned preventative, referral, and management measures in a rural district in southern Malawi.

I served as nutrition programme personnel at an orphan care centre in a rural district in central Malawi in 2009. This experience taught me that with constant surveillance, caregiver education, availability of ready to use therapeutic food (RUTF), and local ingredients as an alternative during RUTF stock-outs, there is potential to reduce malnutrition-related admissions and deaths. In 2013, during my research on food security among HIV affected households in a rural district in Northern Malawi, I was exposed to a community nutrition surveillance and management success story. Specifically, HIV exposed children had routine support systems; as a result, during my four months stay, the NRU was closed as there were no new severe malnutrition cases.

When I received an opportunity to conduct health systems research in South Africa, the attribution of the high incidence of malnutrition, associated with 30% of deaths of children younger than five years, caught my interest right away. After learning that the community interventions are not as advanced as in Malawi, I was interested in exploring the malnutrition services available to rural communities. As a result, I embarked on a journey of trying to understand malnutrition diagnosis, referral, and management at the sub-district level, thus, involving enquiry at the level of community-based programmes, primary healthcare facilities, emergency services, and sub-district hospitals.

CHAPTER 1: BACKGROUND OF THE THESIS

1.1 Overview

Severe acute malnutrition (SAM) is a critical public health issue affecting low- and middle-income countries (LMICs), especially in South Asia and Sub-Saharan Africa (SSA). This thesis used a case study approach to investigate healthcare service provision for children with severe acute malnutrition in two rural sub-districts of the North West Province, South Africa. By focusing on severe acute malnutrition, the study brings together four key issues, namely the burden of SAM amongst children, under the age of five, the functioning of referral systems at three levels of the health system, the practices involved when implementing the SAM diagnosis, management, and referral guidelines, and the contextual factors influencing the implementation of the SAM guidelines among health workers. In this chapter, these issues are briefly discussed to contextualise the overall study. The aim and objectives of the study are stated, followed by an outline of the thesis structure.

1.2 Background

SAM is a condition where children have a low weight-for-height outcome of below -3 z-score of the median WHO growth standards; or a mid-upper arm circumference (MUAC) outcome of less than 115mm; or clinical signs of bilateral oedema of nutritional origin, despite other measures being above specified cut-off values [1]. Poverty is a crucial determinant of SAM [2]; however, inadequate dietary intake and frequent infections are the immediate causes of SAM [3]. Underlying the immediate causes are household food insecurity, inadequate care, and feeding practices, unhealthy household environment, and inadequate health services [3]. This study does not focus on the determinants of SAM, but on the services available for the assessment, referral, and management of

children with SAM. This section provides an overview of SAM, the global, SSA and South African prevalence, interventions aimed at prevention, screening, and management of SAM, as well as factors associated with the health care services for SAM.

1.2.1 Severe Acute Malnutrition

Historically, malnutrition was classified into three categories namely marasmus, kwashiorkor and stunting. The current World Health Organization (WHO) terminology and definitions focus on three important terms: wasting (reduction in tissue mass with abnormalities in body functions), nutritional oedema (mostly lower limb oedema) and stunting (reduction in linear growth) [4]. Children with wasting are emaciated and weak due to significant weight loss and may be complicated by bilateral pitting oedema [5]. Wasting (marasmus) is diagnosed by measuring weight-for-height/length <- 3SD based on WHO growth standards or mid-upper arm circumference (MUAC) < 115 mm [1, 6]. Children with nutritional oedema usually have symmetric bilateral pitting oedema, which may manifest in the feet progressing to lower legs and hands and visible on the face for severe cases [5]. Stunting is diagnosed by measuring height/length-for-age is <-2SD below the WHO Child Growth Standards median [7]. The severe forms of wasting and nutritional oedema or both are identified as severe acute malnutrition (SAM)[4] while moderate wasting (WHZ [Weigh for Height Z score] between −2 and −3 or MUAC between 115 millimetres and <125 millimetres) is identified as moderate acute malnutrition (MAM) [8]. Acute forms of malnutrition emanates from a sudden reduction in intake of food or quality of diet in combination with pathological causes, while chronic malnutrition commonly identified by stunting emanates from insufficient intake or absorption of essential nutrients [8]. In worst cases, a child under-five may have a combination of severe wasting, bilateral pitting oedema and stunting [4, 5, 9].

Children with SAM are further classified as complicated and uncomplicated cases. Uncomplicated SAM cases do not have signs of infection and pass the appetite test, which rules out metabolic disturbances, thus can be treated as outpatients with therapeutic food [10]. Complicated cases have “clinical features of infection, metabolic disturbance, severe oedema, hypothermia, vomiting, severe dehydration, severe anaemia and a lack of appetite," and are thus managed as inpatients using several strategies including the WHO ten steps and WHO pocket book [1, 6].

SAM cases manifesting nutritional oedema symptoms often have flaky paint skin depigmentation, which leads to blisters that serve as an entry point for infectious pathogens [11]. Likewise, the entire gastrointestinal tract of children with SAM is infected leading to increased susceptibility to infection with pathogenic bacteria, viruses and helminths [12]. Due to the increased risk of infection by these pathogens, children with SAM are likely to have septicaemia and related metabolic disturbances [13]. Disturbances often trigger severe dehydration and malabsorption of nutrients. Systemic infections like measles, HIV/AIDS and tuberculosis (TB) are typical wasting diseases; therefore, it is important for health systems to address the stated determinants of SAM [14]. Moreover, congenital anomalies, and developmental retardation are common determinants of SAM [5]. As a result of such complications or co-morbidities along with delayed care-seeking behaviours, unavailability of resources, and poor management practices [15], significant numbers of SAM deaths among children occur within 48 hours of admission [16]. Evidence shows that children with SAM have a high risk of dying from diarrhoea, pneumonia, TB and HIV as compared to those without SAM [17]. To ensure that children who are very sick are properly identified and treated immediately, Emergency Triage, Assessment and Treatment

(ETAT) have been recommended at the global and national level; however some South African facilities lack emphasis on the importance of the application of the ETAT approach [18, 19].

1.2.2 Burden of SAM: Global and South African Context

SAM accounts for approximately 1 million under-five children deaths and 20 million under-five children illnesses globally every year [10]. In 2013, the WHO attributed one-third of the global 8 million under-five children deaths yearly to SAM [1]. In 2012, 25% (162 million) of under-five children were stunted, 15% (99 million) were underweight, 8% (51 million) were wasted and 3% (17 million) were severely wasted [20]. Asia and Africa account for the highest cases of SAM, for instance, 71% of the severely wasted children were from Asia while 28% were from Africa [20]. SAM incidences and prevalence are mostly under-estimated due to not accounting for crisis-related cases like those amidst natural disasters or wars, as well co-morbidities as not accounting for cases missing only detectable using MUAC due to the preference of WHZ over MUAC [5, 21, 22]. The 17 million SAM estimate (based on severe wasting) should be considered with caution because it is based on prevalence surveys focusing on under-five children with WHZ less than -3 z-score only, that excludes equally high risk of death under-five children with WHZ above -3 z-score but with a MUAC below 115 mm and nutritious oedema [21]. The current SAM incidence data are from LMICs, particularly in South Asia and SSA [5]. As a result, countries in these regions are a priority in the Sustainable Development Goal (SDG) 3.2 mission to curb preventable under-five children's deaths [23].

In South Africa, SAM was associated with 30% of deaths in the 2013/2014 and 30.9% deaths in the 2016/2017 death audits [24, 25], thus a significant contributor to overall

under-five children mortality. The SAM incidence and case fatality rates (CFR: proportion of deaths from SAM compared to number of SAM cases diagnosed within the referral system) vary across the nine Provinces in SA. At the onset of this study in 2016, the national average SAM case fatality rate for children under-five in audited healthcare facilities (both PHC facilities and hospitals) was 8.9 per 1000 children diagnosed as SAM; with only four Provinces, namely Mpumalanga (12.5), North West (12.3), Limpopo (11.6) and Eastern Cape (10.1) above the national average [26]. The 2017/2018 statistics reveal that this statistic has decreased to 7.4 per 1000 children, however, Mpumalanga (9.1), North West (8.0), and Eastern Cape (11.8) provinces were above the national average [27]. The CFRs for SAM are not based on the level of healthcare but on all SAM deaths occurring at various levels of the healthcare system.

The only classification associating children's deaths to a level of care are from the Child Healthcare Problem Identification Programme (Child PIP), which identifies number of deaths caused by a preventable health problem [28]. The Child PIP program collects data (from caregivers, administrators and health workers) and analyse it based on factors that led to deaths of children at home, clinic, referring (PHC) facility and during referral, accident and emergency department and at inpatient care [28]. For instance, problems that could have been prevented for all child deaths reported in the 2012-2013 period were as follows: 32% from home, 13% from clinic or outpatient, 5% from referral related issues at referring facility or in transit, 26% from inpatient wards, 23% from accident and emergency department [29]. Furthermore, the Child PIP data has been used to report the nutritional status (37% normal weight, 36% underweight, 16% with severe malnutrition, 2% overweight and 8% unknown) of audited children's death

in 2011 in Western Cape Province in SA; further analysis on the children with SAM has potential to identify modifiable factors which causes preventable deaths [30].

Among provinces with the highest CFR, rural districts tend to be the ones registering most deaths. In 2016, the ten districts with the highest SAM case fatality rates (ranging from 18.2 to 12.7 per 1000 children), were from rural parts of Limpopo (n=4), North West (n=2) and one district each from Free State, Mpumalanga, Gauteng and Eastern Cape [26]. To understand the context underlying high SAM incidences and deaths, especially in rural districts, a context-sensitive approach will be required. A syndemics approach, which involves focusing on diseases with a biosocial complexity that involves the interaction of disease with social and environmental factors like the rurality of a setting, should be considered in understanding SAM services [31].

1.2.3 Management of SAM

SAM interventions are clinical, public health, and policy initiatives which adopt a syndemics approach by considering social contexts of a disease by aiming to modify processes, actions, and events that can change characteristics [32, 33] associated with SAM incidence, prevalence and mortality (including CFR). The WHO leads the development of interventions for SAM, which are later adopted or adapted by member countries including SA. The South African experience in adopting global guidelines on SAM is depicted in Figure 1.2.1 below:

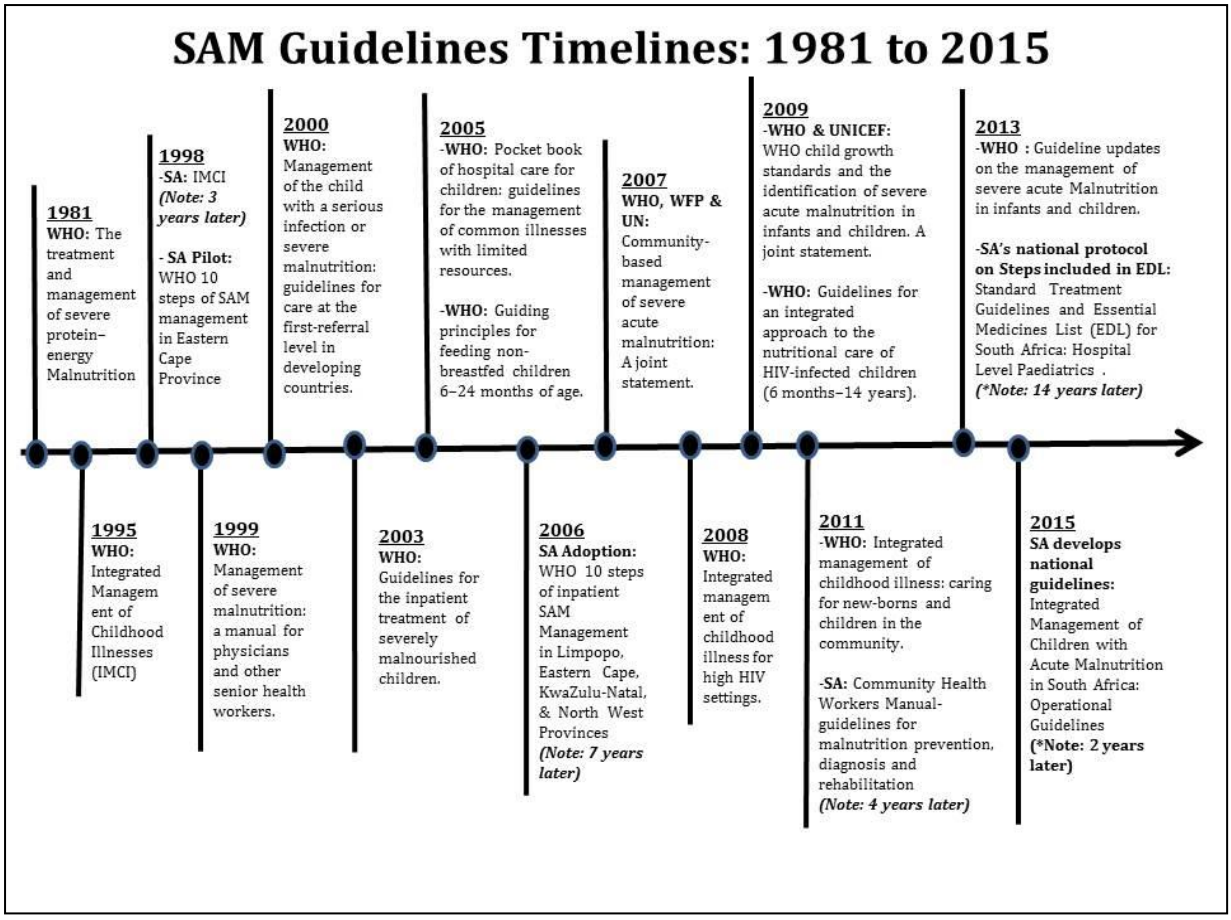

Figure 1.2.1: Evolution of SAM Guidelines in South Africa and at Global Level

The timeline documents South Africa's progression in adopting guidelines, which inform SAM diagnosis and management at all levels of the health system.

Since the 1980s, the WHO, in conjunction with relevant organisations and member states, has been developing expertise and guidelines to prevent and manage SAM [34]. Table 1.2.1 includes guidelines for various levels of care.

Table 1.2.1: Guidelines for SAM Management and Prevention

Level/Purpose	Year/Guideline	Author(s)
Hospital	**2013** -Guideline: updates on the management of severe acute malnutrition in infants and children.	-WHO
	-Pocket book of hospital care for children: guidelines for the management of common	-WHO

	childhood illnesses.	
	2000 - Management of the child with a serious infection or severe malnutrition: Guidelines for care at the first-referral level in developing countries	WHO
	1999 - Management of severe malnutrition: a manual for physicians and other senior health workers	WHO
PHC	**2005** -Handbook IMCI: integrated management of childhood illness.	WHO
Community	**2011** -Integrated management of childhood illness: caring for new-borns and children in the community	-WHO
	2007 - Community-based management of severe acute malnutrition. A joint statement	WHO, WFP, UNSCN, UNICEF
All	**2009** -WHO child growth standards and the identification of severe acute malnutrition in infants and children. A joint statement by the World Health Organization and the United Nations Children's Fund	WHO
	2017 -Understanding pathways of integrating severe acute malnutrition interventions into national health systems in low-income countries.	Deconinck, H

Initially, there was a high emphasis on inpatient care guidelines for managing SAM using a ten-step approach (Figure 1.2.2) since it reduce fatality rates within two to six weeks [34, 35].

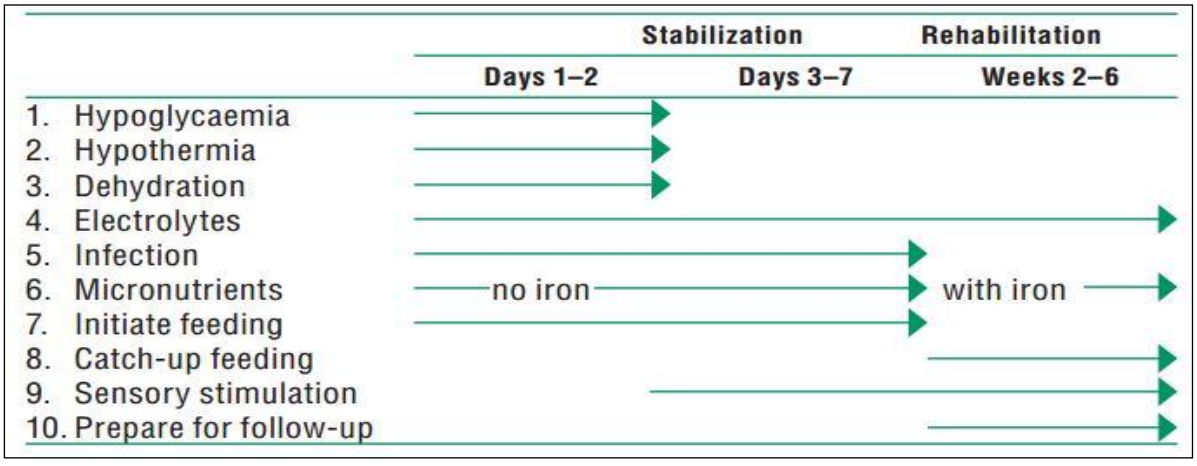

Figure 1.2.2: Ten Steps for Inpatient Treatment of Severely Malnourished Children[6]

Despite the WHO inpatient management guidelines for SAM being traced back to the 1980s [1], the 10 steps advancement was first introduced in the manual for physicians disseminated in 1999. In 2000, the "Management of the child with a serious infection or severe malnutrition: Guidelines for care at the first-referral level in developing countries" was introduced to carter for serious infections [36]. The inpatient guidelines prescribe SAM stabilisation within seven days and rehabilitation within two to six weeks [6]. Later, the inpatient model of SAM management proved restricting as it could only reach a few children, kept children that were clinically well in hospital, thus was not cost-effective and caregivers were kept away from their livelihoods [32]. These shortfalls prompted a need for an alternative. RUTF which was developed and proved to be safe in 1999 is influential alternative care; a study in Malawi replacing standard treatment with RUTF found that children were likely to gain weight, not relapse or die compared to those receiving standard therapy [32, 37]. Due to similar outcomes from other contexts, there a shift to outpatient SAM management [38]. Although used in treating moderate cases, RUTF is best suited for treating severe cases while moderate cases require supplementary foods like the ready-to use lipid-based nutrient supplement (LNS) and complementary food supplements (CFS) are essential for preventing acute malnutrition [39, 40]. While the standard measure it to treat severe and moderate malnutrition separately; a simplified MUAC-based combined dosage protocol using same product (2 sachets of RUTF for severe and 1 sachet of RUTF for moderate per day) which has achieved nutritional recovery and increased coverage while reducing costs is being proposed [41, 42]. RUTF is now widely and safely used in

Community Based Rehabilitation of MAM and non-complicated SAM, and replaces F100 in hospital based therapeutic diets in complicated SAM.

In 1995, the WHO introduced the Integrated Management of Childhood Illness (IMCI) strategy to enable children under the age of five to be safely cared for at the clinic or home as outpatients (WHO-CAH, 2005). IMCI informs drug prescription, counselling, and booking appointments for facility-based check-ups [38]. Figure 1.2.3 portrays uncomplicated SAM management options and recommends referral for children with medical complications according to the South African IMCI booklet:

One or more of the following • Oedema of both feet. • WFL/H Z-score < - 3 • MUAC < 11.5cm • Very low weight for age **AND** One or more of the following: • Any danger sign • Any RED or YELLOW classification • Weighs 4 kg or less • Is less than six months of age • Is not able to finish RUTF (fails the Apetite Test (p.19))	**SEVERE ACUTE MALNUTRITION WITH MEDICAL COMPLICATION**	➢ **Test for low blood sugar, then prevent (p. 36)** ➢ **Keep the child warm (p. 12)** ➢ **Give first dose of Ceftriaxone (p. 36)** ➢ **Give stabilizing feed or F75 (p. 36)** ➢ **Give dose of Vitamin A (p. 35)** ➢ **Refer URGENTLY**
• WFL/H Z-score < - 3 or • MUAC < 11.5 cm. **AND** • Able to finish RUTF • No oedema of both feet • Six months or older • Weighs 4 kg or more • No other RED or YELLOW classification	**ACUTE MALNUTRITION WITHOUT MEDICAL COMPLICATION**	➢ Give amoxicillin for 5 days (p. 38) ➢ Give dose of Vitamin A (p. 35) ➢ Treat for worms if due (p. 35) ➢ Assess the child's feeding and counsel the caregiver on the feeding recommendations (p. 18 - 20) ➢ Assess for possible HIV & TB infection (p. 33 & 34) ➢ Provide RUTF (p. 42) and counsel caregiver on how to use it (p. 24) ➢ Advise caregiver when to return immediately (p. 46) ➢ Refer to for home visits ➢ Follow up in 7 days (p. 49) ➢ Refer URGENTLY if child develops any medical complication

Figure 1.2.3: IMCI Management Options for SAM Cases [43]

In addition to IMCI, there is sufficient evidence to show that well-trained health workers and lay-people in rural settings can accurately diagnose SAM and administer ready to use therapeutic food (RUTF) which can also be offered as a simplified combined dosage for both MAM (1 sachet per day) and SAM (2 sachets per day) [5, 34, 41, 42]. The prescription of RUTF has resulted in community-based management of acute malnutrition (CMAM) model, which has achieved a 76.3% to 90% recovery rate in some

settings [5, 34, 41]. The outpatient care measures from IMCI booklets and the community-based model became more emphasised due to their ability to reduce SAM mortality further [5, 38]. Therefore, the ideal continuum of care for SAM cases is to first prevent and treat uncomplicated SAM under the outpatient model at community or primary healthcare (PHC) levels; and inpatient care to be given for complicated SAM cases. Despite the inpatient guidelines for SAM focusing on a variety of complications, some are yet to be fully addressed. For example, the already complicated state of SAM is affected by the prevalence of HIV in some children, which has altered its clinical presentation, pathophysiology and case management resulting in CFRs ranging from 20% to 50% while children without HIV have a CFR of 5% [4, 44].

In SA, the facility-based SAM interventions are adaptations of the WHO guidelines offered at two of the three levels of the health system, namely the community (CHWs home visits), PHC facilities, and hospitals. The IMCI strategy is mostly used at PHC facilities and contains information on SAM diagnosis indicators, management, how to make referral decisions, and referral stabilisation strategies [45]. However, the IMCI is not aligned to the SA's HIV-related guidelines which had been developed to accommodate the country's estimated high HIV prevalence of 11.3% among the population; national experts have expressed a need for SAM interventions to also address HIV prevention and treatment at PHC level [46, 47]. Regardless, it should be acknowledged that the current IMCI goes beyond referral of SAM cases in the initial version and includes specific assessment algorithm and management of HIV infection (including palliative care) that are symptomatic [48]. Some southern African countries like Malawi have further taken up the management of malnourished children with HIV by including them in Community-based Therapeutic Care (CTC) programmes where they

access HIV testing, referral to specialised HIV care and SAM management [49]. The WHO ten steps of managing SAM are incorporated in the hospital-level paediatric practice guidelines' document and inform inpatient SAM stabilisation, transition and rehabilitation [50]. There has been the incorporation of community-based interventions for malnutrition in the CHW manual, which is part of the recent intervention toward achieving universal health coverage (UHC) [51, 52].

SA's mission for UHC is through the national health insurance (NHI) initiative which focuses on PHC under the umbrella of PHC revitalisation, known as "PHC re-engineering" which further aims at improving timely access to quality care [53, 54]. These interventions include but are not limited to: the establishment of the municipal ward-based primary health care outreach teams (WBOTs) to offer community-based services through CHWs; the establishment of district clinical specialist teams (DCSTs) to strengthen clinical governance at PHC and district hospitals; and efforts to strengthen bi-directional (upward and downward) referral systems [54]. Therefore, there is a need to examine whether services for managing malnourished children within these referral levels in provinces with high incidences of SAM are offered as per the national guidelines. Additionally, the role of the community-based tier and whether it has adopted the CMAM model is yet to be explored.

1.2.4 Factors Influencing the Implementation of SAM Guidelines and Quality of SAM Services

The quality of health services embodies the degree to which practitioners give care, increase the likelihood of desired health outcomes, and are consistent with current professional knowledge [55]. In this case, the current professional knowledge in SAM services lies in the WHO or locally adapted guidelines; however, contextual factors

influence the implementation of the guidelines. Critical to providing quality care, management of SAM requires health systems building blocks such as, health workforce capacity, availability of finances, healthcare facilities capacity to deliver more effective services, including the availability and capacity of information systems, as well as availability of technology and medicines [56].

The health workforce are prone to poorly implement evidence-based guidelines, due to insufficient knowledge [57], limited implementation guidance (including job aids), inspection and capacity [58] and lack of supportive supervision [59]. For instance, despite clear guidelines for diagnosis of SAM, it seems to be challenging for health workers in some developing countries. The challenges in diagnosis of SAM have been reported in a study conducted in Gambia, which showed that nurses in an outpatient clinic could only identify half of the children with SAM and further misdiagnosed over 20% of SAM cases [60].

In addition, the successful implementation of SAM guidelines is reliant on whether technology and medicines are available. At selected clinics in Kenya, non- prescription of medication for some cases, and not completing referrals to hospitals per IMCI guidelines were partly due to the unavailability of drugs and lack of transport, respectively [61]. There is a direct link between the availability of technology and medicines to the mode of financing including source of funds, budgeting and procurement systems adopted by health departments at national or local levels. For instance, the availability to implement RUTF in 25 African countries is enabled by UNICEF funding [62].

The scope of health service packages delivered at various tiers of the health system also influences the quality of SAM services. For instance, children with SAM are often critical condition on arrival at hospitals. The critical state may be due to the severity of co-

morbidities like pneumonia, diarrhoea, TB, or HIV infections, which compound with their already poor nutritional status to worsen the situation. In certain communities, the critical state of SAM cases received at hospitals is enhanced by delays in seeking appropriate care due to administering traditional medicines before seeking hospital services, or receiving inefficient care at PHC facilities in the respective communities [63, 64]. To close gaps that delay appropriate management for acutely malnourished children at community and PHC levels, there is a need to explore, understand and intervene on factors influencing delays in care at all health system levels.

1.3 Problem Statement

In South Africa, SAM management studies are mostly focused on inpatients or hospital-based care [65-68], yet SAM management including its prevention, requires an interdisciplinary and holistic approach addressing all diagnostic and therapeutic aspects at the different tiers of the district health system. Furthermore, few studies have explored the transitioning of children with SAM through referral pathways between different levels of care. Specifically, it is hard to find studies that investigated care during referral and whether acceptable SAM stabilisation guidelines are used to guide the referral process.

As SAM management in South Africa involves a three-tier referral system, the SAM guidelines comprehensiveness in informing implementation along these levels needs to be studied. The WHO takes the lead and offers respected sources of guidelines that adhere to high standards of using systematic reviews to make recommendations and dealing with conflict of interest among developers of guidelines to achieve guideline trustworthiness [58, 69, 70]. The reputation of offering commendable guidelines can be strengthened if the WHO strives to prevent the development of strong

recommendations based on limited evidence, diversify developers of guidelines by including consumers of services and also consider funding constraints prior to implementation [69]. In particular, guidelines for nutrition action, weak implementation ability evidenced by a lack of implementation advice has been observed [58]. In this regard, there is a need to explore whether the WHO "despite being the best possible" or locally adapted guidelines for SAM used in South Africa fulfil preconditions which may influence their implementation.

The essential aspects of SAM guidelines within a referral system are the diagnosis, stabilisation before and during referral, management, transition and follow-up [1, 43]. An exploration of whether implementation practices at all referral levels are aligned to the WHO and locally adapted guidelines for SAM will be required. Concurrently, there should be an examination of whether there are enabling or hindering environments for implementation of SAM guidelines within a referral setting. Enabling environments in the context of curbing malnutrition are political or policy processes building or sustaining momentum for effective implementation [64]. Lastly, there is a need to account for SA's scope in community intervention for SAM. This inquiry is timely because CMAM has been adopted as an alternative to inpatient SAM management and it can achieve a 90% recovery rate [5].

1.4 Aims and Objectives

This study aimed to explore the health management of children with SAM within and across the (sub-district) health system of North West Province in South Africa in 2016.

The specific objectives were to:

1. Examine the comprehensiveness of the South African adapted WHO guidelines used for SAM diagnosis, management, and referral in North West Province in South Africa.
2. Describe the practices involved in implementing and adhering to SAM diagnosis, referral, and management guidelines from the South African adapted WHO guidelines among study sub-districts health systems in North West Province in South Africa.
3. Explore and explain contextual factors influencing the SAM diagnosis, referral, and management practices among study sub-districts health systems in North West Province in South Africa.
4. Explore the job description and role of community health workers in the diagnosis, management, and referral of children under the age of five with SAM in study sub-districts in North West Province in South Africa.

The following research questions were developed from the objectives:

1. Objective one:
    - ✓ What are the SAM guidelines implemented in South Africa?
    - ✓ How comprehensive are the SAM guidelines in informing all levels of care in SA?
    - ✓ What is the quality of SA's SAM guidelines usability?
    - ✓ What are the implications of SA's SAM guidelines comprehensiveness and quality?
2. Objective two:

- ✓ How do health workers implement SA's SAM guidelines at PHC, during referral and at hospital levels?
- ✓ Which health workers are involved in the implementation of SAM guidelines and what are their roles?
- ✓ How do health workers interact and receive supervision when implementing SAM diagnosis and/or management guidelines within a sub-district health system?

3. Objective three:

- ✓ What factors influence (hinder or facilitate) the implementation of SAM guidelines at all referral levels?
- ✓ How do the factors influence implementation?

4. Objective four:

- ✓ How comprehensive is the content of the SA's CHWs manual to inform CHWs on SAM management in SA?
- ✓ Which actors are involved in community-based SAM services and what are their roles?
- ✓ How are the SAM guidelines for CHWs implemented?
- ✓ What factors influence community health workers' SAM guidelines implementation?

1.5 Thesis Outline

This thesis contains seven chapters, including this introductory chapter.

Chapter 2 is a literature review that highlights issues related to SAM guidelines at different levels of care, the implementation of SAM guidelines packages in LMICs

contexts and factors influencing the implementation of SAM guidelines. The chapter further discusses how a policy analysis triangle and additional conceptual frameworks informed the understanding of SAM services within sub-district referral systems.

Chapter 3 describes the methods used to achieve the stated objectives for the PhD study.

Chapter 4, 5, and 6 presents the study findings:

- **Chapter 4:** "*A Critical Appraisal of Guidelines used for the Management and Referral of SAM Cases in South Africa.*" The chapter focuses on a content analysis of all guidelines used for SAM management and referral in South Africa. It mainly analyses the comprehensiveness of the SAM guidelines in the diagnosis, management, and referral of SAM cases [71].

- **Chapter 5:** *"Factors Influencing Implementation of Severe Acute Malnutrition Guidelines in Rural Subdistricts in North West Province, South Africa*." This chapter offers an account of SAM diagnosis, management, and referral guidelines practices and factors influencing these practices in two subdistricts.
- **Chapter 6:** "*The Roles and Factors Influencing Community Health Workers Performance when Managing and Referring Severe Acute Malnutrition in two Rural Subdistricts of South Africa*." The chapter reveals the role of CHWS in examining, stabilising, referring, and rehabilitating children with SAM [72].

Chapter 7 is an integrated synthesis and discussion of the main findings concerning the key objectives of the thesis. It also includes discussions on the strengths and limitations of the study designs. In conclusion, it states the contribution of my PhD to existing

knowledge, areas for future research and recommendations emanating from the findings.

1.6 Conclusion

In this section, the gaps in the appraisal of the quality of the WHO and SA's modified WHO guidelines for SAM, the functioning of the referral systems for SAM management and the CHWs job description and role in SAM care within the South African context have been identified. The intentions to explore SAM management across tiers of a subdistrict health system have been identified as a means to fill the existing gaps. Finally, the research process has been summarised in a brief outline.

CHAPTER 2: LITERATURE REVIEW

This chapter provides an overview and critique of the literature on global and SA's SAM service packages at various tiers of the health system. It synthesises LMICs literature on the contents of care packages, cadres of health workers responsible for delivering care packages, and services delivered, as well as review factors that influence the delivery of SAM services. The service packages discussed are from the community-based outreach teams, emergency medical services (EMS), PHC facilities and hospital levels of the health system. The factors aspects are based on the service delivery, information systems, technology and medicines, health workforce and financing building blocks of a health system [73].

2.1 SAM Service Packages within the Health System

A healthcare system is an organisation of people, institutions, and resources that deliver health care services to meet the health needs of target populations [74]. In SA, the private and public sectors provide healthcare, the use of either sector is based on the population's economic status. The minority of SA's population use the private sector;

based on 2016 Stats SA, 28% of the sampled population were reported to have used the private sector for their healthcare needs [75]. More than half of the population using the private sector for healthcare relied on medical aid schemes which are only owned by16% of South Africans [75]. Amidst this uncertainty, the possibility of using both sectors by people without medical aid should also be acknowledged. This study focuses on the public sector, which adopts a referral system structure involving PHC facilities (clinics and community health centres) referring cases to district hospitals (primary level) which further refer the cases to provincial hospital (secondary level) which can further refer them to national specialist hospital (tertiary level). Based on the severity of the cases, the referrals from all facilities can be aided by emergency medical service (EMS) ambulances, which are called using a toll-free number '10177'; the EMS stations are located in each South African subdistrict. Various cadres of EMS health workers known as basic ambulance assistant (offering basic life support-BLS), ambulance emergency assistant/technician (offering intermediate life support-ILS) and paramedics (offering advanced life supporters-ALS) offer various services during referral in South Africa [76, 77]. Underneath the PHC facilities are community-based services known as Ward Based Outreach Teams (WBOTs) in SA. Figure 2.1.1 is an organogram depicting the tiers of health care in SA's public healthcare sector:

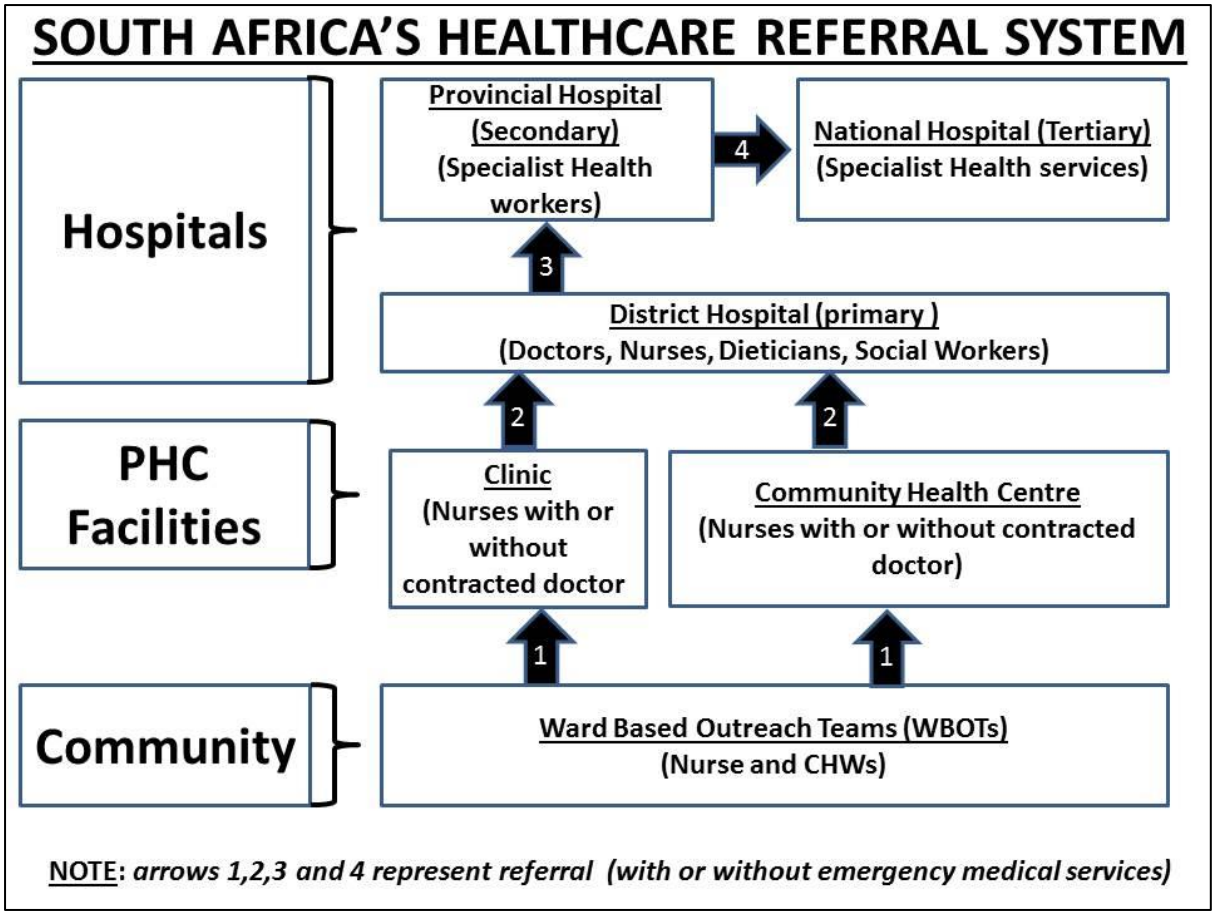

Figure 2.1.1: South Africa's Healthcare Referral System

Therefore, this section discusses SAM service packages offered at community, PHC, EMS and hospitals levels of the referral system continuum.

2.1.1 Emergency Medical Services: Life Support Manuals

The emergency medical services (EMS) offer emergency medical care, during referral medical treatment, or transport for ill and injured persons. The IMCI handbook identifies paramedics to be part of the IMCI users, guidelines recommended during a complicated SAM referral are to continue feeding and give a follow-up dose of antibiotics [38, 45]. However, EMS practices in South Africa are based on EMS life support guidelines prescribed to the three EMS cadres. The basic ambulance assistants possess a certificate in basic life support and their job description includes resuscitation and administering first aid [78, 79]. The ambulance emergency assistant (also known as

a technician) possesses a certificate in intermediate life support (4 months training) and their job description includes giving intravenous therapy, drugs like Beta 2-stimulants and dextrose [78, 79]. The paramedics possess a National Diploma or Bachelor of Technology or Bachelor of Health Sciences in Emergency Medical Care and can thus offer advanced life support medical services during referral [77, 79]. Seldom do studies on SAM management report care during referral [63, 68, 80], yet during referral, a septic child with SAM requires Emergency Triage Assessment and Treatment (ETAT) within the golden hour [6].

The South African studies on emergency services focus on its transition from the apartheid era, gaps in regulation, and inequitable distribution, which leaves rural settings under-resourced [79, 81]. Understanding the rural inequities aspect of emergency services requires a syndemic lens[1] due to the historical roots of socio-economic problems from the apartheid era. The available emergency services studies are also unclear on the SAM service packages during referrals; as a result, there is a need to understand whether medical or nutritional care is continued during referral.

2.1.2 Community-level SAM Service Package: Community Management of Acute Malnutrition (CMAM)

The SAM services at the community level includes timely detection of malnutrition, provision of treatment for SAM without complication using RUTF or other nutrition-dense foods and referral [82]. Community health workers (CHWs) who are basic health providers responsible for preventive, promotive rehabilitative, and currently, curative care offer SAM services in communities [83]. These roles differ per cadre and the

[1] A syndemics framework concentrates on how the health system and communities can best respond to disease through monitoring their emergence and lessening impact (Singer and Clair, 2003). The focus is on the synergies of interaction between co-morbidities, which often increases the disease burden and as well as structural and political adversities which underlie the disease (Singer and Clair, 2003; Mendenhall, 2017).

settings of CHWs. The CHWs are classified as specialists and generalists as well as voluntary and formal in various contexts of LMICs [83, 84]. The specialists training and deployment are for a defined population (e.g., children younger than five years) or to serve a specific disease (e.g. malnutrition); while generalists are given a broad mandate to serve a range of primary health care needs of the entire community [84]. The formal CHWs undergo a year-long training to serve at a health post or village clinic, they offer medical care (including antibiotics), and have a salary [83]. The volunteer CHWs undergo a short training (10 days in SA) to offer basic services (including promotive and preventive health tasks) at the household or community level without formal payment [83]. Therefore, a community-based care package can be within households, communities, or health posts.

SAM service packages vary based on the type of cadre or a country's scope of community services. For instance, in southern Bangladesh, community-based SAM services involved household-level screening using MUAC and checking danger signs using an algorithm and treating uncomplicated SAM using RUTF, antibiotics, and folic acid [34]. In the Malawian and Ethiopian context, community health aides, and formal CHWs, respectively, offer CMAM at community health posts [85, 86]. Considering the variations in the scope of community-based SAM service packages and the types of health workers who provide care at this level, there is a need to explore the situation in settings with high SAM incidence and fatality rates.

In SA, the community-based outreach teams offer promotive, preventive, and rehabilitative roles for all population groups [52]. These service providers are

generalist CHWs[2] under the leadership of professional nurses based at district-level facilities [52]. Regarding malnutrition, the South African CHWs guidelines depict screening for malnutrition and providing education [51]; however, the curative aspects are unclear. Therefore, it is vital to explore the role of CHWs in managing SAM cases; specifically, there is a need to explore whether CHWs are involved in screening, preventing, referring or treating uncomplicated cases.

2.1.3 PHC Facilities: Integrated Management of Childhood Illnesses (IMCI)

The IMCI strategy promotes the accurate identification and treatment of SAM, strengthens care at home by educating caregivers or providing preventative measures, and speeds up the referral of severely ill children [38]. IMCI is meant to improve the standard case management skills of health workers attending to young children at first level of care; nurses serve the majority of patients at this level in South Africa [38]. IMCI includes guidelines on the assessment and classification of malnutrition, pre-referral treatment, referral for complicated SAM cases, treatment for uncomplicated SAM cases, and counselling. If implemented well, IMCI enhances the quality of PHC care and reduces child mortality; a study in Egypt reported a decrease in under-five children mortality from all causes from 6.3% to 3.3% [87].

Studies in various LMIC settings, including Burundi, Kenya, and SA, report poor IMCI implementation [61, 68, 88]. In Kenya, health workers attend 11 days of training on common childhood illnesses, but implementation remains inadequate. This inadequacy is evident in incomplete assessment and classification, not prescribing some medicine and non-adherence to IMCI guidelines [61]. A study of 200 cases undergoing a SAM

[2] Generalist CHWs in South Africa undergo 10 days of training, which offer health knowledge including Maternal, Neonatal and Child health (MNCH), TB, HIV and AIDS and basic skill (Padayachee et al., 2013). They are expected to offer promotive, preventive and curative health services (Moosa et al., 2017).

diagnosis in Burundi, revealed that only 3% of the cases underwent screening for all 6 indicators "weight, height/length, mid-upper arm circumference, oedema, filling in and discussing the growth curve and calculating the weight for height z-score" measures, thus missing cases that required further management or referral [88].

IMCI was introduced in South Africa in 1996 and was adopted nation-wide in 1998 [46]. The implementation of IMCI in South Africa is alongside 'Standard Treatment Guidelines and Essential Medicine List for South Africa - Primary Healthcare Level, which give detailed steps of PHC management options for all diseases. The IMCI related implementation problems that have been reported in South Africa include incomplete assessment, insufficient use of IMCI for SAM, incorrect classification of malnutrition by clinic nurses, and administration of inadequate pre-referral treatment [68, 89]. The challenges in IMCI implementation are partly due to poor definition of service package elements, incompetent health workers, and poor governance [90]. Considering the importance and need to strengthen the capacity of PHC services in SAM management along the referral continuum, IMCI implementation and factors influencing implementation have to be explored. Since 2011, doctors are beginning to serve PHC facilities under the PHC reengineering programme of general practitioners contracting [52]. It is, therefore, vital to explore whether the presence of doctors makes a difference to SAM care given at PHC level.

2.1.4 Hospital Level: Steps of Managing SAM

Globally, the following WHO guidelines documents inform complicated SAM management at hospital level: "Guidelines for the inpatient treatment of severely malnourished children", "Management of the child with a serious infection or severe malnutrition for the first referral level in developing countries" and "Pocketbook for

hospital care inform inpatient SAM management." The guidelines' SAM service package is composed of diagnosis, stabilisation (hypoglycaemia, hypothermia, infection, and micronutrient imbalances) and rehabilitation (catch-up feeding, sensory stimulation, and follow-up) phases [1, 6, 36].

In South African district hospitals, doctors are expected to diagnose and treat severe cases with support from nurses and dieticians [91]. The careful implementation of the WHO inpatient guidelines for managing SAM is supposed to reduce fatality rates to 5% [67]. However, this reduction is complex in SSA where severe co-morbidities and weak health services impede the reduction of fatality rates [80]. The WHO inpatient guidelines improve SAM management at the hospital level; they are also feasible, sustainable, and affordable [65]. However, in selected Ghana and South African hospitals non-compliance to dietary needs, monitoring weight and lack of follow-up planning for South Africa restricted recovery [65]. In the Kenyan context, malnutrition care was rare or never available in 11 of 14 referral hospitals meant to implement SAM service packages for hospitals [92]. Inpatient care for SAM in South Africa can be traced back to the 1950s through 1970s [93-96]. In the South African context, inpatient SAM care is highly informed by WHO 10 steps of managing SAM incorporated in the Standard Treatment and Essential Medicine List for South Africa Hospital Level Paediatrics.

The South African district hospitals are meant to support PHC levels by offering more specialist care (to PHC or self-referred cases) which includes, the provision of general paediatric services ranging from diagnostic, treatment, care, counselling, and rehabilitative services [91]. Studies have declared the SAM guidelines feasible for rural South African hospitals when complemented with support structures [64-66]; with one study reporting a reduction in SAM mortality from 50% to 28% [66]. However, non-

adherence to SAM management guidelines by health providers has contributed to high SAM mortality rates [66, 97, 98]. In SA, poor practices and implementation of the WHO guidelines for managing SAM have been observed, particularly in rural settings [63, 64, 98]. Poor practices include non-prescription of potassium, incorrect prescription of antibiotics [99] and not prescribing therapeutic food [63]. The attribution of poor practices to SAM mortality should be cautiously considered due to a lack of confirmatory evidence [80].

It has been observed that studies that identify poor practices recommend what needs to be done but less emphasis is placed on how recommendations can be executed and how the recommendations can be scaled up in countries that are in need the most [100]. For instance, in response to the 2008 Lancet series on Maternal and Child Undernutrition, the South Africa National Department of Health published new guidelines "Integrated Management of Children with Acute Malnutrition in South Africa: Operational Guidelines" covering all levels of healthcare in 2015. Whether current guidelines have been adopted independently or implemented alongside the essential drug list guidelines is unknown. Interventions introduced at scale require delivery research at national level to understand implementation; however commitment limitation and institutional capacity for delivery, management and assessment of such programmes pose obstacles to achieving results [100]

It is therefore vital for this study to explore whether the newly adapted South African guidelines for SAM and the existing South African version of WHO guidelines for SAM are in use in hospitals and other referral tiers. It will also be important to examine whether the implementation or not of SAM guidelines for South Africa is influenced by factors including the capacity and commitment to manage and assess implementation.

2.1.5 A Summary of SAM Service Packages within a Referral System

The level-specific SAM service packages discussed in sections 2.1.1 to 2.1.4 are informed by specific guidelines, which require various competencies from various cadres of health workers. Despite their complexity, the care packages for levels of care form a referral system. In addition to level-specific guidelines, paediatric emergency triage, assessment and treatment (ETAT) is also a critical requirement at PHC facilities, during referrals by EMS and hospital levels [101]. The ETAT concept involves the early identification of children with emergency signs to be prioritised for immediate treatment upon contact with emergency personnel and health workers at healthcare facilities [19, 101]. The emergency signs include "airway obstruction, shock or circulatory impairment, convulsive seizures or coma and severe dehydration, because if these condition are not treated with urgency children are at high risk of dying [101]. In the South African setting, children with emergency signs are not held up in queues but treated within the golden hour (a period following trauma or shock due to non-trauma events) to prevent death [19, 102]. In offering ETAT, children with SAM that are not in shock should not be prescribed fluids through infusion [101]. Table 2.1.1gives a summary of the SAM care packages that informs the services and the competencies required per referral level:

Table 2.1.1: A Summary of Packages of SAM Care and Competencies

REFERRAL LEVEL	PACKAGE OF SAM SERVICES	COMPETENCIES
Emergency services	Life Support Guidelines: ✓ in-transit medical treatment ✓ transporting patients Paediatric emergency triage, assessment and treatment (ETAT)	✓ Paramedic training ✓ ETAT training
Community Service	CMAM: ✓ detection of malnutrition using MUAC ✓ provision of treatment using	✓ CHW training ✓ CMAM training

	RUTF, vitamin A and sometimes antibiotic ✓ health promotion activities to prevent SAM	
PHC facilities service	IMCI: ✓ detection of SAM using anthropometry ✓ Treating or stabilising SAM with F75, Vitamin A and antibiotic ✓ Refer urgently Paediatric emergency triage, assessment and treatment (ETAT)	✓ In-service training ✓ IMCI training ✓ Formal nursing training: college or university ✓ ETAT training
Hospital service	Several guidelines: ✓ Detection of SAM using anthropometric and clinical assessment ✓ WHO 10 Steps of Treating Severely Malnourished children ✓ Paediatric emergency triage, assessment and treatment (ETAT)	✓ In-service training ✓ IMCI training ✓ Inpatient SAM guidelines training ✓ Formal nursing, dietician and doctor training: college or university ✓ ETAT training

The services offered at each level of care require health workers that are competent in the implementation of the guidelines for the levels they serve. The competencies are attainable through university training, guidelines-specific dissemination trainings and in-service trainings [103, 104]. However, when it comes to ETAT for the EMS in SA, the basic ambulance assistant cadre is limited in their scope of practice as they are only allowed to resuscitate while the ambulance emergency assistant cadre can also administer intravenous therapy [105].

Therefore, for this study, it is vital to explore whether and how the service packages and competencies at each level of care are geared to provide the aim of seamless SAM care.

2.2 Factors Influencing SAM Diagnosis, Management and Referral

The evaluation of the quality-of-care aspects of the delivery of SAM service packages at various levels of care fall under one or more of the following health systems building blocks:

2.2.1 Service Delivery

Health services are meant to deliver interventions that are safe, effective, and of good quality, and are on time and within their settings [56]. The WHO guidelines offer guidance on intervention for SAM at various levels of care based on the best evidence available; however, a need to improve on rigour of development, applicability and adaptability has been noted [58, 106]. Despite WHO guidelines undergoing updates since the 1990s rigour of development, including literature used has been unclear. Contrarily, the guidelines updates published in 2013 have clarified the evidence used and declared uses of weak evidence for some guidelines thus a need for clinical trials to enhance the quality of evidence [106].

In addition to clinical trials evidence aimed at strengthening SAM diagnosis and management options, research from other setting has revealed other important aspects in SAM service delivery. In regards to applicability, there is a need to develop precise and explicit implementation advice for WHO guidelines on SAM because they have potential to enhance guidelines implementation ability which may minimise variable and erroneous implementation [58]. For instance, in implementing CMAM intervention such as administering RUTF, antibiotics and vitamins, the operational components including thorough training for CHWs and strengthening chains of supplies adopted in Bangladesh should be considered as lesson for LMICs with poor access to facility services [34]. In addition, active case finding and surveillance for SAM has also proved

successful for early detection and treatment of SAM, hence reducing fatalities and should be strengthened to enhance SAM services [5]. A follow-up study of children who recovered from SAM in Malawi were likely to depict poor infant growth linked to cardiovascular and metabolic diseases in future thus suggested need for find strategies to best optimise recovery including dietary and social transition [107]. Based the outcomes from these three studies, there is a need to uncover gaps in implementing outpatient, inpatient and post-discharge guidelines and management practices for SAM.

In some instances, guidelines are yet to address some management challenges. For instance, children with both SAM and HIV are yet to be fully served using WHO guidelines because HIV changes the dynamics of SAM management including changes in metabolic functions and body composition which raise concern for antiretroviral treatment [67, 108]. Therefore, there is a need for more research to address unresolved issues in SAM management in children with HIV.

Therefore, for this study, it important to focus on the applicability of content used by exploring whether there are implementation guidelines in place at local level and assessing gaps in SAM management at all levels of care.

2.2.2 Human Resources

Health systems that perform well are characterised by a sufficient and efficient health workforce that is motivated, equitably distributed, and have the right skills for the service package at a particular tier of care [56]. In the context of paediatric care, pre-service IMCI training is to be given to medical and paramedic students while specific to malnutrition management the WHO pocketbook should form part of the training [104, 109]. In practice, erroneous SAM management due to incorrect implementation of clinical guidelines still occur. The incorrect implementation of SAM guidelines is from

unskilled health workers who lack experience or induction, and lack mentoring and refresher courses [80, 99, 110]. There should be capacity-building services like formal training programmes, in-service training, and mentoring to achieve successful SAM services. To prevent misdiagnosis of SAM cases, investment in anthropometric training, which is a challenge among practicing health workers, has been suggested [5]. Additionally, in-service e-learning for poorly performing SAM managers should be considered for improving knowledge and skills in SAM diagnosis and management since it boosts skills, confidence and clinical practice [111]. Therefore, in this study, training and skills of the health workforce should be explored to understand the implementation context.

The hospital clinical managers (doctors), hospital ward managers (nurses) or PHC facility managers (nurses) are critical in supervising and mentoring other health workers on SAM practices, but discussions on their skill requirements are rare. A study focusing on district-level management of child services found that management teams "lacked the skills and authority to effectively prioritise, plan, implement, and monitor services"[112]. As a result, countries are beginning to consider and train managers on how to monitor, supervise, and support IMCI implementation [61, 112]. In some instances, general shortages of health workers or those with a specific skill impede SAM service packages delivery, thus calls are being made to ensure highly qualified nurses or doctors are available when required during the day and night [63, 113]. It is, therefore, vital to explore whether there are structures ensuring capacity building, promoting the desired skill mix, and ensuring the availability of the health workforce. In regards to issues of health workers capacity, the training and skills of the health workforce should be explored to understand the implementation context.

2.2.3 Leadership and Governance

This building block involves making sure that policy frameworks to guide health systems exist and have regulation, accountability, attention to system design, and effective oversight structures [56] to ensure the desired implementation. The implementation of service packages without monitoring frameworks or regulations; may result in poor practices. For instance, during a regulated integrated facility visit in Kenya IMCI was excluded because it lacked a checklist to rate health workers' performance, as a result, less attention was paid to its implementation [61]. Thus far, experts have proposed checklists to monitor performance, and this can be beneficial at all levels of SAM care; however, there will be a need to equip management teams with skill in developing tools and conducting monitoring [112]. In addition, South African factors influencing IMCI implementation noted a lack of policy guidance to operationalise implementation aspect like health worker-patient ratio, rotations and supervision logistics including responsible profession/s, frequency of supervision and what needs to be done [90]. Exploring the implementation of SAM service packages will also require a focus on leadership and governance roles, which include implementation of policy-based monitoring and operational guidelines.

Therefore, in this study, exploring whether there are monitoring frameworks and policy structured operational structures will be required.

2.2.4 Medicines and Finances

Equitable access to medical products and technologies that have proven to be efficient, safe, of good quality, and scientifically sound is also a priority in an effective health system [56]. Availability of SAM management supplies influences the quality of SAM care. For instance, the implementation of IMCI in a district in Tanzania was ineffective

because of inadequate vital drugs and supplies [110]. Shortage of drugs due to non-inclusion in essential drug list, restocking and ordering challenges have caused the incomplete implementation of SAM management guidelines in selected healthcare facilities in Ghana, SA, and Kenya [61, 65]. A health worker in South African study reported an extreme case of shortage as follows: "because of the lack of food, no milk, nothing – the mothers want to go home. Even us (health workers) we are not happy because there is no food to give them. It does not make any difference if there is no food here, and there is no food at home. So, it is better for them to go" [63].

Insufficient funding accelerates these shortages. In SA, vast income inequalities are evident by a 0.63 Gini coefficient within a range of 0 to 1 Gini coefficient where 0 represents perfect equality and 1 represents maximum inequality [114]. The South African inequalities are further manifested in the expenditure of the 8.7% GDP on health; 4.2% is consumed by the private sector serving 16% of the population while 4.5% is consumed by the public sector serving 84% of the population [115]. Malnutrition programmes funding is also limited compared to other programmes. For instance, vertical programmes like HIV have been prioritised and received more funding while other programmes remain under-funded [90]. Efforts to cover therapeutic supplies by non-governmental organisations exist, but they are not enough. For instance, UNICEF procures 80% of global RUTF which is supplied to 25 African countries, Afghanistan, Haiti, Bangladesh, Pakistan, Myanmar and Yemen; however, the supply only covers 23% of global SAM cases [62]. At the community level, emergencies like periods of drought have attracted funds for malnutrition programmes that seized after the disaster, thus hampering programme continuity [116]. Based on these unstable funding structures, there is a need to explore and strengthen sustainable

funding for SAM care package requirements at all levels of the referral system. There is a need to review the nature and sustainability of government supply chain despite NGOs being the leading funders in some settings.

Therefore, in this study, it is vital to explore whether required resources, medicines and foods are available for SAM management at all levels of care.

2.2.5 Information

Effective health systems also produce, analyse, disseminate, and use health status and system performance information which should be reliable and timely [56]. The critical information includes patient records and performance appraisals on service delivery. In this regard, standard records that enable the collection of quality data are essential for care audits, which can later be collated and disseminated as feedback for care given or basis for care strengthening decision making [90]. Lack of information for continuity of referral services not only impedes the continuation of care but also affects planning for service delivery in setting in need at the national and sub-national levels [117]. It is therefore vital to always include exploration of information systems when studying SAM services.

Therefore, it is important for this study to explore whether patient records (if any) inform care at other levels or to other health workers as well as whether health workers of facility performance appraisals (if any) inform strengthening of care.

2.3 Theoretical Framework

The Walt and Gilson policy triangle framework was used to understand SAM diagnosis, management, and referrals practices in SA. The framework had the potential to systematically elicit the content, process, actors and context [118, 119] that may affect

SAM policy guidelines implementation. The triangular framework is discussed alongside other frameworks worth considering in the quest to understand or intervene in SAM guidelines implementation practices.

2.3.1 Description of the Walt and Gilson Policy Triangle

This study utilises a policy triangle framework, since it acknowledges the importance of policy content and how policies are developed and implemented, and thus dwells on content informing policy (and practice), the context of policy development and implementation, the process of policy development and implementation, and actors involved [118]. Despite the policy analysis triangle being mostly used to explore the development of policies, it is also essential in understanding the implementation process. In this study, SAM was used as a case study to examine the implementation process of the diagnosis, management and referral guidelines by exploring the content, context and actors involved. The interaction of the triangle's underpinnings of content, actors, process, and context, was essential in eliciting an extensive account of the implementation of SAM guidelines and referral policy documents at the sub-district level.

When used to understand policy implementation, the triangular elements interact to influence the process of implementation. The content aspect encompasses the guidelines and how they are interpreted; the action in the delivery of services becomes the process that is influenced by the implementing actors' attributes and contextual factors [118, 120, 121]. Different components of the policy analysis triangle enable the identification of potential influencers to policy implementation including the values and experience of implementers [97, 98]. The diagram below depicts the components of the

policy analysis triangle and their interconnectedness (**Error! Reference source not found.**).

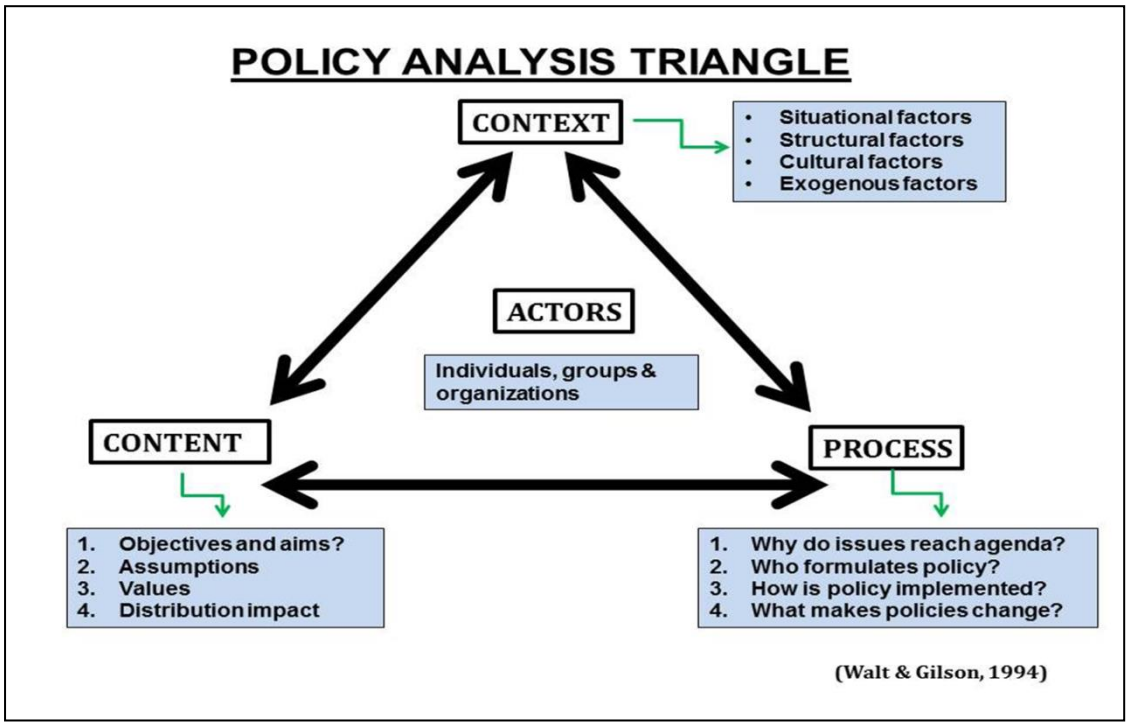

Figure 2.3.1: Policy Analysis Triangle

The policy analysis triangle was complemented by the Appraisal of Guidelines for Research and Evaluation (AGREE) approach [122] to elicit implementation-specific concepts such as content applicability. The AGREE approach further used to examine the policy content comprehensively.

2.3.2 The Appraisal of Guidelines for Research and Evaluation (AGREE) for Content (see manuscript 1)

While the content element of Walt and Gilson framework was useful in outlining the specific objectives of the guidelines, it was complemented by the AGREE approach in providing details of stakeholder representation, editorial independence, clarity of presentation, applicability and rigour in the guidelines development [122]. **Error! Reference source not found.** is a summary of items per each AGREE domain:

Table 2.3.1: AGREE Items for Guidelines Appraisal (chapter 4)

AGREE Domain	Summary of Item Questions
1. **Scope and purpose**	**3 items:** a specific description of objectives, coverage of health questions and description of the target population.
2. **Stakeholder involvement**	**3 items:** guidelines development team variety, whether views of the target population were sought and definition of target users.
3. **Rigour of development**	**8 Items:** use of systematic evidence search methods, criteria for selecting evidence, description of strengths and limitations of the evidence, description of recommendations formulation methods and risks of recommendations, the link between evidence and recommendation, external review, and procedure for updating guidelines.
4. **Clarity of presentation**	**3 items:** were recommendations specific, unambiguous, with different options, and easily identifiable.
5. **Applicability**	**4 items:** provision of a tool for practice, describe barriers and facilitators to practice, consider resource implications and present monitoring and audit criteria.
6. **Editorial independence**	**2 items**: not influenced by views of funding bodies and declare competing interests of guidelines development members.

Critical to the implementation process of SAM management and referral guidelines was appraising whether the scope and purpose, clarity of presentation and applicability items of the AGREE approach. The comprehensiveness of the guidelines was further appraised using the stakeholder involvement, rigour of development and editorial independence items of the AGREE approach. The following guidelines documents, which inform SA's SAM management, were appraised:

- **EDL:** Standard Treatment Guidelines and Essential Medicines List for South Africa: Hospital Level Paediatrics (2013)
- **IMCI:** Integrated Management of Childhood Illnesses Chart Booklet (2014)
- **IMC-SAM:** Integrated Management of Children with Acute Malnutrition in South Africa: Operational Guidelines (2015)

- **WHO-Steps:** Guidelines for the Inpatient Treatment of Severely Malnourished Children (2003)

Furthermore, whether the SAM guidelines encapsulated all levels of SA's sub-district referral system (PHC, transit, and hospital) was appraised.

2.3.3 Health Systems Building Blocks

The WHO health system building blocks framework is a useful and generalizable method to analyse the impact and strength, as well as the limitations in the implementation of the healthcare guidelines including guidelines for managing SAM because it enables exploring and understanding health systems with systems thinking lens [123, 124]. Systems thinking offers a way forward for successful and effective operations of real-world settings and complex health systems, thus a convenient tool for identifying and resolving challenges [123]. The building blocks that are financing, governance, information systems, service delivery, human resources, medicines and technology are acknowledged as a critical framework in classifying factors that may influence SAM guidelines implementation. **Error! Reference source not found.** is a brief account of building blocks:

Table 2.3.2: Health Systems Building Blocks [123]

Building blocks	Brief description
Service delivery	includes a provision to those in need, at the right time and place,
Health workforce	includes the responsiveness, fairness, efficiency and availability of workers,
Health information	focuses on timely production of information on determinants, performance and health status,
Medical technologies	includes a focus on safety, quality, efficacy and cost-effectiveness of medical products and technologies

Health financing	Focuses on raising adequate funds to ensure people use needed services
Leadership and governance	Ensures effective oversight, coalition building, regulations, accountability and attention to systems designs.

The interaction of these six building blocks is essential in understanding what challenges or enables the functionality of a health system.

2.3.4 The Syndemics Framework

A syndemics framework concentrates on how the health system and communities can best respond to disease through monitoring their emergence and lessening impact [33]. The focus is on the synergies of interaction between co-morbidities, which often increases the disease burden as well as structural and political adversities which underlie the disease [33, 125]. A syndemics approach also addresses treatment by emphasizing interventions that not only strengthen care but also focus on prevention through considering the entire scope of vulnerabilities; the underlying goal is to address "complex contexts in which diseases occur" unlike individual treatment [126]. In this study, a syndemics approach has the potential to expose and later lead to developing interventions aimed at SAM prevention and bringing attention to the interaction of SAM co-morbidities.

2.4 Conclusion

This critique of literature has not identified a study that jointly documents the interconnectedness of the community-based services, PHC facilities and hospitals and the role of emergency medical services levels in managing children with SAM. Using the component of the Walt and Gilson policy analysis triangle the interconnectedness was explored first by focusing on whether the SAM management guidelines inform each level of care, the process of SAM management and actors involved as well as factors

influencing the process. This study explored whether there was connectedness by appraising WHO and South African adapted WHO guidelines using the AGREE approach to elicit the scope and usability of guidelines and their comprehensiveness. Furthermore, the health systems building blocks have been adopted to specifically explore whether service packages offered are seamless, health workers have the capacity, policies to govern implementation are in place, medicines and other resources are available and information systems aid continuation of care.

CHAPTER 3: METHODOLOGY

This section justifies the rationale behind study designs, site selection, sampling, data collection, and analytical methods. Specifically, it also describes use of purposive sampling, primary and secondary data collection, inductive and deductive thematic content analysis in the three inter-related PhD manuscripts.

3.1 Study Design

This thesis employs a case study design that enables in-depth exploration of a complex phenomenon like implementing South African adapted WHO SAM guidelines in subdistrict referral system in everyday contexts by uncovering boundaries between implementation and context [127, 128]. The subdistrict referral system in South Africa is composed of WBOTs at the community level who refer patients (including children) beyond their mandate to PHC facilities, which further refer patients (especially complicated severe illnesses) to district hospitals using emergency medical services [43, 105, 129]. A case study is bound by time, place, definition, and context; as a result, it offers a focused exploration [130]. This PhD study focused on SAM guidelines implementation practices (definition) and factors influencing the practices (context) at subdistrict referral levels (place) in 2016 (time).

The complexity of case studies requires selecting research methods based on needs leading to concentration on research problem using pluralistic approaches including engaging with multiple experiences to derive knowledge that may enable problem solving through habits reconstruction [131-133]. Therefore, this thesis is a series of studies utilising pluralistic approaches and multiple experiences including secondary data from guideline booklets and patient records, and primary data from in-depth interviews, observations, and facility appraisals. The first and second studies employed

complementary mixed-method approaches, which involved clarifying or enhancing the results from one method (qualitative or quantitative) with the other; while the third study only employed the qualitative approach. The first study was a desk review of SAM guidelines comprehensiveness using a Likert scale [122]. The second study was an explanatory case study design that was used to explain how a complex phenomenon "SAM guidelines implementation" is influenced by the everyday contexts [127, 134]. Explanatory case studies are essential in investigating a complex phenomenon like health services where the number of variables far outstrip the number of data points (or participants), and events may be challenging to control using traditional quantitative means [134]. Explanatory case studies aim to answer 'how' or 'why' questions with little control on behalf of the researcher over the occurrence of events [135]. The third study was an exploratory case study that was used to understand a phenomenon that is not well defined [135], as the role of South African community health workers in SAM services during the era of using CHW manuals under the ward based outreach teams (WBOTs) programme. [51, 136]

3.2 Study Setting

The site for this study was North West Province, South Africa. At the onset of this study in 2016, the latest data (2015 during that time) showed that North West was one of the Provinces that had the highest incidences of SAM in SA. The Province registered an incidence of SAM of 8.1 per 1000 children, which was above the national incidence of 4.5 per 1000 children [24] in 2015. Concurrently, North West was the only province whose SAM case fatality rate (CFR) did not improve by remaining at 12.3% in 2015/16 and 2014/2015 [26]. This was actually an increase from 11.6% in 2013/14 [26].

Considering the North West did not reduce its CFR compared to other provinces, its health service was an area of concern.

Two subdistricts were recruited using the principle of maximum variation. One subdistrict was recruited based on its implementation of the NHI pilot interventions aimed at achieving universal health coverage. The NHI interventions were informed by PHC re-engineering interventions such as ward-based outreach teams (WBOTs), referral strengthening and district clinical specialist teams (DCSTs). The other subdistrict was recruited based on the highest SAM incidence and SAM case fatality rates registered by its district in the Province. However, the latter was not piloting all the NHI interventions. Maximum variation sampling allowed the inclusion of a wide range of individuals, groups, or settings for multiple perspectives that exemplify the complexity of the real-world setting [137, 138], which in this case is the North West Province health system. The reference for the recruited subdistricts will be *NHI* and *Non-NHI subdistrict*s henceforth. Figure 3.2.1 illustrates the geographical positioning of these sub-districts within the Province.

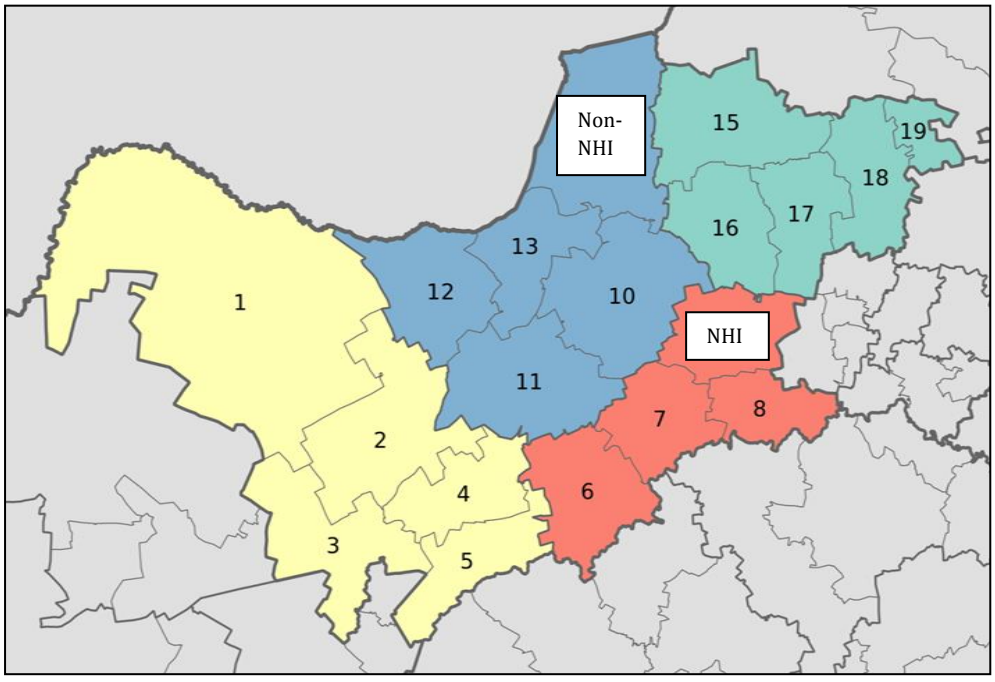

Figure 3.2.1: Study Sites

Although the National Department of Health officially selected the *NHI subdistrict* for piloting NHI pilot interventions, the *Non-NHI subdistrict* was also implementing two NHI interventions based on the PHC re-engineering strategies of ward-based outreach teams (WBOTs) and district clinical specialist teams (DCSTs). The WBOTs included six CHWs (or more) and a nurse as a leader [52]. According to the policy, they were meant to offer preventive, promotive, curative and rehabilitative services to communities divided in municipal wards [52]. The DCSTs consist of clinical specialists in essential services who provide clinical governance, which include an oversight role, management of resources, the delivery of quality services and improvement of health outcomes including the maternal and child health outcomes [139]. Figure 3.2.2 is a flow diagram depicting PHC re-engineering interventions per study sub-district:

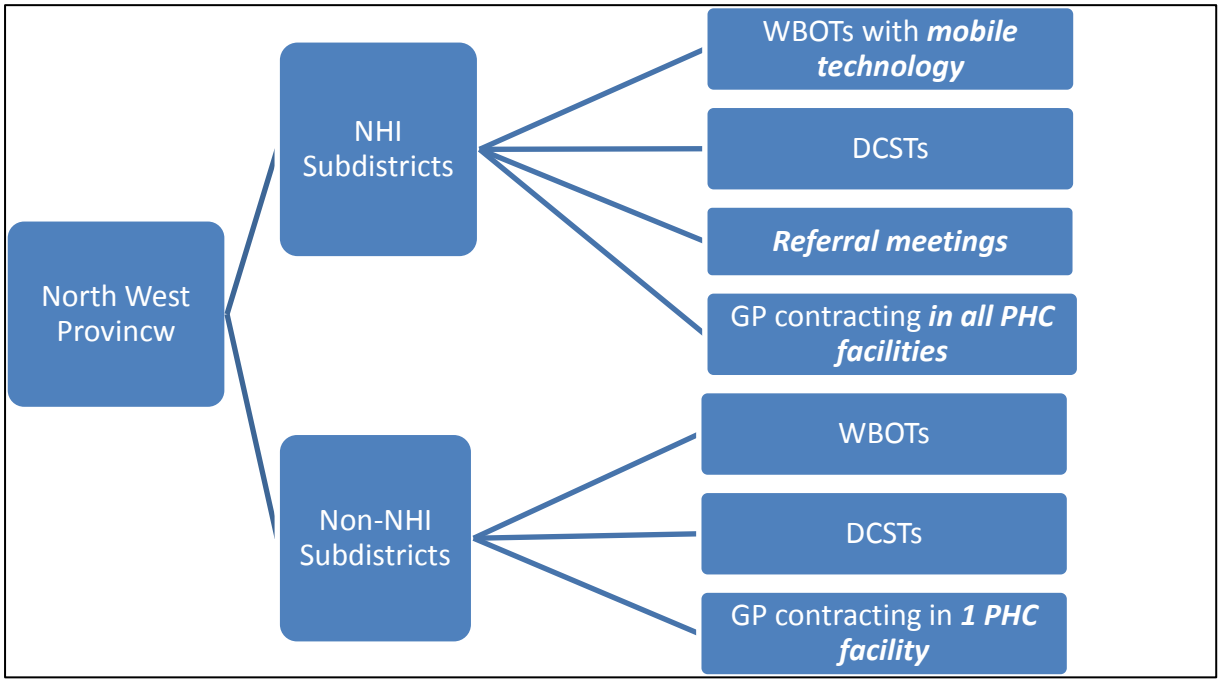

Figure 3.2.2: PHC Re-Engineering Intervention in Study Subdistricts

The flow diagram is only meant to aid the description of how certain practices within the health system of a particular subdistrict were enabled or hindered and not for

quantitatively depicting whether a certain variable is significant to an outcome of SAM care. The distribution of interventions across study subdistricts in flow chart is further described in sections 3.2.1 and 3.2.2.

3.2.1 NHI Subdistrict

The NHI subdistrict was within a district which reported SAM incidence of 6.6 per 1000 children which was above the national incidence of 4.5 per 1000 children in 2014/2015 [24]. They also reported a 10.7 CFR for SAM which was below the nation average of 11.6 in 2014/2015 [24]. In 2015/2016, the NHI subdistrict CFR for SAM increased to 10.8% which was above the national average of 8.9% [26]. Their NHI interventions were the contracting of general practitioners for PHC facilities, strengthening of referral pathways and ward-based outreach teams using mobile technology, called Mobenzi.

The NHI subdistrict had eight facilities: *a district hospital, one CHC*, and *six clinics*. The district hospital was in the process of being downgraded to a super community health centre (CHC) and was meant to offer more services than a regular CHC but not as much as a hospital. Nonetheless, the super CHC will be referred to as the NHI district hospital since it remained a referral point for all clinics, had five doctors, and offered inpatient services during the study. Using purposive sampling, the recruitment of two of the six clinics for the study occurred to achieve maximum variation based on distance determined using google maps. One clinic was 0.5 kilometres (km) from the hospital, while the other was 47km away from the hospital. The six facilities recruited from the NHI subdistrict were a NHI district hospital, NHI CHC (4km away), NHI clinic1 (0.5km), NHI clinic2 (47kms) and a NHI emergency service station.

3.2.2 Non-NHI Subdistrict

The Non-NHI subdistrict was within a district which in 2014/2015 had triple the national SAM incident of 4.5 per 1000 at 19.5 per 1000 children [24]. They also reported a 9.9 CFR for SAM which was below the national average of 11.6 in 2014/2015 [24]. In 2015/2016, the CFR for SAM increased to 11.3% which was above the national average of 8.9% [26]. The selection of a high-burdened setting enabled the exploration of more diverse SAM cases. This non-NHI subdistrict had 10 facilities: a *subdistrict hospital with two wings, which* were 22kms apart, two *CHCs*, and eight *clinics* (some hosting a mobile clinic). Using purposive sampling, two clinics were recruited based on being far and close to the referral hospital; Non-NHI Clinic1 was 6kms while Non-NHI Clinic2 was 124kms away. The seven facilities recruited from Non-NHI subdistrict, were a Non-NHI district hospital, Non-NHI CHC1, Non-NHI CHC2, Non-NHI clinic1, Non-NHI clinic2 and a Non-NHI emergency service station.

The Non-NHI CHC2 had privileges of an NHI pilot site like having access to general practitioners. All studied PHC facilities also had WBOTs; however, they did not have access to Mobenzi technology. The subdistrict was not undergoing referral strengthening.

3.3 Sampling Approaches

The recruitment of different categories of facilities, guideline documents, health workers within the referral systems and patient files were guided by the purposive quota sampling technique, which allowed for the inclusion of a sample that represents variety [140]. The sampling approaches for each study objective are elaborated below.

3.3.1 Documents for Desk Review

Using expert recommendations (three academic experts in child health, a dietician, a clinical associate and a doctor) and internet searches (Google and Government websites), the following guidelines used or adapted in South Africa were included for review:

1. **EDL:** Standard Treatment Guidelines and Essential Medicines List for South Africa: Hospital Level Paediatrics (2013)
2. **IMCI:** Integrated Management of Childhood Illnesses Chart Booklet (2014)
3. **IMC-SAM:** Integrated Management of Children with Acute Malnutrition in South Africa: Operational Guidelines (2015)
4. **WHO-Steps:** Guidelines for the Inpatient Treatment of Severely Malnourished Children (2003)

Current WHO updates on SAM care were excluded due to the delay of their incorporation into guidelines that have been disseminated nation-wide in South Africa.

3.3.2 Facilities and Emergency Services

This study aimed to capture subdistrict level SAM management and referral systems. As a result, the sampling of various levels of the referral pathways consisting of WBOTs, PHC facilities, emergency services, and district hospitals was done in each subdistrict. Table 3.3.1 depicts each level's care package:

Table 3.3.1: Facilities and EMS Care Packages

Referral Level	Care Package
District hospital	Support primary health care by offering more specialist care (to PHC or self-referred cases) which includes, the provision of general paediatric services ranging from diagnostic, treatment, care, counselling and rehabilitative services [141]
CHC (24 hours) and Clinic (8 hours)	Are commissioned to offer promotive, preventive (including growth monitoring) and curative (assess, classify and treat) services based on the IMCI guidelines [142]

EMS	Offer emergency medical care, inter-health facility medical treatment or transport for ill and injured persons[143]
WBOTs	Offer promotive, rehabilitative, and preventive health services at the community level [52].
NOTE: *The care packages may vary based on contextual issues, which include the decentralised system of government.*	

3.3.3 In-Depth Interviews with Relevant Health Workers

Various cadres of health workers conduct SAM care and referrals in the South African context. Table 3.3.2 depicts the cadres of health workers at each level of care and their duties:

Table 3.3.2: Cadres and Roles of Health Workers within Referral Levels

Referral System Level	Cadre of Health Worker	Roles
Community	Community Health Workers (CHWs),	-SAM assessment -Promotive and preventive services
	Outreach Team Leaders (OTLs)	-supervise CHWs
PHC Facilities	Nurses	-SAM diagnosis -Treat moderate acute malnutrition -Refer severe acute malnutrition to subdistrict outpatient department [142],
	Visiting or Contracted GPs	-SAM diagnosis -Treat moderate acute malnutrition -Start treatment then refer severe acute malnutrition to wards
Subdistrict Hospital	Doctor	-SAM diagnosis -Treat severe acute malnutrition [141].
	Nurse	-Support Doctor in Treating SAM
	Dietician	-Nutrition assessment -Prescription of therapeutic diet regimens [144].
Emergency Medical Services	Basic ambulance assistant	-Offer basic life support • Resuscitate and give first aid
	Ambulance emergency assistant	-Offer intermediate life support • Prescribe intravenous therapy, drugs like Beta-2 stimulants for Asthma and dextrose[105]
	Paramedic	-Offer advanced life support

The curative role of SA's CHWs in SAM management was unclear.

To elicit diverse experiences from each level of care, facility, and cadre of practitioners, 54 practitioners were purposely sampled to participate in the study. Table 3.3.3 provides a summary of the participants per subdistrict.

Table 3.3.3: Summary of Study Participants

Cadre of Participants	NHI Subdistrict	Non-NHI Subdistrict
Doctor	2	2
Dietician	1	1
Manager	6	6
Life supporters	2	2
Nurses	7	10
CHWs	7	4
Outreach Team Leaders	3	1
Total	**28**	**26**

Overall participants' selection for the facility-based studies was based on saturation. Saturation is the discontinuation of recruiting participants when no new information emerges [145]. For the guidelines' documents appraisal study, five informants were interviewed to provide complementary information on the SAM guidelines comprehensiveness (see manuscript 1). Three individuals were part of the national guidelines' development/adapting teams, while two were part of the implementing teams in the study subdistricts.

3.3.4 Patient Files

The study included all available patient files for children between six months to five years who were referred and treated for SAM between January and June of 2016, which was the convenient time for the researcher. However it should be noted that globally acute malnutrition peaks at the beginning of light rain and end of the dry season due to decline in farm produce [146]. Among Northern Cape farm workers relying on casual labour; food insecurity which often results in malnutrition was noted during winter season (June to August) where casual farm jobs are scarce and food is expensive [147].

Patient files for children below six months of age were excluded because this group requires specialised diagnosis and care that may differ from older children. The documents were 20 (i.e., referral letters and road-to-health books with CHWs information) at WBOTs level, 19 (files and road-to-health books) at PHC level, and 21 (files) at the hospital level.

3.3.5 Observations

Ten facility observations (six at the hospital and four at clinic levels) were conducted in this study. The observations were identified based on convenience, thus involved all SAM consultation and ward rounds during the researcher's visit.

3.4 Data Collection

In order to elicit deep insights into diagnosis, management, and referral of SAM in the subdistricts, triangulation, which involved the use of various information sources to broaden the range of details was used [148, 149]. The data sources used for triangulation are listed below.

- Document review of relevant policies and guidelines
- Facility appraisals
- Review of patient files
- In-depth interviews with health workers, managers, and informants
- Observation notes

Data collection involved the piloting of study instruments, the extraction of data from guideline documents, and the collection of primary data from the study subdistricts. Data collection was done between February and July 2016.

3.4.1 Pilot Testing

The piloting of all data collection tools (observation checklist, interview guides, facility appraisal checklist, data extraction guide for patients' records review) occurred at a rural subdistrict, which was not part of the study in the North West Province. The pilot involved four interviews with one ward manager, one facility manager and two nurses. A facility appraisal, five patient record reviews, and two observations were also conducted.

The pilot testing led to minor revisions of the data collection tools, including the deletion of questions that were repetitive, ambiguous, or confusing. The pilot also informed the inclusion of ward managers as part of the study sample, who were initially not considered. Their role in overseeing paediatric ward operations was considered crucial during the pilot phase. The pilot exercise further informed the sequencing of data collection methods. For instance, it became clearer that reviewing patients' files before conducting interviews with health workers was ideal as it allowed the probing of inconsistencies that emanated from the patients' files with the health workers.

3.4.2 Document Review of Relevant Policies and Guidelines

Data collection involved a review of relevant policy and guidelines on SAM management and referrals. A 32-item Appraisal of Guidelines for Research and Evaluation (AGREE) instrument (see appendix 1) was used to extract data from four guideline documents, to examine their comprehensiveness in informing SAM management and referral practices at subdistrict PHC clinics and hospital levels. Four individuals, including the PhD candidate, appraised the four guidelines from December 2015 to April 2016. The PhD candidate trained the three appraisers (who were clinical practitioners and a fellow PhD candidate) in using the AGREE instrument. Critical to the appraisal was

scoring guidelines' applicability, clarity, scope and development processes according to a 1 to 7 Likert scale, along with explanatory comments.

With regards to the CHWs manuals, data was extracted based on the following expected SAM services at the community level: SAM preventive, curative and rehabilitative guidelines. There was the extraction of information on SAM diagnosis, stabilisation, referral and rehabilitation steps. Similarly, referral policies were reviewed by the PhD candidate based on whether they had information on SAM referrals, stabilisation and mode of transport.

3.4.3 Facility Appraisals

In the nine facilities and two emergency service stations included in the study, a facility appraisal was conducted using a standardised checklist (see appendix 2), adapted from a study on universal healthcare coverage in Tanzania and South Africa (UNITAS) [150]. The UNITAS study is evaluating and monitoring policy processes and regularly communicates findings to policy makers and implementers. The PhD candidate went through the checklist with the facility managers and further walked around the facility to verify the managers' responses to the checklist items.

The checklist was aimed to capture contextual aspects of the participating facilities. Therefore, it captured the number of health workers, availability of supplies, and quality of infrastructure essential for SAM management and referrals at each facility.

3.4.4 Review of SAM Patient Files

Records of under-five children with SAM occurring between January and June 2016 were included in the study. The six months timeline was the researcher’s initial data collection period. At the hospital level, patient files were identified using the admission

register while at clinics, referral registers were used to identify files of cases referred for SAM. The WBOT leaders' referral records served as documents at the community level. Sixty records (20 at WBOTs level, 19 at PHC level and 21 at hospital level), comprising of patient files, CHW referral letters and Road to Health Books were reviewed, based on availability at facilities involved.

At the facility level, 15 records were from the Non-NHI subdistrict, while 25 records were from the NHI subdistrict. The justification for the variation in the number of files between the two subdistricts was that at the NHI subdistrict, files were easy to find due to an organised filing system, which made accessibility easier at all levels of care. At the Non-NHI subdistrict, the filing was poor at the PHC level; thus, patient files were only available at the subdistrict hospital. Access to PHC information at the Non-NHI subdistrict was only achievable using the Road to Health Books of children admitted with SAM. The CHW referral letters were mostly found in patient files at the NHI subdistrict while at the Non-NHI subdistrict, CHW leaders had some letters.

Using a structured data extraction form (appendix 3), data on the diagnoses, stabilisation, management and referral of SAM cases were reviewed to understand the extent of the use of facility resources and implementation of policies, patient files, Road to Health Books, EMRS forms and CHWs referral letters.

3.4.5 In-Depth Interviews with Relevant Health Workers, Managers' and Informants

In-depth interviews with different categories of health workers were conducted using semi-structured interview guides with questions on SAM diagnosis, management, and referral (see appendices 4-7). Different guides were used, based on the cadre of the participant. For instance, managers were asked questions involving supervision and

oversight of SAM services; health workers were asked questions regarding their involvement in SAM services, while informants' questions were regarding the comprehensiveness and usability of the SAM guidelines. All interviews were audio-recorded and numerous issues were explored, including the:

- Participant's interpretation and adherence to guidelines;
- Practices involved in managing and referring SAM cases and
- Factors influencing SAM management and referrals.

Before data collection, permission was granted by the Department of Health at the subdistrict level. The PhD candidate and the primary supervisor further explained the objectives of the study to the facility managers. To facilitate easy access to the participants at each facility, the facility managers introduced the PhD candidate and the study to the potential participants. During the data collection period, the facility manager informed the potential participants about the presence of the PhD candidate and requested willing participants to meet the researcher for an interview. The interviews lasted for approximately 1-hour, and most involved sit-down conversations in facility offices, lunchrooms (off-lunch hours to maintain privacy), or unused wardrooms.

To complement the content extracted from guideline documents, another set of interviews, meant explicitly for commenting on guidelines documents, was conducted with guideline developers and users. Five in-depth interviews with informants consisting of three individuals who participated in adapting guidelines to the South African context and two individuals who are implementing guidelines were conducted. Implementers were interviewed at facilities, while guideline developers were interviewed in the PhD candidate's office and using Skype calls.

3.4.6 Observations

To conceptualize how malnourished children's health was managed at the clinic and hospital levels, the PhD candidate conducted observations of practitioners during consultations and ward rounds. SAM cases that were diagnosed, stabilised and managed during data collection visits were observed. All consultations or ward rounds for malnourished children conducted during the researcher visit were observed. A semi-structured ward observation guide (appendix 3) that tracked SAM diagnosis, management and referral practices was used to record how practitioners implemented the guidelines across five facilities during the day for 10 days. The management practices during the referral process were not observed because of inaccessibility during emergency service station visits. The practices was in the form of field notes, however, were guided by the observations checklist. Due to informal incorporation into daily facility activities, the researcher observed health workers' behaviour and attributes during duty, tea break, and facility meetings chats. The activities captured using the observation guides was also complemented with comments made and behaviours observed throughout facility visits.

3.5 Data Management and Analysis

Data analysis was in three phases as per the study objectives. All audio-recorded data were transcribed, coded and analysed into themes. All documents and transcripts from interviews, records reviews and observations were evaluated by eliciting meaning, understanding and developing empirical knowledge on SAM cases diagnosis, management and referral processes in the two study subdistricts. Details of the analysis are provided in Chapters 4-6.

3.6 Methodological Rigour

Various data sources were used to address specific objectives; this improved the quality of the research since findings from one data source were crosschecked by another [151]. For instance, narratives by health workers were crosschecked through record entries and by observation. To further improve the data analysis, another independent researcher (PhD supervisors or fellow PhD candidates) were involved in coding and interpreting the data; thus, a consensus of at least two opinions (primary researcher and another researcher) enhanced the quality and dependability of the findings.

Preliminary results were shared with the research participants to ensure the authenticity of the research findings. In the Non-NHI subdistrict, feedback sessions were conducted at the study facilities and later a joint one was conducted at the Non-NHI hospital resource centre on 6th February 2018. The joint feedback session involved a preliminary findings presentation by the PhD candidate and receiving feedback from relevant stakeholders from the subdistrict health department (manager and heads of departments), community (WBOT members), emergency (station manager and life supporter), primary health care (manager and nurses) and hospital (ward manager, nurses and doctors) levels. This session resulted in generating additional information and recommendations on issues to do with the availability of therapeutic feeds, the sustainability of WBOTs activities, roles of emergency services, referral structures and the need to locally simplify SAM management guidelines at PHC level as it was done at hospital level.

In the NHI subdistrict, feedback sessions were firstly conducted at the study facilities and later a joint one was conducted at the subdistrict health department's boardroom on 23rd April 2018. The joint feedback session involved a preliminary findings presentation

by the PhD candidate and receiving feedback from subdistrict health department (manager and area nursing officer), community (WBOT members), emergency (station manager and life supporter), primary health (manager and nurses), and hospital (ward manager, nurses, and doctors) levels. The results from this session were similar to the prior session, with additional clarification on how hospitals downgrade SAM care to CHC and the associated challenges.

3.7 Ethical Considerations

This research was conducted with ethics approval from the Human Research Ethics Committee (Medical) of the University of the Witwatersrand (appendix 8). The Ethics certificate number for the study is M151015. Permission to conduct research was also granted by the North West Province (appendix 9) and the Departments of Health in the two districts. Participation was voluntary; participants gave written informed consent to be interviewed and audio-recorded before in-depth interviews. Participants received assurance of no risk or potential benefits in their participation in the study. Consent to access the archival documents which are not in the public domain was also sought from and granted by the paediatric ward managers at hospitals and facility managers at Clinic or CHCs.

All hardcopy data and backup audios have been locked away and all audio-recorded data and electronic transcripts are in a password-protected computer that is only accessible to the PhD researcher and supervisors. Participants are only identified by the use of pseudonyms to attain the anonymity of the findings.

CHAPTER 4: A CRITICAL APPRAISAL OF GUIDELINES USED FOR MANAGEMENT AND REFERRAL OF SAM CASES IN SOUTH AFRICA

Thesis Objective 1: Examine the comprehensiveness of the guidelines used for SAM management and referral in SA.

Manuscript Reference: Mambulu-Chikankheni, F. N., Eyles, J., Eboreime, E. A., & Ditlopo, P. (2017). A critical appraisal of guidelines used for management of severe acute malnutrition in South Africa's referral system. *Health Research Policy and Systems*, 15(1), 90.

Abstract

Background: Focusing on healthcare referral processes for children with severe acute malnutrition (SAM) in South Africa, this paper discusses the comprehensiveness of documents (global and national) that guide the country's SAM healthcare. This research is relevant because South African studies on SAM mostly examine the implementation of WHO guidelines in hospitals, making their technical relevance to the country's lower level and referral healthcare system under-explored.

Methods: To add to both literature and methods for studying SAM healthcare, we critically appraised four child healthcare guidelines (global and national) and conducted complementary expert interviews (n = 5). Combining both methods enabled us to examine the comprehensiveness of the documents as related to guiding SAM healthcare within the country's referral system as well as the credibility (rigour and stakeholder representation) of the guideline documents' development process.

Results: None of the guidelines appraised covered all steps of SAM referrals; however, each addressed certain steps thoroughly, apart from transit care. Our study also revealed that national documents were mostly modelled after WHO guidelines but were not explicitly adapted to local context. Furthermore, we found most guidelines' formulation processes to be unclear and stakeholder involvement in the process to be minimal.

Conclusion: In adapting guidelines for management of SAM in South Africa, it is important that local context applicability be taken into consideration. In doing this, wider stakeholder involvement is essential; this is important because factors that

affect SAM management go beyond in-hospital care. Community, civil society, medical and administrative involvement during guideline formulation processes will enhance acceptability and adherence to the guidelines.

Keywords: Severe acute malnutrition, Referral healthcare, South Africa, Guideline

4.1 Background

Malnutrition accounts for 50% to 60% of hospital child deaths in sub-Saharan Africa [113]. Out of all of South Africa's under-five children deaths audited between 2012 and 2013, 30% were associated with severe acute malnutrition (SAM), 29% with under-weight for age, 1% with over-weight for age, 34% with normal nutrition status and 6% were unknown [97]. Co-morbidities such as HIV and other illnesses are responsible for the high incidence of morbidity and mortality in children with SAM [67, 152]. Children with SAM have a higher risk of death, estimated at 5–20 times above that of children with normal nutrition status since the condition's complication (hypoglycaemia, hypothermia, dehydration, etc.) are deadly within 48 hours if not stabilised [153]. SAM is confirmed when children aged 6–59 months have a height-for-weight or length of less than 3 standard deviations or a z-score of less than –3, bilateral pitting pedal oedema and less than 115 mm upper-arm-circumference during a malnutrition diagnosis [1, 153]. Hospital SAM-related deaths result from inappropriate case management at facility level during primary health-care referral processes and follow-up after discharge [153]. It is therefore important to understand the in-hospital SAM care by exploring the facets that may contribute to the mismanagement of these cases within the entire healthcare services.

As noted by South Africa's National Department of Health [153], the referral process is vital in ensuring the reduction of SAM deaths (fatality rates) within the healthcare services. A few studies that have examined paediatric and other health-care referrals in South Africa have not necessarily focused on SAM; however, they indicate non-adherence to referral protocols and clinical guidelines for healthcare by providers and non-compliance to referrals by consumers [154-156]. Therefore, there is a need for a

critical analysis of the protocols for healthcare providers in the context of managing and referring SAM cases, i.e. how does non-compliance manifest itself? While a number of scholars have attempted to explore in-hospital SAM mortality by measuring the quality of in-hospital care through an assessment of the applicability of 10 WHO guidelines for malnutrition management (a global 10-step guide for managing and rehabilitating SAM cases at hospital level), guideline quality is barely analysed [113]. There is also a need for a comprehensive understanding of the guidelines discussing the decision to refer and of care in preparation for, during and when receiving SAM referrals.

This paper aims to understand the complexity of guidelines for care and referral processes of SAM in South Africa. Specifically, we (1) identified guidelines related to SAM care and referral processes (from examination, decision to refer, care involved in transit and at receiving facility and during back referrals); (2) examined the quality of guidelines that are used in South Africa and (3) discussed the implications of the strengths and shortfalls of the documents reviewed.

4.2 A Critical Review of Studies on SAM Healthcare Policies and Guidelines

Healthcare is best performed with the use of policy guidelines or protocols. Waterlow [157] found that detailed and minimal errors in malnutrition treatment were associated with the use of standardised protocols or guide-lines. Guidelines in clinical healthcare practice are developed systematically to aid practitioners when deciding relevant healthcare treatments and pathways for specific clinical conditions [158]. The clinical practice guide-lines are meant to reduce variations in handling specific ailments, thus regarded as rigid support tools by some scholars [159]. However, evidence-based guidelines are known to improve patient care and outcomes as well as promote practitioners' positive attitudes and efficient use of facility resources [160]. It is

therefore vital to explore whether guidelines for healthcare meet this technical quality. In South Africa, global (WHO based), national-based or local guidelines contain information on SAM management; however, they are not equally researched. Specifically, most South African studies examine global guidelines, including the integrated management of child-hood illnesses (IMCI) and WHO's Guidelines for the Inpatient Treatment of Severely Malnourished Children (WHO-Steps), rather than the national or local guidelines for managing or referring SAM [65, 66, 99, 113]. Therefore, this critical review will enable a discussion of the quality of all relevant SAM guidelines.

South Africa-based studies that have previously explored SAM treatment guidelines have only focused on adaptation of WHO-Steps for inpatient care of children with SAM to rural hospitals. Such studies acknowledge the feasibility of implementing WHO-Steps of managing SAM in rural hospital settings. However, omission of some procedures (i.e. feeding per every 3 hours at night and giving routine antibiotics) by health workers was a hindrance to the guidelines' full implementation [65, 66]. To resolve such problems, in-service training, support and supervision are mostly recommended, but focus is seldom vested on whether the WHO guidelines were rigorously developed to suit the implementing context [113]. On the contrary, Deen et al.'s [65] study in 12 African hospitals found that clinical staff raised concerns about the evidence of using the same antibiotic regimen for children with marasmus and kwashiorkor, thus leading to the guidelines being implemented differently in various contexts. As a result of the scepticism over anti-biotic recommendations in guideline documents, some hospitals gave antibiotics to all children with malnutrition while others only administered them to children with SAM [65]. Applicability of guidelines meant for global use may be difficult to achieve in low- and middle-income countries despite extensive fieldwork,

involvement of SAM expert teams and revisions at development stage [65]. In consideration of the scepticism over the credibility of guidelines and a need for contextual-based SAM healthcare protocols, there is a need to assess SAM guideline development rigour and contextualisation.

Also neglected in studies that explore guidelines on SAM healthcare is the assessment of whether the documents are clear on practice, up to date (with revision plan) and if they were developed rigorously, by whom and under whose influence. In a study meant to appraise WHO guidelines for maternal health, Polus et al. [161] acknowledged WHO's vital role in provision of global guidance to healthcare. It is therefore apt to explore SAM guidelines on both a technical level and a management, dissemination and implementation one. Additionally, since most studies on implementation of SAM guidelines are conducted at hospital level, focusing on how relevant they are to primary healthcare (PHC; com-posed of clinics and community health centres) and during referrals to other levels of care is an analytic gap.

South Africa did not have a national framework for managing malnutrition until 2012; prior to that, four of nine Provinces adopted the WHO-Steps guidelines. The rest of the Provinces utilised IMCI and South Africa's standard treatment guidelines and essential drugs list for hospital level paediatrics, which were not explicitly explored in the context of SAM [153]. By focusing on SAM aspects of the guidelines currently implemented and how specific they are to context as well as how translatable they are to clinical operations implied in a referral framework, this analysis will utilise a specific technique, namely the Appraisal of Guidelines for Research and Evaluation (AGREE) tool, as well as WHO components of the referral process.

4.3 Methods

4.3.1 Study Design

This study is a critical appraisal of care guidelines for SAM care that inform the referral process in South Africa. **Error! Reference source not found.** shows a summary of the 23 elements of the AGREE domains that were utilised to score the documents' quality. Additionally, qualitative document analysis was used for systematic scrutiny; this method involved the examining and interpreting of a document's content in order to draw its meaning and implications to SAM examination and care before, during and after a referral process [162, 163]. Therefore, we valued the identification of information pertinent to SAM referral process (Figure 4.3.1)from information meant for other ailments or care outside the referral steps [163].

4.3.2 Data Sources: Inclusion/Exclusion Criteria

Critical appraisal of the documents involved guidelines that address the care and referral of children with SAM. Through the consolidation of subject matter according to expert recommendations (three child health lecturers, a dietician, a clinical associate and a doctor) and internet searches (Google and government websites), we identified four guidelines (three national and one global) that are used (with the global guidelines adapted for local context) in South Africa (Box 1).

Box 1: List of Guidelines

1. **EDL:** Standard Treatment Guidelines and Essential Medicines List for South Africa: Hospital Level Paediatrics (2013)
2. **IMCI:** Integrated Management of Childhood Illnesses Chart Booklet (2014)
3. **IMC-SAM:** Integrated Management of Children with Acute Malnutrition in South Africa: Operational Guidelines (2015)
4. **WHO-Steps:** Guidelines for the Inpatient Treatment of Severely Malnourished Children (2003)

Note: The EDL is a standard guideline for hospitals, IMCI is the likely to be used at PHC facilities, WHO-Steps shaped SAM care in SA and IMC-SAM is the current national guideline specifically for SAM care.

4.3.3 Quality and Content Assessment

Analytical framework

Healthcare guidelines are reviewed and assessed using various tools that reveal their complexity and technical quality [122]. We utilised components the WHO referral and AGREE frameworks (Figure 4.3.1).

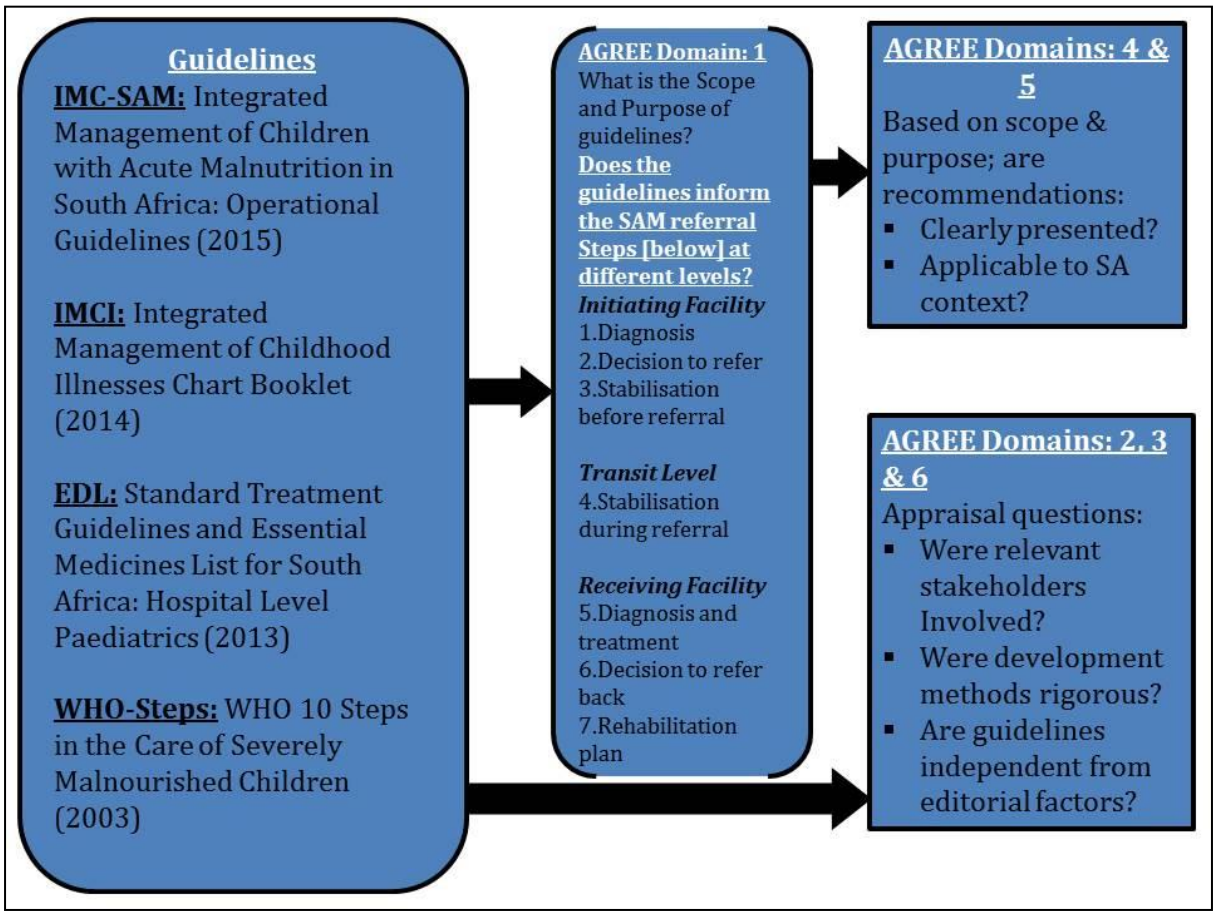

Figure 4.3.1: Integrated Analytical Framework for Appraising SAM Guidelines

The WHO framework examines five components, namely initiating facility, referral practicalities, receiving facility, supervision and capacity-building [164]. In specifying stages of referral process, we broke down the WHO referral components of initiating

and receiving a referral into seven steps (Diagnosis, Decision to refer, Stabilisation before referral, Stabilisation during referral, Care at receiving SAM referral, Decision to refer back, Rehabilitation plan after referral). Since the steps are descriptive in nature, the AGREE framework was incorporated to examine the documents analytically. Table 4.3.1 summarises the AGREE framework for policy development and content quality [122].

Table 4.3.1: Summary of AGREE Domains

AGREE Domain	Summary of Item Questions
3 Scope and purpose	**3 items:** specific description of objectives, coverage of health questions and description of target population.
4 Stakeholder involvement	**3 items:** guidelines development team variety, whether views of target population were sought and definition of target users.
5 Rigour of development	**8 Items:** use of systematic evidence search methods, criteria for selecting evidence, description of strengths and limitations of evidence, description of recommendations formulation methods and risks of recommendations, link between evidence and recommendation, external review, and procedure for updating guidelines.
6 Clarity of presentation	**3 items:** were recommendations specific and unambiguous, with different options and easily identifiable.
7 Applicability	**4 items:** provision of tool for practice, describe barriers and facilitators to practice, consider resource implications and present monitoring and audit criteria.
8 **Editorial independence**	**2 items**: not influenced by views of funding bodies and declare competing interests of guidelines development members.

Comprehensiveness of the referral steps was mainly examined using three of the six domains (scope and purpose, clarity of presentation, applicability). These domains are

specific to the SAM referral process, while the remaining three assess the rigour of guideline development processes (Fig. 1).

Document Review Process: AGREE and Interviews

The guidelines (n = 4) were appraised by three individuals (except one, which was reviewed by two individuals), with two authors (FNM-C and EE) individually appraising all documents using an online portal and a further three individuals (doctor, dietician and clinical associates) appraising one document each using hard copies. Responses were scored on a scale of 1 (strongly disagree) to 7 (strongly agree) on each of the AGREE tool domains.

To describe the referral representation and complement AGREE, five in-depth interviews were conducted with two academics, two frontline health workers (doctor and clinical associate) and a government official involved in guideline development. One government official, one academic and one frontline health worker commented on the EDL, a second health worker commented on the IMCI, while a third academic mainly commented on the IMC-SAM and added comments to other guidelines. The interviews explored the clarity of referral steps contained in the guidelines, adherence to the AGREE criteria and whether they could be recommended for use in various levels of SAM referral. Specifically, we sought information on stakeholder involvement, rigour of development (including use of evidence) and editorial independence (funders' influence, competing interests).

4.3.4 Data Analysis

The lead researcher tabulated raw scores from all appraisers and emailed them for crosschecking and reconsideration before aggregation. The AGREE online portal scaled

the percentage from all appraisers; in addition, we used the AGREE consortium (Box 2) formula to incorporate off-line appraisals.

Box 2: AGREE's Scaled Domain Score Formulae

Obtained score – minimum possible score *100 =Scaled Domain Score *maximum possible score-minimum possible score*
-Obtained Score (for domain with 3 items) = item 1 (sum of appraisers core) + item 2 (sum of appraisers core) + item 3 (sum of appraisers core) =? -Maximum possible score = 7 (strongly agree) x n (items) x 3 (appraisers) =? -Minimum possible score = 1 (strongly disagree) x n (items) x 3 (appraisers) =?

Note: Maximum possible score was a sum of all scores of the individual item by scaling the total as a percentage of the maximum possible score for that domain.

4.3.5 Rigour

Co-authors (JE and PD) were responsible for ensuring all appraisals were equally incorporated in the final commentary of the SAM documents relevance in SAM referral. To ensure representation of the assessors' input, the preliminary findings from the critical appraisal were mailed to all participants for member checking [165].

4.4 Results

This section is composed of results from the guideline document versus SAM referral steps assessment, AGREE appraisals and expert interviews. The results are outlined for each document (aim of guideline, referral steps representation and AGREE scores/narratives) with an overall summary of the documents' comprehensiveness. We report the guideline documents' results in order of the oldest to the latest.

4.4.1 WHO-Steps (2003): Guidelines for the Inpatient Treatment of Severely Malnourished Children

Aim of the guideline

WHO-Steps aim to improve global inpatient treatment of severe malnutrition in 10 steps. It is expected to address the SAM care problems alongside a WHO manual for managing SAM and the WHO/UNICEF strategy of IMCI. In South Africa, the 10 steps are embedded in two national guidelines (in this study: EDL and IMC-SAM) for hospital use only.

Referral steps representation

The guideline thoroughly elaborates in-hospital diagnosis/care and rehabilitation processes by emphasising appropriate case management and follow-up care [13]. The guidelines are meant for the receiving facility (hospital).

AGREE domain scores and narrative

The guideline scored high on scope and purpose (89%), clarity (75%) and applicability (61%), and lower on stakeholder involvement (44%), rigour of development (27%) and editorial independence (17%).

Scope and purpose: the objectives and populations were clearly articulated. It is meant to provide practical help to persons responsible for medical and dietary management of children with SAM. Despite its overall clarity, the guidelines' objectives and problem statements were not easily traceable by section titles.

Stakeholder involvement: a 44% score acknowledges that only a few experts contributed to the guidelines. Relevant professional groups or the public were not mentioned as being involved in reducing the stakeholder involvement strength. The specific users of guidelines were not stated, but rather spaces for implementation were identified as hospitals, therapeutic feeding centres, emergency situations and in nutrition rehabilitation centres [13]. It is unclear whether social workers and other professions in

rehabilitation centres were obligated to implement the highly clinical recommendations.

Rigour of development: the procedures for updating the guideline and using evidence were not reported. Consideration of benefits, side effects and risks of recommendations were not fully discussed, but case– control-based recommendations, also in the 2013 update of malnutrition care, point to the use of research evidence. Additionally, WHO is known for use of systematic reviews and randomised trials [161].

Clarity of presentation: recommendations were easily identifiable by having a similar flow per step of care, containing various options of case management. Each step of SAM care started with conditions to note, how to treat, monitoring points, what to prevent and a reference for specific dosage and measures. However, WHO-Steps did not have in-text charts to guide diagnosis, classification of severity and treatment.

Applicability: it was made flexible for global dissemination, thus giving room to adaptation to nutritious ingredients and drug options that can be accessed in various contexts. However, the guideline was not thorough on facilitators or barriers of its application and, therefore, implications for resource-limited settings were unknown. Hence, applicability to context-specific conditions could not be guaranteed. It should be noted that the 10 steps have been updated per current evidence; thus the revised version and South Africa's adapted version are respectively found in the 2013 WHO updates on SAM management and the 2015 South Africa's operational guidelines for managing acute malnutrition [1, 153].

Editorial independence: the influence of funding bodies and competing interests on guideline development and/or group members were barely traceable. While disclosure of funders was disclosed, competing interests were unreported and thus unknown.

4.4.2 EDL (2013): Standard Treatment Guideline and Essential Medicine List for South Africa – Hospital Level Paediatrics

Aim of the guideline

The EDL is a clinicians' guide for quality, equitable and efficient healthcare in order to save the lives of babies and children [50]. It is meant for hospital-level paediatricians covering a wide range of diseases, including SAM.

Referral steps representation

EDL contains a comprehensive medicine list covering in-hospital level SAM diagnosis and treatment, decision to refer back and rehabilitation. However, the role of community health workers during rehabilitation was vague despite their importance in South Africa's PHC strengthening.

AGREE domain scores and narrative

The guideline's highest score were in scope (96%) and clarity (93%), followed by stakeholder involvement (63%), applicability (53%), rigour of development (44%) and editorial independence (9%). Table 4.4.1contains supporting narratives.

Table 4.4.1: EDL (2013) AGREE Domains Support Quotations

AGREE Domains	Informants' Quotations
1. **Scope and purpose**	***Quote 2a:*** *"In the EDL objectives are not clearly explained, for example it is not stated how much percentage this intervention [guideline] is expected to reduce mortality from malnutrition".* (Informant 4, Paediatric Ward Doctor)

2.	**Stakeholder involvement**	***Quote 2b:*** *"The national essential drug list committee appointed by the Minister of Health [national official] includes health professionals, officials from the ministry of health and heads of pharmaceutical services from the Provinces"*. (Informant 2, Government Official) ***Quote 2c:*** *"They should involve clinical associates when developing these guidelines; we are in the field we are likely to say what is needed".* (Informant 6, Clinical Associate)
3.	**Rigour of development**	***Quote 2d:*** *"Honestly, there is not always evidence thus sometimes only expert opinions are used. Particularly when new medicine has to be added then there has to be a systematic review of evidence and cost effectiveness of introducing a new medicine".* (Informant 2, Government Official) ***Quote 2e:*** *"In those forums the loudest voice wins, I wrote to them to revise treatment per the new WHO recommendations, guess what, they overlooked my suggestion".* (Informant 3, Academic)
4.	**Clarity of presentation**	***Quote 2f:*** *"The EDL is very good for individuals experienced in SAM care, if not; some treatments are skipped since one has to go back and forth the pages. It could be best if the treatments were outlined in specific steps of execution for beginners or clinicians with general training".* (Informant 4, Paediatric doctor)
5.	**Applicability**	***Quote 2g:*** *"affordability is taken into account at national level thus once something is in the EDL the affordable drugs team makes sure supplies are procured and made available. That's the theory to say once something is in the EDL it should be available in the whole country".* (Informant 2, Government Official)
6.	**Editorial independence**	***Quote 2h:*** *"The EDL is funded by national department of health and there is a process for managing conflict of interest. So no funding will ever be accepted from any supplier that has interest".* (Informant 2, Government Official)

<u>*Scope and purpose:*</u> EDL had a clear objective "to reduce child mortality through offering quality healthcare", emphasising essential medicines, clearly identified target population (children) and maintained consistency with South Africa's PHC guidelines

[153]. However, EDL was limited in expressing outcome goals (quote 2a) and health questions were vaguely embedded in introductory sections.

Stakeholder involvement: based on acknowledgements, various teams were involved in EDL development. Singled out were various paediatric and national departments of health, including HIV/AIDS and child health clusters and, in particular, IMCI, tuberculosis and nutrition directories [50]. Despite appearing inclusive, team selection was political (quote 2b). Some relevant individuals were excluded. Individuals with less expertise in paediatrics but more conversant with remote area issues were side-lined (quote 2c). Additionally, 'clinicians' is used to identify target users but is unspecific.

Rigour of development: the methods of formulating recommendations and involving external reviewers and other health professions through emails were reported. However, there was no reporting of evidence search, selection and quality. The development process was mostly expert-based with use of some systematically searched evidence (quote 2d). Even where other experts contributed, inclusion of their inputs into the guidelines could not be guaranteed (quote 2e). Despite this, the guidelines had an updating procedure every 3 years, but its pace was slow since the current version is the third since 1998.

Clarity of presentation: its structure was clear with the segregation of diseases by chapters. The SAM chapter had headings for each treatment step sub-divided into prevention, detection, treatment and warnings. Different medication options were available; however, continuous reference to other chapters seemed unfriendly for a new user (quote 2f). Despite the shortfalls, key recommendations were easily identifiable and unambiguous.

Applicability: barriers and potential resource implications during implementation were not reported. One of the implementation barriers lay in accessing a mineral-vitamin mix ingredient for preparing the F75 and F100 feeds for stabilisation and catch-up (quote 4d under IMC-SAM). Nevertheless, a government official implied resource implications were taken into consideration (quote 2 g). EDL also had useful support tools, including feed recipes, tables and growth charts in appendices.

Editorial independence: the roles of EDL funders (the government) were not disclosed. Funding suppliers, such as pharmaceutical companies, were avoided (quote 2 h). Therefore, immunity from external influence was implied but disagreements among development teams were not reported.

4.4.3 IMCI (2014) Integrated Management of Child Illnesses Aim of the guideline

Aim of the guideline

South Africa adopted IMCI in 1997, originally developed by WHO/UNICEF in the 1990s. IMCI is meant to address serious challenges pertaining to provision of quality child healthcare by focusing on the wellbeing of the whole child [38]. Malnutrition is one of the major conditions included in IMCI.

Referral steps representation

The IMCI guided SAM examination, classification for decision to refer, and stabilisation before and during a transfer; however, the transit instructions were caregiver-centred. The IMCI was clearly for PHC and transit level guidelines.

AGREE domain scores and narrative

The IMCI scored highly on clarity (87%) and purpose (67%), but low on applicability (38%), rigour of development (24%), stakeholder involvement (17%) and editorial

independence (17%). Despite covering PHC and transit recommendations, the IMCI scored the least because its development/adaptation process in South Africa was not reported.

Table 4.4.2: IMCI (2014) AGREE Domain Support Quotations

AGREE Domains	Informants' Quotations
2. Stakeholder involvement	***Quote 3a:*** *"I think EMRS personnel [paramedics in the ambulance] are not targeted in this guideline and yet they are involved in most emergencies of SAM care".* (Informant 5, Clinical Associate)
5. Applicability	***Quote 3b:*** *"...SA IMCI is adopted from WHO; however it includes HIV components not highly represented in the original IMCI by WHO".* (Informant 1, Academic)

<u>*Scope and purpose:*</u> the South Africa version of IMCI lacks an introductory section; thus, its scope and purpose are implicit, but the original version aims to reduce death, illness and disability, and to promote improved health among children under-five [38]. Its strength lies in the scope of diseases it covers and clarity in target population with sections specific to children 0 to 2 months and those from 2 months to 5 years.

<u>*Stakeholder involvement:*</u> we assumed South Africa IMCI abides by WHO requirements which state that all IMCI content should be carefully reviewed and revised (if needed) to make them consistent with the nationally adapted IMCI guidelines [38]. The IMCI handbook also identified doctors, nurses and other professions as users; however, users in the South Africa context remain vague with ambulance personnel not included in guideline dissemination (quote 3a). The low score on stakeholders also resulted from the absence of the list of developers, including information on whether public/patient opinions were sought.

Rigour of development: procedures for updating the guidelines were not reported. We assumed use of evidence due to guideline sections on clinical warnings about some treatments. Since the IMCI development process could not be easily traced, there was no guarantee about whether the evidence search processes, selection and their limits were rigorously engaged.

Clarity of presentation: well-articulated recommendations were arranged in the form of examination (by looking and tests), classification (colour-coded severity) and treatment. Recommendations were also specific and un-ambiguous with different options for stabilisation and referrals suggested for severe cases.

Applicability: South Africa-specific HIV/AIDS needs and evidence of implementation were included (quote 3b). Although not clear in the booklet, IMCI guidelines were adapted to include identification and management of HIV-infected and -exposed children. However, it is unknown whether the SAM treatments are feasible in resource-constrained and rural PHC facilities. Auditing criteria were also absent.

Editorial independence: with no report on competing interests and funders, we assumed the South African government was part of the IMCI development/ adaptation process funding body. However, it was unknown whether the adaptation team was influenced by the government or WHO/UNICEF (as original developers).

4.4.4 IMC-SAM (2015): Integrated Management of Children with Acute Malnutrition in South Africa – Operational Guidelines

Aim of the guideline

The IMC-SAM is the latest (2015) and only national guideline document entirely dedicated to acute malnutrition in South Africa. The IMC-SAM supplements a two-page

national protocol for managing children with SAM (appendix 11 of guideline), which was developed in 2012 [153].

Referral steps representation

The IMC-SAM covered five steps of the SAM referral process, namely SAM examination, classification, diagnosis/care at hospital, decision to refer back and rehabilitation. IMC-SAM guided hospital and PHC facility practices but had minimal transit instructions. Addition-ally, IMC-SAM did not strongly stress stabilisation of SAM at PHC level.

AGREE domain scores and narrative

This document scored the highest of all the appraised documents with both scope and clarity scoring 89%, 74% on stakeholder involvement, 61% on applicability, 54% on rigour and 20% on editorial independence. The guideline followed the format of recent WHO documents and thus had more information on reasons for its development and its objectives. Table 4.4.3contains supporting narratives.

Table 4.4.3: IMC-SAM (2015) AGREE Domains Support Quotations

AGREE Domains	Informants' Quotations
2. Stakeholder involvement	***Quote 4a:*** *"When we did work in the Eastern Cape we did not seek public opinion, I don't know whether before the national guidelines were developed whether they did [involve the public]".* (Informant 1, Academic)
3. Rigour of development	***Quote 4b:*** *"Under the deputy director of the ministry of health, the development of a national guideline was spearheaded with the content highly dependent on WHO guidelines developed in 2013… its content as well as the IMCI are SA specific by modifying the antibiotic step due to high prevalence of HIV".* (Informant 1, Academic)
5. Applicability	***Quote 4c:*** *"With step 10 [of SAM care] on rehabilitation we followed a sub-sample of discharged under-fives and found most of them had not gained much weight because they had limited amount and range of food, were not receiving enough money and*

AGREE Domains	Informants' Quotations
	were not accessing child grants which have just been introduced. On the basis of that, we did a lot of advocacy work, including a TV program; this had a very big impact nationally, which caused the minister to visit the next day and there were stuff in the Sunday Times [local newspaper]. That influenced the inclusion of [a slogan saying] "make sure all children with SAM in the hospital are linked to social services" in SA's version of 10 steps of SAM care". (Informant 1: Academic).
	Quote 4d: *"The ingredients were not mostly stored by facilities but the main problem was the mineral micronutrient mix because it did not appear in the EDL thus not accessible through normal channels thus it has to be made up so we found a friendly pharmacist in East London who made it up for the whole Province [pilot site-Eastern Cape Province], however he could not keep up with the demand".* (Informant 1, Academic)
6. Editorial independence	***Quote 4e:*** *"There was a dispute from certain doctors on whether antibiotic should be given routinely (ampicillin). For F75 some doctors pushed very strongly for infant formulas since they were easier to get than rely on hospitals to make feeds; because of the issue of not binding on iron they cannot absorb thus likely to cause septicaemia and since F75 has no iron present it was endorsed around 2007".* (Informant 1, Academic)

<u>*Scope and purpose:*</u> its objectives were clearly stated; the questions covered by the guideline were stated under sub-headings. It was exceptional since it had ample information on the problem of SAM, ideal SAM care and its goals.

<u>*Stakeholder involvement*</u>: the guidelines clearly acknowledged developers and had well-identified target users. Contributors/developers were the nutrition and child directorate, child health and nutrition experts, international partners and members of the EDL committee. However, it is unknown whether public opinions were sought (quote 4a). Users of the guidelines were identified as doctors, nurses, dieticians and other healthcare workers responsible for the medical, dietary, social and rehabilitative management of SAM [153].

Rigour of development: the guidelines were informed by the 2013 evidence-based SAM care recommendations made in the WHO guidelines update document and the 2008 Lancet series on maternal and child undernutrition [1, 153]. Concurrently, other recommendations were adopted from the outcomes of the 10 steps of SAM care pilot study in Eastern Cape Province (quote 4b). The recommendations were therefore based on systematically searched, selected and well-evaluated evidence with acknowledged limitations [1]. However, the procedure for updating the guidelines was not explicit and use of South Africa-based pilot studies, aside from the Eastern Cape study, was not emphasised.

Clarity of presentation: it had specific, easily identifiable and unambiguous recommendations for both diagnosis and treatment of SAM with a diagram guiding decisions to refer at PHC level and treatment routes at hospital level. However, ease of use remained unsatisfactory since there was too much information for easy identification and follow through during implementation at different levels of care.

Applicability: Prior to IMC-SAM, there were strong piloting strategies of advocating for grants for all children with SAM and ensuring availability of resources for managing SAM in the Eastern Cape Province pilot site (quote 4c and 4d). The funds for the pilot were provided by those that contributed to the nation-wide roll-out of 10 steps. Further, it is unknown whether all recommendations are applicable in resource-limited areas (quote 4d).

Editorial independence: publication by the government, support for training and advocacy from other organisations were disclosed. However, it was not transparent whether the organisations influenced the development procedures. Although the conflicts of the guideline development team were not disclosed, the 10 steps of SAM

care adaptation revealed some conflicts. Among SAM pioneers, a prescription and care practice debate erupted and was resolved using evidence from research (quote 4e). Yet, the editorial independence seems weak because the influence of funders and competing interests of the IMC-SAM development team were not fully disclosed.

4.4.5 Summary

All guidelines adequately addressed the seven referral practices. However, transit guidelines are vague since they are only in the IMCI, highly disseminated to facility-based healthcare practitioners and seldom disseminated to paramedics. Figure 4.4.1 depicts document versus referral step representation.

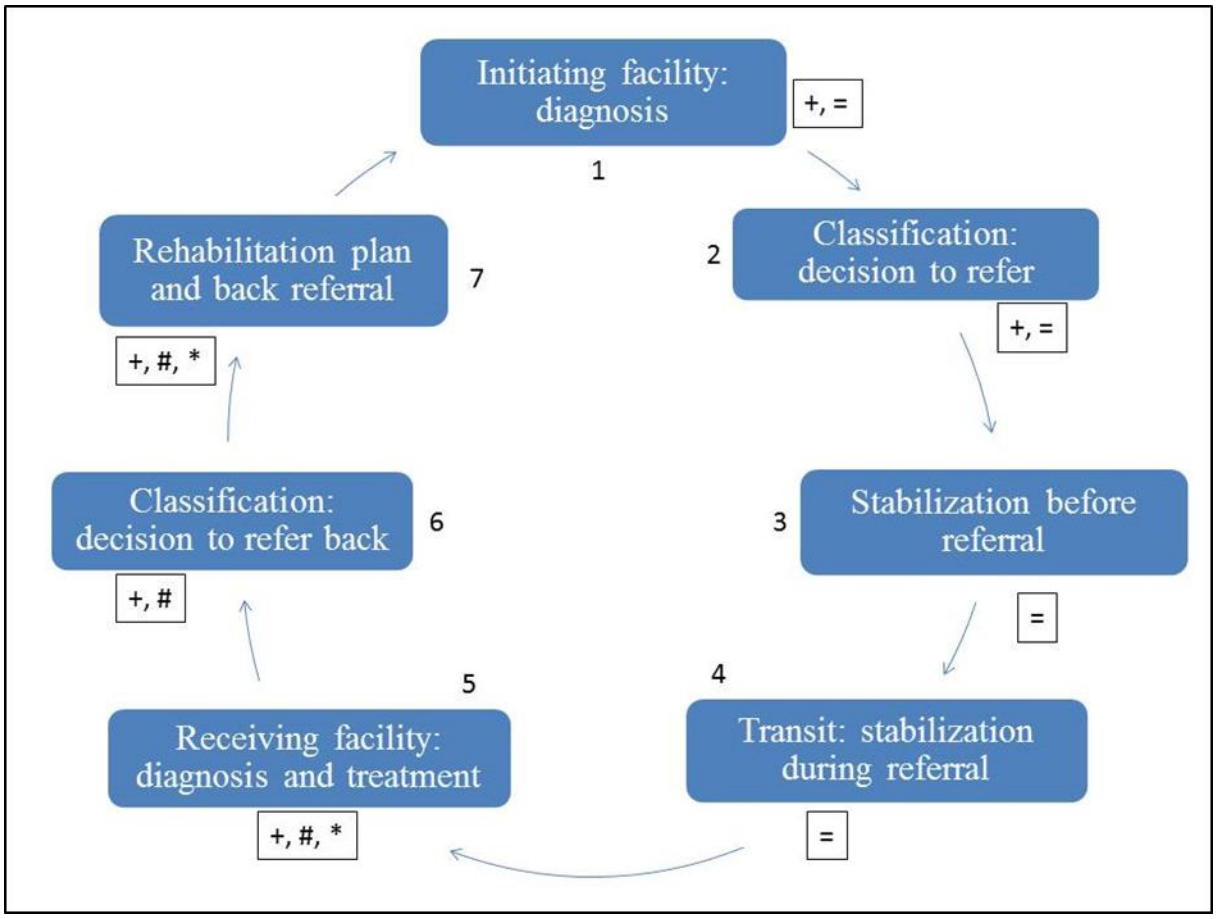

Figure 4.4.1: Guidelines' documents versus referral steps

With guidelines disseminated to a variety of users (especially EDL and IMC-SAM), little demarcation was made based on qualifications of care providers. For instance, nurses cannot administer some antibiotics without a doctor's instruction; therefore, it is unclear as to which parts of the guidelines are relevant to a nurse, doctor or dietician.

Overall, all guidelines could be recommended for use with some modification on the stakeholders' involvement, rigour of development, applicability and editorial independence. The guidelines appraised fell short on monitoring and auditing criteria for implementation such as process, behavioural and health outcome measures, which can shape quality of SAM care provision. A well-formulated guideline uses rigorous methods, involves relevant stakeholders, including the public/patients, and discloses funders and their roles as well as competing interests.

4.5 Discussion

Overall, all guidelines are recommendable for use at different levels of the SAM referral process. Guidelines must adhere to rigorous development processes, involvement of relevant stakeholders and consider implementation applicability. There is a need to address duplication across two national guideline documents (IMC-SAM and EDL) that currently give similar in-hospital care recommendations. Although presented differently with IMC-SAM incorporating recent methods and the EDL being intensive on drug options, there is a need to move to a standard best practice, which is depicted in IMC-SAM. However, for specific domains of AGREE, the documents had their own best and poorer practices.

Scope, purpose and clarity of presentation: The guidelines have clear objectives and recommendations but lack detail about which profession is responsible for specific guideline contents. Improvement of guidelines by identifying this is apt, especially in

hospital settings where a child with SAM is under the care of doctors, nurses, dieticians and social workers.

Rigour of development: The IMC-SAM is the most recent (2015) and overall highest scoring amongst guide-lines reviewed because it is disease specific, utilised re-cent evidence and was modelled over the recent WHO guidelines using the AGREE criteria [161]. However, all guidelines need to rate the quality of evidence used, especially for practice recommendations [1, 166]. Only IMC-SAM portrayed its use of various sources of evidence but not its strength. Clinical practitioners should be given an opportunity to judge the validity of recommendations; thus, a brief on how evidence is searched, selected and used is a necessity to enhance their depend-ability. It is therefore appropriate to incorporate the evidence-based approach, which integrates clinical expertise (education, experience and skills) and patient values to decide on ideal patient care [167]. Additionally, the absence of guideline update times is worrying since it leaves no assurance on whether new evidence is being incorporated. For instance, there is a 7-year gap between hospital level EDL revisions. The question on how long it should take a guideline document to be reviewed remains unclear, with little or no debate.

Stakeholder involvement: determining which groups and individuals were relevant in the development process was problematic for all guidelines. To increase endorsement of guidelines, end-users must be incorporated [168]. Some stakeholders were side-lined, although the role of patients and their guardians is increasingly recognised [161]. Patients are vital because they are likely to prioritise the risks and benefits of treatment [27]. Increasingly Focus group discussions are structurally conducted to hear, understand, and incorporate patients' (families) and all other stakeholders' comments and agreement with the practical use of guidelines. To enhance guideline applicability

and patient satisfaction, future guideline development must include end-users and patients, now a WHO practice [161, 169].

Applicability: The potential of clinical practice guidelines to improve care and outcomes relies on their quality and independence [170]. In this case, quality includes consideration of resource implications and acknowledging potential funder influence. Since the South Africa guidelines are mostly modelled on WHO, their quality needs to be ensured by use of pilot studies. It is ideal practice to pilot test and overcome implementation barriers before guidelines are disseminated [166]. The piloting of the WHO 10 steps of SAM care in Eastern Cape Province is a good example, leading to social grants for the SAM rehabilitation phase to address poverty constraints and adapting antibiotics to suit HIV/AIDS care-related complications.

Editorial independence: a full disclosure of sources of funding, editorial independence from funders and conflicts among the guideline development teams is necessary in ensuring guideline independence from external forces [166]. Even in cases where funders influenced guideline contents and conflicts of interest are inevitable, developers are mandated to give valid justification for influence.

AGREE process: This study followed the procedures of AGREE. Potential bias is reduced by collating the views of several experts. However, we acknowledge a bias towards IMCI and WHO-Steps since there were no views from the developing teams; thus, our critiques are based on outsiders views. Furthermore, as the paper shows, utilising the commentaries of these and other experts provides insight into the meanings of the scores.

4.6 Conclusion

In conclusion, the guidelines have clear scope and purpose for SAM referral healthcare. The clarity in presentation of care recommendations inform PHC and hospital level practices in the South Africa health system, but is inadequate to inform transit practices. Appraisals have revealed shortcomings in the guidelines development process and some gaps in implementation strategies. However, many SAM guidelines implementation difficulties may not be a result of poor clinical recommendations but of the health systems administrative challenges. These require research so that evidence can aid future guideline development. In the meantime, the IMC-SAM seems the best guideline since it has recent and more comprehensive recommendations.

CHAPTER 5: FACTORS INFLUENCING IMPLEMENTATION OF SEVERE ACUTE MALNUTRITION GUIDELINES IN RURAL SUBDISTRICTS IN NORTH WEST PROVINCE, SOUTH AFRICA

Thesis Objective 2: to explore SAM diagnosis, management, and referral practices in rural subdistrict facilities in the North West Province.

Thesis Objective 3: to explain factors contributing to SAM diagnosis, management, and referral practices in rural subdistrict facilities in the North West Province.

Abstract

Background: Since the 1980s, there has been a global focus on developing guidelines for managing severe acute malnutrition (SAM) among under-five children at various levels of care; however, the condition remains a public health concern. Although the South African health system has guidelines that are streamlined to reduce SAM mortality, SAM is still associated with 31% of the country's audited under-five children deaths. Co-morbidities such as HIV and other infectious illnesses contribute to the high incidence of morbidity and mortality in children with SAM. Although South Africa (SA) operates a referral system, studies on the implementation of SAM guidelines focus on only one level of care. These studies reveal erroneous practices; factors influencing the practices and how neglecting the referral level limits efforts to reduce preventable under-five children deaths (SDG 3.2) and possible solutions to limitations. Therefore, we examined the practices involved in implementing SAM guidelines within a subdistrict referral system and factors influencing these practices.

Methods: An explanatory qualitative case study design was used. Two subdistricts in the North West Province were selected; one implementing the National Health Insurance (NHI) interventions, and the other was not. The study was conducted in two hospitals; three community health centres, four clinics, and two emergency service stations between the two subdistricts. Multiple methodologies were used to collect data including 39 in-depth interviews with clinical, emergency service and administrative personnel; a review of 40 under-five children records; as well as nine facility appraisals and observations. Thematic content analysis was used to analyse all data except records. The record entries were aggregated per step of the guidelines to elicit whether all steps were administered per case reviewed.

Results: We found discrepancies in SAM diagnosis demonstrated by incomplete anthropometric assessments. Non-compliance to SAM management guidelines was also observed where certain health professionals skipped some critical steps such as feeding F75 at PHC level. The study also showed that there were varying referral mechanisms, within particular documentation, which was contradictory, and concomitantly restricted continuation of care. Some of the factors that influenced these practices included inadequate clinical skills; inconsistent supervision and monitoring; and unavailability of subdistrict specific referral policies and operational structures. Suboptimal national policies to support the availability of therapeutic food and reliable referral transport also influenced practices.

Conclusion: To curb preventable child deaths (as stipulated in SDG 3.2 goal), several strategies need to be adopted to strengthen SAM diagnosis, medical as well as dietary treatment and referrals within subdistrict health systems. Referral policies would need to be revised to clearly define packages for SAM services at each level of care to ensure the continuity of SAM management. To strengthen SAM diagnosis and management, job aids, which are easy-to-use, should accompany the implementation process along with a monitoring tool for supervision. Furthermore, national policies on therapeutic food need to be revised to ensure their availability and accessibility at PHC facilities. To create enabling environments for SAM referrals, transport options for remote locations need to be considered. All strategies should be locally adapted to align with the subdistricts contexts.

Keywords: Severe acute malnutrition, SAM diagnosis and management, referral systems, guidelines, implementation

5.1 Introduction

Since the 1980s, there has been a global focus on developing guidelines for managing severe acute malnutrition, particularly among young children at various levels of care; however, the condition remains a public health concern [1, 38, 171]. In 2018, approximately 17 million global under-five children had SAM, while malnutrition-related factors accounted for 45% of 5.3 million global under-five children deaths [172]. The death of children with SAM is mostly associated with co-morbidities such as diarrhoea, pneumonia, HIV, and TB [17, 67, 152]. In Sub-Saharan Africa (SSA), the combined burden of HIV and TB led to high SAM incidences and case-fatality; for instance, in 2018 SSA had high SAM incidence of approximately 4.2 million [14, 67, 173]. Efforts have been made to understand why SAM incidence remains high despite said guidelines being developed. Studies on SAM guidelines implementation separately report experiences of SAM management at community, clinic, and hospital levels, as well as the disconnection gap across the levels which are meant to operate within a referral system continuum [68, 113, 174]. To achieve SDG 3.2, efforts to reduce preventable deaths of under-five children, SSA should strive to identify and address bottlenecks to successful utilisation of SAM management guidelines [172, 175]. The identification of bottlenecks requires a focus on the entire referral system, unlike separate levels, thus, the focus of this study.

In addition to the referral system, SAM diagnosis is critical to its management. However, poor classification of SAM leads to under or over treatment at all levels of care [65, 68]. The Integrated Management of Childhood Illness (IMCI) informs diagnosis, care of moderate acute malnutrition (MAM), and stabilisation of SAM before referral at primary healthcare (PHC) level. SAM diagnosis involves assessing weight for height or length

(WHZ/L), mid-upper arm circumference (MUAC) and checking oedema; however, preference of one leads to misdiagnosis [9, 176]. The WHZ/L measures weight of a child against H/L while MUAC measures the left arm circumference at midpoint to detect nutrition status, both measures are based on standardised measures of children with same H/L and sex. For instance, a precise SAM diagnosis prevented overtreatment by reducing admission from 81 to 39 children in a hospital in Ghana [65]. In Gambia, erroneous classification of SAM led to missing 50% of SAM cases in Gambia and poor stabilisation of SAM cases at primary healthcare (PHC) facilities in South Africa [60, 68]. These errors in implementing IMCI for SAM are attributed to incompetence due to poor training, lack of supportive supervision and resources [60, 68, 90].

Furthermore, the management of SAM during referral is not well documented despite the IMCI recommending stabilisation steps during referral. Studies on SAM in South Africa focus on referral systems functionality; and they emphasise the seamless continuation of care and the need to link community-based services to facilities [63, 64]. However, these studies seldom explore the guidelines and care for children with SAM during referral from PHC to the hospital-level. Existing studies on referral administration are not on SAM and focus on whether referred patients arrived at the next level of care, whether referrals were appropriate (in need of inpatient care) and back-referral feedback [154, 156, 177]. Such studies do not seem to capture the operational aspects of a referral process beyond referral letters. Understanding the transition of SAM care across referral levels and care during referral will be essential in informing efforts aimed at reducing SAM deaths in South Africa and globally.

Over the years, various guidelines including "guidelines for the inpatient treatment of severely malnourished children"; "management of the child with a serious infection or

severe malnutrition for the first referral level in developing countries"; and "pocketbook for hospital care inform inpatient SAM management", have informed SAM diagnosis and inpatient management at hospital level. Accordingly, this study focused on the WHO 10 steps for the inpatient treatment of severely malnourished children, which have proven feasible and capable of reducing SAM fatality in rural SSA [65, 67, 99]. In SA, the WHO 10 steps are a standard treatment included in the national guidelines. However, errors, inconsistency and not implementing some of the guidelines due to lack of training, resources or supervision impede the guidelines' potential to reduce inpatient SAM deaths [63, 65, 66, 80]. The health workers' errors are often associated with low morale or poor clinical skills [57, 63, 178]. Although there has been an emphasis on training health workers, implementation specific factors like creating enabling environments, and including job aids to enhance guidelines applicability, are emerging [58, 64, 98]. There is, therefore, a need to explore whether issues similar to hospital or PHC levels affect a SAM referral system. The referral system inquiry has the potential to identify factors beyond a facility because factors that influence practice are not only at the facility but also at district and national levels [120].

South Africa is currently using adapted version of the IMCI SAM management for PHC level adopted in 1996 and ten steps of managing in-patient SAM imbedded in Essential Drug List for hospital-level since 2006 [50]. However, 31% of all audited deaths among children under the age of five years in South Africa were associated with SAM in 2017 [25, 43, 50]. Co-morbidities such as HIV and other illnesses are responsible for the high incidence of morbidity and mortality in children with SAM [67, 152]. The SAM incidences and fatality rates for South Africa are marked with geographical disparities. In SA, poor practices in the implementation of the WHO guidelines for managing SAM

have been observed, particularly, in rural settings [63, 66]. A study that focused on the rural-urban differences among under-five with SAM in 51 developing countries of Africa, Asia, Europe and America, including South Africa, noted that 69% resided in rural settings and their 4.8% SAM prevalence compared to the 4.2% SAM prevalence in urban were accelerated by inequalities including socio-economic hardships and poor sanitation[179]. In addition, rural dwellers in developing countries have low life expectancy due to poor healthcare services like poor infrastructure, limited transportation, poor financing and lack of human resources [180]. The rurality of a setting potentially exposes young children to inequalities of access to good healthcare. Rural health solutions should, hence, aim to improve healthcare access and address underlying socio-economic factors [31, 181]. In this study, we explored the complexity of implementing SAM guidelines concerning diagnosis, management, and referral of children younger than five years within the rural subdistricts referral system and factors influencing these practices.

5.2 Methods

5.2.1 Conceptual Framework

To capture practices related to the implementation of SAM guidelines and factors that influence the practices, we utilised the Walt and Gilson's policy analysis triangle framework. When used to explore policy implementation, the framework focuses on how processes of implementation occur alongside actors who implement policies and the context in which these policies are implemented [118, 119]. The implementing actors' characteristics such as power, knowledge, and interests, are regarded as influential to the process of translating guidelines into practice [182]. The content and the processes involved in implementation may differ because of changes in context;

thus, it is essential to understand and resolve factors that compromise effectiveness and quality during implementation [119, 183]. The policy analysis triangle considers situational, structural, cultural, and exogenous factors as context. The situational factors are impermanent conditions, while structural factors are unchanging elements within a setting and cultural factors are norms, customs or behaviour [118, 119]. Exogenous factors encompass all factors beyond an organisation or actors such as external funding and political situation [184].

5.2.2 Description of the Study Setting

The study was conducted in two rural subdistricts of the North West Province (NWP) in South Africa. This province was selected because it had the second-highest incidence of SAM in the country during the conceptualisation of this study. The province registered 8.1 cases per 1000 among children under-five years [24]. Also, one district in this province reported an incidence of 19.5 cases per 1000 compared to the national average of 4.5, which was the highest incidence nationally in 2014/2015 [24]. We aimed to elicit holistic experiences and achieve maximum variation, which enables the inclusion of a wide range of individuals, groups or settings for multiple perspectives that exemplify the complexity of the real-world setting [185]. Therefore, subdistricts were purposefully selected based on two reasons: i) the high SAM incidence and ii) whether the subdistrict was implementing any of the national health insurance (NHI) interventions. One of the subdistricts was officially piloting the NHI intervention whilst the other was not a pilot site. The assumption was that the subdistrict piloting the NHI interventions had the potential to illustrate the role of NHI interventions in influencing SAM care. Henceforth, these subdistricts will be referred to as NHI and non-NHI subdistricts.

Although the National Department of Health officially selected the NHI subdistrict for piloting NHI interventions, the Non-NHI subdistrict was also implementing district clinical specialist teams (DCSTs). The DCSTs consisted of clinical specialists in essential services who provide clinical governance including an oversight role, management of resources, the delivery of quality services, and improvement of maternal and child health outcomes [139]. The non-NHI subdistrict had 10 facilities: a subdistrict hospital with two wings that were 22kms apart, two CHCs, and eight clinics. The NHI subdistrict had eight facilities: a district hospital, which was in the process of being downgraded to a super community health centre (CHC). The district hospital was meant to offer more services than a regular CHC but not as much as a hospital; it had one CHC, and six clinics.

5.2.3 Study Design

An explanatory case study design was used in this study [134]. Case studies enable the exploration of how and why complex phenomena occur due to influences from everyday context, which the researchers have no control over [127, 186]. In the context of this study, the complex phenomenon refers to the implementation of SAM guidelines within subdistrict referral levels, focusing on how implementation occurred and why it occurred in a particular manner. The explanatory principle was essential in providing a detailed description of concepts for practical understanding rather than providing conclusive evidence [134, 187]. We used complementary mixed methods to describe the practices involved in implementing SAM guidelines, the qualitative results were used to complement or enhance the quantitative results [188]. Qualitative approaches were mainly used to holistically explore the complexity of implementing SAM guidelines, based on contexts of location (subdistricts or levels of care) or cadres of health workers [130, 189].

5.2.4 Sampling

Several strategies were used to select subdistricts, facilities, patient records, participants for in-depth interviews, and SAM guidelines implementation practices for observations.

Subdistricts

The cases in this study were the SAM referral systems of the NHI and non-NHI subdistricts due to their contrasting access to NHI interventions. The cases were purposively selected to elicit contrasting experiences as per the maximum variation [127].

Facilities

Using the principle of maximum variation, we selected PHC facilities near and far from each subdistrict referral hospital to elicit varying perspectives based on proximity to a referral centre. Sub-districts' lists of facilities were used to select participating PHC facilities and this was complemented by assistance from the area managers. Each subdistrict had one referral hospital and emergency services station; thus, these were selected by default. Table 5.2.1 depicts the number of facilities per level of care involved in each subdistrict.

Table 5.2.1: Study Facilities per Subdistrict

Level of care	NHI Subdistrict	Non-NHI Subdistrict
Subdistrict hospital	1	1
Emergency service station	1	1
Community health centre (CHC)	1	2
Clinic	2	2

Note: The NHI subdistrict had one CHC, thus the only one recruited.

Patient records

The records were identified using admission registers at hospitals and referral registers at clinics. We selected records for children aged between six months and five years who were treated and referred for SAM between January and June 2016, based on their availability at study facilities. There were 19 records (patient files and Road-to-Health books (RHB) found at PHC facilities and 21 records (patient files) found at the subdistrict hospitals. Records were difficult to trace at the hospital level because there was a mismatch between registers and the filing system. Records were unavailable at all Non-NHI clinics because they did not keep records for children under-five years. Therefore, the Non-NHI RHBs were accessed from children admitted at Non-NHI hospital.

In-depth interviews

The participants interviewed in this study were selected using purposive quota sampling, which allowed the inclusion of various categories of individuals involved in the diagnosis, management, and referral of SAM cases. The different categories were nurses, doctors, dieticians and emergency services personnel. Nurses at the clinic level are mandated to assess, treat mild cases, and refer severe cases to hospitals [142]; at the district hospital level, doctors are expected to diagnose and treat severe cases with support from nurses and dieticians [141]. Dieticians are responsible for nutrition assessment and prescription of therapeutic diet regimens [144]. The emergency services' basic cadre is expected to resuscitate and give first aid, while technicians are allowed to give intravenous therapy, drugs like B2 therapy and dextrose [105]. As depicted in Table 5.2.2, we interviewed 39 individuals from various cadres of the health workforceTable 5.2.2:

Table 5.2.2: In-depth Interviews Participants

Category	NHI	Non-NHI	Total
Managers	6	6	12
Doctors	2	2	4
Nurses	7	10	17
Dieticians	1	1	2
EMS personnel	2	2	4
Total	**18**	**21**	**39**

We recruited the nurses until saturation was reached [145], and the two dieticians were purposively selected because each district hospital had one dietician who occasionally visited PHC facilities. The doctors and emergency services personnel were recruited based on their willingness and availability to participate.

Non-Participatory Observations

Convenience sampling was used to recruit nurses and doctors who were observed while implementing SAM guidelines. Therefore, we recruited health workers involved in assessing and managing children who were younger than five years, and were suspected to have SAM. These included health workers in PHC consultation rooms and those making ward rounds for under-five children admitted for SAM from February to July 2016.

5.2.5 Data Sources and Collection

Data were collected from February to July of 2016 using (i) *facility appraisals,* (ii) *patients' record reviews,* (iii) *in-depth interviews,* and (iv) *non-participatory observations*. In each study subdistrict, data collection started at clinics, followed by emergency service facilities and lastly, referral hospitals.

Facility appraisals

Using a checklist (Appendix 2) adapted from a study on universal healthcare coverage in Tanzania and South Africa (UNITAS) [150], facility appraisals were undertaken to audit the availability of resources required for SAM care or referral in all study facilities and emergency service stations. Aspects appraised included the availability and quality of infrastructure, human resources, supplies, and transportation-related to SAM services across the nine facilities. After completing the checklist, the facility or ward manager was asked to clarify and complement areas that required further information on the facility appraisal checklist.

Patient records

Forty patient records were reviewed using a structured data extraction form (Appendix 3). The extraction form captured whether required SAM diagnosis, management and referral indicators were implemented. The record reviews were complemented by data collected from in-depth interviews.

In-depth interviews

Thirty-nine in-depth interviews with managers from all facilities, nurses at the hospital and PHC level, emergency service personnel from emergency service stations, dieticians and doctors from hospitals, were conducted in English, using interview guides (Appendices 6 to 9). The questions explored how participants implemented SAM diagnosis, management and referral guidelines as well as whether they were enabled or hindered by other actors within their context. All interviews were audio-recorded and lasted between 40 to 60 minutes. Interviews were carried out in the lunchrooms, empty wards, emergency service station offices or consultation rooms during health workers' breaks for convenience and privacy. We recruited participants at each facility after the researcher (FNM-C) introduced the study to potential participants and planned data

collection days with permission from the facility managers. On the day of the interviews, the researcher approached available health workers who consented to participate.

Non-Participatory Observations

The researcher observed health workers' practices using a checklist (Appendix 3) based on the IMCI and the 10 steps from the WHO guidelines for inpatient treatment of severely malnourished children during duty. The checklist captured the practices involved in SAM diagnosis, management and referral. There were no transit practice observations because no transits happened during data collection visits to PHC facilities.

5.2.6 Data analysis

In-depth interviews were transcribed verbatim and thematic content analysis was used to analyse the data from the transcripts, observational notes and facility appraisals. This analysis involved reading data sources line-by-line (interview transcripts, observational notes, and facility appraisals), coding, extracting emerging sub-themes and then, main themes [190], using NVivo software. The themes derived were then aligned to SAM diagnosis, management and referral practices as well as factors that influenced the practice. Thematic content analysis was used to analyse all data except records. The record entries were aggregated, using each guidelines' steps implemented, to elicit whether all steps were administered per case reviewed. The factors influencing practices were further aligned to the Walt and Gilson's policy analysis triangle domains.

5.2.7 Methodological Rigour

Triangulation of data sources was performed to enhance the authenticity of the findings [148]. All data sources were collaboratively used to inform each theme. Themes, codes and quotations were cross-checked by supervisors to limit bias. Additionally, member

checking, which involved taking back preliminary research findings to participants for authentication [165], was employed. Subdistrict presentations took place in February and May 2018 to allow participants to discuss, endorse, contradict, and add any other relevant information to conclusions made by the researchers.

5.2.8 Ethical Considerations

Ethical approval was obtained from the University of the Witwatersrand's Human Research Ethics Committee (Medical) and the North West Provincial Department of Health. Before each interview, an information sheet on the aim of the study, its potential benefits and how identities of participants will be kept confidential was read to or read by a participant for an informed decision to participate. Informed consent to conduct and record interviews was sought from facilities and participants before data collection. Data are de-identified, and codes identifying participants by their profession and facilities by subdistrict and level of care were used to conceal identities of participants and facilities.

5.3 Results

The findings of this study are presented according to three broad themes, namely i) *discrepancies in SAM diagnosis*, ii) *poor compliance to SAM management guidelines*, and iii) *variations in referral mechanisms*. Under each theme, sub-themes are used to discuss SAM diagnosis, management, and referral practices as well as factors contributing to these practices. The results of SAM management practices are based on a combination of the appraisal of patients' records and qualitative data. The findings on the factors influencing these practices are only based on qualitative data. To contextualise the study settings, Table 5.3.1 depicts the attributes of facilities based on facility appraisals:

Table 5.3.1: Study Facilities and Attributes

Level of care	NHI	Non-NHI
Hospitals	***<u>NHI Subdistrict hospital</u>*** • 4-bed paediatric ward • 5 general doctors (for all departments) • 4 general nurses • 1 paediatric ward manager (general nurse) • 1 dietician	***<u>Non-NHI Subdistrict hospital</u>*** • 22-bed paediatric ward • 2 general doctors (for paediatric ward) • 6 paediatric nurses • 1 paediatric ward manager (paediatric nurse) • 1 dietician
Community Health Centres (CHC)	**<u>NHI CHC</u>** • 4 Km to NHI hospital • Modern and big facility (sickbay for children) • 1 doctor • 4 general nurses (1 community service) • 2 managers (general nurses)	***<u>Non-NHI CHC 1</u>*** • 24 Km to non-NHI hospital • Old and small facility (no sickbay for children) • No doctor • 3 general nurses • 1 manager (also serving as a nurse)
		<u>Non-NHI CHC 2</u> • 12Km to non-NHI hospital • Modern and big facility (sickbay for children) • 1 doctor • 4 general nurses • 2 managers (general nurses)
Clinics	***<u>NHI Clinic 1</u>*** • 0.5Kms to NHI hospital • Small facility and old (child wing in container structure) • 1 doctor • 2 general nurses for children wing (1 on community service) • 1 manager (general nurses)	***<u>Non-NHI Clinic 1</u>*** • 5Kms to non-NHI hospital • Small and modern facility (general sickbay) • 3 general nurses (2 community service) • 1 manager (also serving as a nurse)
	<u>NHI Clinic 2</u> • 47Kms to NHI hospital • Small and modern facility • Visiting doctors (once a week) • 2 general nurses (for all departments) • 1 manager (also serving as a nurse)	***<u>Non-NHI Clinic 2</u>*** • 108Kms to Non-NHI hospital • Small and old facility (general sickbay) • No doctor • 3 general nurses (serving all departments) • 1 manager (also serving as a nurse)
Emergency Services	***<u>NHI Emergency Service</u>*** • 3Kms to NHI hospital • 2 EMS personnel	***<u>Non-NHI Emergency Service</u>*** • 23Kms to NHI hospital • 2EMS personnel

Level of care	NHI	Non-NHI
	• 2 high technology and 2 basic ambulances	• 2 high technology and 2 basic ambulances

5.3.1 Discrepancies in SAM Diagnosis

The review of patients' records revealed that SAM diagnosis was incomplete at PHC facilities and hospitals. Table 5.3.2 portrays sub-themes that emerged to illustrate the discrepancies in the diagnosis of SAM, and these are discussed in detail below.

Table 5.3.2: Themes on SAM Diagnosis

Broad Themes	Practices Sub-Themes	Factors Sub-Themes
Discrepancies in SAM diagnosis	▪ Incomplete anthropometry at PHC and hospital levels	▪ Poor clinical skills ▪ Unavailability of height and length measuring equipment ▪ Irregular and unstructured monitoring of SAM practices
	▪ Variations in SAM diagnosis amongst different cadres of health workers	▪ Same as above ▪ Limited opportunity for real-time consensus amongst different cadres

5.3.1.1 Incomplete anthropometry at PHC and hospital levels

The review of patients' records revealed that SAM diagnosis was incomplete at PHC facilities and hospitals. Table 5.3.3 depicts the anthropometric assessments that were completed.

Table 5.3.3: Incomplete Anthropometry for 19 PHC and 21 Hospital Cases

Anthropometric Indicator	PHC Level (19 records)	Hospital Level (21 records)	Total (40 records)
• Weight • Height • MUAC • Oedema • Blood glucose	• 19/19 (100%) • 0/19 (0%) • 3/19 (16%) • 2/19 (11%) • 0/19 (0%)	• 21/21 (100%) • 3/21 (14%) • 11/21 (62%) • 8/21 (38%) • 1/21 (5%)	• 40/40 (100%) • 3/40 (8%) • 14/40 (35%) • 10/40 (20%) • 1/40 (3%)

The study participants' description of SAM assessment revealed that health workers concentrated mainly on weight for age, the physical appearance of the child, and complications presented in their assessment of SAM, while missing weight for height, MUAC and oedema:

> "I look for fluffy hair, they are also thin with a big stomach and I also check the weight on the chart" *(IDI 20A, PHC Facility Nurse).*
>
> "…you check the weight indicator [chart] if it is red, you know it is malnutrition" *(IDI 22B, Mobile Nurse).*
>
> "I check weight for age and complications like hypoglycaemia, be it sepsis, be it severe anaemia or dehydration" *(IDI 2B, Doctor)*.

The incomplete SAM assessment was observed in NHI and Non-NHI facilities. Also observed were differences in classifying SAM amongst different cadres of health workers.

5.3.1.2 Variations in SAM diagnosis amongst different cadres of health workers

Nurses and doctors mainly measured weight for age on the growth chart, while dieticians assessed several anthropometric indicators. For instance, 13/14 MUAC assessments were conducted by dieticians. The file entries below confirm the health workers' cadre differences in SAM assessment:

> **File 1*: Doctor Diagnosis -*** classified the illness as SAM based on assessing weight for age and blood glucose. ***Dietician Diagnosis -*** opposed the doctor's diagnosis by writing "Not SAM based on the findings from assessing weight for age, weight for length, MUAC, oedema and blood sugar".
>
> **File 5*: Doctor Diagnosis -*** classified illness as marasmic kwashiorkor based on a swollen body and face. ***Dietician Diagnosis -*** opposed the doctor's diagnosis by writing "Not SAM, MUAC was 13.3 mm above the less than 11.5mm benchmark ".

While the dietician opposition in File 1 was valid, the file 5 opposition was incorrect because the swollen face and body signifies oedema, which is an indicator of SAM despite WHZ and MUAC being above their benchmarks. The patient records also

revealed that dieticians' inputs did not complement the diagnosis of 10/21 children at the hospital level; thus, only 11/21 SAM assessments were crosschecked by dieticians. As a result, dieticians opposed 5/11 SAM diagnoses made by doctors at the hospital level (Files 1A, 3A, 5A, 1B, 3B). However, due to not assessing oedema by the dietician, the file 5A opposition might have been invalid.

5.3.1.3 Factors that led to discrepancies in diagnosis

Table 5.3.2 is a summary of key factors contributing to the discrepancies in SAM diagnosis and these are discussed in detail below.

A. <u>Poor clinical skills and unavailability of length/height measuring equipment</u>

The qualitative findings demonstrated that poor diagnosis was partly due to a lack of skills emanating from inadequate training of general doctors and nurses on SAM. The skill limits are reflected in the quotations below:

> "Nurses don't have the capacity to screen malnutrition because there are no dieticians to guide them… they adequately check growth charts like underweight for age, but the dietician is needed to train them on other things" *(IDI 7A, Doctor).*

> "…the doctors are not formally trained on SAM; as a result, they don't always diagnose and treat correctly…" *(IDI 3A, Dietician)*.

Although the doctors felt that the diagnostic skills of PHC nurses concerning SAM were poor, concerns about doctors' skills, due to a lack of formal training, were also raised by dieticians. The PHC nurses' lack of skills coincided with the unavailability of height board and length mats at their facilities, thus, further limiting their skills to conduct comprehensive SAM assessments.

B. <u>Irregular and unstructured monitoring of SAM practices</u>

The interviews with health workers demonstrated that lack of structured, regular and regulated monitoring also contributed to inconsistent SAM diagnosis. The NHI hospital

manager reported monitoring practices, but other facility managers rarely or poorly monitored practice:

> "We track their [PHC nurses] performance on an annual basis…" *(IDI 10A, PHC facility manager).*
>
> "I do not assess IMCI use; however, in 2009, nurses from the district came to assess IMCI use. They observed and wrote everybody's practices starting from when I take a child; how I consult the child, they were looking for every mistake based on IMCI… Afterward, advised us on how to do better" *(IDI 7B, PHC facility manager).*

This particular PHC facility manager further revealed that nurses who came to inspect IMCI implementation used the IMCI guidelines as a benchmark to assess the consultations, which include diagnosis and treatment. However, the facility and ward managers did not have a standard for checking SAM diagnosis and they rarely monitored the implementation of IMCI.

C. <u>Limited opportunity for real-time consensus</u>

The dietician-doctor communication on SAM diagnosis at hospitals was provided in writing, limiting engagement between these professionals to reach consensus.

> ***Observations:*** at the study hospitals, doctors and dieticians had separate ward rounds. They made notes with different views on the same paper for five files (Files 1A, 3A, 5A, 1B, 3B), and three days without consolidating in a Non-NHI file (File 1B).

The absence of close collaboration in SAM diagnosis between doctors and dieticians also led to doctors treating children for SAM while dieticians were recommending treatment for moderate acute malnutrition (MAM) or co-morbidities only.

5.3.2 Poor Compliance to SAM Management Guidelines

Table 5.3.4 portrays sub-themes used to illustrate the poor compliance to SAM management guidelines, and these are discussed in detail below.

Table 5.3.4: Themes on Compliance with SAM Management Guidelines

Broad Themes	Practices Sub-Themes	Factors Sub-Themes
Poor compliance with SAM management guidelines	▪ Limited adherence to feeding guidelines to prevent hypoglycaemia	▪ Financial constraints ▪ Non-inclusion of RUTF in the national Essential Medicine List ▪ Clinical scope of practice limits for EMS personnel
	▪ Poor adherence to SAM management steps	▪ Lack of skills ▪ Availability of summarised guidelines ▪ Irregular and poor monitoring and supervision

The management of children with SAM was based on specific steps; however, they were either not, partially or poorly implemented at various levels of care. The SAM management practices are summarised into feeding to prevent hypoglycaemia and inconsistencies of other treatments.

5.3.2.1 Limited adherence to feeding guidelines to prevent hypoglycaemia

Based on records reviewed at PHC facilities, feeding to prevent hypoglycaemia was only administered for 1/19 children and not reported during transit. At the hospital level, hypoglycaemia prevention for 17/21 children involved feeding F75 or formula. The lack of feeding at PHC facilities raised concerns regarding delayed care:

> "Severely malnourished children at the clinic should be fed starter formula [F75] immediately as per requirement... if done at the clinic, queuing at the out-patient department will not be a problem. When they have taken nothing, the blood glucose goes down" *(IDI 2A, Doctor).*

The absence of F75 administration was also reported during transit by the emergency services. Despite the IMCI recommendations to administer follow-up feeding while referring children, the emergency services life supporters who transferred children did not feed them.

> "We get them from the facilities where they have already been given their medication [all stabilisation required for child illnesses including SAM]; ours is just to observe them to the hospital" *(IDI 8, EMS personnel).*

> "We don't have to feed children; we just give oxygen and make sure the patient is transported to the hospital" *(IDI 4B, EMS personnel).*

At the hospital level, the feeding of F75 and transitioning to F100 was practised; however, the Non-NHI hospital used self-made formulas that lacked an essential ingredient *mineral mi*x while the NHI hospital only used self-made formulas during stock-outs.

> "We prepare the F75 and F100 in our kitchen…I think children like it better than the already prepared one. All ingredients are available apart from the mineral mix, but the formula works" *(IDI 3B, Ward Manager).*

> "We had a shortage of stock before, so we used homemade therapeutic feeds, basically its milk, oil and sugar, but the ready to use ones they have added electrolytes and minerals" *(IDI 3A, Dietician).*

The use of therapeutic food without mineral mix to prevent hypoglycaemia limited the quality of the formula feed.

5.3.2.2 Factors contributing to unavailability and quality of therapeutic food

As summarised in Table 5.3.4, the absence and poor quality of therapeutic food were influenced by financial constraints, non-inclusion in the national Essential Medicine List and the scope of practice of EMS personnel.

A. <u>Financial constraints</u>

Financial constraints contributed to making F75 only available at hospitals, which led to the preparation of self-made F75 and F100 without mineral mix and stock-outs at NHI hospitals.

> "There is no F75 at clinics because of budgetary issues; we do not have enough to keep things at that level" *(IDI 40B, Dietician).*

> "I cannot trust clinics with the ready to use therapeutic food packet; they are expensive…if it is misused at hospital level what more clinics" *(IDI 3A, Dietician).*

> "The mineral mix is expensive, so in times of scarcity, we prepare feed without it….the scarcity is mainly due to budgetary constraints" *(IDI 3A, Dietician).*

Due to budgetary constraints, it was a norm that ready to use F75 was stocked, and other times, prepared at hospitals.

B. **Non-inclusion of RUTF in the national drug list**

The lack of national mandate to make RUTF and mineral-mix available also influenced whether they were readily available.

> "The essential drug list for South Africa does not include mineral mix and ready to use therapeutic food, that is why they are not readily available" *(National Child Health Committee Feedback Session-Dietician).*

The drugs that are included in the drug list are locally available, and at reasonable prices, thus, the non-inclusion of RUTF and mineral-mix was possibly due to their high price.

C. Scope limitation for emergency services

The lack of feeding F75 during referral was due to the unavailability of an advanced cadre of emergency services personnel in the study subdistricts:

> "We don't have advanced life support; the highest qualification… that's a huge burden on the health system, especially on the emergency because they are allowed to give advanced care …" *(IDI 9A, EMS Manager).*

It is therefore apparent that, the absence of feeding F75 during referrals was because the scope of practice of the EMS personnel at study subdistricts did not include feeding.

5.3.2.3 Poor adherence to SAM management steps at PHC facilities, in transit and hospitals

Overall, the findings of this study showed that there was inconsistent adherence to SAM management steps at the PHC facilities, during transit and within hospitals. For instance, the record reviews at the PHC level showed that despite being required for the 19 children referred for SAM, 6/19 were given antibiotics and 7/19 received vitamin A. At PHC level, 3/19 children were rehydrated before referral due to signs of dehydration.

Nurses as illustrated in the quotations below also reported the SAM stabilisation practices at PHC facilities:

> "Most of the kids have diarrhoea, so before I refer, I give ORS… If it is not possible, I have to insert an IV line" *(IDI 19B, PHC Nurse).*
>
> "I tell the mother to go to the hospital, before that I give the child multivitamins and Philani [fortified porridge to be prepared at home] too; I can't do the other treatment here, it's for the hospital" *(IDI 9B, Mobile Nurse).*

However, instead of administering ReSoMal (REhydration SOlution for MALnutrition) and RUTF, the nurses reported administering ORS and porridge respectively.

The primary stabilisation practice administered by emergency service life supporters during referrals was ensuring circulation through rehydration:

> "…as an ECT [emergency care technician], I know that I have to ensure that I put a drip on that child [with malnutrition] to give him the electrolytes… if the poor child has diarrhoea, he or she is losing the fluids" (IDI 4, EMS Supervisor).

Despite the IMCI recommending follow-up antibiotics during referrals, they were not administered.

Based on record reviews at the hospital level, the following WHO steps for managing SAM were *inconsistently* followed:

- ✓ The prevention of dehydration was intravenous for 13/21 children, while the recommended oral rehydration solution (ORS) was only prescribed to 2/21 children.
- ✓ Antibiotics were used to treat infections for 16/21 children. Antibiotics prescriptions varied per subdistrict; the NHI hospital only prescribed amoxicillin while the Non-NHI hospital prescribed a variety of antibiotics (including Ampicillin, Bactrim, and Gentamicin).

- ✓ The correction of micronutrients varied per child as zinc was prescribed for 13/21, folic acid for 3/21 and multivitamins for 9/21 children.
- ✓ The management steps that were least complied with by health workers/professionals were balancing of electrolytes using potassium (1/21children), recording stimulation (1/21children) and planning follow-up (3/21children). The recorded follow-ups were from the NHI hospital.

However, these hospital findings need to be looked at with caution since there were missing or unrecorded rehydration measures for 2/21 children, infection treatment for 5 /21 children and micronutrient correction for 1/21 child.

Like the PHC nurses, the NHI hospital doctors skipped some steps. Based on record reviews of children treated for SAM, infections were treated for 4/7 and micronutrients were corrected for 3/7. However, the NHI hospital had a well-structured follow-up system:

> "…when there is an infection or other things, dehydration, electrolysing them, we do those things, the dieticians do the rest and the follow-ups in the community" *(IDI 4A, Doctor).*
>
> "The previous senior dietician started a follow-up system involving booking patients on a certain day… then you SMS (text message) a reminder…if they don't come, I call, if I fail, I send a CHW through their leader. I release cases whenever I feel malnutrition is resolved" *(IDI 3A, Dietician).*

On the contrary, doctors at the Non-NHI paediatric ward were better at complying with SAM management guidelines. For instance, infections were treated for 12/14 children and micronutrients were corrected for 10/14 children. However, the Non-NHI follow-up structure was inconsistent:

> "First, if the child with malnutrition comes, we follow those steps [participant points at a chart]…that's what we call the ten steps of the management of acute malnutrition" *(IDI 2B, Doctor).*

"We follow up after two weeks then a month; however, because of distance, some do not come back" *(IDI 40A, Dietician).*

5.3.2.4 Factors contributing to inadequate implementation of SAM management guidelines

Table 5.3.4 summarises key factors contributing to the poor compliance to SAM management guidelines and these are discussed in detail below.

A. <u>Lack of skills</u>

The poor compliance with SAM management guidelines was also due to the general limited skills of doctors and nurses compounded by continuous rotations from paediatric consultation rooms and wards. At five facilities [3 NHI and 2 Non-NHI], general doctors and nurses were rotated to various departments within the facility. The long-serving nurses with uninterrupted service in SAM departments had the opportunity to gain extensive expertise in SAM management. The results of uninterrupted service in NHI hospital were as follows:

> "The nursing staff in paeds [paediatric ward]… those that have been here for a long time they are very experienced, they assist us [doctors] in planning SAM management" *(IDI 2B, Doctor).*

However, the absence of rotations did not positively improve SAM management in two PHC facilities (one in each subdistrict) because skills were also gained through in-service programmes. To make-up for general doctors and nurses' skill deficiency, the Non-NHI hospital conducted ongoing skill development programmes. Based on reviews of 21 inpatient files, the Non-NHI hospital was better at achieving the WHO's ten steps for managing SAM partly because their ward manager provided the following complimentary programmes:

> "After being trained in SAM management, I trained people [health workers]…now we are not doing in-service training because I think everyone now knows how to treat malnutrition; I do in-house training like when someone is new" *(IDI 3B, Ward Manager).*

Additionally, the Non-NHI paediatric ward doctor was undergoing a mentoring programme with senior paediatricians who instilled enough knowledge for him to efficiently adhere to SAM guidelines and further mentor doctors on call from other departments.

B. <u>Summarised guidelines to aid implementation and monitoring:</u>

At the Non-NHI hospital, senior doctors summarised the WHO ten steps of managing SAM to an A4 paper point format. They pasted it on walls of outpatient consultation rooms and the paediatric ward. The modified guidelines served as mandatory regulation for doctors serving children:

> "…permanent paediatric ward individuals don't miss a thing, but doctors on call from other departments are likely to jump other steps; therefore, this summary puts them in line…When I notice problems, I refer them back to them [summary]" *(IDI 3B, Ward Manager).*

The summarised guidelines also served as a SAM implementation monitoring tool.

C. <u>Irregular and inadequate monitoring by supervisors</u>

The non-compliance to guidelines was due to the absence, irregular or poor supervision because nurses and doctors worked without being accountable to a superior:

> "They do not supervise and monitor my activities. The last time I was supervised was in 2008; now they are short of staff to come to supervise" *(IDI 9B, Mobile Nurse).*

> "I don't think we are adequately supervised because all of us now are at the same level…we used to have a clinical manager, but now we [doctors] appoint [a clinical manager] within ourselves; since we are at the same level, there is no fear of something happening if we don't do well" *(IDI 7A, Doctor).*

Despite the doctor perceiving the absence of a clinical manager as a limitation to supervision, the ward manager who was a general nurse perceived himself as efficient:

> "I've never received any formal management training… I'm just a professional nurse with general training, but I manage my work… after

> the doctors have done their doctors' rounds, I check whether everything that was supposed to be done was done" *(IDI 3A, Ward Manager).*

In at least five sites (NHI Clinic1, NHI Clinic2, Non-NHI Clinic2, and EMS stations), there were instances where facility managers perceived themselves as efficient supervisors, yet their juniors refuted those perceptions. The health workers' contradictory views of the managers' capacity were based on qualifications and experience.

> "I don't know how the manager was appointed, but I am more qualified and experienced than him, I am not sure how he can supervise me" *(IDI 18A, PHC nurse).*

> "The thing is you are qualified as a level six emergency care technician, and then your manager is on an intermediate level, so he can't supervise you" *(IDI 9A, EMS personnel).*

The supervisors were either junior to their subordinates in terms of qualifications or holding acting managerial positions.

5.3.3 Variations in Referral Mechanisms

Table 5.3.5 contains sub-themes that illustrate varying referral mechanisms of children with SAM and these are discussed in detail below.

Table 5.3.5: Themes Related to Variations in Referral Mechanisms

Broad Theme	SAM Practices Sub-Themes	Factors Sub-Themes
Variations in Referral Mechanisms	-Unavailable and inconsistent documentation	-Unavailability or availability of subdistrict referral policy -Regular subdistrict referral meetings
	Limited transport options	-Limited number of ambulances serving a vast area -Limited sense of urgency by caregivers

5.3.3.1 Unavailable or inconsistent documentation

Although documentation is essential for informing health workers on medical history and care given in a referral system, PHC facilities lacked or inconsistently documented

SAM management. All NHI facilities had under-five children files, while only the hospital had under-five children files in the Non-NHI subdistrict. The PHC facilities in the NHI subdistrict referred cases with an RHB, referral letter and an IMCI form, while the Non-NHI PHC facilities only used the RHBs:

> "Referral letters are for adults; we have an RHB for children…usually, we do not keep a copy; the caregiver keeps the book" *(IDI 7B, PHC Manager).*

The disadvantage of only using an RHB was that health workers recorded less information while the use of more documents (IMCI form and referral letter) enhanced the recording of more details. The referral letters forced nurses to give a detailed account of pre-referral care and the IMCI form made provision for a detailed diagnosis to be recorded. However, at PHC facilities in the NHI subdistrict where children's files were kept, the IMCI forms were not completed, thus lacking some information. In addition to written communication, the three PHC facilities expanded information sharing by making pre-referral calls:

> "If the patient is not fine, they [NHI CHC nurses] call us for consultations and then we agree on whether they can transfer to us" *(IDI 7A, Doctor).*

> "If a child's condition deteriorates after I have tried managing according to the IMCI, I call the doctor. I report: *'I have got a case like this and that and I have done this and that to the child, but the condition is deteriorating*.' Then the doctor can say *'give him this and that while you are still waiting for the ambulance'…*" *(IDI 18B, PHC Facility Manager).*

The use of phone communication enhanced collaborative decisions on pre-referral care and whether to refer.

5.3.3.2 Factors contributing to unavailability and inconsistent documentation

The key factor contributing to unavailability and inconsistent documentation of under-five children referrals is depicted in Table 5.3.5.

A. <u>Availability and unavailability of subdistrict specific referral policy, structure and meetings</u>

The Non-NHI subdistrict was inefficient at documenting referrals because they relied on the provincial referral policy, which was only available at one clinic and not enforced. On the contrary, the NHI subdistrict was better at documenting information at the PHC level and for referral purposes because of the availability of a district referral policy and subdistrict referral meetings

> "We are strengthening the referral system to fulfil the NHI pilot requirement; we have developed our own referral policy which is being used by all facilities"*(Feedback Session-Health department manager-NHI subdistrict).*

> "We do have referral meetings with them [hospital level] to say, *'guys, please let's come up with a strategy to resolve the issue of miscommunication during the referral of our client'*…still, there's not much improvement, but we just continue to have meetings…"*(IDI 10A, PHC Manager).*

The specific referral policy and subdistrict wide meeting enabled dialogue and the likely development of strategies to strengthen referral systems and processes.

5.3.3.3 Limited transportation options

The review of patient records at hospitals revealed that to travel to referral hospitals, 10/21 children used emergency services, 6/21 children used public transport and 3/21 children walked to referral hospitals. In all instances where emergency services were used, nurses or PHC managers called the public emergency call centre "10177 [emergency line]". Although the use of emergency services appeared to be ideal, the waiting hours were between 45 minutes and 7 hours in some Non-NHI and NHI clinics:

> "We wait for the ambulance for between 4 to 10 hours because we are far [108km per google maps] from the station" *(IDI 12B, PHC facility Manager).*

The waiting times varied based on facility closeness to emergency service stations and whether the ambulances were serving a location far from the facility requesting services.

5.3.3.4 Factors contributing to limited transport options

Table 5.3.5 depicts a key factor contributing to inefficient transportation for children with SAM.

A. <u>Rigid transportation policies</u>

The inefficient transport options were due to limited subdistrict ambulances serving a vast area and the absence of facility-based ambulances:

> "If the subdistrict ambulance is operating far away like area X (pseudonym for an area 270km away from the clinic), we wait for three to five hours …It was better when we had our own ambulance than this central system" *(IDI 18B, PHC Facility Manager).*

> "They only send two ambulances you see...yet our subdistrict has got plus-minus twenty-two clinics, if they [caregivers] can afford transport, we tell them to take the child to the hospital" *(IDI 7B, PHC Facility Manager).*

Due to the unreliability of public ambulances, PHC facilities in the NHI subdistrict were able to access private ambulances with the approval of facility managers. In summary, the existing referral transport option delayed care for remote facilities.

5.3.4 Summary of findings

The main practices involves in the diagnosis, management and referral of children with SAM in the two sub-districts (NHI and non-NHI) of the Northwest province are summarised in Figure 5.3.1:

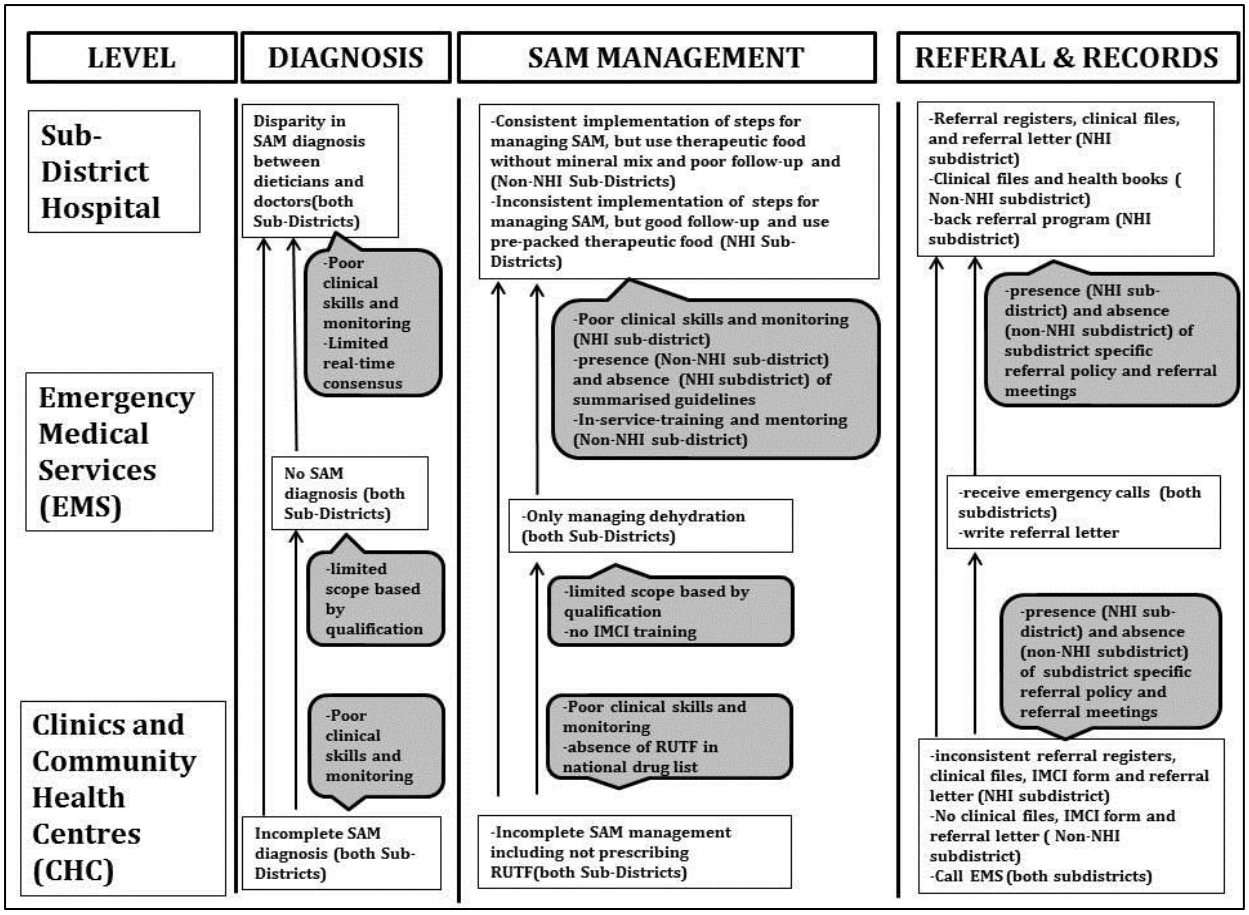

Figure 5.3.1: Summary of SAM diagnosis, management and referral practices and influencing factors in two sub-districts

The main factors enabling or hindering the main practices are also included in Figure 5.3.1.

5.4 Discussion

This study aimed to explore the practices involved in implementing SAM guidelines in two rural subdistricts in South Africa and the factors that influenced these practices. We found that the processes involved in implementing SAM guidelines were marred with discrepancies in SAM diagnosis, non-compliance to SAM management guidelines and varying referral mechanisms. The practices and the factors influencing them are discussed below, based on Walt and Gilson's components of content, actors and context.

Regarding discrepancies in SAM diagnosis, this study found that anthropometric assessments were incomplete, with some health workers often neglecting to conduct weight for height, MUAC and oedema assessments. This finding was consistent with other studies that report the missing and or exclusion of children with SAM due to wrongly executing or skipping SAM diagnosis indicators [60, 63, 68]. Considering only 40% of cases diagnosed as SAM by MUAC or WHZ alone, it is advisable to always use both [176]. In addition, checking oedema is also critical. In this study, the negligence in checking oedema by a dietician led to the incorrect assessment of a doctor's SAM diagnosis. While the use of all indicators is commendable, results from each SAM diagnosis indicator should be taken seriously, and not overlooked when administering treatment. The faulty diagnosis was mostly from actor related problems, including lack of skills by general nurses or doctors and a lack of real-time consensus with other cadres of health workers who might justify their SAM diagnosis. The lack of diagnostic skills to detect SAM with complications by general doctors and nurses is supported by studies carried out in South Africa and Gambia, which further recommend training and supportive supervision [60, 63]. At the hospital level where dieticians also diagnosed SAM, general doctors' consolidation with dieticians' diagnosis could have resolved discrepancies. Doctors are often regarded as having more power in making clinical decisions [64]. However, interdisciplinary decision on SAM management should be encouraged because profession such as dieticians are also a reliable authority in SAM diagnosis and management [64]. The dietician's authoritative role is supported by findings from a province in South Africa where dieticians are key in SAM responses at subdistrict level [64]. This was also seen in this study, specifically in the NHI subdistrict, where the dietician was key in supporting doctors who were not familiar with SAM management.

Regarding the implementation of SAM management guidelines, this study found inconsistencies or non-compliance to SAM management steps per child served. The lack of clinical and supervision skills along with not including aides to support guideline implementation and supervision influenced this non-compliance. One of the key omissions by healthcare workers in this study was the failure to administer therapeutic food to prevent hypoglycaemia at PHC facilities or administering therapeutic food without the mineral-mix ingredient. The non-compliance to use of RUTF or mineral-mix ingredient was due to the high costs of attaining them or being inaccessible to subdistrict hospitals. Previous research has acknowledged that not all ingredients for therapeutic food are locally available [40]. Findings from this study are consistent with other studies conducted in SA, that reported that self-made therapeutic food lacked mineral mix [63, 98].

During the South African piloting of the WHO 10 steps in 1998, manufacturing the mineral-mix was commissioned to a particular pharmacy [71]. The unavailability of cheap therapeutic food and its ingredients as well as ReSoMal in South Africa is partly due to it not being included in the South Africa's National Essential Medicine List, which enables easy and affordable access to medicine and related supplies. In this case, subdistricts and facilities are affected by their context, in which the national health department is not setting structures to create an environment that enables easy administration of therapeutic food. On the contrary, a study conducted in India reported that the Ministry of Health ensured that ingredients like vitamins and mineral premix were available and locally produced. It also commissioned small manufacturing units to produce therapeutic food in settings with a high SAM prevalence [191]. At the global level, UNICEF, as a major supplier of RUTF, tracks the supply chain by focusing on

supply and demand; local supply chains are urged to stock, borrow from other facilities or use alternative strategies [117]. If countries with high SAM incidences are not accessing RUTF from UNICEF, governments are obligated to strengthen supply chains or create an enabling environment for supporting alternative options like local production.

This study also found that lack of urgency in care, incomplete documentation and delayed referrals contributed to unsatisfactory referral processes. The prioritising of inpatient management of SAM over prevention and PHC level care was the main obstacle to providing immediate care in the study setting. The gap in the continuation of care is consistent with other studies that state that SAM is a product of care being absent at a lower level [63, 64, 117]. One of the factors that influenced referral inconsistencies was the lack of precise referral policies that uphold standards of stabilising a case before it becomes critical, and continuity of care (COC).

Referral systems are in place to ensure the continuation of care for every child with SAM by offering appropriate and timely care, enabling full recovery at every spectrum of the condition, and aligning efforts to prevention services [117]. The content of the referral policy in the study setting did not fully support a continuous referral process. Referral pathways for SAM in the study setting were not specified, thus highlighting the need for referral guidelines for SAM which clearly state expected practices in packages that are aligned to global or local guidelines is required. For instance, to resolve gaps in continued care for SAM, districts in Mpumalanga Province in South Africa developed a slogan “no child with SAM will walk alone” to create seamless care across multiple levels [64]. .

Operationally, referral policies should portray pre-referral arrangements (calls, documentation and care), instructions on transit care, instructions for referral facilities to either investigate, treat and refer back patients for rehabilitation [192]. Revising referral system policies to address SAM in the study setting will require locally revising pre-referral arrangements, instruction on care requirements for emergency services and rehabilitation approaches, which can be adapted from the NHI subdistrict follow-up structure.

The unstructured documentation style also hindered the continuity of SAM care in the study setting. On the contrary, parts of Ghana, Brazil, and Saudi Arabia have experimented and adopted the use of electronic information systems, which have enhanced care collaboration across health workers and facilities [193-195]. Whether electronic or paper-based, information systems encourage knowledge sharing and resolving medical challenges because they contain patient history, diagnosis, and care administered for health workers initiating and receiving referrals [192, 196].

Another referral system gap noted in this study was inadequate referral transport due to a nationally mandated centralised emergency service structure. Like other South African settings, transport for referred children was a problem leading to delayed care. In other settings, CHWs used their own money to transport patients [197, 198]. Emergency service operations have the potential to improve by scheduling ambulances per coverage area. However, in this study, a PHC manager recommended facility-based ambulances although their cost-effectiveness is unknown. A study exploring EMS station placement and vehicle allocation in Tshwane Metropolitan area, reported that despite the well-positioning of service stations, these were ineffective because they had few ambulances and, thus recommended increasing the number of ambulances [199].

The compliance to SAM diagnosis and management guidelines was partly reliant on whether health workers had skills to execute the required steps for diagnosing and managing SAM. Findings from this study link poor SAM management to health workers' limited skills due to general training, frequent rotations and lack of on-job training, as similarly found in studies conducted in Ghana and Ethiopia [57, 200]. The specialist knowledge of SAM services has been attributed to nutrition courses in college, length of service, and ongoing post-college refresher courses [57, 103]. Through this study, we recommend continuous mentorship of general doctors at district hospital by paediatricians at the tertiary hospital because the strategy was perceived effective in improving clinical skills in SAM management at NHI hospital. In addition to continuous training, mentorship and restricting rotations (structural factor at facility level), a study on IMCI recognises the need to fill a gap in defining paediatric staffing needs [90]. For instance, the need to strengthen the skills of general doctors and nurses in the South African context is partly due to a decrease of specialists and an increase of generalist doctors (and nurses) in the South African public sector [201]. A gap in the specialist training model has also been noted; there is a lack of community paediatric skills due to university courses that are not aligned to South Africa's community needs [201]. Therefore, a proposal to train a sub-specialty in Community Paediatrics and Child Health to curb skill shortages in rural South Africa was made to the government in 2012 [201]. The multi-level approach, which will involve universities and the government, to address shortages of a suitable paediatric specialist, has the potential to address skills inadequacy beyond training [64].

Another key factor that influenced discrepancies in diagnosis and non-compliance to management guidelines in the study setting was the lack of pre-defined or facility

developed implementation support aides/tools which could have empowered implementers by enhancing their capacity to get used to the implementation process [64]. This study highlights the importance of the summarised WHO 10 steps for inpatient treatment of severely malnourished children as both an essential implementation support and monitoring tool. Similar supplements for SAM diagnosis have the potential to enhance adherence. However, the IMCI form meant to supplement diagnosis is considered time-consuming by health workers [90]. Therefore, guidelines' supplements should abide by the eighth commandment for effective clinical decision support, which asserts that attaining clinicians' enthusiasm to use guidelines is achievable upon substantially condensing and simplifying their guidelines to fit a single screen (or page) to serve as job aides [202]. The presence of job aides has the potential to enhance clinical governance. Clinical governance, in this case, involves a mechanism to ensure that high clinical standards are maintained, and the quality of services continuously improved [203].

The lack of subdistrict and facility-level supervision, monitoring and evaluation influenced all SAM guidelines' practices in this study. The managers' incompetency in supervision (actor factor) and lack of monitoring tools (content factor) influenced this gap. These findings correspond with studies in 103 countries, which found that managers' incompetence in managing and monitoring IMCI implementation was because they had similar training to implementing health workers and none on management [204, 205]. Similarly, PHC facility managers in Kenya also attributed their limited managerial skills to being appointed without training and learning on the job [206]. The manager's role is meant to concentrate on effective oversight, regulations, accountability and attention to systems designs [123]. Training managers on

monitoring alone is incomplete if criteria for monitoring implementation do not accompany guidelines. The government of Nepal has successfully substituted two days of IMCI training with a managers' training programme to strengthen planning, supervision, and monitoring skills [204]. In SA, child deaths are audited and implementation problems identified at the national level [207]. However, equipping managers with real-time implementation monitoring criteria will enable identification of aspects that work or do not work, and context-specific factors that enable or hinder implementation [58]. In the Eastern Cape province of SA, combinations of efforts enable successful monitoring and evaluation. A nutrition team composed of a doctor, two senior nurses and academics monitor performance indicators and continually provide solutions for identified gaps [113, 208]. While facilities in the study setting and Mpumalanga province audit deaths, the academics monitor the implementation of guidelines every two months while matrons have implementation quality meetings weekly in the Eastern Cape province [98].

Based on the Walt and Gilson's policy analysis framework, the discrepancies in diagnosis, variation in referrals and non-compliance to management steps were influenced by the actors, content and context elements. Figure 5.4.1 attempts to illustrate the alignment of the factors contributing to SAM practices to the adapted policy analysis triangle discussed in this section as actors' attributes or interaction, content quality, availability or unavailability, as well as facility or external contextual factors.

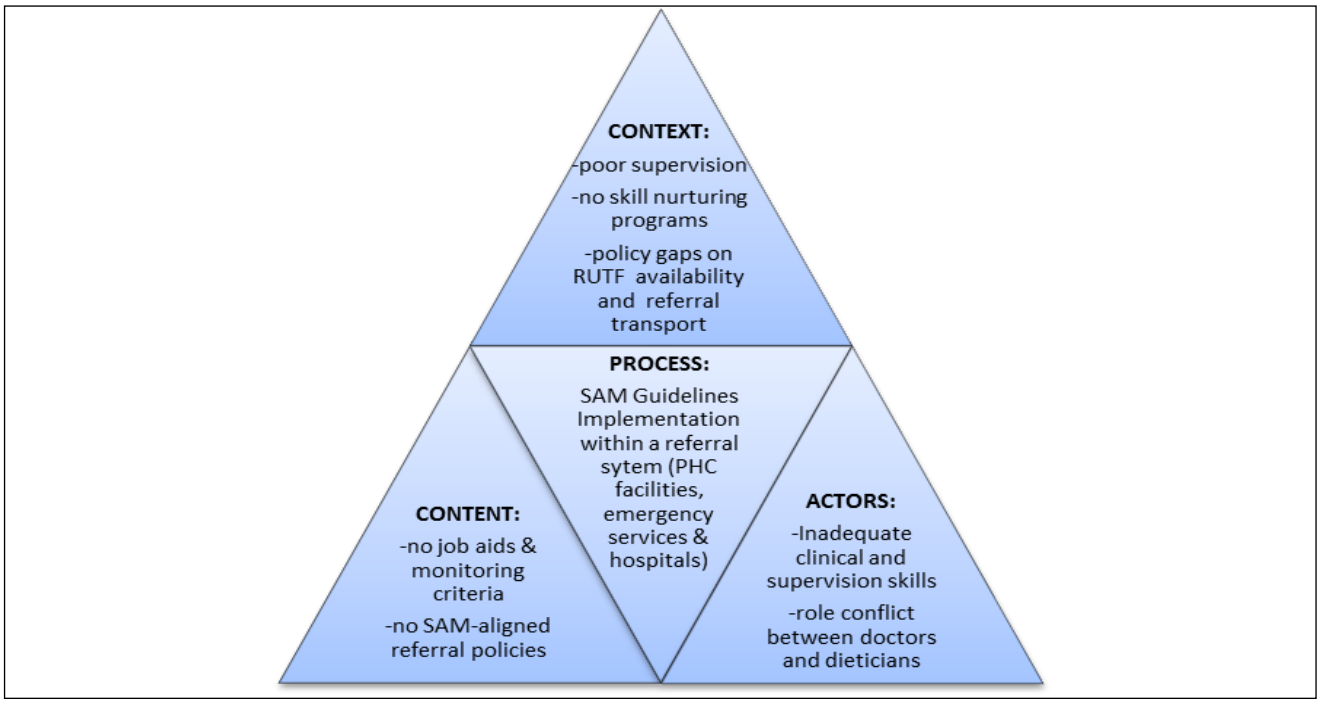

Figure 5.4.1: Alignment of Factors Influencing SAM Practices to Policy Analysis Triangle

Strengths and Limitations

The qualitative nature of our study provides an in-depth and holistic account of SAM practices within referral levels of two subdistricts, along with factors influencing these practices. Adopting a qualitative case study design that employed a maximum variation sampling enabled the comparison of two distinct subdistricts and their complexities as a whole [130]. A varying comparison enabled the giving of a balanced view of the North West Province by accommodating contextual views from two subdistricts with varying access to resources.

However, being situated in two subdistricts of the North West Province limits the generalisability of our findings to other locations. Nonetheless, the study can be replicated using a different population or conceptually replicated using the different procedures on the same population [209]. Therefore, replication to similar South Africa

and LMICs settings facing high SAM incidences has the potential to reveal context-specific factors influencing implementation.

The exploration of the implementation of SAM guidelines' often employ quantitative means using representative samples; however, difficulties in accessing patient files limited this effort [99, 113]. Therefore, inferential statistical conclusions concerning factors that led to implementation practices were not achievable. Future studies should aim to employ inferential statistics designs to establish the *specific* factors, identified within the study setting, that are significant to SAM guidelines implementation.

5.5 Conclusion

This study resonates with the SDG 3.2 goal to curb preventable child deaths by highlighting the need to address subdistrict referral systems' variations, non-compliance to management guidelines, and discrepancies in SAM diagnosis. The importance of referral systems as a means of achieving the continuation of SAM care needs to be realised by locally developing or adapting SAM referral policies. The improvements should uphold essential steps to strengthen information systems and transport options across referral levels. The discrepancies in diagnosing SAM may have potentially led to missing or excluded cases and non-compliance to management guidelines, thus resulting in the administration of incomplete treatment. This could have been prevented if implementers had adequate skills, and were supervised by competent managers and as well as availability of job aids. Continuous skill development programmes will be required to strengthen the clinical skills of existing health workers while addressing shortages of paediatricians at public hospitals. Implementation support tools like job aids will be required to complement the SAM diagnosis and management skills. Ensuring appropriate implementation will not only

require training managers with supervision skills, but also equipping them with monitoring tools. Lastly, there is a need to advocate for national policy commitment to ensuring the availability of RUTF and mineral-mix at facilities.

CHAPTER 6: THE ROLES AND FACTORS INFLUENCING COMMUNITY HEALTH WORKERS' PERFORMANCE WHEN MANAGING AND REFERRING CHILDREN WITH SEVERE ACUTE MALNUTRITION IN TWO RURAL SUBDISTRICTS OF SOUTH AFRICA

Thesis Objective 4: Explore the role of community health workers in the diagnosis, management, and referral of children under the age of five with SAM among study subdistricts.

Manuscript Reference: Mambulu-Chikankheni, F. N., Eyles, J., & Ditlopo, P. (2018). Exploring the roles and factors influencing community health workers' performance in managing and referring severe acute malnutrition cases in two subdistricts in South Africa. *Health & Social Care in the Community*, *26*(6), 839-848.

Abstract

As primary providers of preventive and curative community case management (CCM) services in low- and middle-income countries (LMICs), community health workers (CHWs) have emerged as a formalised part of the health system (HS). However, discourses on their practices as formalised cadres of the HS are limited. Therefore, we examined their role in care, referral (to clinics) and rehabilitation of severe acute malnutrition (SAM) cases. Focusing on SAM was essential since it is a global public health problem associated with 30% of all South Africa's (SA's) child deaths in 2015. Most of SAM deaths are associated with HIV, TB and other illnesses. Guided by a policy analysis framework, a qualitative case study was conducted in two rural subdistricts of North West Province. From April to August 2016, data was collected from CHW's training manuals and guideline reviews, 20 patient record reviews and 15 in-depth interviews with four CHW leaders and 11 CHWs. Using the Walt and Gilson policy triangle, thematic content analysis was conducted to derive emerging themes on case management and administrative structures. The study found that although CHWs were responsible for identifying, referring, and rehabilitating SAM cases, they did not offer curative roles of stabilisation before referral and treatment of uncomplicated cases. Such limitations resulted from restrictive CHW policies, inadequate training, lack of supportive supervision and essential resources. Concurrently, the CHW programme was based on weak operational and administrative structures that challenged CHWs practices. The absence of primary curative care (like prescribing ready to use therapeutic food, prescribing antibiotics and Vitamin A) for moderate acute malnutrition in South African guidelines for CHWs and weak operational structures in this context compromised the use of CHWs in LMICs to strengthen primary healthcare. If CHWs are to contribute to Sustainable Development Goal (SDG) 3 by reducing SAM

mortality, strategies on community management of acute malnutrition coupled with thorough training, supportive supervision, firm operational structures, adequate resources and governments should adopt providers' motivation.

Key Words: community health workers (CHWs), severe acute malnutrition (SAM), South Africa (SA), community management of acute malnutrition (CMAM), healthcare referral

What is known about this topic

- Formal CHWs offer curative SAM management services in addition to preventive, promotive and rehabilitative services, which are offered by volunteer CHWs.
- Community case management of SAM is successful in reducing barriers to accessing treatment.

What this paper adds

- CHWs do not have a formalised curative role in SAM management in contexts where national policies limit the cadre to screening, preventive and promotive roles.
- Successful CCM and referral of SAM are influenced by several factors, including ensuring the availability of adequately skilled, resourced, motivated and supervised CHWs.

6.1 Introduction

Malnutrition accounted for approximately 17 million incidences among under-five children in 2018[172]. Furthermore, malnutrition-related factors accounted for 45% of 5.3 million under-five children deaths in 2018 [17]. Amongst the 17 million incidences, half were from South Asia and a quarter was from sub-Saharan Africa. To address the SAM incidences and deaths, WHO has been developing and revising malnutrition management guidelines since 1981 [34]. Severe acute malnutrition (SAM) was associated with 30% of all child deaths in the 2013 South Africa's (SA) child deaths audit report [97]. Most of SAM deaths are accelerated by HIV, TB and other illnesses [67]. Consequently, exploring community case management (CCM) services for children with SAM is essential.

South Africa has a substantial history in formalising the management of SAM. In the 1960s and through the 1970s, inpatient treatment for SAM was offered alongside education on nutrition, distribution of skimmed milk, and protein-vitamin-minerals [93-95]. In 1998, the WHO 10 steps of managing SAM were piloted in rural hospitals of the Eastern Cape Province [66]. However, it was in 2005 that the management of SAM became critical because over 60% of children who died from pneumonia, diarrhoea and illnesses were underweight and half of them had SAM as a co-morbidity [210]. Thereafter, inpatient SAM management guidelines were adapted and included in the national drug list manual and rolled out throughout the country, with more comprehensive SAM-specific operational guidelines being released for piloting in 2015 [71, 153]. However, little is known on SA's progress on out-patient SAM management beyond enrolling children into supplementary feeding programmes involving the distribution of fortified porridge per IMCI recommendations through PHC facilities and

distributing skimmed milk in the 1970s [95]. Despite most eastern and southern African countries adopting CMAM for CHWs, little is known about CHWs experiences with SAM in South Africa [210]. CMAM involves treating malnutrition based on case findings and triage to suit treatment to nutrition and medical needs; originally performed by nurses or doctors, it has been extended to CHWs in some settings [34].

This inquiry is relevant since South Africa has formalised CHWs, who are meant to screen, stabilise, refer and rehabilitate SAM cases after discharge from hospitals [50, 153]. In December 2011, guidelines to revise roles and organise training, supervision and remuneration of CHWs were developed to curb parallel CHW programmes mostly dependent on NGOs as part of SA's effort to re-engineer primary healthcare (PHC) services [52]. The focus on the lowest level of the healthcare system is aligned to the Alma Ata Declaration of Primary Health Care (PHC), which proposed improvement of health for all through people-centred, CCM services [211]. A focus on community health workers (CHWs) is important and timely because they have become a key response to shortages of health personnel in LMICs, thus constituting a cadre in providing healthcare for all in the context of universal health coverage (UHC) interventions [212].

SA's CCM services are meant to be offered by CHWs under the PHC re-engineering stream of Ward Based Outreach Teams (WBOTs) within the National Health Insurance (NHI) initiative. WBOTs consist of a professional nurse, supported by a health promoter and environmental health officer, in charge of 6 to 10 CHWs (1:250 CHWs-households ratio) within a municipal ward [213]. The national model for WBOTs is composed of preventative, promotive, curative and rehabilitative services, but the curative role is barely established [213]. However, in Mali, Ethiopia and Niger, CHWs are categorised into formal cadres (formally trained, paid and mostly stationed at a health post) and

volunteer cadres (minimal training and not paid) [83]. The former perform curative roles, while the latter provides health promotion and referral without curative roles [83]. Specific to CMAM, volunteer CHWs are tasked with health/nutrition promotion, prevention activities, social mobilisation and referral to formalised CHWs or facilities [83]. In SA, CHWs are formalised, so understanding their role in CCM of SAM will be apt especially how they execute the curative roles.

The CCM approaches including CMAM involves CHWs managing cases with simplified treatment algorithms within homes or communities [214]. This is because facility-based care is barely accessible within the critical window for high child mortality diseases. As such, CHWs offer immediate treatment while waiting for further care [215]. In the case of SAM, which can be deadly within 48 hours due to complications like oedema and infections, immediate therapeutic treatment is required [216]. However, when SAM is without complications, Community Management of Acute Malnutrition (CMAM) is encouraged. However, CMAM remains confined in community-based clinics or within rehabilitation units leaving CHWs with basic tasks [174]. CHWs are then entrusted with identifying children with SAM using Mid-Upper Arm Circumference (MUAC) tape, which shows the status and the need to refer for treatment [215].

A study in Bangladesh found that CMAM within homes was a success due to the reduction of barriers to accessing treatment [174]. CMAM led to earlier treatment, whereas hospital cases that bypassed CMAM required more considerable attention as the time taken to seek care often led to children being more severely malnourished [174]. In this context, the programme of SAM care by CHWs involved training, monthly refreshers, ongoing supervisory support, monthly growth screening for children 6-36 months old, and weekly follow-ups (with Ready to Use Therapeutic Food (RUTF), folic

acids and antibiotics for SAM without complications) [174]. The referral process for SAM within clinics involves identifying cases that require referring, stabilisation (including medication, feeding and rehydration), then referral [38]. However, pre-referral stabilisation procedures for CHWs in SA's manuals/guidelines are not clear. It is, therefore, vital to establish the roles of CHWs for SAM referral (including stabilisation before and care after back referral) in the South African context.

This study aimed to explore the roles and factors influencing CHWs' performance in the management and referral of SAM cases in rural SA. Firstly, we explored the practices involved in the management and referral of SAM cases and identified whether CMAM is incorporated. Then we examined whether documents that guide CHWs are comprehensive in articulating SAM management and referral procedures. Lastly, we investigated contextual factors influencing the management and referral of SAM cases. Recently, the World Health Organisation began developing the principles to guide the design, implementation and management of CHW programmes [212]. This study contributes to efforts to formally integrate CHWs into health systems by giving evidence on their involvement in SAM management and highlighting implications for existing care, capacity and operational structures within South Africa and similar LMICs.

6.2 Conceptual framework

In order to understand the role of CHWs in SAM care and referral, we utilised the Walt and Gilson's policy analysis triangle. The framework systematically reveals complex inter-relationships between the policy-making ***actors*** (stakeholders and their interests/concerns), ***contexts*** (political, social, economic, etc.), ***content*** (substance informing policy matters) and structures of ***process*** [118, 119]. Although it is mostly used to understand the policy-making process, its components allow for exploration of

the ***content*** of the interventions, the ***context*** in which they are being implemented, the ***actors*** involved in the process, and the structures of the ***process*** [119, 217]. Through the lens of the policy analysis triangle, we can understand the processes involved when CHWs refer and care for children with SAM at the community level. It also reveals the content that guides CHWs' practices, actors involved in care and referral from communities to PHC facilities, and contextual factors affecting CHWs' practices.

6.3 Methods

6.3.1 Study Design

An exploratory qualitative case study of WBOTs was utilized to enable an in-depth understanding of CHWs' roles in SAM care and referral. Based on prior knowledge that WBOTs are situated at different distances from clinics, and that some have access to NHI innovation, we selected WBOTs that were close to (n=3) and far from (n=2) facilities, with three belonging to an NHI pilot and two to a non-pilot site. A case study design was used because it enabled close examination of data within a specific geographical area, thus eliciting contextual perspectives [128]. Furthermore, it enabled the uncovering of nuanced relationships between the CCM of SAM and the South African context, where formalised CHWs have complex experiences [130].

6.3.2 Setting

The study reports on experiences from 5 WBOTs from 2 Subdistricts of North West Province (NWP) of South Africa. NWP is considered a success story in implementing WBOTs, but since not all teams are subjected to similar NHI related operational conditions, it is essential to explore if any variations occur. Additionally, there were variations between districts concerning SAM incidences and fatality rates. We selected two Subdistricts, one with a SAM incidence rate of 19.5/1000, four times the national

average, and one with a 6.6 incidence pursuing all streams of NHI revitalization. Starting in 2011 with 24 teams (one in each Subdistrict), by the end of 2014, the province had 244 teams [218, 219]. In addition to health promotion roles, WBOTs in NWP have initiated more child referrals to healthcare facilities compared to other Provinces with WBOTs [129]. The NWP teams' successful implementation emanates from well-established structures, supportive district/Subdistrict health departments, good leadership and policy ownership, the management system based on implementation strategy, and community involvement [220]. Since NWP is viewed as a WBOT success story, this study is limited to exploring experiences from poorer performing Provinces; however, it is vital to explore whether the stated success structures exist or translate to SAM care and referral practices in the study contexts.

6.3.3 Study Population, Sources and Sampling

Data was collected from WBOT members, documents of under-five children with SAM, and WBOT training manuals. WBOT members were selected using a purposive sampling technique which enabled the representation of different categories of members [140]. Since the key players in WBOTS are CHWs (6-10) and the OTL, all OTLs from the 5 study teams (although one was unavailable) and one or more CHWs (n=11) from each team (based on availability) were recruited. At each WBOT facility base, recruitment took place by first presenting the project to all potential participants during a research introduction session where a general call to participate was made. During visits, the facility manager directed and re-introduced the researcher to WBOTs; afterward, the researcher asked for volunteers to be interviewed.

CHW-issued referral letters and clinic-based files of U5s with SAM were also sampled for this study. At two facilities where files of under-five children (U5s) were not kept,

road-to-health books of U5s admitted for SAM at district hospitals were used. The number of participants and files reviewed was determined by saturation: when no new information on SAM care, referral procedures, supervision, challenges and triumphs was emerging, we ceased recruiting [145]. WBOTs' phase 1 and 2 training manuals were included as documents since they provide basic training tools for CHWs.

6.3.4 Data Collection

Data was collected from April to August 2016. We conducted audio-recorded, in-depth interviews (IDIs) lasting approximately 60 minutes with OTLs and CHWs. The IDIs aimed to understand their experiences by capturing the processes involved and factors that affect SAM referrals from communities to PHC facilities. Issues explored included whether CHWs and OTLs were aware of their scope of practice as well as their practices and experiences when executing SAM care and referrals. Concurrently, we reviewed CHWs' training manuals using a data extraction form to understand the content that guides their work as well as documents/records for U5s with SAM to complement the interview data. Patient files, Road to Health Books and CHWs referral letters were also reviewed to explore further practices. A data extraction form was used to track CHWs' practices before, during and after referrals of children with SAM.

6.3.5 Data Management and Analysis

All audio-recorded data was transcribed and thoroughly read to get a sense of WBOTs' involvement in caring and referring children with SAM. All data sources were triangulated to achieve the trustworthiness of the findings [148]. Using content analysis, data from interviews, training manuals and patient files/records were deductively coded into policy triangle components of actors (profession, interests and concerns), context (political, economic, social, etc.), content (objectives and implementation plan)

and process (stages and strategies). For all data text that did not fit the policy triangle components, new codes were assigned, thus broadening factors to consider when exploring SAM guideline implementation [190].

6.3.6 Ethical Considerations

Ethics clearance was obtained from the University of the Witwatersrand's Human Research Ethics Committee (Medical). Approval was also sought from the study Province, district and subdistrict health departments as well as facilities where WBOTs are based. All study participants signed an informed consent form before interviews and the use of their narrative were anonymised using pseudonyms.

6.4 Findings

In the study context, CHWs were responsible for identifying, stabilising, referring and rehabilitating discharged SAM cases. **Error! Reference source not found.** narratives affirm:

Table 6.4.1: CHWs Responsibilities in SAM Care and Referral

Responsibilities	Narrative
Identification	"I check the road health chart [for weight] and I check the MUAC to find malnutrition (CHW, V17)
Referring	if MUAC is on the red label…I refer them to the clinic for malnutrition (CHW, Z16)
Stabilisation	We mix warm water, when it is in one litre with one teaspoon of sugar and a pinch of salt [stabilisation of diarrhoea not SAM] (CHW, Z12)
Rehabilitation	"When they return, I give them a health talk." (CHW, Z16)

CHWs experiences are described under themes of care practices, capacity and administrative operations.

6.4.1 SAM Care and Referral Practices: CHWs' Strengths and Limitations

CHWs' roles in SAM management were influenced by their guidelines' scope, training comprehensiveness, resource and contextual factors; however, they were diligent.

Incomplete SAM Examination

CHWs mostly examined SAM using MUAC tapes and observing the weight gain trend plotted in the Road to Health booklet's chart by nurses:

> "I use MUAC, the malnutrition tape…if green child is fine…if red, we refer for malnutrition" (CHW, V11). "We know the child is malnourished when the weight is going down and below the normal line." (CHW Referral Letter, JB5)

Only WBOT-3 had scales to weigh U5s, thus not only relying on nurses' entries in the road to health booklet's chart. WBOT-1, -2, -4 and -5 were limited in the use of weight as an indicator of malnutrition if entries were unavailable due to caregivers losing road to health booklets or not attending postnatal care to have the road to health booklet's charts plotted. Nevertheless, phase 1 guidelines were vague on CHWs' use of scales, but emphasised the use of nurses' records:

> "Weigh the child if a scale is available…tell the mother/caregiver to ask the healthcare workers at the clinic to weigh the child and mark down the child's weight on the chart" (NDoH, 2012, p. 552).

The availability of scales was essential for caregivers constrained by long distances to make frequent clinic visits.

Unavailability of Before-Referral SAM Stabilisation

Before-referral SAM stabilisation includes feeding therapeutic foods and administration of medication; however, participating CHWs confused the practice with diarrhoea stabilisation:

> "If the children have malnutrition … we boil water… add a teaspoon of sugar and half teaspoon of salt [wrong measures] and give the child" (CHW, Z16).

Only 1 of 8 CHWs gave the correct sugar and salt solution combination of 1 litre of water, 8 teaspoons of sugar and ½ teaspoon of salt. Diarrhoea is mostly a co-morbidity of SAM; thus, its stabilisation is useful but potentially confusing. Additionally, CHWs training manuals/guidelines lacked SAM stabilisation/curative guidelines; one OTL believed stabilisation was for nurses:

> "CHWs do not stabilise serious cases… they just call us and then we can try to stabilise the kids because we [as qualified nurses leading them] are qualified to stabilise SAM". (OTL, V13)

This reveals that CHWs were not commissioned to administer SAM care-stabilisation; the limited scope of practice delayed care for children served by WBOTs 3 and 5, which were in remote settings thus could not access timely facility-based expert care.

Partial SAM Rehabilitation

The phase one CHW training manuals (also used as guidelines) stipulate promotive, educative and supportive guidelines related to child nutrition:

> **CHWs roles:** "Promote child feeding" (p.39)… "Educate on cooking and eating a healthy diet" (p. 553) … "Feeding child with malnutrition" (p.584) … "establish support groups for temporary help for caregivers, rehabilitation services, or financial help" (p.74).

However, CHWs only offered education and initiated grant support:

> "We [OTL/CHWs] teach them how to prepare food for these children [with SAM]" (CHW, Z10) ... "If a family is needy, we [OTL/CHWs] help them get a child support grant, to buy food." (CHW, Z11)

CHWs did not create support groups or rehabilitative services beyond counselling and education on feeding. Only WBOT-3 took fortified porridge to clients, while clients from

other WBOTs collected porridge from the nearest clinics, clinic visit defaulters were not accessing food to assist with rehabilitation of children in recovery.

6.4.2 Human and Financial Resources: Enablers and Challenges

Manageable workloads, effective supervision, availability and access to resources influenced CHWs' ability to provide care for young children with SAM and to make referrals.

CHWs Workloads and Motivation

Based on the South African model, CHWs are to serve 250 families. In the study setting, they served 219 to 250 households, causing infrequent visits and follow-ups. CHWs' guidelines state "children not growing well, [including with SAM] should get regular home check-ups from CHWs" [51], times in the guidelines, due to unspecified CHWs followed-ups once a month.

Lack of motivation also limited CHWs' enthusiasm to conduct home visits. CHWs considered their stipend as low. Younger CHWs who viewed their service as a step towards career advancement, yet unlikely to reach their aspirations felt unappreciated.

> "I received R2000.00 a month; it is a very little salary, cleaners get R6000.00". (CHW, Z16)
>
> "I have been volunteering [as CHW] for five years, but when there is a shortage of staff like enrolled nurses, they don't consider us." (CHW, V12)

In this case, CHW-to-household ratios and demotivation from unsatisfactory remuneration and unguaranteed career prospects were indirect hindrances to SAM care and referral.

Inadequate OTL Supervision

Based on SA's model, OTLs had high supervision workloads of 8-10 CHWs compared to the recommended 6 CHWs. However, models of 10-15 CHWs per supervisor yielded successful monthly supervision in Mozambique [221]. The OTLs' age also affected supervision; while younger OTLs made daily supervision visits, the older ones were constrained by long distances to service areas. Instead, older OTLs mostly did clinical duties:

> "Here at the clinic, I do help a lot… At the baby clinic, we do immunisations and we weight children". (OTL, V13) "I do nursing work because the clinic nurse is busy as the facility manager." (OTL, 22)

As noted, OTLs were more familiar with clinical unlike supervisory or managerial roles. Only one OTL had prior managerial experience, consequently conducting weekly supervision visits with each CHW; most OTLs visited their CHWs once in a month for reporting referrals, in-service training or supervision. The nature of supervision in terms of frequency of visits, support and OTLs' supervisory capabilities determined whether CHWs were adequately supported to perform well in providing care and managing patients' information.

Availability and Access to Resources

The greatest strength of the CHW programme was the availability of MUAC tapes for every CHW, enabling SAM identification and decision to refer. For WBOT-3, availability of scales and fortified porridge respectively enhanced the ability to adequately identify children with SAM and provide rehabilitation care. However, most CHWs felt ill-equipped:

> "The department can do more. We don't have scales, Vitamin A and an emergency kit..." (CHW, Z17).

Regardless, they could call an ambulance in critical cases, despite long waiting times for distant locations. The main hurdle for WBOTs was transportation within service communities. Whilst WBOTs 1, 2 and 4 were close to their communities, WBOTs 3 and 5's communities were dispersed and thus they faced transportation difficulties:

> "They gave CHWs bicycles … I can't imagine a lady cycling a distance of 12km; she will be tired before arriving there". (OTL, V22) "We get tired, so we just go where we can manage." (CHWs, Z17)

The OTLs were allowed to use their cars and claim kilometres after use, but that was less feasible for individuals with small cars and located in settings with bad roads:

> "They said we can use our cars; it only works for those people [OTLs] in towns, not for me in the farms…the roads have dongas and pot-holes … If I get a breakdown with my car 15km away in the veld, there's no garage… warranties of the car are not worth that R100 per km refund they give you, so it's better not to use it". (OTL, 22)

6.4.3 Lack of Standard Operational Structures for Referral Purposes

The WBOTs structures of communication, case documentation and referral transportation were fragmented. The OTLs' capacity or preference, location of the team and availability of resources determined success or failure of care and referral operations.

SAM Cases Communication and Referral Documentation

Referral letters were a standard mode of communication; additionally, CHWs also used phone calls to OTLs and mobenzi technology (NHI mobile-health initiative: data capturing and transmission tablets). WBOT 2 utilised all modes of communication [quote 3.1a].

WBOTs 3 and 5 utilised calls and letters, WBOT 1 used letters and mobenzi, and WBOT 4 only used letters. If kept well, referral letters were useful for communicating,

documenting and enabling the continuation of SAM care. However, most WBOTs misplaced letters because they trusted patients to keep and return referral letters. WBOTs 2 and 4 OTLs made sure letters were kept by them [quote 3.1b]. The OTLs involvement ensured record-keeping for SAM cases. Phone calls enabled collaborative (CHW-OTL) decisions for SAM care despite being expensive for OTLs [quote 3.1c].

While calls came at a cost that was barely reimbursed, mobenzi data was well funded through NHI piloting initiatives. Mobenzi was useful in cyber storage of SAM case information and instant alerts to supervisors. However, mobenzi had work load, network and practicability challenges for users [quote 3.1d]. WBOT-3 network and electricity problems hindered mobenzi use, additionally making entries from paperwork after home visits challenged and limited instant transmission for SAM cases requiring immediate attention by the OTLs.

Table 6.4.2: SAM Communication and Documentation Practices by WBOTs

ID	Quotes
1.3a	**WBOT 2**: "When MUAC is red, they [CHWs] call me … the Mobenzi also gives a notification… then they write a referral letter and send the child here [clinic]" (OTL, V16)
1.3b	"Mothers lose letters…now I told my CHWs that when clients come with a referral letter, nurses will write and keep it in their consultations rooms for me" (OTL, V16)
1.3c	"All the OTLs I know use their own airtime… CHWs give us a missed call we phone them...I spend almost R400 to R600 just to phone my CHWs to find out what is the problem" (OTL, V16)
1.3d	"Updating mobenzi during visits slows me down…so I write in my book, when I get home, I capture it." (CHW, V13) "Mobenzi can have a network error for a week" (CHW, V11) "This side it's a fail because of network problems in some places …and, some of them [CHWs] are staying in the squatter camps without electricity to charge the tablets?" (OTL, V22)

Regardless of the hurdles, monthly referral records were kept by CHWs and reported to OTLs, thus ensuring all WBOTs' work was tracked. Additionally, mobenzi had the potential to enhance instant communication and record-keeping of SAM cases.

SAM cases Transportation: CHWs' Initiatives

Caregivers of children with SAM mostly walked to clinics after referral instructions. Critical cases and remote locations necessitated the use of ambulances and public/private hire. Fares ranged from R8 to R100, depending on whether they were shared with other passengers or hired to pick clients up from their places of residence. While the need to call an ambulance was based on confirmed case severity by OTLs, WBOT 3 CHWs always called an ambulance because of long distances to clinics (15 to 30Kms) and irregular public transport. WBOT 5 CHWs, who were 107 km away from the ambulance station, rarely called an ambulance due to lengthy waiting times (3-7 hours). Instead, they relied on private hire (R100) paid out of pocket by sick child's parents or relatives.

In other cases, CHWs escorted non-receptive mothers with their sick U5s to clinics in order to prevent deferred referrals. Communities were not always on board with CHW advice. Such behaviour included not responding to CHWs coming to their door, non-compliance to their services or disregard for their work:

> "My community thinks that I don't know anything …When I come without OTLs-nurses, they take advantage … They would say 'she is living next to me, she can't say anything to me.'" (CHW, Z11)

Compliance with referrals was, therefore, partly dependent on clients' receptiveness in addition to transport availability.

CHWs guidelines only guided them to refer cases to the clinic, but options on transfer methods were not mentioned. Therefore OTLs' guidance, ambulance waiting hours and community receptiveness contributed to the chosen modes of transporting SAM cases.

6.4.4 Practices, Actors and Content

What has emerged above are the CHWs ***practices*** in SAM care and referral, which included screening, referral, and education (preventive/rehabilitative). Limited were before-referral stabilisation and rehabilitative feeding. Guidance on standard operational logistics was also inadequate. Overall, CHW shortfalls in SAM care and referral resulted from a narrow scope of guidelines' ***content*** and lack of capacity among ***actors*** noted through OTLs' lack of leadership-supervisory skills and CHWs' inadequate training and capacity. Concurrently, ***contextual*** factors like community receptiveness, CHWs motivation and availability of resources also affected success.

6.5 Discussion

Discussion of emerging issues will involve comparing this study's findings on the strengths and limitations in CHWs' scope of SAM care and practices, the capacity to cover target population and availability of resources, with existing literature.

6.5.1 CHWs' Scope: Strengths, Limits and Need for CMAM

The strength of SA's CHW SAM care and referral programme lies in the availability of guidelines and the ability of CHWs to offer preventive and rehabilitative education, screening and referral services. Limitations in screening methods, rehabilitation procedures and the absence of curative roles are drawbacks to the country's efforts to bring healthcare to the communities. MUAC is accurate in SAM detection, but the oedema test and weighing can enhance the identification of malnutrition before it becomes severe and thus make it treatable at the community level [34]. The absence of

curative roles limits the purpose of community health work [215, 222]. Curative provisions have enabled successful CCM of high mortality child diseases like malaria, diarrhoea, pneumonia and SAM, thus reducing mortality [83, 174, 223]. Since caretakers mostly comply with referrals when children are visibly sick, South Africa can benefit from CHWs caring for patients as well as administering antibiotics, folic acid, RUTF or therapeutic milk as part of the CMAM package [224]. Similar CHW programmes have been successfully implemented in some LMICs. For instance, health extension workers care for patients at their stations in Ethiopia [221]; ICCM is actively incorporated in various parts of Kenya [225]; a study in Malawi found no difference in recovery between SAM treated by CHWs and professional health workers; while some projects in Bangladesh have successfully implemented CMAM [34, 85]. A study assessing the quality of CMAM provided by CHWs in Southern Bangladesh found that they could accurately assess MUAC, deliver correct education messages, and administer RUTF, antibiotics and folic acid despite a few of them not administering drugs or education where needed [34].

Considering CHWs in this study made errors in administering homemade sugar-salt solution for diarrhoea, incorporating CMAM will require intensive training. Currently, the ten days [per manual] training offered in South Africa is inadequate, since the CHWs' phase 1 and 2 manuals/guidelines encompass healthcare practices for all illnesses and all age groups. Therefore South Africa needs to set up a more comprehensive training programme because CMAM alone requires advanced skills of routine growth monitoring, administering antibiotics and RUTF [174]. Intervention-based CHWs in Bangladesh and Zambia have shown capability in administering appropriate amounts of antibiotics for SAM and pneumonia and are thus not liable to errors that can cause

future antibiotic resistance [34, 226]. Since prescribing antibiotics is a critical component of CMAM, it is unknown if CHWs in South Africa will be granted the right to administer them. The CHWs' errors in mixing sugar-salt solution noted in this study can be dangerous to infants because sugar beyond and water below the recommended measures worsen diarrhoea, while excessive salt can be harmful [227, 228]. The errors promote scepticism about their capabilities driven by poor training. South Africa is beginning to entrust vitamin A and mebendazole administration to CHWs, thus creating a potential environment for this [229].

6.5.2 WBOTs' Workforce Capacity: Lessons on Motivation, Manageable Ratios and Supportive Supervision

Achieving success in CCM requires teams that are motivated and have sufficient adequately supervised CHWs/volunteers to cover a manageable number of the population. As integral facets of a health system, CHWs' remuneration affects focus and motivation [230]. However, as noted in Mozambique and Tanzania, CHWs' motivation is not only supervision- and remuneration-based but also their love of helping [230, 231]. This study adds opportunities for career enhancement and manageable workloads as other motivators.

WHO recommends a volunteer-to-child ratio of 1:10 [229]. In Ethiopia, success in reducing SAM centred on manageable ratios, since CHWs oversaw a minimum of 10-15 and a maximum of 50 households, enabling them to achieve regular follow-ups [232]. SA's CHW guidelines urge CHWs to visit SAM cases for growth monitoring and rehabilitation regularly, but in practice, once a month is not achievable due to 1:250 CHW-to-households ratios [34]. If CHWs are going to be used as agents of preventing

deaths from SAM and other under-five children diseases, policy transformation to ensure manageable workload along with supportive supervision will be needed.

Limitations in leadership-supervisory skills made OTLs in this study concentrate on clinical work and not provide supportive supervision, thus compromising the quality of care. Written feedback and the presence and support of supervisors during household visits have been found effective in ensuring quality CHW healthcare delivery in Pakistan and India [229, 233].

6.5.3 Strengths, Limitation and Need for Standard Operational Structures

The strength and sustainability of CHW programmes rely on enhancing infrastructural support through providing reliable transportation, equipment and drug supplies – key dimensions of the NHI/UHC reforms [234]. Findings from this study corroborate those from Ghana on obstetrics programmes and from Swaziland on HIV/AIDs clients' transport difficulties after referral instructions [235, 236]. The study context had reliable ambulance services for most sites, with a few requiring expensive means that were not feasible for poor individuals. That said, unreliable transportation would continue to hinder CHWs' operation and frequency of OTLs' supervision in remote locations if context-specific innovations are not implemented. Apart from providing bicycles and reimbursing supervisors that use personal vehicles, resident CHWs should be recruited for remote places and reliable vehicle provisions made for bad roads. Although not contained in SA's scope of CHWs' roles, implementing the CMAM package will require RUTF with therapeutic milk (formula 100) and antibiotics [174, 234]. CHWs' roles in SAM care will be compromised if investments in policies that support operational structures and sufficient resources are unreliable [234, 237]. However, NHI development requires these dimensions for much healthcare delivery.

Multiple communication strategies were found vital in CHWs' decisions to refer or provide care in the study context. While CHWs-initiated referral letters are commended for increasing facility attendance, compliance is ensured by reminders to clients and follow-up visits [224]. Diligent CHWs in this study escorted patients to clinics to ensure referral compliance; thus, numerous support structures are vital in ensuring referral compliance. To further enhance clients' trust in CHWs, instructions including referrals, community awareness strategies should be incorporated in South Africa and LMCs' CHW programme dissemination plans [34, 234].

Additionally, this study established that due to the need for rehabilitation after back-referrals and CHWs' supervisors should oversee prevention of relapse and follow-up on detailed referral feedback from clinicians. Although still being piloted and not yet widely practiced because of network and electricity dysfunction, the use of mobile technology has a promising future for CHWs' communication and improved quality of care. Well-funded mobile tools with motivated CHWs and supervisors with enough airtime will not only contribute to reduced errors in practice and supervision but also the preservation of clinical information for relevant stakeholders [237].

6.6 Conclusion

This study has established that reducing preventable deaths of U5s from malnutrition through CCM in South Africa and Low- and –middle-income countries (LMICs) will require CMAM by adequately skilled, resourced, motivated and supervised CHWs. A reform of CHWs' guidelines' scope to include curative roles will be the main shift required in SA. Concurrently, manageable CHW-to-households ratios, enhancing mobile technology and supportive supervision will be apt. Thus we recommend that SA's CHW guidelines be amended to include clear curative guidelines in the form of CMAM

components, thorough training on SAM in high incidence contexts and clear guidelines and logistics to enhance supervision and administrative tasks.

CHAPTER 7: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This chapter critically discusses the main findings reported in the three thesis studies (in chapters 4, 5 and 6) on the South African WHO guidelines for SAM and their implementation in managing SAM in two sub-districts in North West Province. The chapter begins with discussing the summarised findings of the study under broader themes on how the South African WHO guidelines for SAM were implemented, aligned to the subdistrict services and factors enabling implementation at the subdistrict health system level. The four themes that emerged from the findings will further be complemented by generalised factors from other studies on the implementation of South African WHO guidelines for SAM. Secondly, this chapter revisits the strengths and limitations of the study conceptualisation and methodology. Additionally, it reflects on the contributions of the study on the adaptation of the policy analysis triangle and existing literature. The chapter concludes with recommendations emanating from the thesis findings.

7.2 Emerging Themes from the Thesis Studies

This thesis used a case study approach to explore the diagnosis, management, and referral services for children with SAM within the healthcare system of two subdistricts in North West Province, South Africa. In this write-up, findings from three studies on comprehensiveness of SAM guidelines, their implementation and alignment to continuum of care are highlighted. In the first study, findings showed that the South African SAM guidelines are clearly written to enhance implementation. However, implementation may be hindered because the guidelines lack a monitoring/audit criteria, implementation aides and considerations for implications of limited resources.

The second study found inconsistent compliance with SAM diagnosis, management and referral guidelines, which varied across facilities and subdistricts. The observed inconsistent implementation of South African SAM guidelines was due to limited supervision and monitoring of health workers, health workers poor clinical skills and lack of locally developed implementation support tools. The third study highlighted that the community-based programme for SAM focused on promotive and preventive services, but lacked curative services due to the limited scope of the national guidelines for CHWs.

From the studies based on work from this PhD, three crosscutting themes supporting the continuum of professional health care delivery to children with SAM emerge namely: a) the implementation of the South African adapted WHO guidelines for SAM at district health system level; b) SAM guidelines alignment to a guaranteed continuum of care in existing South African district health systems; and c) governance, training and environmental requirements for successful management of children with SAM in South African district health systems. In addition, a fourth theme titled "generalised factors influencing SAM management within South African district health systems" was added to complement the themes emerging from the findings of this PhD thesis.

7.2.1 Implementation of SA's WHO SAM Guidelines at District Health System Level

In the study setting, the absence of additional information and tools to support implementation of SAM guidelines hindered their comprehensive implementation. This unavailability of implementation support tools was despite the availability of WHO training manuals on use of guidelines which include SAM guidelines implementation support tool [104, 238]. Whether the WHO training manual for SAM has been used in the subdistricts and other parts of South Africa is unknown. Furthermore, the SAM

guidelines used in South Africa did not have additional information on factors that may influence implementation including alternatives for limited resources. Guidelines are considered applicable in any context if they inform users on factors that may hinder or facilitate practice, give an account of resources that implicate practices, and offer tools to support practice along with audit/monitoring [122].

The WHO guidelines for SAM used at all levels of care in South Africa lacked monitoring or audit tools, which strengthen information systems and ultimately can inform SAM care. While guidelines used in South Africa might have been adapted prior to prioritising audits, features, the current WHO guidelines developers are tasked to include implementation and adaptations plans, along with a minimum standard for reporting [70]. The quality of guidelines implementation in South Africa, including the study setting, is captured through death audits, which identify whether a death was caused by problems at a certain level of care or through the care received by certain cadres of health workers [207]. However, the audits were not specific to SAM services. Since the study setting concentrates on death audits, a shift to auditing SAM care based on essential guidelines will be essential in informing interventions on routine service gaps. Countries like Ethiopia and Uganda have prioritised audits by incorporating into their health management information system, indicators that captured the quality of SAM services [239]. Collecting quality services data is critical in improving the coverage and quality of SAM service packages; however, the PhD study setting lacked service quality data to inform improvements in SAM services.

Since the WHO SAM guidelines in South Africa lack standard audit plans, lessons to rectify the problem through the use of a scorecard can be learnt from Ethiopia and Sweden [240, 241]. Health systems are beginning to adopt balanced scorecards, which

are performance management tools meant to track and report implementation activities. In Ethiopia, these are used to assess the delivery of health service packages [241]. If considered, the inclusion of clinical audits like scorecards enable measurement of clinical processes against principles of evidence-based medical standards to formulate strategies for improving quality [242]. Use of a scorecard has been done for several purposes, including auditing practices. For instance, in one case in Sweden, it was employed to provide structure for strategic direction in hospital management, 15 measures were set in collaboration with employees, thus enabling adaptations to suit departmental goals [240]. The scorecard exercise enhanced order in implementing strategic plans, understanding the expected measures, and participation of employees [240]. In the study setting, the need to implement monitoring tools to track and intervene in SAM guidelines implementation can be addressed by adapting extracts from the WHO training manual to develop the local context specific scorecards to track guidelines implementation.

In SA, specifically the study setting, another aspect that hindered WHO SAM guidelines from being well implemented was constraints in essential resources. For instance, the inconsistencies in access to RUTF including stock-outs, unavailability at PHC facilities, and use of therapeutic food (F100 and F75) without mineral-mix in the two study subdistricts need to be acknowledged as a resource implication. To fulfil the AGREE domain of adaptability, alternative measures for RUTF unavailability at various levels of the health system should be provided within the guidelines. The solution to stock-outs is upon the government to address weaknesses within its supply chain including involving local suppliers and lowering costs [239, 243]. In SA, policy action to include RUTF into the essential drug list and operationalise its availability at PHC facilities will

be required to create environments that enable the consistent availability and use of RUTF. Arrangement to make RUTF available through local pharmacies seemed feasible in resolving inconsistent availability in South Africa during WHO guidelines pilot in rural hospitals. During adaptation of WHO guidelines, consideration of local constraints is allowed because the guidelines which are often developed based on evidence from a variety of contexts are framed to be adaptable elsewhere; however, some settings with high incidences of particular ailments remain constrained in terms of healthcare infrastructure and resources [70, 244]. Barriers to implementation often emanate from personal (skills or experience), guideline-related (clarity or scope), or external factors (policy or health system structures); thus leading to non-compliance to guidelines [245, 246]. The analysis and understanding of the contextual factors including strengths and barriers before implementation allows tailoring implementation strategies to specific settings or groups [245, 246]. The scarcity of therapeutic food for managing SAM is a major challenge to providing quality SAM management [117]. While UNICEF supplies RUTF to 25 African countries, those not included (like SA) may require localised strategies to prevent stock-outs [62].

Another implementation aspect worth considering was the absence of implementation support tools to rectify inconsistencies in SAM care provided. In the files reviewed for this PhD research, SAM cases that were served at hospital level were complicated with pneumonia or diarrhoea, yet the treatment of these co-morbidities using additional available guidelines like the Pocket book of hospital care for children was rare. In other cases, HIV and TB are the main co-morbidities of SAM which requires integration of HIV and TB treatment [67]. Local-level job aids need to be developed; and health workers should be continuously trained and supervised to address the interaction of SAM with

other diseases for cases served at hospital level. The attention to SAM interaction with other conditions is critical because despite having access to WHO SAM guidelines, health workers responsible for inpatient management of SAM at hospital with limited experience find difficulties in treating SAM with complications like diarrhoea, pneumonia and HIV, thus administering incorrect treatment [63].

As an easy implementation strategy for hospital level, local-level job aids should integrate SAM management with other conditions. At PHC facility levels in this study setting, the IMCI booklet was accompanied with IMCI forms, which integrate SAM diagnosis with other diseases, but health workers concentrated on a few diseases. The consideration of co-morbidities amidst various contextual factors e.g. food availability is in line with a syndemics approach, which calls for integrating diagnosis, treatment and care for co-morbidities, while addressing the harmful contextual factors. This therefore requires district staff to conduct continuous training of health workers on the IMCI approach. For example, in adults, integrating care for HIV, TB and sexually transmitted diseases, while addressing the socio-cultural or economic factors that lead to these diseases have proven successful in improving patient management [181]. Beyond IMCI integration, the South African health system including the study setting can learn from Niger, Nepal and Burkina Faso as they are implementing an integrated management of acute malnutrition (IMAM) approach which has also led to decentralisation of SAM management [32]. The IMAM includes community and hospital levels and not only involves changes in service delivery but also systematic and organisational dimensions [32, 247].

It is therefore important to consider implementation strategies, which will ease and ensure implementation of SAM guidelines. In the study setting, use of simplified job aids

and a monitoring strategy like scorecards along with considering resource implications like making RUTF available will be ideal. These implementation strategies will need to be introduced in a health system that guarantees a continuum of care from community level and successive higher tiers.

7.2.2 SAM Guidelines Alignment to a Guaranteed Continuum of Care in Existing South African District Health Systems

Findings reported in this thesis demonstrated that weaknesses at one referral level including not offering curative services at community level, incomplete management at PHC facilities, and poor follow-up after management at hospital level burdened and even stripped the effectiveness in terms of ability to prevent or manage SAM at another referral level. Therefore, it is essential to understand gaps in SAM management at each referral level and intervene by ensuring the Continuation of Care (COC) for SAM involves every child receiving appropriate and timely care, which enables full recovery at every spectrum of the condition [117]. Achieving timely care and recovery within a referral system will require aligning inpatient care with diligent treatment of moderate acute malnutrition to prevent SAM at community and PHC facility levels.

In SA, PHC guidelines make SAM prevention provisions, while hospital guidelines offer extensive inpatient SAM management options. Within this study setting, the inconsistent compliance to prescribed SAM guidelines has led to incomplete SAM preventive measures at the PHC level followed by poor discharge criteria by hospitals which limits rehabilitation at the community level. This challenge can be resolved by health workers consciously adopting and assimilating SAM management interventions into the health system pathways like managing SAM at lower levels of care than hospitalising which has been adopted in Niger or strengthening the already existing

referral system [247]. Moreover, the health workers awareness of integration including emphasizing roles of referral levels will motivate them to have a common goal of continuing care and understanding its complexity will help them consider health system dynamics and prevent creating adverse effect like discontinued care [247]. The study setting should employ local service delivery integration systems and organisational structures to ensure health workers responsible for the diagnosis, management and referral requirements maintain their roles in continuing SAM care. Part of the integration required for the South African health system is the IMCI and HIV or TB vertical programmes while the organisational structures include accountability and cooperation among various management cadres like the DCSTs and district child health coordinator [90].

The assessment of children with SAM in the study setting is consistent with global practices where community-based services use MUAC while PHC facilities and hospitals employ anthropometry and other measures to investigate complications [45, 248]. The CHWs packages in Mali include malnutrition diagnostics by formalised CHWs who receive 40 days of training (15 basic and 25 in-service) and thus could be considered adequately skilled [83]. There is a dearth of evidence on SAM assessment guidelines and practices for emergency medical services at district health system; unlike during humanitarian crisis where they are staffed with skilled personnel, momentum to address SAM priorities is high and funding sources are numerous [249]. However, this thesis reveals that the first contact for some children with SAM was emergency services personnel who, if capable, could have identified and stabilised danger signs specific to SAM while transporting children to inpatient care. Therefore, these cadres of CHWs need training in South Africa to close some of the implementation gaps identified.

All levels of the referral system are obliged to perform various forms of appropriate SAM treatment [1, 45, 164]. In line with global guidelines, hospitals in the study setting were responsible for treating children with SAM who had complications like diarrhoea and pneumonia; however, some severity of malnutrition occurred because PHC facilities failed to identify and offer adequate care including RUTF to moderate acute malnutrition or uncomplicated cases of SAM. The RUTF is considered treatment for acute malnutrition, yet it is commonly absent in treating moderate acute malnutrition and sometimes replaced with supplementary feeding which is considered prevention [117]. The PHC facilities in the study setting were also over burdened with SAM cases because CHWs were not mandated to offer curative services for moderate forms of malnutrition, which could help the current situation by lessening the burden of professional CHWs. In contrast, the formalised cadre of CHWs with one-year of training are able to provide SAM treatment, prescribe antibiotics and administer vitamin A in Ethiopia [83]. The introduction of CMAM has led to CHWs treating children with uncomplicated SAM and only involving facilities in case of complications and emergencies [171, 174]. Without concentrating on clinical aspects of SAM management, the IMCI and CMAM recommend RUTF and medicines including Vitamin A for outpatient care [45, 171]. Therefore, the national, provincial and district health departments in South Africa are tasked to offer level-sufficient training for health workers serving a specific level and align local SAM care packages to address the outpatient aspects of SAM management including the community service needs.

In SA, the CHWs' program manual does not explicitly include curative guidelines for SAM [51] However, the poor health-seeking behaviour of some South African caregivers leads to poor utilisation of the facilities; thus a need for a community-based approach as

an alternative [63]. A study in Mpumalanga, a province in South Africa attributed its efforts to strengthen referral and continuation of care across three levels of care to a realisation that SAM is partially (aside from socio-economic constraints, a child is exposed to and effects of co-morbidities) a product of missing care at one level [64]. Therefore, it is worth equipping each level with packages that will enhance the continuum of care.

In healthcare, prevention is always better than cure, however, findings from the reviewed files in this thesis demonstrated that preventing SAM through prescribing treatment for moderate acute malnutrition was poorly done, while SAM treatment was extensive. Indeed, if SAM prevention was prioritised, the number of cases in need of cure could have been reduced. In SA, promotive and preventative roles were available in the norms and standards document for PHC level (IMCI education, home and community health component p.20) and the norms and standards document for district hospital level (child illnesses and education support p.24) [91, 250]. However, compliance during implementation was not always exercised partly due to lack of job aids, poor monitoring, lack of supervision and RUTF unavailability. As a result, moderate acute malnutrition cases transitioned to SAM at the clinic level and discharged SAM cases relapsed. The subdistrict health systems in the study setting should consider working closely with the community health workers to facilitate close monitoring of children in their homes and communities, as this strategy has proven successful in Malawi, Ethiopia and Bangladesh [34, 85, 86].

Working with the CHWs in treating moderate acute malnutrition and uncomplicated SAM is crucial as CHWs may understand some of the contextual factors that not only lead to SAM in the community, but also factors that may impede prevention,

management, and care for complicated cases. As such, drawing from the syndemic framework- which not only looks at diseases concentration and interaction, but also, the larger contextual factors [social, political, cultural, environmental] that contribute to disease causation and severity, may offer multi-layered and -sectored solutions to prevention and management of SAM [251]. A syndemics approach is prevention-oriented, but also focuses on testing common socio-economically influenced conditions that may go undiagnosed and allows community-based follow-up by CHWs, thereby decreasing patients travel costs [181]. Despite this, services to care are often poor due to structural and contextual challenges, as noted for diarrhoea, pneumonia and malaria in community-based strategies in Brazil [252]. It is, therefore, imperative to consider addressing CHWs economic burden by introducing compensation, simplifying care by integrating care protocols while assigning CHWs manageable catchment areas [181].

Referral registers, back referral letters, communication and referral forms (mostly in Non-NHI subdistrict) were used in the study setting. However, inconsistencies in use of referral records due to absence of guidelines for actual operations like duties of ward or facility managers as well as health workers were observed. Sufficient information on referral systems was meant to align referral operations in four steps. Firstly, initiating facilities call receiving facilities for pre-referral arrangements, including paperwork necessary for information sharing (electronic records are proving useful) [192]. Secondly, emergency services transfer patients with instructions on transit care requirements [192]. Thirdly, receiving facilities either investigates further or continue with treatment agreed upon during initial communication [192]. After treatment, a patient is referred back for rehabilitation [192].

The steps for initiating and receiving referrals involving linking of all levels of care in a referral continuum are highlighted in referral policies. A standard referral package includes an out and backward referral form, communicating with the referral or receiving facility, feedback to initiating facilities and referral registers [164]. In the current provincial and subdistrict referral policies for the study settings, the CHWs' duties and operations based on administrative duties have not been fully incorporated. To enable care from communities and ensure rehabilitation after hospital discharge, the CHW duties should be included in the study setting and other South African settings missing this component in their referral policies. In addition, the four steps of initiating and receiving referral, personnel responsible for each step should be incorporated in referral policies to enhance administration of referral.

Therefore, ensuring continuation of care will in the study setting need to involve emphasis on integrated roles of health workers at each level of care, involving CHWs in curative services, and strengthening the referral mechanism across various levels. The implementation strategies along with ensuring continuation of care will also require strongly supervised district-based continuous professional development and good governance.

7.2.3 Governance, Training and Environment Requirements for Successful Management of SAM

In addition to implementation strategies and focus on care continuum, context-specific enabling factors that include building the capacity of managers to lead, enhancing health workers skills, and creating enabling environments for effective implementation are required to enhance SAM management.

In the study setting, referral system levels' governance and leadership were often assigned to a hospital or PHC managers who as similarly observed in another study in

South Africa often held such responsibilities without the necessary guidance, authority and skills to resolve problems [205]. Instead of operating as administrators, managers are meant to set strategic direction, formulate new initiatives meant to improve service delivery, and monitor and evaluate activities through standardised supervision tools [205, 253]. Governance and leadership are central to the implementation of healthcare guidelines. Governance in health services involves constant oversight, improvements, accountability and ensuring quality, thus requires strong leadership and teamwork [64, 254]. A lesson can be learnt from a South African setting where strengthening governance at district and subdistrict level involves monitoring and response unit meeting meant to report, analyse and respond to deaths every 24 hours [64]. The meetings have become effective because they operate as a management triangle involving facility managers as drivers responsible for convening meeting and holding health workers accountable; information or public health specialist as navigators responsible for monitoring progress and supporting planning; and clinical specialists as experts responsible for training and technical support [64]. In this study setting, providing a summary of the management steps, including 10 steps for managing SAM will not only ease implementation of guidelines, but it will also act as a monitoring tool for managers to hold health workers accountable for care provided. This has potential to enhance quality of care. Shared leadership through constant meetings with various stakeholders to play roles of drivers, navigators and experts will also be helpful in ensuring remedial responses are given to SAM guidelines implementation challenges.

One of the duties by facility or ward managers involved inspecting the performance of nurses and doctors in SAM guidelines implementation. Lessons can be learnt for other health conditions and incorporated to strengthen the programme. For example, a study

conducted in Korea proposed that appraisals and training on medical malpractices must be conducted by specialised agencies [255]. Other research in India, South Africa and Korea has explored the legal penalties for malpractices in diagnosis and treatment and argued that these can lead to deformity or death [255-257]. In SA, while professional boards have disciplinary powers and can impose penalties on medical malpractices [257], it is unclear whether disciplinary measures can be applied for misdiagnosis, and under-or over-treatment of SAM among children. The focus on malpractices will be fairly placed if they are accompanied by consideration of training gaps in the study setting. The poor practices in managing SAM emanate from lack of on-job training which is required due to skill limitation emanating from general training [57, 200]. Apart from nurses in the Non-NHI hospital, health workers involved in SAM management were general practitioners and only general practitioner in NHI hospital accessed in-service training and mentoring from paediatric specialists. To enhance health workers skills as a means of preventing malpractices in management of illnesses, in-service training and mentoring should be implemented with restricting rotation to non-paediatric wards [57, 90].

Creating an enabling environment involves establishing conditions that will enhance healthcare service delivery and the successful attainment of outcomes for SAM [64]. An enabling environment for implementers of SAM guidelines includes policies that support implementation processes and funding for implementation requirements. An enabling environment can be further grouped into knowledge and evidence offered in SAM guidelines, politics and governance, which is implicit in the study setting, financial resources, and capacity of the sub-district to offer SAM services in this case [64, 183]. In section 7.2.1, the unavailability of RUTF due to its absence in the national drug list and

financial constraints has been discussed. However, in another setting in South Africa, improvement in supplies procurement and ensuring continued supply has been achieved at district level[64]. The strengthening of SAM management by ensuring continuum of care in the study sub-district will require the inclusion of RUTF in the national drug list or local measures to ensure continued supply and strengthening sub-district governance using management triangle (experts, line and information managers).

7.2.4 Factors Influencing SAM Management within South African District Health Systems

The implementation strategies, continuum of care, governance and training issues experienced in the study setting are similar to other settings in South Africa; regardless, a few experiences are unique to specific settings. The management of SAM in other South African sub-districts have been enabled and hindered by numerous factors which are best summarised to reflect the WHO health systems building blocks.

Considering the WHO health system building blocks, the management of SAM based on the South African adapted WHO guidelines was mostly reported in districts or facilities where they had audit and response information systems accompanied with meetings where they resolved SAM management implementation gaps [64, 90, 98, 258]. The availability of job aids like management charts and standardised management forms also eased SAM service delivery [90, 258]. The constant supply of technologies such as weight assessment tools, medicines, therapeutic food or their ingredients also enabled growth monitoring and prescription of required treatment [64, 98, 258]. In unfortunate cases, the stock out of growth monitoring tools impeded detecting SAM while shortage of beds and food led to untimely discharge of SAM patients [63, 90].

Financing of SAM management and governance activities was reliant on government but insufficient and fragmented procurement of supplies was delayed by unnecessary bureaucratic channels [63]. Health workforce issues such as rotations to various departments, poor staffing of night shift, absence of induction and in-service training were influential to poor adherence to SAM management guidelines [63, 90, 98]. These workforce issues were resolved by limiting rotations, mentoring, induction and in-service training by internal and external experts [64, 98, 258]. Governance issues noted by presence of well-coordinated leadership and supervision were influential in ensuring SAM management based on South African adapted WHO guidelines. The presence of internal (ward and facility managers) and appointment of external experts (DCSTs, maternal and child health coordinators and other experts) to supervise and oversee SAM management ensured adherence to South African adapted SAM guidelines [64, 98, 258].

7.3 Strengths and Limitations of the Study

The key strength in my thesis is that it provided an in-depth account of factors, which influenced the implementation of SAM guidelines within the healthcare referral systems of two sub-districts of the North West Province with the aid of the policy analysis triangle components. The adaptation of the policy analysis framework alone has enabled a systematic focus on the actors involved in the implementation and the context of implementation as possible factors that influence guidelines implementation. The uncovering of the policy analysis triangle component of content with domains from the Appraisal of Guidelines for Research and Evaluation (AGREE) Instrument has enabled linking the gaps in applicability of SAM guidelines as a factor contributing to

implementation shortfalls such as feeding poorly prepared therapeutic food and missing some management steps.

The use of qualitative methods has provided a detailed and, a fragmented description of the implementation of the SAM guidelines due to accounts of various stakeholders by offering how implementers perceive implementation practices, unlike quantitative perspectives, which lack the voice of the implementers. The study also triangulates multiple data sources such as health workers narratives, which were complemented with patient records to limit biases emanating from using one method. The authentication of findings was further ensured by presenting preliminary findings to participants through member checking, a technique which involves feed backing the results to participants to check for accuracy and resonance with their experiences [259].

A key limitation in this thesis is the study design, which was aimed to achieve comparability but could not be fully achieved. Initially, the study intended to demonstrate subdistricts variations in regards to NHI interventions. However, the Non-NHI subdistrict was also implementing three NHI interventions despite not being a pilot site and sometimes poorly due to limited funding. The disparity in these finance-driven interventions in the study districts infringed appropriate implementation of some guidelines to manage SAM like the use of mobile technology by CHWs resulting in confrontation of unavoidable biases. As a result, the diversity emanating from varying experiences in SAM incidences and capacity of facilities became the focus of the intended maximum variation.

Another limitation was a potential bias in appraising guidelines since they depended on reviewers' interpretation of the AGREE questions. In addition, developers of two of the

four reviewed guidelines were unavailable to appraise guidelines; hence, conclusions were based on guidelines implementers' views. Despite the involvement of individuals outside the guidelines development team enabling the attainment of outsiders perspective instead of views that could have been conflicted by insiders' values [260]. In future, a Delphi technique that involves a panel of experts answering questions, sharing responses and discussing to reach consensus should be employed [261].

Another limitation was related to observation of implementation because there were limited cases to observe at PHC facilities and none at the community level. The limitations were beyond the researcher's control because none of the consultations observed at PHC facilities during the researcher visits were diagnosed with SAM. While patient records served as an alternative for crosschecking practices, missing information in some facilities was a limitation [262]. Based on these limitations, real-time observations at each referral level will be required to fully capture the SAM guidelines implementation processes.

7.4 Contribution of the Study Findings

In this section, I discuss the adaptations made to the policy analysis triangle framework and the contribution of the findings to existing literature on SAM management.

7.4.1 Adaptations of the Policy Analysis Triangle

At the onset of this research, the policy analysis triangle concepts of content, process, actors and context were used as a framework for understanding the implementation of SAM guidelines. When used to explore policy implementation, the framework focuses on implementation as the processes while actors who implement policies and the context in which policies are implemented as aspects that influence the implementation

process [118, 119]. The policy analysis triangle considers situational, structural, cultural and exogenous factors as context.

An additional framework was utilised in efforts to enhance its capacity to explore the content of SAM guidelines. The AGREE analytical framework was added to elicit implementation-specific qualities in SAM guidelines as well as to provide an in-depth understanding of the comprehensiveness of the SAM guidelines [122]. Beyond focusing on the science behind clinical guidelines and the development process, the AGREE tool enabled exploring whether guidelines equip implementers with implementation support tools like job aids [122, 161]. **Error! Reference source not found.** depicts the adaptation of the policy triangle along with objectives explored using each component:

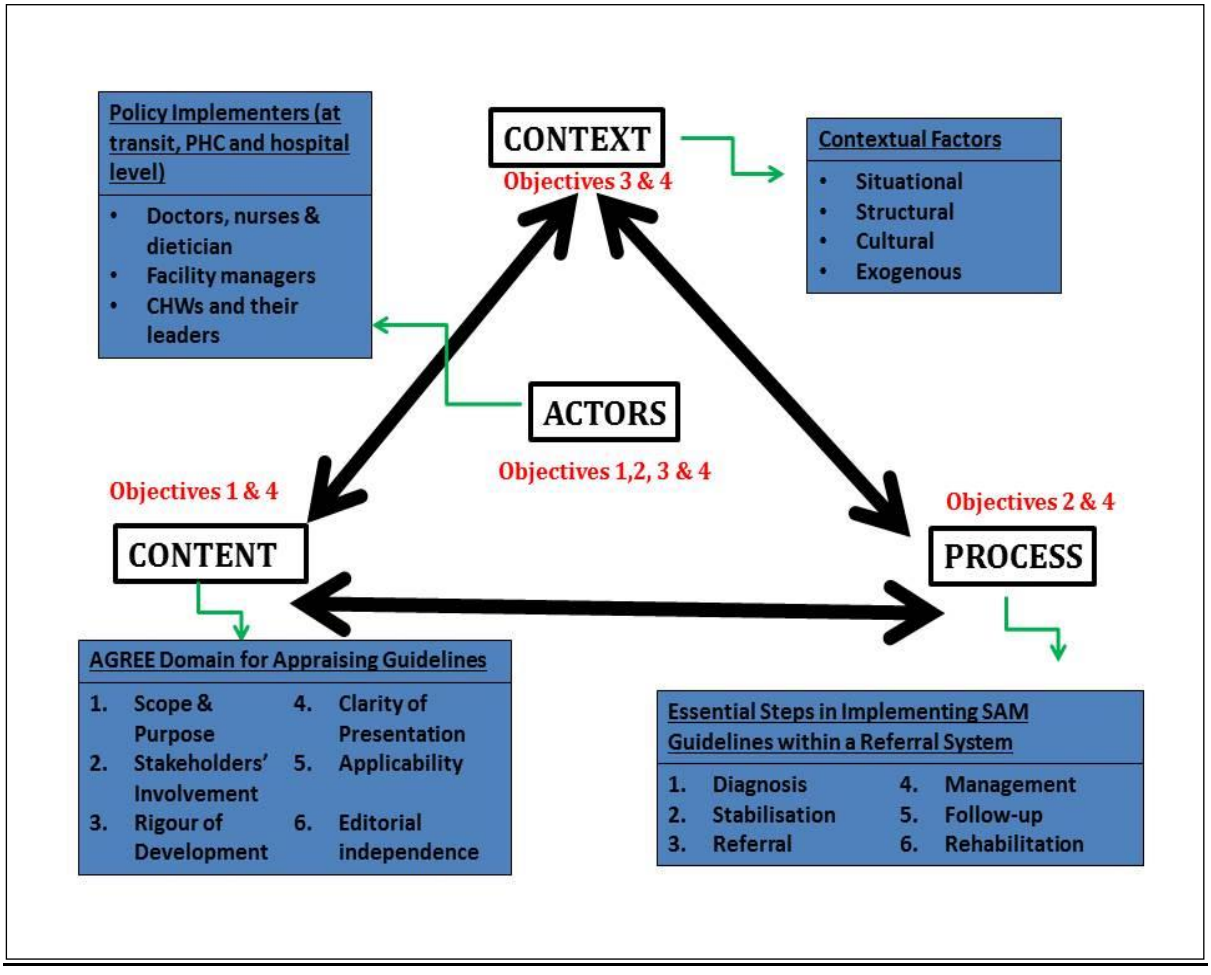

Figure 7.4.1: Adapted Policy Analysis Triangle for exploring SAM Guidelines Implementation

The incorporation of a complementary framework to the policy analysis triangle component of content enhances its relevance to assessing how the implementation of SAM diagnosis, management and referral guidelines can be influenced by limitations in the applicability domain of the AGREE tool.

In the study setting, the processes depicted in the adapted policy analysis triangle were influenced by content, actors and context. South African adapted SAM guidelines' content factors such as guidelines applicability especially absence of job aids and monitoring criteria (guidelines content factors) impeded adherence to guidelines and audit of implementation quality. The actors' factors such as role conflicts, inadequate clinical and supervision skills led to none or poor adherence to South African adapted SAM guidelines implementation. Context factors like policy gaps on referral transport (ambulances) and RUTF as well as lack of continuous training and supervision, respectively led to poor diagnosis, referral, poor therapeutics and thus poor implementation of guidelines.

7.4.2 Contributions to Literature on SAM Services

The concept of continuum of care is well aligned in the IMCI and inpatient guidelines for SAM, which offers comprehensive preventive, referral and treatment measures for all levels of the health system. However, delay of SAM management at the PHC or community levels and absence on SAM specialised care during transfers by emergency services in this PhD research are a possible product of inefficiency during inpatient treatment of SAM because cases are sent to the hospital in critical state [63, 64]. Findings from this PhD research reveal the absence of community based management and limited PHC facility management of SAM as care delay aspects influencing the need

for in-patient services. Considering that the delay of care is experienced in the lower levels of care, exploring factors that lead to absence and limited PHC services for SAM will be required. This inquiry is important in the South African context which despite holding a middle-income status and assumed to have a good facility-based health system, there are still visible inequities that may require primary health facility and community-based solutions. The focus on referral for children with SAM also bridges the gap of studies that focus on community, clinic, or hospital care, without reflecting on experiences along the continuum [34, 64, 68].

This thesis affirms that health interventions are complex because they require several steps and also occur in complex health systems [263]. In this PhD research, the prevention and management of SAM occurred in a complex referral system involving several processes including the continuum of care across referrals levels and interaction of various cadres of health workers. Evidence of factors that influence SAM guidelines implementation is well documented; it focuses on enabling environments, health systems factors and broader contexts [32, 64, 65, 80, 113, 117]. This thesis enhances this knowledge by aligning the factors to an adapted policy analysis triangle. Using the policy triangle lens, attention is not only brought to actors and contextual factors but also the quality of the guidelines' content. Specifically, it identifies guidelines developers as responsible for creating implementation support tools like job aids and implementers as responsible for locally adapting and effectively implementing guidelines [245]. The FANTA project has developed training manuals for SAM management with job aids; countries like Malawi, Ghana and Zambia have adapted manuals [264, 265]. This thesis identifies the need to accompany implementation with

easy-to-use job aids, clear referral policies, monitoring tools, resources, or alternatives in case of scarcity, continuous training for managers and clinical staff.

7.5 Study Recommendations

7.5.1 Recommendations for Future Research

In this PhD research, the gaps in implementing SAM guidelines were based on the review of records and a few observations complemented by narratives from health workers and managers (at facility or ward levels). To capture experiences from facilities with missing or without records, real-time observations complemented by perspective of patients will be required in future. To ensure availability of records, future research will benefit from setting data collection information systems for SAM management at each level of the referral continuum as a means to elicit health outcomes and significant gaps in care provided. To understand implementation gaps at the local, district and national level, an information system focusing on adherence to SAM management and similar to death audits should be developed. In the meantime, the obstacles in adherence to South African adapted WHO guidelines for SAM can be captured and intervened on by the South African Department of Health using and based on an expert scoping review of studies that have captured the SAM management practices at various levels of the South African health system.

This PhD research also conducted a rigorous appraisal of "Standard Treatment Guidelines and Essential Medicines List for South Africa: Hospital Level Paediatrics (2013)"; "Integrated Management of Childhood Illnesses Chart Booklet (2014)"; "Integrated Management of Children with Acute Malnutrition in South Africa: Operational Guidelines (2015)"; and "Guidelines for the Inpatient Treatment of Severely Malnourished Children (2003)" using AGREE [13, 43, 50, 153]. However, experts who

participated in guidelines development were not involved in the AGREE scoring but some of them were available for in-depth interviews. In future, an AGREE based Delphi study with experts that participated in developing guidelines will be apt to balance the conclusion on guidelines quality. Considering the role of these experts in influencing what makes policy guidelines, their anticipated conclusions may enhance their future practices.

The WBOTs role in SAM management remains preventive in the South African context, yet they can do more if well trained including lessening the burden of care for professional HCWs. Future research should be a CMAM intervention study in a rural setting with poor health-seeking behaviour and high SAM relapse rates. The study should be conducted with the anticipation of finding alternative ways to curb SAM incidences and deaths. The future study should employ a syndemics framework focusing on identifying and resolving bio-social aspects underlying SAM and SAM deaths per the communities' perspective; such consideration will enable exploring structural and political issues that hinder the prevention of SAM [181, 251]. Part of this exploration which may also be extended to the other levels of care will be a collaboration of researchers with the Ministry of Health research unit to systematically track inconsistent availability of SAM management material like RUTF, ReSoMal and referral form.

One of the main factors influencing all SAM implementation practices was a lack of clinical and supervisory skills. Findings from this PhD research and reported in literature offer skill nurturing strategies, but they may not be enough if core competencies are not defined [64, 103]. The concept of core competencies emphasises teaching and assessing a workforce on the knowledge and skills required for the

effective execution of their duties [266]. The core competencies in treating malnutrition are mostly aligned to clinical education curricula, which health workers in this PhD research also recalled [267]. However, competencies gained during tertiary training may not be enough; thus, there is a need for continuous teaching and assessment. The FANTA project offers outpatient and inpatient continuous training manuals which have been successfully adapted in countries like Malawi [264, 265]. Future studies in South Africa including in the study context should adapt and implement the FANTA training manuals and evaluate their impact on WHO SAM guidelines adherence.

7.5.2 Recommendations on how to Continuously Improve Implementation of SAM Guidelines

In an attempt to contribute towards strengthening the implementation of SAM guidelines, the candidate shared the findings of the study with the Ministerial Committee on Morbidity and Mortality in Children under 5 years (CoMMiC) through a special invitation by their chair after he reviewed my work during a PhD interim assessment phase required by the Witwatersrand's School of Public Health. Despite being based on SAM diagnosis, management and referral services in two sub-districts, from the findings of this thesis, I recommend policy and practice actions that can be useful at the national level and for other similar settings.

In the study setting, there was limited monitoring of the implementation of the WHO SAM guidelines due to the absence of a monitoring tool. This resulted in varying practices at facility and sub-district levels. To best track quality of care and intervene, a standardised checklist that can be adapted to local settings should be included in SAM guidelines and enforced through audit and feedback during implementation. The WHO Training Manual for SAM management has no checklist to monitor SAM management, instead the manual offers two wall charts to serve as support material for the ward and

emergency room [104]. To ensure standardised monitoring, the easy-to-use summary of the ten steps of managing SAM has been used to monitor implementation of SAM guidelines in one of the study sub-districts. Locally adapted implementation monitoring checklist from the WHO wall charts need to be developed to serve as a proxy for implementation quality control. In addition to monitoring implementation of SAM guidelines which mainly focuses on the service delivery building block of the health system, the "Framework of key health system functions for SAM interventions" which encompasses all building block of the health system should be considered [32].

The health workers at all levels in eight of the nine facilities in the study setting missed or poorly implemented some steps because of lacking continuous training on SAM management. The WHO and FANTA project have widely disseminated training manuals for SAM management which are ideal for various cadres of health workers [104, 264, 265]. In the South African setting, there is a need to develop a training manual, which will incorporate updated SAM guidelines and consider hindrances found in implementing SAM guidelines at various district health systems in South Africa [1, 63, 64, 68, 90, 98]. If implemented, the proposed training manual has potential to curb some competency challenges among health workers implementing SAM management guidelines.

The CHW programme in South Africa and study setting is restricted to promotive and preventive services despite the CHWs use of MUAC to detect SAM providing potential for treating children whose caregivers have poor health-seeking behaviour or reside in remote settings with poor access to health services. Further research may be required to establish the need to include treatment to the current SA's CHW model and incorporate them more in the SAM management, especially in remote settings, which

may need more community-based SAM management in addition to diagnosis using MUAC. Studies on SAM prevention state that emphasis on management of moderate acute malnutrition at the community or PHC level prevents SAM [64, 117]. It is unclear whether health care access is a problem and if CHWs can be trusted with curative services in the study setting and in SA. This is an area of focus for future studies employing alternatives for bio-social interactions in syndemics approach. The Food and Technical Assistant Nutrition Assistance Project (FANTA) showcases various models for strengthening CMAM through a training guide for managers, supervisors and implementers that is also useful for strengthening health systems and informing health departments [239, 265]. Real-time models can be borrowed from Ethiopia and Mali, where a specified cadre of CHWs received advanced training (40 days or a year) to best offer curative services with assistance from regular CHWs [83]. A consensus from a systematic review on CHWs operation during SAM management has established that quality and regular training accompanied with intensive supervision and CHWs motivation are essential in enabling effective detection and treatment [268].

The South African government has District Clinical Specialist Teams (DCST) that have proven influential in enhancing clinical governance by abiding to four pillars namely overseeing clinical effectiveness, clinical risk management, professional development and improving accountability through services evaluation [269, 270]. On the contrary, facility-based governance for SAM in the study setting lacked explicit roles, as it was dependent on the facility or ward managers experience and interest. As such, structuring roles of managers in SAM care based on context-specific needs will be required. In Mpumalanga province, the dieticians have taken a leading role to train others and oversee SAM guidelines implementation to improve services [64]. While

dietician are key in Mpumalanga, staff development in one of the study setting was initiated by an experienced paediatric nurse working as a ward manager and a paediatrician working at a tertiary hospital. In extension, the DCSTs are commissioned to initiate in-service training, onsite mentoring, identify need for formal education and monitor coverage of mandatory training [270]. Therefore, facility based governance in terms of initiating professional development and SAM management will require involving various clinical experts (experienced ward or facility managers and paediatricians) and DCSTs.

This thesis portrays the importance of subdistrict-specific referral policies accompanied by audit meetings. The WHO referral guidelines emphasise the need to communicate the situation to receiving facilities before referrals are made[164][164] but in practice, this is rarely done [164]. The referral policies' localisation at subdistricts will require adapting provincial policies to suit sub-districts as well as prioritise communication before referral.

Lastly, this thesis has noted a need to involve all stakeholders including consumers when adapting WHO guidelines to the study setting to accommodate their needs. The anticipated inputs from caregivers of children with SAM can assist in including structures that may work to prevent relapse of SAM after discharge while involvement of CHWs can assist in addressing factors that hinder prevention of SAM.

7.6 Conclusion

The South African adapted SAM guidelines for PHC and hospital level used in the study setting are clearly written to enhance implementation. The partial to lack of implementation of South African adapted WHO guidelines for SAM across the referral system was influenced by the limited scope of community-based and emergency

medical services, weak implementation structures including limited resources, poor governance and absence of job aids. These findings foreground the need to prioritise applicability measures like developing audit plans to inform care structures requiring strengthening and creating cushions for resource implications during guidelines development. Furthermore, the study proposes strengthening the communication amongst referral levels to ensure the continuum of SAM management from the community to the hospital level. Most importantly, these findings stress the need to develop and uphold implementation strategies such as audit and feedback, simplifying guidelines for local use, strengthening supportive supervision and supply chains for therapeutic food. The alignment of SAM services to level of care and creating enabling environments for SAM management will enhance South African adapted WHO guidelines' potential to ensure continued and expected SAM management within the study setting in sub-district healthcare referral system.

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APPENDICES

Appendix 1: AGREE Questionnaire

The Appraisal of Guidelines for Research and Evaluation (AGREE) Instrument

(Evaluates the process of practice guideline development and the quality of reporting)

DOMAIN 1: SCOPE AND PURPOSE (p.12-14)

1. The overall objective(s) of the guideline is (are) specifically described.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Are objectives described in detail?
b) Are the expected health benefits from the guideline specific to the clinical problem or health topic?

2. The health question(s) covered by the guideline is (are) specifically described.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Is there a description of the health questions covered by the guideline, particularly for the key recommendations (see Item 17)?

3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Is there a clear description of the population (i.e., patients, public, etc.) covered by a guideline should be provided?
b) Does the information include the age range, sex, clinical description, and co-morbidity?

DOMAIN 2: STAKEHOLDER INVOLVEMENT (p.16-18)

4. The guideline development group includes individuals from all relevant professional groups.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Who were members of the steering group?
   - ✓ Their discipline and relevant expertise?
   - ✓ How were they involved?

b) Who were the research team involved in selecting and reviewing/rating the evidence?
   - ✓ Their discipline and relevant expertise?
   - ✓ How were they involved?

5. The views and preferences of the target population (patients, public, etc.) have been sought.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Did the information about target population experiences and expectations of health care should inform the development of guidelines? How?
b) Were there formal consultations with patients/public to determine priority topics, participation of these stakeholders on the guideline development group, or external review by these stakeholders on draft documents?

6. The target users of the guideline are clearly defined.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Who are they and at what level of healthcare?
b) Any excluded at that level of care? Why?

DOMAIN 3: RIGOUR OF DEVELOPMENT (p.20-27)

7. Systematic methods were used to search for evidence.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Explain details of the strategy used to search for evidence:
   - ✓ Where there any search terms used and sources consulted?
   - ✓ What were the dates of the literature covered?

b) How comprehensive was the evidence search strategy:
   - ✓ Was it executed in a manner free from potential biases and sufficiently detailed to be replicated?

8. The criteria for selecting the evidence are clearly described.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) What was the criterion for including/excluding evidence?
   - ✓ Is it explicitly described in the guideline? If not, how was it done?
   - ✓ What were the reasons for including and excluding evidence?

9. The strengths and limitations of the body of evidence are clearly described.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) What are the strengths and limitations of the studies?
   - ✓ Was there use of informal or formal tools/methods?
   - ✓ Was there a way to assess and describe the risk of bias for individual studies and/or for specific outcomes and/or explicit commentary of the body of evidence aggregated across all studies

10. The methods for formulating the recommendations are clearly described.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) What were the methods used to formulate the recommendations? How?
b) How were final decisions reached?

11. The health benefits, side effects, and risks have been considered in formulating the recommendations.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) What were they?
b) What evidence supports that issues above have been addressed?

12. There is an explicit link between the recommendations and the supporting evidence.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Are recommendations and the evidence on which they are based included in the guideline?
b) Are components of the body of evidence relevant to each recommendation identifiable? How?

13. The guideline has been externally reviewed by experts prior to its publication.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Who were the reviewers?
   - ✓ Clinical or methodology experts?
   - ✓ Is a list and affiliation of clients reported in guideline?
b) How was it done?

14. A procedure for updating the guideline is provided.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Is there a timescale or a standing panel who receives regularly updated literature searches and makes changes as required?
b) If yes, is this communicated in the guideline or elsewhere? How?

DOMAIN 4: CLARITY OF PRESENTATION (p.29-31)

15. The recommendations are specific and unambiguous.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Does the recommendation provide a concrete and precise description on options appropriate for various situations and in what population group? How?

16. The different options for management of the condition or health issue are clearly presented.

1 Strongly disagree	2	3	4	5	6	7 Strongly agree

a) Are different possible options for screening, prevention, diagnosis or treatment of the condition it covers? How so?

17. Key recommendations are easily identifiable.

1 Strongly disagree	2	3	4	5	6	7 Strongly agree

a) Are the most relevant recommendations easily identifiable? How?
   - ✓ Summarised in a box, typed in bold, underlined or presented as flow charts or algorithms?

DOMAIN 5: APPLICABILITY (p.33-36)

18. The guideline describes facilitators and barriers to its application.

1 Strongly disagree	2	3	4	5	6	7 Strongly agree

a) Are there any existing facilitators and barriers that will impact the application of guideline recommendations?
   - ✓ Is there special funding mechanism to finance the recommendations?
   - ✓ Are there sufficient numbers of clinicians available to execute recommendations?

b) Does the guideline have a section for barriers, guideline utilization, and quality indicators?

19. The guideline provides advice and/or tools on how the recommendations can be put into practice.

1 Strongly disagree	2	3	4	5	6	7 Strongly agree

a) Was the guideline disseminated or is being implemented with additional materials?
   - ✓ A summary document, a quick reference guide, educational tools, results from a pilot test, patient leaflets, or computer support?

20. The potential resource implications of applying the recommendations have been considered.

1 Strongly disagree	2	3	4	5	6	7 Strongly agree

a) Do guideline recommendations require additional resources in order to be applied?
   - ✓ What are they?
   - ✓ Specialized staff, new equipment, and expensive drug treatment?
   - ✓ Cost implications for health care budgets

b) Does the guideline have a discussion on the potential impact of the recommendations on resources? How?

21. The guideline presents monitoring and/or auditing criteria.

1 Strongly disagree	2	3	4	5	6	7 Strongly agree

a) How is measuring the application of guideline recommendations conducted?
   - ✓ Is it clearly defined criteria that are derived from the key recommendations in the guideline?
   - ✓ Are they process measures, behavioural measures, clinical or health outcome measures.

DOMAIN 6: EDITORIAL INDEPENDENCE (p.38-39)

22. The views of the funding body have not influenced the content of the guideline.

1	2	3	4	5	6	7

Strongly disagree						Strongly agree

a) Is there an explicit statement that the views or interests of the funding or supporting body have not influenced the final recommendations? How true is that statement?
b) Their names, support and non-influence?
    - ✓ Is it the government, professional associations, charity organizations, pharmaceutical companies?

23. Competing interests of guideline development group members have been recorded and addressed.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

a) Is there an explicit statement that all group members have declared whether they have any competing interests?
    - ✓ Is it valid or not included? How?

OVERALL GUIDELINE ASSESSMENT (p.41)

For each question, please choose the response which best characterizes the guideline assessed:

1. Rate the overall quality of this guideline.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. I would recommend this guideline for use.

Yes	
Yes, with modifications	
No	

NOTES

NOTE: The overall assessment requires the AGREE II user to make a judgment as to the quality of the guideline, taking into account the appraisal items considered in the assessment process

Appendix 2: Health facility Checklist (HFC)

(Mostly adapted from UNITAS project and Family Care International)

Interview with person in charge for Paediatric care

FACILITY IDENTIFICATION

001	Name of the facility	

INFORMATION ABOUT INTERVIEW

002	**Interview date**				
	Day.....				
	Month.....				
	Year.....	2	0	1	6

003	Name of the data capturer	

Ask to be shown the location in the facility where paediatric services are provided. Find the person most knowledgeable about infrastructure, protocols and capacity of the health care facilities' paediatric services in the facility. Introduce yourself, explain the purpose of the as stated in the information sheet for interviews (appendix 11).

<u>SECTION 1</u>: Clinical Infrastructure, Equipment and Resources

1.0	What infrastructure and resources are available for paediatric service?	Available, seen	Available, not seen	Not available	Condition
1.1	ICU • What equipment is available and missing?				
	Explain the impact of missing items?				

1.2	Consultation rooms • What equipment is available and missing?				
	Explain the impact of missing items?				
1.3	Ward beds • Are beddings available or missing?				
	Explain the impact of missing items?				
1.4	Ward heating system • What equipment is available and missing?				
	If missing or not in good condition what is the impact on care quality?				
1.5	Laboratory • What equipment is available and missing?				
	Explain the impact of missing items?				

SECTION 2: Clinical management guidelines and protocols

Ask to see copies of each available guideline/protocol

2.0	What severe malnutrition paediatric guidelines/clinical protocols are available at the facility? (Which year? If old; why are you not using recent version?)	Available, seen	Available, not seen	Not available
	Malnutrition			
2.1	IMCI guidelines			
	Explain the impact of missing items?			
2.2	Standard Treatment Guidelines and Essential Drugs List for Hospital Level Paediatrics			
	Explain the impact of missing items?			
2.3	WHO Management of Severe Malnutrition: a Manual for Physicians and Other Senior Health Workers			
	Explain the impact of missing items?			
2.4	South African Standard Treatment Guidelines for severe malnutrition at hospital level			
	Explain the impact of missing items?			

2.5	national guidelines for the management of severe malnutrition			
	Explain the impact of missing items?			

2.6	How often do you think staff members refer to these guidelines/protocols? *Do not read out. Probe and tick best response*.	1 Never; how (in a month)? 2 Rarely; how (in a month)? 3 Regularly; how (in a month)? 4 Do not know
	How do such practices affect service delivery?	
2.7	Are these guidelines/protocols available for reference by staff at all times in accessible areas of the facility? *If NO:* Why not? *Tick all that apply.*	1 Yes 2 No, they are locked for safekeeping 3 No, staff keep them in their homes 4 No, other (specify): _____ 5 Do not know
	How does availability or non-availability of guidelines affect actors' practices?	

SECTION 3: Supplies and essential drugs

3.0	What supplies and essential drugs are available for paediatric service?	Available, seen	Available, not seen	Not available	Condition
	Malnutrition				
3.1	Pre-mixed F-75 or F-100				
	Explain the impact of missing items?				
3.2	ready to use therapeutic food (RUTF)				
	Explain the impact of missing items?				
3.3	intravenous fluids				
	Explain the impact of missing items?				
3.4	Antibiotics				
	Explain the impact of missing items?				

SECTION 4: Referrals

4.1	Is this facility currently implementing a	1 Yes

	referral policy?	2 No
	If yes, Which one (new or old)? If old, why not new? If new, how has it been accepted? If no, why?	
4.2	Do you use a referral form when you refer patients to another health facility?	1 Yes 2 No > Go to (6.4)
	If yes, Which one (new or old)? If old, why not new? If new, how has it been accepted? If no, why?	
4.3	Is the form available at your facility?	1 Yes 2 No
	If not, why?	
4.4	Do you inform referral facilities when you send patients to them?	1 Yes 2 No > Go to (6.7)
4.5	If you do, how do you communicate with them?	1 Radio 2 Land line telephone 3 Mobile/Cell phone 4 referral letter 5 Other (specify): __
4.6	Do any other types of communication exist between your facility and referral	

	facilities in relation to referred patients?	
4.7	When you refer a case to another facility do you get feedback on the outcome of the case? *Tick best response.*	1 Never 2 Less than half of the time 3 More than half of the time 4 Always
4.8	Does your facility have a form to register patients who have been referred back to your facility?	1 Yes 2 No
	Is manual, electronic or manual to be electronically transcribed? If manual, don't you lose data? How do you ensure data is not lost? If not, why?	
4.9	To what facilities do you normally refer pneumonia, diarrhoea and malnutrition? • Give the name of the facility (to crosscheck distance)	1 District hospital 2 Regional hospital 3 Tertiary hospital 4 Community Health centre 5 Other (specify): _____
4.10	How far is that facility, in kilometres? *Enter number of kilometres, one way.*	Kilometres: _____ 98 Do not know
4.11	Does this facility have a working ambulance or other means of transport in place to refer pneumonia, diarrhoea and malnutrition emergency? *If Yes, specify type of emergency*	1 No > Go to (6.16) 2 Yes, ambulance (car/truck/van) 3 Yes, moped/motorcycle 4 Other (specify): _____

	transport system available.	
4.12	Is the ambulance (or other mode of transport) in working condition at all times?	1 Yes 2 No
	Explain	
4.13	Is the ambulance (or other mode of transport) fuelled at all times?	1 Yes 2 No
	Explain	
4.14	Is the ambulance (or other mode of transport) equipped at all times?	1 Yes 2 No
	Explain how? What does it have?	
4.15	Is the ambulance (or other mode of transport) staffed at all times?	1 Yes 2 No
	Explain how? What range of staff?	
4.16	Do you call the Emergency Medical Services (EMS) to arrange for transportation of the patient in case of pneumonia, diarrhoea and malnutrition emergency?	1 Yes 2 No
4.17	On average, how long does it take for the EMS ambulance to come to the health facility? *Reply in minutes or hours.*	Minutes: _____ Hours: _____

	If not around, what other options are there? What is the condition of the other forms of transport? If effective or not; how?	
4.18	What means of communication does your facility have to call for transportation to refer pneumonia, diarrhoea and malnutrition emergency? *Tick all that apply.*	1 None 2 Radio 3 Land line telephone 4 Mobile/Cell phone 5 Other (specify): __
4.19	How often does the clinic supervisor discuss the effectiveness of the referral system with you? By discuss I mean talking to you and looking at information (such as patient movement and communication between facilities) with you to check that the referral system is working well. As well as identifying any problems that needs resolving.	1 Never 2 In the past week 3 In the past month 4 In the past 3 months 5 In the past 6 months 6 In the past year 7 1 year or longer 8 Do not know
	How does it affect the referral service?	
4.20	When referring patients, does your facility refer due to unavailability of equipment or supplies?	1 Yes 2 No 3 Sometimes
	Explain	

4.21	Does your facility receive patients referred from elsewhere? *Elsewhere can be another facility, community health workers, etc.*	1 Yes 2 No > Go to (7.1)
	If yes, give a case example?	
4.22	Does your facility have a form to register referrals from other facilities?	1 Yes 2 No
	If yes, how are they used? If no, why?	
4.23	Do you provide any feedback to referring facilities on referral cases?	1 Yes 2 No
	If yes, how is it done? If no, why?	
4.24	Do you inform referring facilities when you refer patients back to them?	1 Yes 2 No
	If yes, how? If no, why?	

4.25	If you do, how do you communicate with them?	1 Radio 2 Land line telephone 3 Mobile/Cell phone 4 Other (specify): __
4.26	Do you undertake any other types of communication with referring facilities about referral patients? • Are referral cases discussed during management cases?	1 Yes, specify:_____ 2 No
	If yes, how? If no, why?	
4.27	When you receive referrals from the referring facility do you get patients referred according to clinical guidelines?	1 Yes 2 No 3 Do not know

SECTION 5: Facility Perceptions

In your opinion, what are the two greatest challenges facing this health facility right now? What are the solutions to these problems?	
Problems (5.1)	Solutions (6.2)
Problems (5.3)	Solutions (6.4)

In your opinion, what are the two greatest obstacles to increasing the proportion of the limited resources?	
Obstacles (5.5)	Solutions (5.6)
Obstacles (5.7)	Solutions (5.8)

In your opinion, what are the practices that are well done in referring children?	
Ideal (5.9)	Maintenance (5.10)
Ideal (5.11)	Maintenance (5.12)

Appendix 3: Observation and Patient File Review Guide Indicators

Theme	Indicator
SAM Diagnosis	1. MUAC (< 115 mm) 2. Weight for age (growth chart entry) 3. Weigh for height (< -3 SD) 4. Oedema (pedal pitting)
SAM Management	1. Preventing hypoglycaemia (F75 or formula milk) 2. Preventing hypothermia (keeping baby warm) 3. Preventing dehydration (oral or intravenous fluids) 4. Balancing electrolytes (potassium or magnesium) 5. Treating infection (ceftriaxone, ampicillin, amoxicillin, gentamicin and cotrimoxazole) 6. Correcting micronutrients (Vitamin A, zinc, copper, folic acid, multivitamins and iron during F100). 7. Cautious feeding (F75 or formula milk) 8. Transition feeding (F100 or formula milk continuation) 9. Provide stimulation (exercise, structured play or occupational therapy sessions) 10. Follow-up preparation (discharge criteria, summary, education and follow-up plan)
SAM Referral process	1. Referral initiation (call or letter) 2. Documentation (IMCI form, referral letter, diagnosis and management notes, discharge summary) 3. Mode of referral (emergency services, public transport and walking)

Appendix 4: Managers Interview guide

(The ticks are probes to the main question)

Background

1. Can you tell me about your job?
    - ✓ Explain your qualification and duties?
    - ✓ How does your post relate to the under-five children health care services?
    - ✓ Explain your responsibilities based on the length of time you have served in this position (including changes in duties over the time served)?
    - ✓ Explain your additional trainings on child health services management?
    - ✓ Include timeframe and usefulness to handling and referring U5s with case diseases

Before, during and after referral care for child illnesses

2. Describe the referral policy and guidelines used for your facility's management of the malnutrition before, during and after referral?
    - ✓ Do you ever train your team on the referral policy and guidelines for the mentioned under-five illnesses on? If yes, how? If no, why not?
    - ✓ How do you monitor or supervise the adherence to this referral policy and guidelines among actors in your team?
    - ✓ Do you ever give referral performance feedback to the facility workforce? If yes, how? If no, why not?

General Referral Process

3. Describe the referral pathways for children with malnutrition (where to/from)? (crosscheck with referral registers)
    - ✓ Are the referrals appropriate? If yes or no, how?
    - ✓ What do you think about the capacity and distance of the facilities that initiate/receive U5 referrals?
4. How does your facility initiate/receive referrals?
    - ✓ Describe your practices: use of referral forms, treatment in preparation for, during or after referrals, documentation and rehabilitation plans.
    - ✓ Describe how you mentor, supervise or support the actors in the referral process?
    - ✓ Describe your facilities' best and not so well executed SAM case referrals (cases) and your contributions? (give examples)
    - ✓ How are referral requests to and from your facility communicated?
    - ✓ Among referral requests made from/to your facility, are some of them refused, delayed or sent elsewhere?
        i. If so, on what grounds?
    - ✓ How do you accommodate clients' socio-economic wellbeing
5. How do you ensure effective referral processes?
    - ✓ Use of forms and register
    - ✓ Feedback to initiating facilities
        i. On outcome of the referral process
        ii. Outcome of child's health

6. Explain the reasons for initiating or receiving referrals of the 3 case conditions?
    - ✓ Is equipment, inadequate skills, space a factor
    - ✓ How do you intend to improve the referral experiences? (using your management position)
7. How are you accountable for your facility's referral processes?
    - ✓ Do you get supervised? If so how? If not, why?
    - ✓ How do you monitor your performance? (Indicators or policies involved)
    - ✓ How do you communicate your facility (and your own) performance to the workforce guardians of children and other stakeholders?
    - ✓ Explain whether under-five illnesses management and referrals are part of your performance appraisal? If yes, how? If no, why?

Motivators and Morale eradicators

8. As a manager, describe the factors that make the management of child referral cases a good experience?
    - ✓ What is it about you that lead to such experiences (training, experience, passion for the job)? How?
    - ✓ How do your environment, network, team and supervisor contribute to this?
    - ✓ As a manager, how do you maintain or improve the desired outcome of the referral process?
9. Explain the factors that hinder your best performance and adherence to referral policy guidelines when managing referred cases?
    - ✓ What is it about you that lead to such performance (training, experience, passion for the job)? How?
    - ✓ How do your environment, network, team and supervisor hinder your satisfactory performance?
10. How do you intend to resolve any setbacks in the facility as well as your performance in handling under-five children referrals (especially case diseases)? Can you give me examples of successfully executed outcome or a setback?

Feelings about referring/referred cases from lower levels

11. How is your working relationship with superiors in the facility, type of support provided, by whom?
    - ✓ Problem solving, performance management; tasks they do together; mentoring, support
12. Are there useful channels for engaging and communicating with **superiors outside the facility** and **others in your teams**? How do you engage with each other?
13. What existing structures lead to satisfactory pneumonia, diarrhoea and severe malnutrition referrals? How? If not, why?
14. What intervention or modifications do you think can enhance your facility and management performance in referring U5s with pneumonia, diarrhoea and severe malnutrition cases? How?

THANK PARTICIPANT FOR THEIR TIME AND INPUT!!!

Appendix 5: Initiating facility health workers interview guide

(The ticks are probes to the main question)

Background

1. Can you tell me about your job?
    - ✓ Explain your qualification and duties?
    - ✓ How does your post relate to the under-five children health care services?
    - ✓ Explain your responsibilities based on the length of time you have served in this position (including changes in duties over the time served)?
    - ✓ Explain your additional trainings on child health services management?
    - ✓ Include timeframe and usefulness to handling and referring U5s with pneumonia, diarrhoea and malnutrition

Diagnosis, Classification, Care before and during Child Referral

(Ask the following questions separately for pneumonia, diarrhoea and malnutrition)

2. Can you tell me about the policies/protocols that guide your diagnosis of malnutrition?
    - ✓ Name of policy guidelines and how they are used? If not used, why?
    - ✓ How do you diagnose this (case disease) disease? (Criteria and equipment used)
    - ✓ How do you diagnose children of different ages and severity?
    - ✓ How do you decide when to refer a case (guidelines used)
3. How do you clinically stabilize the situation before or in preparation of referral?
    - ✓ Medication and other measures
    - ✓ Are all these steps done in all case diseases? If not, why?
    - ✓ How are stabilization processes done differently for pneumonia, diarrhoea and malnutrition?

General Referral Process

4. Describe the referral pathways for children with malnutrition (where to/from)? (crosscheck with register)
    - ✓ Are the referrals appropriate? If yes or no, how?
    - ✓ What do you think about the receiving facilities capacity and distance?
5. How does your facility initiate referrals?
    - ✓ Describe your practices: use of referral forms, registers, healthcare during referrals, documentation and rehabilitation plans.
    - ✓ Describe how you are mentored, supervised or supported by managers and other actors during the referral process?
    - ✓ Describe your facility's best and not so well executed U5 case (3 case illnesses) referrals and your contributions?
    - ✓ How are referrals requests from your facility communicated?
    - ✓ Among referral requests made from your facility, are some of them refused, delayed or sent elsewhere? If so, on what grounds?
    - ✓ How do you communicate referral information to caretakers?
    - ✓ Do you get feedback from receiving facility?
        i. If yes, how is the information used.

ii. If not, how does it affect your operations?
iii. Do clients have complaints or suggestion box/book (or other means of communication)?

6. Explain the reasons for initiating referrals of malnutrition case conditions?
   - ✓ Is equipment, inadequate skills, space a factor
   - ✓ How do you intend to improve the referral experiences?

Motivators and Morale eradicators

7. Describe the factors that contribute toward desired outcomes in regards to diagnosis, stabilizing and referring malnutrition?
   - ✓ What is it about you that lead to such outcomes (training, experience, passion for the job)? How?
   - ✓ How do your environment, network, team and supervisor contribute to the desired outcomes?
   - ✓ How do you maintain or improve the desired outcome of the referral process and child's health?
8. Explain the factors that hinder outcomes of referral steps of diagnosing, stabilizing and referring children?
   - ✓ What is it about you that lead to such outcomes (training, experience, passion for the job)? How?
   - ✓ How do your environment, network, team and supervisor hinder desired outcomes?
   - ✓ How do you intend to resolve the setbacks in desired outcomes?

Feelings about referring cases to higher levels

9. How is your working relationship with superiors in the clinic, type of support provided, by whom?
   - ✓ Problem solving, performance management; tasks they do together; mentoring, support
   - ✓ Are there useful channels for engaging and communicating with **superiors outside the clinic** and **others in your teams**? How do you engage with each other?
   - ✓ What existing structures lead to satisfactory pneumonia, diarrhoea and severe malnutrition diagnosis, stabilization and referrals? How?
     - If not, why?
10. What intervention or modifications do you think can enhance your performance initiating and stabilizing U5s with pneumonia, diarrhoea and severe malnutrition cases? How?

THANK PARTICIPANT FOR THEIR TIME AND INPUT!!!

Appendix 6: Receiving facility health workers interview guide

(The ticks are probes to the main question)

Background

1. Can you tell me about your job?
    - ✓ Explain your qualification and duties?
    - ✓ How does your post relate to the under-five children health care services?
    - ✓ Explain your responsibilities based on the length of time you have served in this position (including changes in duties over the time served)?
    - ✓ Explain your additional trainings on child health services management?
    - ✓ Include timeframe and usefulness to handling and referring U5s with pneumonia, diarrhoea and malnutrition

Management of child illnesses

(Ask the following questions separately for pneumonia, diarrhoea and malnutrition)

2. Can you tell me about the policies/protocols and guidelines that guide your receiving and first care of referred cases of malnutrition?
    - ✓ Name and how they are adhered across each disease?
    - ✓ If not used, why?
    - ✓ Do you have a routine? For how long has it been used?
    - ✓ How do you handle referred case diseases? (Criteria and equipment)

General Referral Process

3. Describe the referral pathways for children with case diseases (where to/from)? (crosscheck with register)
    - ✓ Are the referrals appropriate? If yes or no, how?
    - ✓ What do you think about the initiating facilities capacity and distance?

4. How does your facility receive referrals?
    - ✓ Describe your practices: use of referral forms, registers, healthcare after receiving referrals, documentation and rehabilitation plans.
    - ✓ Describe how you are mentored, supervised or supported by managers and other actors during the referral process?
    - ✓ Describe your facility's best and not so well executed referrals of U5 cases of pneumonia, diarrhoea and malnutrition (give examples) ?
        i. Explain your contributions?
    - ✓ How are referral requests to your facility communicated?
    - ✓ Among referral requests made to your facility, are some of them refused, delayed or sent elsewhere? If so, on what grounds?
    - ✓ How do you communicate referral information to caretakers?
    - ✓ Do you give feedback to initiating facility?
        i. If, what kind of feedback and for what use?
        ii. If not, how does it affect your operations?

iii. Do clients have complaints or suggestion box/book (or other means of communication)?

5. Explain the reasons for receiving referrals of malnutrition case conditions?
   - ✓ Is equipment, inadequate skills, space a factor
   - ✓ How do you intend to improve the referral experiences?

Motivators and Morale eradicators

6. Describe the factors that contribute toward desired outcomes in regards to receiving, planning rehabilitation and sending feedback to initiating facilities of the case diseases?
   - ✓ What is it about you that lead to such outcomes (training, experience, passion for the job)? How?
   - ✓ How do your environment, network, team and supervisor contribute to the desired outcomes?
   - ✓ How do you maintain or improve the desired outcome of the referral process and child's health?
7. Explain the factors that hinder outcomes of referral steps of receiving, planning rehabilitation and sending feedback to initiating facilities of the case disease?
   - ✓ What is it about you that lead to such outcomes (training, experience, passion for the job)? How?
   - ✓ How do your environment, network, team and supervisor hinder desired outcomes?
   - ✓ How do you intend to resolve the setbacks in desired outcomes?

Feelings about referred cases from lower levels

8. How is your working relationship with superiors in the clinic, type of support provided, by whom?
   - ✓ Problem solving, performance management; tasks they do together; mentoring, support
   - ✓ Are there useful channels for engaging and communicating with **superiors outside the clinic** and **others in your teams**? How do you engage with each other?
   - ✓ What existing structures lead to satisfactory pneumonia, diarrhoea and severe malnutrition diagnosis, stabilization and referrals? How?
     - If not, why?
9. What intervention or modifications do you think can enhance your performance in receiving and managing referrals of U5s with pneumonia, diarrhoea and severe malnutrition cases? How?

THANK PARTICIPANT FOR THEIR TIME AND INPUT!!!

Appendix 7: Transit personnel (life supporters) interview guide

(The ticks are probes to the main question)

Background

1. Can you tell me about your job?
    - ✓ Explain your qualification and duties?
    - ✓ How does your post relate to the under-five children health care services?
    - ✓ Explain your responsibilities based on the length of time you have served in this position (including changes in duties over the time served)?
    - ✓ Explain your additional trainings on child health services management?
    - ✓ Include timeframe and usefulness to handling and referring U5s with case diseases

Transit Management of case illnesses

2. Can you tell me about the policies/protocols that guide your transit care of U5s with pneumonia, diarrhoea and malnutrition?
    - ✓ Name of policy guidelines and how they are used? If not used, why?
    - ✓ How do you manage pneumonia, diarrhoea and malnutrition? (Criteria and equipment used)
    - ✓ How do you care for children of different ages and severity?
2. How do you clinically stabilize the situation during the referral process?
    - ✓ Medication and other measures
    - ✓ Are all these steps done in pneumonia, diarrhoea and malnutrition cases? If not, why? (How are they done differently?)

General Referral Process

3. Describe the referring process for children with malnutrition (where to/from)? (crosscheck with register)
    - ✓ Are the referrals appropriate? If yes or no, how?
    - ✓ What do you think about the initiating and receiving facilities capacity and distance?
        i. To what facilities do you usually acquire referred and deliver U5s referral cases?
    - ✓ How are facilities different in terms of communication?
    - ✓ Describe preferred and problematic referrals? Give examples
    - ✓ How do you handle caretakers of under-five children during a referral transfer?

4. How do you get supervised?
    - ✓ Explain individuals responsible and number of times in a month
    - ✓ How does supervision improve your work?
    - ✓ What hinders supervision's impact on your work? How?
    - ✓ How would you prefer supervision? Give an example of your best supervision experience
5. How do you complete a referral transit?

- ✓ How is referral registers involved? If not, why?
- ✓ Do you get your service performance feedback from initiating and receiving facilities?
    i. If, yes how is the information used.
    ii. If not, how does it affect your operations?

Motivators and Morale eradicators

6. Describe the factors that contribute toward desired outcomes in regards to stabilizing and referring the case diseases?
    - ✓ What is it about you that lead to such outcomes (training, experience, passion for the job)? How?
    - ✓ How do your environment, network, team and supervisor contribute to the desired outcomes?
    - ✓ How do you maintain or improve the desired outcome of the referral process and child's health?
7. Explain the factors that hinder outcomes of referral steps of stabilizing and referring children with pneumonia, diarrhoea and malnutrition?
    - ✓ What is it about you that lead to such outcomes (training, experience, passion for the job)? How?
    - ✓ How do your environment, network, team and supervisor hinder desired outcomes?
    - ✓ How do you intend to resolve the setbacks in desired outcomes?

Feelings about transporting cases to higher levels

8. How is your working relationship with superiors in the initiating and receiving, type of support provided, by whom?
    - ✓ Problem solving, performance management; tasks they do together; mentoring, support
    - ✓ Are there useful channels for engaging and communicating with **superiors outside the facilities** and **others in your teams**? How do you engage with each other?
    - ✓ What existing structures lead to satisfactory pneumonia, diarrhoea and severe malnutrition diagnosis, stabilization and referrals? How?
        - If not, why?
9. What intervention or modifications do you think can enhance your performance referring U5s with pneumonia, diarrhoea and severe malnutrition cases? How?

THANK PARTICIPANT FOR THEIR TIME AND INPUT!!!

Appendix 8: Witwatersrand Ethics Clearance

R14/49 Ms Faith Nankasa Mambulu and Ms Prudence Ditlopo

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M151015

NAME: (Principal Investigator)	Ms Faith Nankasa Mambulu and Ms Prudence Ditlopo
DEPARTMENT:	School of Public Health Kenneth Kaunda and Ngaka Modiri Districts,North West Province
PROJECT TITLE:	Investigating HealthCare Referral System Policies, Guidelines and Practices for Managing Child Illnesses in North West Province of South Africa
DATE CONSIDERED:	30/10/2015
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Prof John Eyles
APPROVED BY:	Professor P Cleaton-Jones,Chairperson, HREC (Medical)
DATE OF APPROVAL:	27/01/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004, 10th floor, Senate House/2nd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report.**

Principal Investigator Signature

Date 3/2/16

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix 9: North West Province Research Approval

health
Department of
Health
North West Province
REPUBLIC OF SOUTH AFRICA

3801 First Street
New Office Park
MAHIKENG, 2735

Enq: Tshiamo Mokate
Tel: 018 391 4504
TMokate@nwpg.gov.za
www.nwhealth.gov.za

POLICY, PLANNING, RESEARCH, MONITORING AND EVALUATION

Name of researcher : **Ms F.N. Mambulu**
University of the Witwatersrand

Physical Address _____
(Work/ Institution) _____
_____

Subject : **Research Approval Letter- Investigating Healthcare Referral Systems Policies, Guidelines and Practices for Managing Child Illnesses in North West Province of South Africa.**

This letter serves to inform the Researcher that permission to undertake the above mentioned study has been granted by the North West Department of Health. The Researcher is expected to arrange in advance with the chosen facilities, and issue this letter as proof that permission has been granted by the Provincial office.

This letter of permission should be signed and a copy returned to the Department. By signing, the Researcher agrees, binds him/herself and undertakes to furnish the Department with an electronic copy of the final research report. Alternatively, the Researcher can also provide the Department with electronic summary highlighting recommendations that will assist the department in its planning to improve some of its services where possible. Through this the Researcher will not only contribute to the academic body of knowledge but also contributes towards the bettering of health care services and thus the overall health of citizens in the North West Province.

Kindest regards

Dr. FRM Reichel
Director: PPRM&E

21/01/2016
Date

LEPAPHA LA BOITEKANELO
DEPARTMENT OF HEALTH
Kgetsang Poso Private Bag X2068
Mmabatho 2735
25 JAN 2016
NORTH WEST PROVINCE
REPUBLIC OF SOUTH AFRICA

Researcher

26/01/2016
Date

Healthy Living for All

Appendix 10: Information sheet for interviews

Formal Title: Investigating Healthcare Referral System policy, guidelines and Practices for Child Illnesses in North West Province of South Africa

What is this doctoral (PhD) research about?

My name is Faith Nankasa Mambulu. I am attached at the Centre for Health Policy (CHP) at the University of the Witwatersrand and doctoral studies (PhD) in the School of Public Health, University of the Witwatersrand.

With regards to this PhD research, I am interested in investigating healthcare referral system policy, guidelines and practices for child illnesses in North West province's district facilities in the vicinity of Ventersdorp and Lehurutse. Referral system policies in this study refers to all national and provincial policies that guide the low level healthcare classification of diseases to refer, care before and during referral as well as receiving facilities (district hospital) practices for received referrals. This study seeks to understand how the content in policies align with referral pathways for under-five children with pneumonia, diarrhoea and malnutrition as well as the practices of the actors working within the system and the factors influencing their practices. In today's interview, we will be focusing on you as an individual, your work experience and qualifications, your knowledge of child healthcare referral policies, practices and explaining how your current role at the district (or province) is related to under-five children referrals. I will be focusing on your role in the district or healthcare facility, what are some of your responsibilities or practices, and what are some of the factors that influence your practices when handling (or making policy) healthcare referral of under-fives with pneumonia, diarrhoea and malnutrition.

I will be talking to a range of people at North West province, district health departments of Kenneth Kaunda and Ngaka Modiri Molema and healthcare facilities (district hospitals, community health centres and clinics) of Ventersdorp and Lehurutse. When the work is finished we will combine all the information and feedback the findings to local and national leaders, health care managers and frontline health workers. We would like to interview you for this research.

***[Where taping]*:** If you agree, the discussion will be tape-recorded to assist later in fully writing up the information. No-one will be identified by name on the tape.

Voluntary Participation

Participation in this study is voluntary. If you agree to help with this research and later change your mind you are free to withdraw at any time. The discussion should take approximately one hour.

Confidentiality

We are not here to inspect or audit the facility (province or district). The information will be used for research purposes only. All the data will be owned by CHP and the School of Public Health, University of the Witwatersrand. Recorded information (written and tape recorded) will be kept in a secure place under lock and key for a period of five years at CHP offices. Thereafter all information will be destroyed. No one other than the main researchers (Faith Nankasa Mambulu and supervisors, Professor John Eyles and Ms Prudence Ditlopo) will be allowed to see or have access to the recorded material and the transcripts. Names of interviewees will not be included and will be kept separate from written transcripts. We will not disclose your identity, or use your name in any reports of this work. The knowledge gained from this research will be shared in summary form, without revealing individuals' identities.

Approval for and benefits of this work

The study has been approved by the Human Research Ethics Committee (Medical) at the University of the Witwatersrand, the North West Province, and Kenneth Kaunda and Ngaka Modiri Molema districts. The study will contribute new ideas and insights to possibly improving the child referral systems for U5s at primary healthcare level.

There are no benefits for participating in the study.

What if I have any questions?

You are free to ask me any question about this research. If you have any further questions about the study, you are free to contact the researcher(s) below:

1. Researcher-Faith Nankasa Mambulu

Centre for Health Policy

Address: 3rd Floor, School of Public Health Building

Education Campus, University of the Witwatersrand

27 St Andrews Road

Parktown 2193

Johannesburg

Telephone / Cell phone/ E-mail:

011 717 3436/061 254 4610 or faith.mambulu@wits.ac.za

2. Supervisor-Professor John Eyles

Centre for Health Policy

Address: 3rd Floor, School of Public Health Building

Education Campus, University of the Witwatersrand

27 St Andrews Road

Parktown 2193

Johannesburg

Telephone / E-mail:

011 717 2200/ john.eyles@wits.ac.za

Appendix 11: Consent Form

I have had the study explained to me. I have understood all that has been read and had my questions answered satisfactorily

□ **Yes please** *tick I* **agree to be interviewed**

□ **Yes please** *tick I* **agree for the interview to be tape-recorded**

I understand that I can change my mind at any stage and it will not affect me in any way.

Signature: _____ Date _____

Time: _____

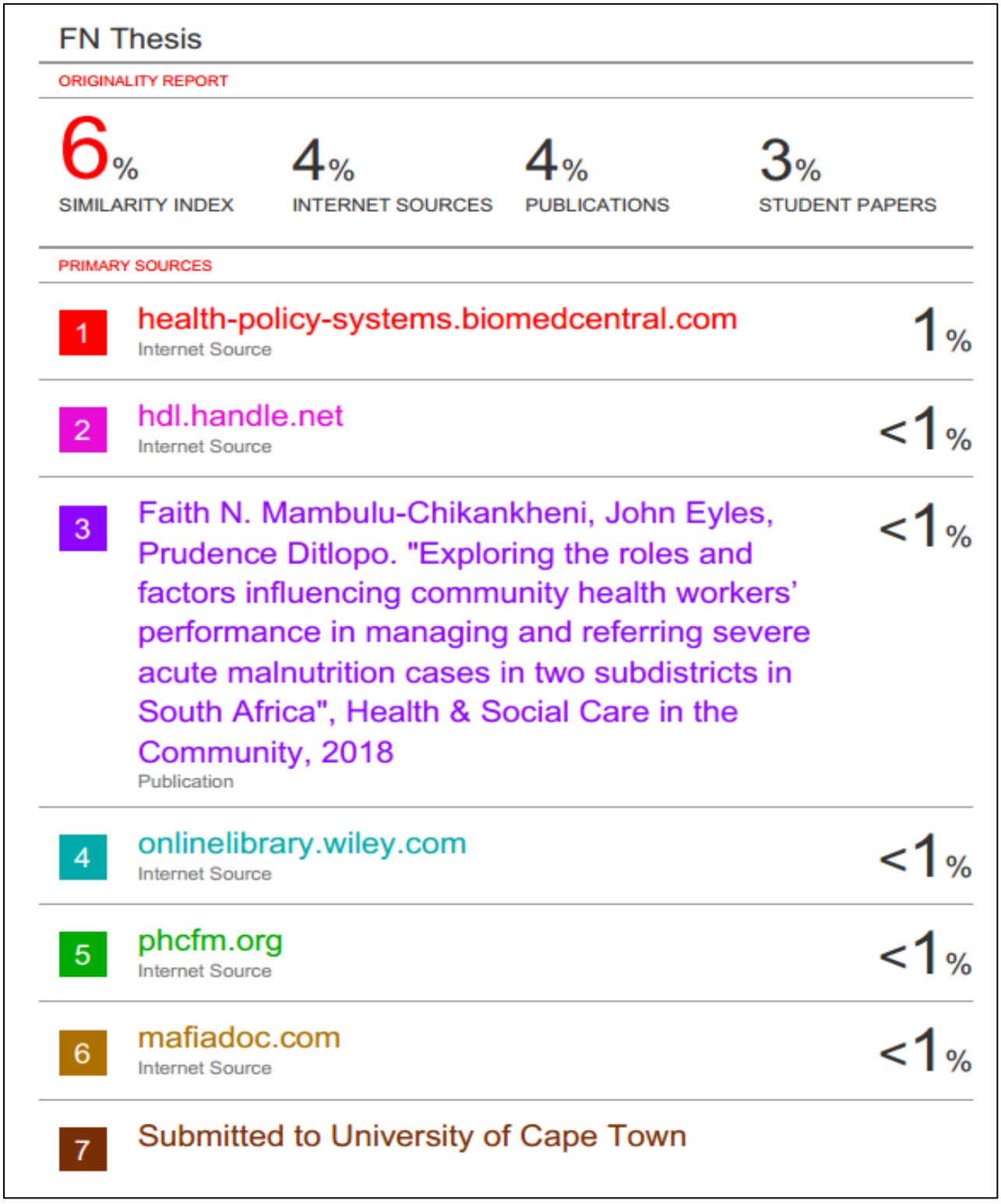
I certify that s/he apparently understood the nature and the purpose of the study and consents to the participation in the study. S/he has been given opportunity to ask questions which have been answered satisfactorily.

Signature: _____ Date _____

Designee/investigator's Name _____ Time: _____

(please print name)

Appendix 12: Turn it in Report



FN Thesis

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