

**COVERAGE AND BARRIERS TO ACCESS FOR SEVERE ACUTE
MALNUTRITION (SAM) SERVICES IN THE TAMALE METROPOLIS
OF NORTHERN REGION**

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OF NORTHERN REGION**

BY

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(UDS/CHD/0182/14)**

**A THESIS SUBMITTED TO THE DEPARTMENT OF PUBLIC HEALTH,
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DEGREE IN COMMUNITY HEALTH AND DEVELOPMENT**

JULY, 2018



I certify that this thesis is the result of my own work and that no previous submission has been made for any degree in any university. Authors whose works I consulted have been duly acknowledged.

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I hereby declare that this thesis was supervised in accordance with the guidelines on supervision of thesis by the University for Development Studies.

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DATE



Malnutrition remains a major public health problem throughout the developing world. For many decades, the only effective treatment for children with Severe Acute Malnutrition (SAM) was based primarily on Inpatient Care. The treatment approach however changed with the introduction of the community-based management of acute malnutrition (CMAM) where a ready-to-use therapeutic food (RUTF) is used. A cross-sectional study was conducted using Simplified Lot Quality Assurance Sampling Evaluation of Access and Coverage (SLEAC), a two-stage sample in the Tamale Metropolis to assess the coverage and barriers to access for SAM treatment services. A mixture of quantitative and qualitative data collection techniques was used. Interviews were conducted among caregivers of children 6-59 months with SAM and service providers (CMAM facilities) while focus group discussions were held among key opinion leaders in four (4) selected communities. The quantitative data was analyzed using SPSS (version 18.0) using the LQAS (Lot Quality Assurance) principles, while the qualitative data was analyzed manually based on thematic areas. Bivariate analysis was done to determine the association between selected factors and uptake of CMAM services. A total of 24 communities were randomly selected for the study and 173 children aged 6-59 months were screened, out of which 12.1% were suffering from SAM. CMAM coverage was found to be 38.1%; described as moderate. Lack of child care/help with children, health facility is too far away, lack of means of transport to OPC sites, financial constraints, ignorance of the CMAM programme, needed to be referred but there is no one to do this, previous rejection of sibling and shortage of Ready-to-use therapeutic food were reported as barriers to access to SAM treatment by respondents. Lack of child care/help with children was identified as the only socio-economic factor that had significant association with uptake of CMAM services ($p=0.007$). Overall, mothers' knowledge on CMAM service was found to be 50%. Quality of CMAM services in the Metropolis was also found to be poor. The Tamale Metropolitan Health Directorate should therefore task all health staff to conduct periodic active case search to improve coverage and ensure early detection and treatment of SAM cases and also train all staff rendering services on the CMAM module.



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DEDICATION

This work is dedicated to my dearest husband (Bernard Ofofu-Apea)

UNIVERSITY FOR DEVELOPMENT STUDIES



TABLE OF CONTENTS

DECLARATIONi

ABSTRACTii

ACKNOWLEDGEMENTSiii

DEDICATIONiv

TABLE OF CONTENTS v

LIST OF TABLES x

LIST OF FIGURES xi

LIST OF ABBREVIATIONSxii

CHAPTER ONE 1

INTRODUCTION 1

 1.1 Background to the study..... 1

 1.2 Problem Statement 3

 1.3 Research Questions 4

 1.4 Aim and Objectives of the study 4

 1.7 Conceptual Model 7

CHAPTER TWO 10

LITERATURE REVIEW 10

 2.1 Introduction 10

 2.2 Malnutrition 10

 2.3 Causes of malnutrition 12

 2.4 History and the nature of the nutritional deficiency..... 13

 2.5 The burden of malnutrition in children 15

 2.6 Consequences of malnutrition in children..... 16

 2.7 Possible Risk Factors for SAM..... 18



	www.udsspace.uds.edu.gh	
2.8	Classification and epidemiology of severe acute malnutrition	20
2.9	The treatment of severe acute malnutrition during emergencies	22
2.9.1	Modern management protocols.....	23
2.9.2	Delivery of treatment	25
2.9.3	Management of severe acute malnutrition	26
2.10	Community-based management of acute malnutrition (CMAM).....	29
2.10.1	The conceptual basis for a community-based approach	35
2.11	Antibiotic Treatment of SAM	39
2.12	Challenges in the management of severe acute malnutrition.....	40
2.13	Treatment outcomes of children with complicated SAM	41
2.14	Effect of HIV and tuberculosis on SAM Children.....	42
2.15	Treatment at home and in the community.....	42
2.15.1	Ready-to-use therapeutic food	44
2.16	Quality of Community-based Management of Acute Malnutrition (CMAM) Services	46
2.17	Coverage levels and barriers to access for CMAM services.....	47
2.17.1	Household Economic Status	49
2.17.2	Mother's Educational Status	50
2.17.3	Women's Status Relative to Men.....	51
2.17.4	Mother's Employment Status.....	51
2.17.5	Water and Sanitation	52
2.18	How to Prevent SAM.....	53
2.18.1	Giving Adequate Nutrition and Disease Prevention	53
2.19	Review of Other Related Works (Empirical Evidence).....	53
2.20	Summary	67



CHAPTER THREE.....	www.udsspace.uds.edu.gh	68
METHODOLOGY.....		68
3.1 Study Area.....		68
3.2 Study Design.....		69
3.3 Study Population.....		69
3.4 The SLEAC method sample size estimation.....		69
3.5 Sampling technique.....		71
3.6 Independent and dependent Variables.....		72
3.7 Data Collection Methods and Tools.....		72
3.7.1 Questionnaire.....		73
3.7.2 Collection of qualitative data.....		73
3.8: Identification of High and Low Coverage Areas.....		74
3.9 Recruitment of Research Assistants.....		75
3.10 Data Analysis.....		75
3.11 Ethical Consideration.....		76
CHAPTER FOUR.....		77
RESULTS.....		77
4.1 Introduction.....		77
4.2.1 Socio-demographic characteristics of SAM children.....		77
4.2.2 Socio-demographic characteristics of respondents.....		78
4.3 Prevalence of severe acute malnutrition (SAM).....		79
4.4 Treatment coverage for SAM.....		80
4.5 Distribution of high and low treatment coverage areas within the Tamale Metropolis.....		80



4.6 Caregivers' knowledge on the services provided for children with severe acute malnutrition.....	81
4.7 Mothers' perspective of the causes of SAM in their children.....	83
4.7.1 Whether or not mothers know where SAM could be treated.....	84
4.7.2 Places where SAM could be treated	84
4.8 Accessibility of CMAM service provided at OPC sites.....	85
4.9 How SAM children got onto the CMAM program.....	87
4.10. Relationship between socio-economic factors and access to SAM treatment services	88
4.11 Barriers to access for treatment of SAM.....	89
4.12. Results from Focus Groups Discussions, Key informant interviews and In-depth interviews	89
4.12.1 Knowledge and practice on SAM and the CMAM program at the community level.....	89
4.12.2 Causes of SAM and misconceptions.....	90
4.12.3 Quality of CMAM services	91
4.12.4 Barriers that prevent mother from accessing CMAM services.....	92
CHAPTER FIVE.....	93
DISCUSSION	93
5.1 Prevalence of severe acute malnutrition (SAM)	93
5.2 Treatment coverage for SAM.....	93
5.3 Distribution of high and low treatment coverage areas within the Tamale Metropolis	94
5.4 Caregivers' knowledge and practices on services provided for children with severe acute malnutrition	95



5.5 Mothers' perspective of the causes of SAM in their children.....	96
5.6 Barriers to access for treatment of SAM.....	97
5.7 How SAM children got onto the CMAM program.....	98
5.8 Accessibility of CMAM service provided at OPC sites.....	99
5.9 Quality of CMAM services in the Tamale Metropolis	100
5.10 Relationship between socio-economic factors and access to SAM treatment services in the Tamale Metropolis	102
CHAPTER SIX	103
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.....	103
6.1 Introduction.....	103
6.2 Summary of main findings.....	103
6.3 Conclusion	105
6.4 Recommendations	106
6.5 Study limitations	107
REFERENCES.....	107
APPENDICES	124
Appendix I: Consent Form.....	124
Appendix II: Field Questionnaire- Questionnaire for Households with SAM Cases	125
Appendix III: Screening/case search Form.....	129
Appendix IV: In-depth Interview Guide.....	129
Appendix V: Key Informant Interview	131
Appendix VI: Focus Group Discussion Guide.....	133
Appendix VII: FOCUS GROUP DISCUSSION GUIDE.....	135
Appendix VIII: Screening Case Search Form.....	137
Appendix IX: Case Search Referral Form	138



LIST OF TABLES

Table 4.1: Socio-demographic characteristics of respondents and their children.....	78
Table 4.2: Prevalence of severe acute malnutrition (SAM).....	79
Table 4.3: Classification of treatment coverage by sub districts	80
Table 4.4: Knowledge level of caregivers on the CMAM program	81
Table 4.5: Mothers' awareness of SAM and the CMAM program.....	82
Table 4.6: Barriers to access to CMAM treatment	89
Table 4.7: How SAM children got onto the CMAM program.....	87
Table 4.8: Accessibility of CMAM service provided at OPC sites	86
Table 4.9: Bivariate analyses of the association between selected factors and uptake of CMAM services ($n = 21$).....	88



LIST OF FIGURES

Figure 1.1: Conceptual Model.....7

Figure 4.1: Treatment coverage of SAM, Field Survey, 2018.....80

Figure 4.2: Mothers’ perspective of the causes of SAM.....83

Figure 4.3: Whether or not mothers’ know where SAM could be treated.....84

Figure 4.4: Places where SAM could be treated.....85



CMAM	Community-Based Management of Acute Malnutrition
CTC	Community Therapeutic Centre
DEF.	Defaulter
EBF	Exclusive Breast Feeding
FGD	Focus Group Discussion
GDHS	Ghana Demographic and Health Survey
GSS	Ghana Statistical Service
HCs	Health Centres
HIV	Human Immunodeficiency Virus
IMCI	Integrated Management of Childhood Illnesses
IPC	Inpatient Care
IYCF	Infant and Young Child Feeding
KII	Key Informant Interview
MAMI	Management of Acute Malnutrition in Infants
MOs	Medical Officers
MOH	Ministry of Health
MSF	Médecins Sans Frontières
MUAC	Mid Upper Arm Circumference
NCHS	National Centre for Health Statistics
Non-R	Non-Recovery
OPC	Outpatient Care
OTP	Outpatient Therapeutic Programme
PEM	Protein Energy Malnutrition
PSUs	Primary Sampling Units



RUTF	www.udsspace.uds.edu.gh Ready-to-Use Therapeutic Food
SAM	Severe Acute Malnutrition
SAU	Severe Acute Undernutrition
SD	Standard Deviation
SLEAC	Simplified Lot Quality Assurance Sampling Evaluation of Access and Coverage
SQUEAC	Semi-Quantitative Evaluation of Access and Coverage
TFC	Therapeutic Feeding Centre
TFU	Therapeutic Feeding Unit
UN	United Nations
UNICEF	United Nation Children's Fund
WASH	Water, Sanitation and Hygiene
WFP	World Health Organization
WHO	World Health Organization
WHO-GS	World Health Organization Child Growth Standards
WHZ	Weight-for-Height Zscore



INTRODUCTION

1.1 Background to the study

Malnutrition remains a major public health problem throughout the developing world and is an underlying factor in over 50% of the 10-11 million children under 5 years who die each year of preventable causes (Rice et al.,2000; Caulfield et al.,2002; Black et al.,2003; Pelletier et al., 2003).

Acute malnutrition is a condition associated with high rates of morbidity and mortality among children under five years and requires specialized attention in its management (Collins et. al., 2006). Globally, acute malnutrition, both moderate and severe is reported to trigger more than 50% of childhood mortality in children under 5 years old and about 3.5 million children die from malnutrition each year (Park et al., 2012). The risk of mortality increases with severity of acute malnutrition and Severe Acute Malnutrition (SAM) affects nearly 20 million children under-fives and contributes to one million child deaths yearly (UNICEF 2007; Black et al.,2008). About 2% of children with SAM live in developing countries (UNICEF 2001) and most of them (9% and 15%) are found in Sub-Saharan African and South Asian respectively (UNICEF 2001; UNICEF 2005).

SAM as defined by WHO/UNICEF includes nutritional oedema and severe wasting as defined by weight-for-height z-score (WHZ) below -3 standard deviations (SD) or mid upper arm circumference (MUAC) <115 mm (UNICEF 2007; Prudhon et al.,2006).

According to the GDHS (2014), about 5 percent of children under the age of five years are reported to be wasted in Ghana. However, wasting among children under the age of five years in the Northern Region of Ghana was reported to be higher (6.3%) compared to the national figure.



For many decades, the only effective treatment for children with SAM was based primarily on Inpatient Care (often hospitals or rehabilitation centre) with fortified milk formulas resulting in congestion, low coverage rates with high mortality, as malnourished cases were identified at very bad state, often plagued with complications. The treatment approach however changed with the introduction of the community-based management of acute malnutrition (CMAM) where a ready-to-use therapeutic food (RUTF) is used.

CMAM is a proven public health intervention for the management of SAM based on the principles of coverage, access and cost-effectiveness (Collins et al., 2006). The model attempts to maximize population-level impact by focusing on providing effective therapeutic care to the majority of acutely malnourished children at community level as outpatients, using techniques of community mobilization to engage the affected population and maximize coverage and compliance and wherever possible, programmes build on local capacity and existing structures and systems, helping to equip communities to deal with future periods of vulnerability (Collins et al., 2006).

The CMAM programme targets and treats children suffering from severe acute malnutrition using a combination of three treatment modalities, inpatient care, outpatient care and supplementary feeding according to their clinical and anthropometric characteristics at presentation (Collins et al., 2006). Those with severe acute malnutrition without medical complications are treated at Outpatient care (OPC) and clients registered on the programme are required to attend OPC weekly or fortnightly to receive Ready to Use Therapeutic Food (RUTF), a course of oral based broad-spectrum antibiotics, anti-helminth treatment, folic acid



supplementation, and www.udsspace.uds.edu.gh if appropriate vitamin A supplementation, measles vaccination and anti-malarial treatment. Acutely malnourished children with additional serious medical complications are however treated at the Inpatient care site (specialized hospital) until they are well enough to be transferred to an OPC site (WHO, 1999).

The CMAM Programme was introduced in Ghana in June, 2007 and the Northern Region started to implement the programme in 2010 with only four districts on board. Currently, all the twenty-six (26) districts in the region are implementing the programme. Tamale Metropolis, one of the beneficiary districts has been implementing the programme since 2012 with 15 OPC sites. A review of the programme showed that though the Metropolis is having high levels of malnutrition, it performed poorly in terms of treatment and geographical coverage. Treatment coverage is the proportion of children with severe acute malnutrition (SAM) who receive therapeutic care.

According to Sphere guidelines of 2011, coverage of CMAM services in urban areas is expected to be >70 %. CMAM treatment coverage is defined as the proportion of children with severe acute malnutrition (SAM) who receive therapeutic care. The factors that affect coverage include acceptability of the service, location and accessibility of program sites, security situation, frequency of distributions, waiting time, service quality, extent of mobilization, extent of home visiting and screening, and admission criteria alignment (CMAM FORUM, 2012).

1.2 Problem Statement

Tamale Metropolis is one of the implementing districts of the CMAM programme in the Northern Region with fifteen (15) treatment sites. Since the inception of the programme, the Metropolis is reported to be among the worst performing district in the region based on the programme indicators. Only 32.4% of SAM cases in the Metropolis were detected and registered in 2014. Defaulter rate has consistently



increased from 34.6% in 2012 to 41.7% in 2014 and cure rate decreased from 58.4% in 2012 to 56.2% in 2014.

The quality of the SAM treatment services in the Metropolis is unknown. Furthermore, the demand-side barriers of the CMAM programme in the Metropolis have not been documented. The study therefore aims to assess the barriers and boosters to access for SAM treatment services in the Tamale Metropolis.

1.3 Research Questions

- I. What is the treatment coverage of Severe Acute Malnutrition in the Tamale Metropolis?
- II. Which areas within the Tamale Metropolis have high or low coverages
- III. What are the barriers to access for treatment of SAM among mothers/caregivers of children with SAM who are not enrolled in the CMAM programme in the Metropolis?
- IV. What is the quality of service provided by health care providers to children with SAM in the Tamale Metropolis?
- V. What is the perspective of caregivers about the causes of malnutrition in the Tamale Metropolis
- VI. What is the relationship between socio-economic factors and access to SAM services among caregivers of children with SAM in the Tamale Metropolis.

1.4 Aim and Objectives of the study

The main aim of the study was to assess treatment coverage and the barriers to access for severe acute malnutrition services in the Tamale Metropolis.

The specific objectives were to:

- i. Assess the treatment coverage of Severe Acute Malnutrition (SAM) in the Tamale Metropolis.



- ii. Identify high and low coverage areas within the Tamale Metropolis, www.udsspace.uds.edu.gh
- iii. Assess caregiver's knowledge on the services provided for children with severe acute malnutrition in the Tamale Metropolis.
- iv. Identify the caregiver's perspective of the causes of malnutrition in Tamale Metropolis.
- v. Assess the quality of services provided by health care providers to children with SAM in the Tamale Metropolis.
- vi. Ascertain the relationship between socio-economic factors and access to SAM treatment services among caregivers of children with SAM in the Tamale Metropolis.
- vii. Identify barriers to access for treatment of SAM among mothers/caregivers of children with SAM who are not enrolled in the CMAM programme.

1.5 Significance of the study

The development of MAM is inevitable when the right nutrition and health practices are not attained, and this condition can eventually graduate into SAM especially when all the factors such as inadequate intake of micronutrients and poor hygiene practices are in place (Lenters et al., 2013).

Most nutrition interventions focus on the children and their caregivers and how to get them rehabilitated. However, caregivers of SAM children with less knowledge on the causes of SAM, its prevention and even the general process of managing a SAM child are highly likely to experience relapse even after they have been rehabilitated through intervention programs. The findings of this research will therefore provide firsthand information about the barriers to the successful implementation of the CMAM programme in the Tamale Metropolis to improve quality of care for children (6-59mths) with SAM. The study will also provide data



for policy makers on www.udsspace.uds.edu.gh appropriate strategies to the implementation of the CMAM programme.

Finally, the study will serve as a future reference for researchers on the subject matter.



1.7 Conceptual Model

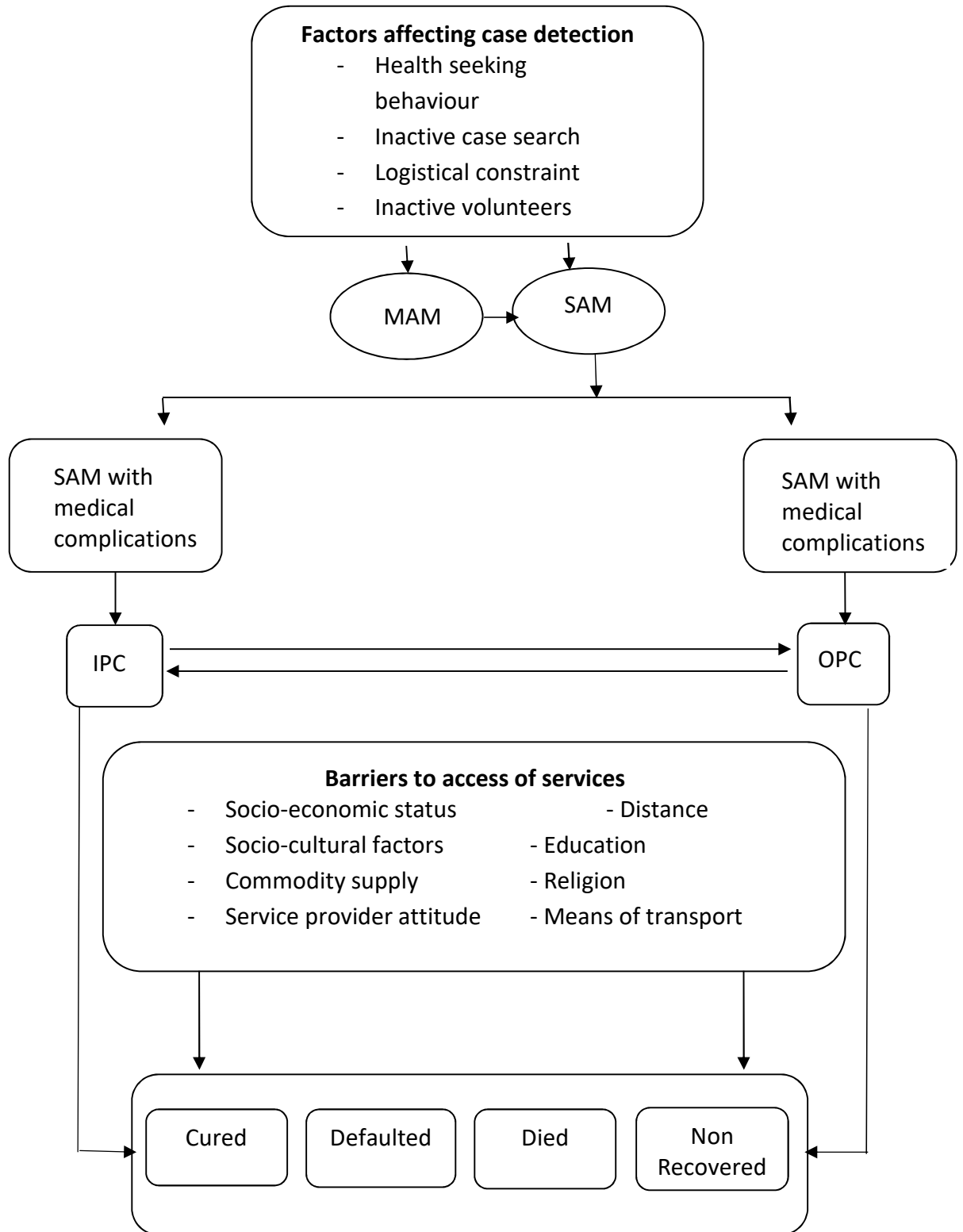


Figure 1.1: Conceptual Model



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The causes of malnutrition are multifaceted and seeking early treatment is essential. Several factors could hinder the detection of SAM cases at the population level. Some of these factors could include beliefs and culture, performance of treatment sites, effectiveness of case detection and referral network as well as availability of logistics. In most traditions, SAM is not linked to poor feeding but rather as a result of witchcraft and therefore treated by traditional healers and religious homes. In some areas, stigma as a result of the appearance of the child prevents people from seeking treatment at all. Poor performance of a treatment site could affect coverage as the population lose trust in the services provided by the health system and then seek treatment somewhere else. Poor attitude of service providers could also be a contributive factor to low case detection and hence a low coverage of the CMAM programme.

SAM cases detected are either treated at OPC or IPC based on the classification. SAM cases with medical complications are admitted and treated at IPC while those without medical complications are admitted and treated at OPC. It is expected that, all the cases detected and registered onto the CMAM programme recover successfully. However, some implementing centres experience difficulties including low case recovery and certain barriers could have affect the effective utilization of the services of the programme leading to undesirable outcomes such as defaulting, death and non-recovery (not responding to treatment). Some of these barriers could include socio-economic status, distance, socio-cultural factors, education, commodity supply, religion, service provider attitude, means of transport among others.



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Based on this assertion, the study developed the model above to assess the coverage and barriers to access for severe acute malnutrition services in the Tamale Metropolis

Hence, improving access for SAM treatment services requires the need to focus on the factor affecting both coverage and utilization resulting in effective implementing of the programme.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter deals with review of literature that are related to the topic under consideration. The literature relevant to the topic under discussion includes, the burden of malnutrition in children, magnitude and consequences of malnutrition in children, the concept of Community-Based Management of Acute Malnutrition (CMAM) as well as coverage and barriers to CMAM services.

2.2 Malnutrition

Malnutrition is defined by the standard medical dictionaries as “any disorder resulting from a deficiency or excess of one or more essential nutrients (Wiley & Sons, 1986). In the developing world this is generally characterised as under-nutrition or protein energy malnutrition (PEM) whereby there exists varying degrees of deficiencies in essential nutrients. A child’s body responds to PEM in two ways that can be measured by anthropometry: a deceleration or cessation of growth, which in the long-term results in low height for age or stunting; and body-wasting and/or nutritional oedema, which are short term responses to inadequate nutritional intakes that often occur in combination with infection. Wasting is commonly assessed by weight relative to height and nutritional oedema by the presence of bi-pedal pitting oedema (Waterlow, 1992).

The indicators height for age and weight for height thus discriminate between different biological processes and result in different clinical, bio-chemical and functional characteristics. Under weight or low weight for age is a composite indicator that depicts both stunting and wasting and is used as an official indicator of progress towards achieving the first Millennium Development Goal (MDG):



www.udsspace.uds.edu.gh eradication of extreme poverty and hunger (UN, 2004). The most recent UN Standing Committee for Nutrition's 5th report on the World Nutrition Situation estimates that the Latin America and Caribbean region is on track to meet this MDG, Asia is close to meeting it, but in Africa, the gulf between projected rates and the MDG is widening (UN, 2004). It is estimated that 26.5% of children under 5 years of age in developing countries are stunted or chronically undernourished with the highest levels occurring in sub Saharan Africa, where on average 34.5% of children are affected. In their State of the World's Children Report 2007, UNICEF estimates that wasting affected 10% of children under 5 in developing countries between 1996 and 2005, and whilst Asia has the highest prevalence. Africa is the only region where wasting continues to rise (UNICEF, 2007).

It is not, the numbers that give rise to concern but rather the effects that malnutrition has on host populations. Starting with Pelletier's work in the 90s, many studies now estimate that malnutrition is an underlying factor in over 50% of the 10-11 million children under 5 years who die each year of preventable cause. This malnutrition encompasses stunting, wasting, intra-uterine growth retardation (or low birth weight) and deficiencies of essential vitamins and minerals (collectively referred to as micronutrients). It is important to note that the risk of death increases with descending Z scores for all categories of malnutrition: underweight, stunting, or wasting; as well as for infants born with low birth weight. Although this thesis focuses on 'severe acute malnutrition' (those children that are severely wasted) the number of young children that are stunted or born low birth weight are of great relevance to the discussion presented here; not only are they present in much greater numbers across the world, but children that suffer



from these conditions www.udsspace.uds.edu.gh are much more likely to develop severe wasting than those of normal birth weight and normal height for age (Black, 2008)).

The link between malnutrition and child mortality is as a result of compromised immunity. Malnutrition and infection are intertwined in a synergistic vicious cycle (Black, 2008). Malnutrition reduces immunity and raises the risk of mortality by increasing the likelihood that the illness will be prolonged or become severe. A more prolonged or severe illness is more likely to cause and/or aggravate malnutrition by causing appetite loss, malabsorption, metabolic changes and behavioural changes which affect feeding practices and thus deplete body nutrient stores. This relationship results in a potentiating effect on child mortality (Pelletier 1993). The WHO discussion paper entitled “Turning the tide of malnutrition; responding to the challenge of the 21st century”, summarises the effects of malnutrition worldwide (NHD/WHO, 2000):

- Malnutrition kills, maims, cripples and blinds on a massive scale worldwide.
- Malnutrition affects one in every three people worldwide, afflicting all age groups and populations, especially the poor and vulnerable.
- Malnutrition plays a major role in half of the 10.4 million annual child deaths in the developing world; it continues to be a cause and consequence of disease and disability in the children who survive.
- Malnutrition is not only medical; it is also a social disorder rooted in poverty and discrimination.
- Malnutrition has economic ripple effects that can jeopardize development.

2.3 Causes of malnutrition

The causes of malnutrition are multifaceted and a number of models have been developed in an attempt to explain them. Currently, the most widely use was first published by UNICEF in 1990 and is titled “The Causes of Malnutrition”. This



www.udsspace.uds.edu.gh framework was incorporated within the original Sphere Project's minimum standards for humanitarian response as the conceptual basis for all nutrition-related assessment and analysis in humanitarian response (SPHERE, 1999). It therefore remains the basis of a public nutrition approach to assessment and analysis within nutritionally vulnerable populations (Young, 1999). It encompasses the concepts of the primary causes of malnutrition; the synergistic relationship between inadequate food intake and infectious diseases, which in turn, result from a combination of three main secondary causes that relate to the nutrition, social and health environment of the child.

2.4 History and the nature of the nutritional deficiency

In 1932, Cecily Williams reported her findings about a disease found in very young children in the Gold Coast (Golden, 2002). At about the same time, Trowell reported similar cases from Uganda (Golden, 2002). By the late 1940s, scientists had agreed that the two syndromes were the same and called it 'Kwashiorkor' (literally meaning 'the disease of the deposed baby when the next one is born'). At this time the attention of nutritional scientists was largely concentrated on the vitamins and it was thought that nutritional oedema might be a manifestation of vitamin B deficiencies. William's work however showed that kwashiorkor developed in children weaned on starchy paps and that milk could cure it. So, emerged the 'protein deficiency' theory of severe malnutrition and in 1963 Williams said explicitly: kwashiorkor is a disease primarily due to protein deficiency. However, dietary studies began to show that children with both marasmus and kwashiorkor had inadequate intakes of energy as well as protein. This led to the concept of a spectrum of combined deficiency called 'protein energy malnutrition' (PEM), with protein being most limiting at the kwashiorkor end and energy at the marasmus end (Golden, 2002). In the 70s, work in Jamaica



www.udsspace.uds.edu.gh demonstrated that children with kwashiorkor fed a low protein diet improved more rapidly than those fed higher protein diets and that the rate of loss of oedema was entirely independent of the protein content of the diet. With this work, the early argument that kwashiorkor was the result of protein deficiency was judged to be fallacious and nutrition scientists began the search for alternative explanations of the different syndromes seen in malnutrition. Work started by Waterlow in Jamaica in the 50s and 60s and later developed by Golden in the 80s suggested that kwashiorkor might be caused by antioxidant depletion as a result of an imbalance between the production of free radicals and their safe disposal (Golden, 2002). Linked to this, Golden classified nutrients into those that cause specific clinical signs (type I) and those that cause growth failure (type II).

He hypothesised that wasting is caused by a severe deficiency of type II nutrients that result in tissue catabolism in association with anorexia. Kwashiorkor on the other hand, according to the free radical theory, occurs when patients lacking type I nutrients suffer from tissue damage and free radical production. A recent randomised controlled trial in Malawi that provided antioxidant supplementation to prevent kwashiorkor has cast some doubt however on the free radical hypothesis (Ciliberto et al., 2005). It found that antioxidant depletion may be a consequence rather than a cause of the condition and suggested, as an alternative hypothesis, that variant isozymes or variations in concentrations of enzymes in the metabolic pathways might permit the development of kwashiorkor in some children with poor diets. Alternative theories proposed that the toxic effects of aflatoxins directed primarily towards the liver could account for many of the clinical features of kwashiorkor (Househam & Hundt, 1991). However, later papers discredited this



theory (WHO, 1999). www.udsspace.uds.edu.gh Thus, the explanation of the pathogenesis of kwashiorkor continues to evade us.

2.5 The burden of malnutrition in children

The burden of malnutrition is defined as the estimation of the total number of malnourished cases in a population over a specified time period (UNICEF 2012). Black et al (2013), in their recent publication in the Lancet Series of Maternal and Child Nutrition indicated that, the burden (in terms of prevalence) of child underweight, wasting and stunting has declined since 1990.

It is estimated that 26.5% of children under 5 years of age in developing countries are stunted or chronically undernourished with the highest levels occurring in sub Saharan Africa, where an average 34.5% of children are affected (UNICEF, 2012). In 1990, the number of children who suffered from underweight, wasting and stunting were 159 million, 58 million and 235 million respectively (UNICEF, 2012). These numbers have dropped by end of 2012 e.g. underweight levels have dropped by 36%, wasting by 11% and stunting by 35% (Black et al., 2013). According to Gretchen et al (2012), the largest reduction in stunting rate was reported in Asian countries.

Africa remains the only region in the world where progress has been slow, and reports in the last 10 years indicates that the prevalence of stunting and severe wasting has been increasing in sub-Saharan African (Gretchen et al, 2012). It is estimated that, globally around 20 million children under five years of age are currently suffering from the severest form of malnutrition (UNICEF, 2012). The majority of the cases are concentrated in 36 countries and two regions namely South Asia and Sub-Saharan Africa countries have more than 90% of the cases (WHO, 2002; UNICEF, 2012).



In Ghana, 18.8%, 4.7% and 11.0% of children under five years are said to be stunted, wasted and underweight respectively while 33.1%, 6.3% and 20.1% of the under-five children in northern region of Ghana are respectively stunted, wasted and underweight. This indicates higher prevalence of malnutrition in Northern Region of Ghana than the national average figures (GDHS, 2014). Saaka et al., (2015) also found the prevalence of stunting, wasting and underweight among children 6-23 months in northern Ghana to be 20.5%, 11.5% and 21.1% respectively. The higher prevalence of malnutrition in Northern Ghana than the national figures is against the numerous interventions by various actors particularly NGOs to reduce the prevalence of malnutrition in Northern Ghana.

2.6 Consequences of malnutrition in children

Malnutrition affects one in every three people worldwide, afflicting all age groups and populations, especially the poor and vulnerable (Golden, 2000). Malnutrition plays a major role in half of the 10.4 million annual child deaths in the developing world; it continues to be a cause and consequence of disease and disability in the children who survive (Golden, 2000).

If not treated, malnutrition can have detrimental consequences on children's health and development. Kauffmann and colleagues in the mid-80s noted that malnutrition could limit children's ability to respond to stress and make them more vulnerable to infectious diseases (Kauffmann et al., 1986). Golden (2000) added that severe malnutrition exposes children to high morbidity and mortality risk and explained that children's resistance to infections is lowered when they are severely wasted, putting them at an increased risk of death from common ailments like diarrhoea, respiratory tract infections and other infectious diseases. Kaufmann and colleagues further pointed out that early change in the immune system response can also occur. These include impaired lymphocyte response, impaired



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phagocytosis secondary to decreased complement of certain cytokines, as well as decreased secretory immunoglobulin A (IgA). These changes further predispose children to severe and chronic infections (Kaufmann et al., 1986). Pipes and Trahms (1993) take this further and stated that chronic infections as a result of a weak immune system lead to a compromised nutritional status in children, resulting in anorexia, decreased nutrient absorption, increased metabolic needs and direct nutrient loss.

According to WHO (2005), when children are malnourished prior to their second birthday, they suffer irreversible physical and cognitive damage, which could have an impact on their health and development in later life. Black and others are of the view that severely malnourished children who survive the condition are more likely to be below average height when they reach adulthood, and give birth to smaller or low birth weight children (Black et al., 2008; Bennett, 2009; Saul et al., 2008; Schubl, 2010).

Malnutrition also has some social, behavioural and psychological consequences. Studies conducted in Jamaica in the early 80s by Graham-McGregor and colleagues found that children who are affected by malnutrition exhibit marked behavioural changes in the acute stages (Graham-McGregor et al., 1983). They found that malnourished children are more apathetic, less active and also irritable when disturbed. The findings also showed that such children explore their environment less, using few types of manipulation compared to well-nourished children. According to Tomkins and Watson (1993), when such children are iron deficient in addition, they tend to have learning difficulties in later life.

Morbidity due to malnutrition depends on the nature and severity of the illness. In 2005, Collins and colleagues estimated that 16% of pneumonia, diarrhoea and



malaria morbidity in www.udsspace.uds.edu.gh children under 5 was attributed to severe underweight (Collins et al., 2006). The risk of mortality associated with underweight is directly related to the severity of the condition. Children who are moderately malnourished (below -2 z scores) are associated with mortality rates between 30 and 148 per 1000 children per year, whilst those with severe underweight (below -3 z score line) are associated with mortality between 73 and 187 per 1000 per year (Black et al., 2008). Children who suffer from SAM are up to 20 times more likely to die compared with well-nourished children, and the condition directly causes around 2 million deaths of children under 5 annually (WHO et al., 2007; Black et al., 2008). In addition to mortality, Black et al. (2008) estimated that malnutrition alone was responsible for nearly 22% of overall global disability adjusted life years in children under 5.

Malnutrition reduces immunity and raises the risk of mortality by increasing the severity and prolonging the illness. A more prolonged or severe illness is more likely to cause and/or aggravate malnutrition by causing appetite loss, malabsorption, metabolic changes and behavioural changes which affect feeding practices and thus deplete body nutrient stores (UN, 2004).

2.7 Possible Risk Factors for SAM

Research has shown that factors such as low birth weight, socio-demographic characteristics, inadequate food intake, inappropriate feeding practices, incomplete vaccination, political and environment instability and emergency situation are seen to be closely associated with SAM and as such can be considered as its risk factors (Lenters et al., 2013). According to studies, children who are not well fed with breast milk and the right kind of complementary foods are more likely to become severely malnourished compared to their counterparts who are exclusively breastfed and have had the appropriate timely complementary feeding (Lenters et



al.,2013). The same can also be said about caregiver's age since younger or teenage caregiver are likely to give birth to malnourished children compared to older mothers (Yartey et al., 1998).

According to Menon and others (2013), Infants and Young Child Feeding (IYCF) practices and water and sanitation hygiene (WASH) cannot be left out when it comes to identifying the risk factors for SAM. Ensuring that foods eaten are chosen from all the different food baskets and improving WASH has proven to be a better way to enhance nutritional status of children. It has however been found in studies that when all these interventions and not just one are used to curb these risk factors, the impact will be more effective than the use of just one intervention (Menon & others 2013). Studies by Islam et al., (2013), Laghari et al., (2013), Long et al., (2013), Menon et al., (2013), and Meshram et al., (2012) have all established that when caregiver's educational level is low, children stand a higher risk of becoming wasted. Children of illiterate parents have a higher risk of SAM (Amsalu, 2008) especially when it has to do with the caregiver (Poel et al., 2007).

Other risk factors for SAM may include poverty, drinking unwholesome water and the

absence of toilet facilities (Islam et al., 2013). This is because poorer families will have less access to portable drinking water, such as pipe borne water or wells, and as well as difficulty in accessing toilet facilities. Another study that did not really assess WASH indicates that family wealth index was significantly associated with SAM (Meshram et al., 2012). Both studies over emphasised that larger family sizes were significantly associated with an increased risk of SAM (Islam et al., 2013; Meshram et al., 2012; Laghari et al., 2013). A study in Burkina Faso also revealed



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that incomplete vaccinations and caregiver's literacy could also be risk factors for the relapse of SAM (Somasse et al., 2013).

2.8 Classification and epidemiology of severe acute malnutrition

Today, the syndrome protein energy malnutrition described by Williams and others is commonly described as severe acute malnutrition (SAM) in order to differentiate it from more chronic conditions. It is this term that I have adopted throughout this thesis. Severe acute undernutrition (SAU), synonymous with the term SAM, is in the process of being adopted by the United Nations as a more appropriate term to differentiate wasting and oedema from obesity, a form of malnutrition most common in the developed world. The causes of SAM are an extension of those discussed above whereby the environment that has supported the development of malnutrition has been particularly acute or prolonged in nature. There is an especially high risk of the development of SAM when "disaster events", such as acute severe food deprivation and/or infections, occur in an already chronically malnourished population or individual. The WHO manual for the treatment of severe acute malnutrition reflects this understanding of causes being multifaceted in nature and refers, in its introductory chapter, to severe malnutrition as being "both a medical and social disorder" and states that "...the medical problems of the child result partly from the social problems of the home in which the child lives" (WHO, 1999).

SAM is characterized by severe body wasting (marasmus) and/or nutritional oedema (kwashiorkor). In 1956, Federico Gomez described the clinical profile and the apparent cause of death of a group of malnourished children admitted to the Nutrition Department of the children's hospital in Mexico City (Gomez 1956). Using these data, he described an indicator (weight-for-age) to classify varying degrees of malnutrition linked to prognosis, or risk of death. With time, the so-



www.udsspace.uds.edu.gh called “Gomez classification” (using a reference population and different cut-off points, i.e., 80%, 70% and 60% of median weight for age) was used widely to classify individual children for clinical referral as suffering from severe malnutrition or marasmus (< 60% of the reference weight for age), moderate malnutrition, or mild malnutrition. Subsequently however, the indicator weight-for-age was shown to be a poor discriminator between children that were severely stunted (with short stature) and those that were severely wasted (with recent weight loss) and several authors identified low weight-for-height (as a measure of recent weight loss) as the indicator of choice for screening severely malnourished children who are at increased risk of dying (Trowbridge, 1979; Bern, 1997).

Bern reported that three (3) indicators; visible severe wasting, a low weight for height score and bipedal oedema, were all associated with a significantly increased mortality risk. These findings, in combination with the threshold effect, first reported by Chen *et al* in 1980 (Chen 1980), whereby mortality increased with worsening nutritional status when malnutrition was severe, are now used in international protocols for the identification of children who require special therapeutic attention. The most recent guidelines from WHO on the management of severe malnutrition (WHO, 1999; Ashworth, 2003) uses the following definitions to define the level of severe acute malnutrition that requires intensive treatment, and it is these definitions I have therefore adopted for defining SAM in this study:

Severe wasting or Marasmus: weight for height less than -3 SD (or z scores) or less than 70% of the median National Centre for Health Statistics (NCHS) reference values (NCHS, 1979). Oedematous malnutrition or Kwashiorkor: symmetrical oedema involving at least the feet.



Many organizations also diagnose SAM when the Middle Upper Arm Circumference (MUAC) of a child is less than 110mm (Boelaert et al, 1995; UNHCR, 1999). A recent review suggests that MUAC is a precise, accurate, sensitive and specific indicator for the identification of severe acute malnutrition and that it is also simple, cheap and acceptable (Myatt et al, 2006). Recently, an informal scientific committee convened by the WHO concluded that MUAC < 110 mm could be used as an independent criterion for admission to therapeutic feeding programmes for children aged 6-59 months (WHO, 2007).

Approximately 2%, which is equivalent to 13 million children living in developing countries suffer from SAM (UNICEF, 2006). A recent review paper, on which the author contributed estimates that, SAM contributes to 1.7 million child deaths per year. This estimate used the UNICEF global database and applied the epidemiological approach of Pelletier (Collins et al, 2006). However other more recent publications have attributed fewer; 449 000 child deaths to severe wasting (Black et al, 2008). When taken together with the fact that these figures do not include children who die of oedematous malnutrition, a form of SAM that in some countries is more common, it is clear that SAM is an important health problem worldwide. This is made clear with a visit to almost any hospital in a developing country where it is likely that severely malnourished children comprise a significant proportion of paediatric deaths (Jackson et al, 2006).

2.9 The treatment of severe acute malnutrition during emergencies

Majority of SAM cases can be prevented by economic development and public health measures designed to increase dietary quantity and quality alone, with no need for clinical inputs (Cahill, 1998). However, as malnutrition becomes more severe, normal physiological mechanisms designed to adapt the organism to differences in food intake become more pronounced (Cahill, 1998). These



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“reductive adaptations” affect every physiological function in the body mobilizing energy and nutrient reserves and decreasing energy and nutrient demands (Waterlow, 1992).

Initially they are beneficial and allow the organism to maintain homeostasis. However, as the severity of nutritional insult increases, adaptations such as those to conserve energy and slow protein turnover become increasingly damaging (Golden, 1977). The organism becomes poikilothermic, loses its ability to produce an acute phase response (Reid, 2002); becomes progressively more immunosuppressed and loses control of water and electrolyte balance (Waterlow, 1992). As these changes progress, treatment must become increasingly intensive and costly if it is to succeed and units treating SAM are frequently confronted by extremely ill patients who require intensive medical and nursing care.

2.9.1 Modern management protocols

A structured approach to the clinical care of SAM involving ten steps in two phases (stabilization and rehabilitation) and taking into account the profound physiological changes that exist in severe acute malnutrition is now generally accepted as a robust and effective treatment model (Ashworth, 1996; WHO, 2004).

The current clinical protocols were developed as a result of a long history of clinical research in the 20th century, particularly prompted by the spectra of mass starvation associated with each of the world wars (Waterlow, 1992). International protocols were first published as a Pan American Health Organization manual in 1974 and later with minor changes, as the first WHO manual (1981). This manual included many of the treatment elements recommended today, such as cautious initial re-feeding; cautious, predominantly oral, treatment of dehydration with low sodium high potassium rehydration solutions; enhanced micronutrient content of rehabilitation diets, and highly energy dense diets to enable catch-up growth. By



the end of the 1970s, www.udsspace.uds.edu.gh such protocols were producing dramatic reductions in case fatality rates in well run and resourced units.

For example, the children's nutrition unit in Dhaka Bangladesh, reduced mortality rates from 20% in 1976 to between 4-7% in 1979 (Khanum et al, 1994). Even in emergency situations such as Ethiopia and Biafra, the implementation of similar dietary protocols without the use of systematic antibiotics for all admissions, achieved mortality rates of < 15% (Mason, 1974). In 1999, the WHO manual was revised to take into account further advances in the understanding of the pathophysiology of SAM (WHO, 1999). Changes were made to reflect new ideas over the role of protein (Golden, 1993), the importance of free radicals and antioxidants in the pathogenesis of SAM (Golden, 1994) and the development of the concept of type 1 and type 2 nutrients (Ciliberto et al, 2005). A growing realization of the importance of immunosuppression (Cunningham-Rundles, 1982) also resulted in the addition of systematic antibiotics for all cases of SAM. This basic protocol with minor adaptations forms the core of all major guidelines in use today (Macmillan & Talc, 2003; WHO, 2000) and, with the WHO guidelines for the management of severe malnutrition in first referral facilities (WHO, 2000), forms part of the WHO/UNICEF initiative of Integrated Management of Childhood Illness (IMCI) (WHO, 1997). The essential elements of these guidelines are:

Prevention or treatment of hypoglycaemia, hypothermia, dehydration and correction of electrolyte imbalances right at the start of treatment. Rehydrate more slowly than usual using a rehydration fluid with a lower sodium and higher potassium content. Use low osmolarity feeds during the initial stages of treatment to reduce incidence of diarrhoea.



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Treatment of infection by giving all patients broad-spectrum antibiotics on admission, paying particular attention to gram negative cover. Treat any patient suffering from complications with parenteral antibiotics.

Correction of micronutrient imbalances. Withhold iron supplementation until the recovery phase of treatment.

Cautious initial re-feeding, carefully controlling intake to provide just enough energy and protein to meet basic needs (80-100 kcal kg⁻¹day⁻¹ and 1-1.5g protein kg⁻¹day⁻¹) in the first phase of treatment.

Provision of formula diets enhanced with a range of micronutrients to correct micronutrient imbalance. This method uses a dietary approach to supplementation, wherein the ratio of all the different nutrients, including energy, is fixed, as opposed to a medical approach, where supplements are provided as a dose per kg body weight.

Transfer to a rehabilitation phase on the stabilization of vital signs such as appetite. This indicates that infections are coming under control, the liver is able to metabolize the diet, and other metabolic abnormalities are improving.

Provision of 150-220 kcal kg⁻¹day⁻¹ and 4-5 g kg⁻¹day⁻¹ protein in highly energy dense feeds provided 8 times a day to allow for the metabolic costs of catch-up growth during the rehabilitation phase of treatment.

Provision of psycho-social stimulation during rehabilitation.

2.9.2 Delivery of treatment

During nutritional emergencies when organizations are faced with large numbers of severely malnourished individuals it is the inpatient therapeutic feeding centre (TFC) or the paediatric ward that usually provides most of the treatment required (Collins, 2001). These centres are often set up and/or supported by external international agencies; provide high quality individual patient care, and appropriate



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diets and medical treatments based on the WHO inpatient management protocols described above and elsewhere (WFP, UNHCR, 1999). The widely accepted standards that many organizations use to measure the quality of care delivered have been developed by the Sphere Project's Humanitarian Charter and Minimum Standards in Disaster Response and now, as well as purely clinical indicators, include others that are more community and socio-economic orientated (SPHERE, 2004).

2.9.3 Management of severe acute malnutrition

It is known that children with severe acute malnutrition must be treated differently from other children because their physiology is seriously affected. This makes management of severe acute malnutrition in developing countries like Ethiopia very important. Ministry of Health (MOH) in collaboration with UNICEF, WHO and other key partners developed National Guidelines for the management of severe acute malnutrition in Ethiopia, in order to standardize and improve the quality of care for severely malnourished children across the country (Golden & Grellety, 2007). In these National Guidelines, the 10 WHO steps for the management of severe acute malnutrition were adopted.

The use of WHO guidelines on the management of severe acute malnutrition (Central Statistical Agency and ICF International 2011) has led to successful treatment and reduction in mortality from this condition in both emergency and hospital settings. They focus on ten general principles of management targeted at controlling or recognizing and treating the complications of severe acute malnutrition. A recent review of over 140 studies agrees that the protocolized management would improve case fatality rates in children with this condition (Golden & Grellety, 2007).



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The quality of health care provided in any health institution plays a major role in patient outcome, regardless of the hospital setting. In some high-income countries, the incidence of errors in management of hospital patients, which often goes unnoticed, is reportedly close to 17%. While many of these errors are preventable, one fifth of them result in death or permanent disability. In many health institutions, children do not receive adequate ambulatory and/or institutional care. Surveys have revealed that many sick children are not properly assessed and treated (Pelletier & Frongillo 2003; UNICEF 2001). Often, severely ill children who require admission receive inadequate triage, assessment and treatment. When admitted, they receive insufficient monitoring. This adversely affects the outcome of a significant proportion of hospitalized children, especially those with severe acute malnutrition, resulting in unnecessary suffering or avoidable death each year. According to an evaluation conducted by UNICEF in Ethiopia titled; The “Protocol for the Management of Severe Acute Malnutrition” (2007), stipulates that SAM cases with complications admitted to inpatient care require separate wards, with staff specially trained on the three phased approach for SAM treatment (Phase 1= administration of F75; Transition phase = introduction of F100 or RUTF, and Phase 2 = treatment with F100 or RUTF) and daily progress measured on multi-charts. The three phased approach is a critical concept in the guidelines as Phase 1 promotes recovery of electrolyte balance and metabolic function rather than weight gain and the transition phase permits gradual weight gain (BASICS 2003; UNICEF, 2012). The stabilization center geographic services coverage also has improved significantly.

The overall coverage of TFU compared to estimated need (the total number eligible facilities) is currently 24.6%. A total of 473 sites (HCs and hospitals) are



www.udsspace.uds.edu.gh providing TFU services in the 622 wordas, which means there are now 0.7 TFU per wordas. The majority of hospitals (93%) and only 22% of HCs provide TFU services. The data clearly shows that more effort is required to reach the recommended level of one in-patient unit per wordas. A barrier to reaching the TFU goals as per the guidelines is that infrastructure does not exist in many health facilities to allow establishment of a separate inpatient ward. According to the evaluation, the following gaps were identified for the stabilization centers: Few health facilities especially HCs adhered to the protocols. There were gaps and treatment errors in the services. Children were not given routine drugs such as Amoxicillin. Children who should be treated in phase two (using RUTF) were treated in phase one, while some who can be treated in OTP were being treated in TFU. Some indications of weak capacity included inappropriate admissions of children; delayed transfer of cases from phase to phase and to discharge, and poor record keeping. The space allocated to the TFU was often too limited. Which increase cross infection and increased risk of mortality (Maimuna, 2013). Some studies have found a lack of competence among health workers, leading to poor quality management of children with SAM in hospital settings (Collins, 2007). Other issues identified include low coverage rates due to the high cost of care, longer durations of hospital stay to achieve recovery and the increased risk of cross-infections when children are admitted to hospitals with poor hygiene standards (Collins and Saddler, 2002).

To circumvent the need for and the burden associated with hospital-based management of malnutrition, a Community-based Management Acute Malnutrition (CMAM) approach was developed. Different terminologies have been used previously to describe the CMAM model, including community therapeutic care



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(CTC); integrated management of acute malnutrition (IMAM), community-based therapeutic care (CBTC) and ambulatory care for the treatment of acute malnutrition. In this document, CMAM will be used to refer to all of the different terms formerly used to describe the community-based management of acute malnutrition mode.

2.10 Community-based management of acute malnutrition (CMAM)

CMAM according to Collins and others (2006) is a public health intervention based on the principles of coverage, access and cost-effectiveness. The model attempts to maximise population-level impact by focusing on providing effective therapeutic care to the majority of acutely malnourished people as outpatients, using techniques of community mobilization to engage the affected population and maximise coverage and compliance. Wherever possible, the programme builds on local capacity and existing structures and systems, helping to equip communities to deal with future periods of vulnerability.

The CMAM model treats people suffering from severe acute malnutrition using a combination of three treatment modalities, inpatient care, outpatient care and supplementary feeding according to the clinical and anthropometric characteristics at presentation.

Ideally, those with moderate acute malnutrition and no medical complications are supported through a Supplementary Feeding Programme (SFP) that provides dry take-home rations. SFP are common in humanitarian operations but rarely exist in developmental settings. Those with severe acute malnutrition with no medical complications are treated as Outpatient Care (OPC). The patient attends an OPC site weekly or fortnightly to receive Ready to Use Therapeutic Food (RUTF), a



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course of oral broad-spectrum antibiotics, anti-helminth treatment, folic acid, and if appropriate vitamin A, measles vaccination and anti-malarials. People who are acutely malnourished and have additional serious medical complications are treated in an inpatient Stabilization Centre until they are well enough to be transferred into the OPC. The inpatient protocols used in CMAM are essentially the same as those recommended by the WHO with the exception of the admission criteria and discharge criteria and the dietary protocols in the transition phase. (Collins et al, 2006)

CMAM is based upon the fundamental principle that all people whose lives are at risk from malnutrition should receive appropriate care and assistance. The provision of care should be impartial, targeted solely on the basis of need. It should be delivered without discriminating between or within affected populations and should not favour any particular side in conflicts or disputes. In practice, this principle translates into a commitment and obligation to provide the largest possible proportion of the acutely malnourished population with access to appropriate care in a timely fashion for as long as necessary. The core operating principles of CMAM according to Collins and others (2006) are:

Maximum coverage and access: Programmes should be designed to achieve the greatest possible coverage and make services accessible for the highest possible proportion of a population in need. It aims to reach the entire severely malnourished population.

Timeliness: Programmes should catch the majority of cases of acute malnutrition before additional medical complications occur on top of the simple malnutrition. In humanitarian situations CTC programmes aim to start case-finding and treatment before the prevalence of malnutrition escalates.



Appropriate care: www.udsspace.uds.edu.gh Programmes should provide simple, effective outpatient care for those who can be treated at home and inpatient care for those who require inpatient treatment in order to survive.

Care for as long as it is needed: Programmes should be designed to help ensure that people can stay in the programme until they have recovered, and it aims to ensure appropriate services continue to be available for as long as acute malnutrition is present in the population. (Collins et al, 2006)

According to Luby (2011), the CMAM model provides a framework for an integrated public-health response to acute malnutrition, treating most patients with SAM solely as outpatients and reserving inpatient care for the few with SAM and complications. The model also aims to integrate treatment with other interventions designed to reduce the incidence of malnutrition and improve public health and food security. The Programme design attempts to take into account the socioeconomic factors, particularly poverty, high workloads for women, and the exclusion from health and education services that contribute to the late presentation of cases of acute malnutrition.

The CMAM Programme is therefore decentralized to minimize geographical barriers to access and include intensive community consultation and mobilization to maximize understanding and participation. This design minimizes the costs to families and maximizes access to treatment.

The decentralized design also means that, in non-emergency situations, there are few cases of SAM at any one access point and the quantities of ready-to-use therapeutic food required to treat them are therefore small. In current Ministry of Health implemented programmes in Malawi, for example, a health-centre treating 15 children with SAM per month requires 160 kg (eight boxes) of ready-to-use



therapeutic food. This small quantity can be delivered easily together with other routine health supplies. This eases the problems associated with integrating community-based therapeutic care into existing health services, even in resource-poor settings.

The use of mid-upper-arm circumference as the sole anthropometric indicator for screening and admission into community-based therapeutic care also facilitates community participation, helping to devolve responsibility for selection of patients towards the community.

Mid-upper-arm circumference is an indicator of acute malnutrition that reflects mortality risk and has recently been endorsed as an independent criterion for admission into therapeutic feeding programmes by an informal consultation of WHO (Shaheen, 2006). The use of this measure requires no complicated equipment and can easily be taught to community-based workers, making it practical for use in resource-poor settings (Lassi et al, 2013).

Community-based therapeutic care's clinical approach is based on the fact that the severity of SAM, its prognosis, and the determinants of successful treatment are primarily dependent on the time of presentation (Lassi et al, 2013).

SAM is classified on the basis of whether there are coexistent life-threatening complications (Shaheen, 2006). Children presenting with SAM complicated by life-threatening illness receive inpatient care according to the WHO treatment protocols. Those with SAM but without life-threatening complications are treated through weekly or fortnightly attendance in outpatient therapeutic programmes. In outpatient therapeutic programmes, they receive an 837 kJ/kg/day (200 kcal/kg/day) take-home ration of Ready-to-Use Therapeutic Food (RUTF), a course of oral broad-spectrum antibiotics, vitamin A, folic acid, anthelmintics



and, if appropriate, www.udsspace.uds.edu.gh antimalarials. To increase access to treatment and encourage earlier presentation, outpatient therapeutic programmes are decentralised and implemented through standard primary health-care units or even non-permanent access points. This approach results in most children presenting at a stage when they can still be treated effectively as outpatients by front-line health staff, which greatly reduces the need for trained clinic staff, thereby easing integration into routine health services.

Case-fatality rates among 23 511 unselected severely malnourished children treated in 21 programmes of community-based therapeutic care in Malawi, Ethiopia, and Sudan, between 2001 and 2005, were 4.1%, with recovery rates of 79.4% and default rates of 11.0%. 74% of these severely malnourished children were treated solely as outpatients. (Shaheen, 2006). Coverage rates for nine of these programmes have been estimated with a new coverage-survey technique designed to provide more precise coverage estimates of health-care programmes (Lassi et al, 2013).

Average coverage was 72.5%, (95,103) substantially higher than coverage rates seen in comparable centre-based programmes which are often less than 10% (Lassi et al, 2013). Similar positive results have recently been published from Niger, where Médecins Sans Frontières (MSF) cared for more than 60 000 children with SAM with an approach based on outpatient therapeutic programmes. About 70% of patients were treated solely as outpatients and overall case-fatality ratios was about 5% (Clarke 2011). Community-based therapeutic care has also shown promise as an intervention to assist children with SAM infected with HIV. A cohort trial in Malawi assessed the effectiveness of community-based therapeutic care in the treatment of SAM in HIV-positive and HIV-negative children and



www.udsspace.uds.edu.gh examined its use as an entry point for home-based care programmes targeting people living with HIV/AIDS (WHO, 2007). 59% of the severely malnourished HIV-positive children not receiving antiretroviral drugs recovered compared with 83.4% of the HIV-negative children ($p < 0.002$, unpublished). However, at a mean follow-up of 15 months after discharge, 53% of HIV-positive children had relapsed into moderate acute malnutrition compared with 10.4% of the HIV-negative children. HIV-positive children therefore need continual community-based monitoring after discharge and, for treatment to be optimally effective, community-based programmes for SAM must be integrated with home-based care and antiretroviral-drug programmes for HIV. In this study, the uptake rate for voluntary counselling and testing for children attending the programme was greater than 90%, far greater than usually seen in Malawi (unpublished). This finding shows a high potential for synergy and integration between community-based therapeutic care, home-based care, and antiretroviral-drug programmes for HIV. Programmes aimed at treating SAM tend to be highly cost effective in terms of additional years of life gained because they precisely target resources at children with a very high mortality risk. Initial data indicate that the cost-effectiveness of emergency community-based therapeutic care is comparable to mainstream child-survival interventions, such as vitamin-A provision or oral rehydration therapy for diarrhoeal disease.

Estimates from two established emergency programmes were US\$101–197 per admission which is equivalent to between US\$12 and US\$132 for each year of life gained dependent on the assumptions made for the mortality rates of untreated SAM. (Clarke 2011). The exact figure depends on the density and prevalence of severe acute malnutrition, the numbers of acutely malnourished children treated,



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the infrastructure present, accessibility, and the estimation of case-fatality ratios in untreated SAM (Clarke 2011). Although these are broad ranges, they are below the \$150 threshold described by the World Bank as highly cost-effective. The development of local production of ready-to-use therapeutic food with new cheaper recipes based on locally available grains and pulses should further reduce costs.

2.10.1 The conceptual basis for a community-based approach

According to Collins et al, (2006), CMAM is founded on three important premises. The first is that if malnourished people access nutritional care early in the evolution of their condition and remain in a nutritional programme until they have recovered, then success rates are high. Conversely, if people access care late and/or they are deterred from staying in a nutritional programme for as long as they need to, then success rates are limited.

The basis of this understanding is that malnutrition is the result of a complex interaction of economic, social, political, nutritional and public health factors. The clinical course of malnutrition is a gradual decline in nutritional status from normal adaptation towards metabolic complication, immunosuppression, infection that further compounds the metabolic derangement, increased immunosuppression, more infection and eventual death. The severity of the condition is primarily a function of the stage of its evolution. As these changes progress, treatment must become increasingly intensive and costly. Units treating severe acute malnutrition are frequently confronted by extremely ill patients who require intensive medical and nursing care. However, most of these units are in the poorest parts of the poorest countries in the world and have scarce resources and staff constraints. In addition, the caretakers of the malnourished patients almost always come from the poorest families and have great demands on their time and cannot afford to leave



home for long periods of time to stay with their malnourished child during treatment.

However, if the condition is caught in the early stages, the technical aspects of treatment are simple: all that is required is a balanced diet of sufficient quantity and quality in terms of protein, carbohydrate, fat and micro-nutrients. The composition of such diets is now well researched, they are relatively cheap to produce and so long as the patient has appetite they are easy to administer, making success rates high and costs of treatment low. In practice this means that the actual clinical treatment of severe malnutrition is not the only crucial aspect of a successful programme. Instead, finding and treating cases of acute malnutrition early in the progression of their condition, before the metabolic and immunological aspects of the condition become marked are the major determinants of success.

The second premise under pinning CMAM according to Collins and others (2006) is that in order to present early and comply with treatment people must understand, accept and participate in the programmes. To be sustainable and effective, community-based programmes must involve the target populations. This is a major shift in attitude from clinically orientated inpatient programmes wherein professional health care workers provide health care to a largely passive clientele.

In practice, there are several important features of programme design that are required to promote participation. The first is to minimise barriers to access. Physical and logistical barriers to presentation can be overcome by providing access to services close to where the target population lives. In the developmental setting, this involves delivering the Outpatient Care Programme (OPC) for the severely malnourished through the front line primary health care structures such as local clinics, health posts or temporary EPI vaccination points. In humanitarian



www.udsspace.uds.edu.gh responses it often involves creating new temporary OPC access points. Social and cultural barriers to access although more subtle are equally important. These must be overcome by a range of measures. Foremost is the need for service providers to make initial investments into understanding the socio-cultural milieu in which CMAM programmes will operate. These investments are not necessarily expensive or particularly time consuming, but they have to be planned properly and have sufficient appropriate resources allocated to them. It is important to realise that within any given society, marked socio-cultural differences exist, between town and country, educated and non-educated or employed and peasant. Even in MoH, health care systems that employ “local” staff, there will still be socio-cultural issues that need to be explored if issues of vital importance to the target population are to be adequately addressed in programme design. Reducing socio-cultural barriers also requires sensitisation of the population to ensure that people understand the services that are available to them, and consultation to enable people to participate in programme development and implementation. This is vital in order to ensure issues of importance to potential programme clients are factored into programme design. In particular, it is essential that programme designs take into account the socio-economic barriers (opportunity costs) of attendance to enable people to access treatment easily and stay in treatment with the minimum of costs to them and their families.

The third premise underlying CMAM according to Collins et al., (2006) is that in order for programmes to move towards sustainability, there must be upfront investment in social mobilisation to ensure that key stakeholders can benefit from the positive feedback and kudos that successful individual cures generate. The positive feedback that is required if programmes are to generate sufficient and self-

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perpetuating motivation of community-based volunteers will only occur when communities feel some responsibility for service implementation. The nature of acute malnutrition offers unrivalled potential for this to happen and there is no other condition that is potentially so devastating to families but so easily treated with simple understandable measures (food) delivered by the families themselves. This is a vital advantage that community-based programmes treating severe acute malnutrition have that can enable these programmes to succeed where they have failed for most other conditions. However, this potential must be cultivated right from the start of programmes. This requires appropriate resources and extensive engagement with the communities, key stakeholders and local health care providers to build understanding, trust and participation amongst all groups and to ensure that programmes are designed to reflect the priorities, constraints and resources of the target population. This focus on engagement, building understanding and participation of communities and local stakeholders distinguishes community-based models from more usual health extension and outreach services. Treatment models based on this extension concept, such as 'Home Treatment' and 'Ambulatory Care', start with a medical focused and aim to extend services out from treatment centres into the community. Programmes are therefore designed more from the perspective of the health care providers and as such, in many contexts, have more difficulty in fostering sufficient understanding and participation to ensure the sustainable system of early presentation that must occur if these programmes are to succeed over the long-term. Decision over whether to employ community-based or extension models of treatment should be based upon an analysis of context specific factors. (Collins et al., 2006)



2.11 Antibiotic Treatment of SAM

There has been an advancing curiosity in considering antibiotic treatment for SAM. Broad spectrum antibiotics have been conditionally recommended for treatment of uncomplicated SAM in community-based treatment programs (WHO, 2007). Local governments and policy makers are asked to make this determination in light of their local context. Although routine antibiotic treatment at the enrolment stage in CMAM programs is part of the CMAM protocols of many organizations, this practice remains a contentious issue in the eyes of many academics (L. Lenters, Child, & Hospital, n.d.).

In 2013, Alcoba and others who did a systematic review of antibiotics as part of SAM management and concluded that the evidence for the addition of antibiotics to therapeutic regimens for uncomplicated SAM is weak and urges for further efficacy trials. Another review concluded that the evidence was insufficient to recommend antibiotic use (Picot et al., 2012). A recent RCT in Malawi looked at children with uncomplicated SAM treated in a community setting compared RUTFs to RUTFs plus antibiotics (either amoxicillin or cefdinir); the trial found a significantly higher mortality rate in children receiving placebo than in either antibiotic arm (Trehan et al., 2013).

Although there is growing interest and attention being given to antibiotics for the treatment of SAM, our understanding of the issue is far from definitive. Due to the small number of studies with limited generalizability, as well as the costs and resistance risks associated with broad use of antibiotics, this topic requires further investigation urgently. Additional studies are needed to strengthen the evidence based on whether children with uncomplicated SAM should receive routine antibiotics, including specific investigations of children with additional medical conditions, such as HIV.



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2.12 Challenges in the management of severe acute malnutrition

Nutrition Rehabilitation Units are faced with a lot of challenges in handling cases of severe acute malnutrition. Some of the challenges include; limited in-patient capacity, lack of enough skilled staff in the hospitals to treat the large numbers needing care, the centralized nature of hospitals promotes late presentations and high opportunity cost for caregivers, serious risk of cross infections for immune suppressed children with severe acute malnutrition and mortality rates before and after discharge (Golden & Grellety 2007; Tesfalegn et al, 2010).

Severe acute malnutrition affects all organs in the body including the immune system. It is now established that severe acute malnutrition can lead to an immune compromised state involving both humoral and cellular immunity; this has been referred to as Nutritionally Acquired Immunodeficiency Syndrome (NAIDS). However, the extent and severity of the condition is not easily assessed. Immunological depletion predisposes these children to acute bacterial/viral infections and chronic infections such as tuberculosis, necessitating adequate investigation and prompt management with appropriate antibiotics. For resource-poor settings, the option of empirical antibiotic coverage has been recommended (Sylvie, 2011).

A cohort of 430 children aged 6-59 months old with complicated SAM admitted to Zambia University Teaching Hospital's stabilization center, majority of the children, 67.3% (261/388), presented with diarrhea; 38.9% (162/420) tested HIV positive (Sylvie, 2011). Another study conducted in Jimma specialized teaching hospital shows among the 215 severely malnourished children 25 (11.6 %) were HIV infected.



2.13 Treatment outcomes of children with complicated SAM

The preferable outcome of malnutrition is to reach normal standard weight for height / length, after the nutritional supplementation in the ward. This outcome can be achieved by prompt treatment of all infections in these children with appropriate antibiotics, correction of the electrolytes, hypothermia, hypoglycemia, micronutrients and macronutrients following WHO criteria. Unfavorable outcomes include failure to gain weight for severe marasmus children and failure of reduced weight for the edematous children, failure of treatment of infected children and Death due to complications of malnutrition most commonly occur during the first 48 hours of admission (UNICEF, 2012).

A cohort of 430 children aged 6-59 months old with complicated SAM admitted to Zambia University Teaching Hospital's stabilization center; 40.5% (174/430) of the children died. The median Length of stay of the cohort was 9 days (IQR, 5-14 days); 30.6% (53/173) of the death occurred within 48 hours of admission. Children with diarrhea on admission had two and half times higher odds of mortality than those without diarrhea; Adjusted OR = 2.5 (95% CI 1.50- 4.09). The odds of mortality for children with HIV infection were higher than children without HIV infection (UNICEF, 2012).

A study conducted in Jimma specialized teaching hospital amongst 215 severely malnourished children; the recovery rate was 68% and 86.6%, and mortality was 16% and 7.4% in HIV infected and uninfected children respectively (UNICEF, 2012). Similarly, a study done in southern region of Ethiopia on treatment outcomes of children with severe acute malnutrition admitted to stabilization centers, 87% (11,191) were cured while 3.6% (468) died. The average length of stay was 25 and 21 days with an average weight gain of 14 and 13.4 g/kg/d for



children with severe wasting and edematous malnutrition, respectively (Anne et al, 2013).

2.14 Effect of HIV and tuberculosis on SAM Children

HIV and tuberculosis are increasing the workloads of hospital units treating SAM through both the direct effects of infection and the indirect negative effects on livelihoods and food security. HIV and tuberculosis infection decrease skilled human resource capacity in health services, raises the prevalence of SAM, and increase case-fatality rates (Islam et al, 2013; Jesmin et al, 2011). In sub-Saharan Africa, a high proportion of severely malnourished children admitted to nutritional rehabilitation units are now also HIV positive (Chakraborty, 2008; Das et al, 2008).

In 2000 in Malawi for example, 34% of the severely malnourished children admitted to the Blantyre Queen Elizabeth hospital nutritional rehabilitation unit were HIV positive (Das et al, 2008). Although experience in resource-poor sub-Saharan countries have shown that many HIV-positive children can recover normal nutritional status when given standard treatment protocols for SAM without antiretroviral drugs (Mostafa et al, 2010; Arimond & Ruel 2004) their recovery is slower than that of uninfected children. HIV infection is also associated with high rates of complication and case fatality (Chakraborty, 2008; Das et al, 2008).

2.15 Treatment at home and in the community

Concerns over the limited capacity of hospital units to treat SAM are not new. Since the 1960s, the high cost and poor success rates of inpatient treatment have prompted debates over whether hospitals were the best places to treat SAM (Kumar et al, 2006; Murata 2000). There are several well-known weaknesses of a centre-based approach: limited inpatient capacity and lack of enough skilled staff



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in hospitals to treat the large numbers needing care (Wamani et al, 2006 Roy, 2000). The centralized nature of hospitals promotes late presentation and high opportunity costs for carers and the serious risks of cross infection for immune suppressed children with SAM and the high mortality rates before and after discharge (Psaki et al, 2012; Hackett et al, 2009).

In the 1970s, these problems prompted moves to decentralise the treatment of SAM and move the locus of treatment away from hospitals to communities, into either simple nutrition rehabilitation centres, existing primary health-care clinics, or the homes of those affected (Jeyaseelan & Lakshman 1997). The results from early outpatient treatment programmes were variable. Some achieved low mortality and positive effects on growth while children were attending nutrition rehabilitation centres, but usually these benefits were not maintained after discharge (Mahgoub et al, 2006; Hien & Kam 2008). In others, mortality and relapse rates both during treatment and after discharge were high and rates of weight gain were low (Britton et al, 2007). The requirement for children to attend each day and eat in the nutrition rehabilitation centres has also resulted in low programme coverage, often proving to be unpopular with mothers and resulting in high default rates (Britton et al, 2007).

In 2001, Ashworth reviewed 27 of such programmes from the 1980s and 1990s. Only six (22%) out of the 27 achieved case-fatality rates of less than 5%, average weight gains of more than 5 g/kg/day, and relapse or readmission rates of less than 10%—Ashworth concluded that home treatment is rarely successful and that the early discharge of severely malnourished patients from inpatient treatment units is usually hazardous (Das & Rahman, 2011). In 2005, Ashworth updated her review to include an additional six studies of ready-to-use therapeutic food. Five (83%) of



these six studies were www.udsspace.uds.edu.gh considered to be successful; a far greater success rate than in those studies not using ready-to-use therapeutic food (Haider, 2000).

Two other programmes, both in Bangladesh, have reported successful rehabilitation of children with SAM discharged to home care after 1 week of inpatient management with mixtures of local foods combined with the provision of multivitamins and minerals. The costs for home-based treatment of US\$29 and US\$22.30 were substantially lower than those of US\$156 and US\$74.60 for hospital care (Bhandari et al, (2003)). Similar improvements in cost-effectiveness of care were seen in home-treatment programmes in Jamaica.

2.15.1 Ready-to-use therapeutic food

The Ashworth review indicates that the recent development of ready-to-use therapeutic food has greatly eased the difficulties associated with providing a suitable high-energy, nutrient-dense food that is safe for use in outpatient programmes. Ready-to-use therapeutic food is an energy-dense food enriched with minerals and vitamins, with a similar nutrient profile but greater energy and nutrient density than F100, the diet recommended by WHO in the recovery phase of the treatment of SAM (Imdad 2010). In contrast to the water-based F100, ready-to-use therapeutic food is an oil-based paste with an extremely low water activity (Imdad 2010). As a result, ready-to-use therapeutic food does not grow bacteria even when accidentally contaminated, allowing it to be kept unrefrigerated in simple packaging for several months. As the food is eaten uncooked, heat-labile vitamins are not destroyed during preparation and the labour, fuel, and water demands on poor households are minimised. The production process is simple, and ready-to-use therapeutic food can be made from local crops with basic technology that is readily available in developing countries (IMCI, 2004).



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In a clinical trial in severely malnourished children in Senegal, energy intakes (808 kJ/kg/day vs 573 kJ/kg/day, $p < 0.001$), rates of weight gain (15.6 g/kg/day vs 10.1 g/kg/day, $p < 0.001$) and time to recovery (17.3 days vs 13.4 days, $p < 0.001$) were all significantly greater in those receiving ready-to-use therapeutic food than in those receiving F100 (Puoane et al, 2008). Trials in Malawi have also successfully used a take-home ration given to children in the recovery phase of the treatment of SAM. A take home ration of 730 kJ/kg/day (175 kcal/kg/day) successfully rehabilitated HIV-negative, severely malnourished children, after early discharge from a nutrition rehabilitation unit providing initial, phase-one care according to WHO protocols. Rates of weight gain (5.2 g/kg/day vs 3.1 g/kg/day) and the proportion of children recovering to 100% weight for height (95% vs 78%, relative risk [RR] 1.2, 95% CI 1.1–1.3) were significantly better in the ready-to-use therapeutic food groups when compared with groups receiving a larger amount of energy from corn–soya-blend flour supplied by the World Food Programme. In the same trial, 56% of the HIV-positive children treated with ready-to-use therapeutic food also achieved 100% weight for height (Puoane et al, 2008).

In another trial implemented in rural nutrition rehabilitation units, 730 kJ/kg/day of locally made ready-to-use therapeutic food given during the rehabilitation phase of treatment produced significantly better rates of weight gain (3.5 g/kg/day vs 2.0 g/kg/day), recovery (79% vs 46%, RR 2.8 95% CI 2.5–3.1), and mortality (3.0 vs 5.4%, OR 0.5, 95% CI 0.3–0.7) than did the standard inpatient treatment with F100, followed by outpatient supplementation with a large one-off ration (50 kg) of corn-soya-blend flour (WHO, 20017). However, the rates of weight gain on the ready-to-use therapeutic food regime were far lower than the 10–15 g/kg/day that can be achieved with a ratio of 730 kJ/kg/day. The combination of low rates of



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weight gain and low mortality rates indicates that this was probably due to sharing of the ration.

The development of ready-to-use therapeutic food has allowed much of the management of SAM to move out of hospitals. By shortening the duration of inpatient treatment from an average of 30 days to only 5–10 days, the move towards using ready-to-use therapeutic food in the recovery phase of treatment reduces the resources needed to treat SAM, which improves cost-effectiveness.

The provision of phase-one inpatient care for all cases, however, still requires substantial resources and entails substantial opportunity costs for carers. A requirement for inpatient care also means that programmes must be implemented from hospitals and large clinics with inpatient facilities. Centralised treatment increases barriers to access for rural communities where acute malnutrition is most prevalent. Increased barriers to access and opportunity costs serve to delay presentation, making the disorder harder to treat, and increase the number of patients with complications. These barriers increase costs and case-fatality ratios and decrease the proportion of severely malnourished children who are able to access treatment, thereby reducing coverage (unpublished).

2.16 Quality of Community-based Management of Acute Malnutrition (CMAM) Services

WHO defines quality of care as “the extent to which health care services provided to individuals and patient populations improve desired health outcomes. In order to achieve this, health care must be safe, effective, timely, efficient, equitable and people-centered.”

According to Bruce (1990), quality of care has different meanings, ranging from technical competence to the interpersonal dimensions of care and the perceived importance of these dimensions often varies by context and stakeholder (BRUCE,



1990). Therefore, it is [vital to understand quality of care](http://www.udsspace.uds.edu.gh) from perspective of both the recipients and the service providers.

The quality of services being rendered under the Community-based Management of Acute Malnutrition (CMAM) programme can only be assured when the National CMAM treatment guidelines are being followed in rehabilitating SAM children. Continuous monitoring and supportive supervision of CMAM services using standard monitoring checklists is also key.

Linneman and others in 2007, conducted a study in Malawi which compared outcomes for cases of acute malnutrition treated by medical professionals to cases handled by community health aids with medical aids with no medical training. There were no differences in recovery rates between the two groups, with an average 89% recovery rate: an acceptable outcome by international standards (Linneman et al., 2007).

Another study conducted by Amthor and others in 2009, also demonstrated good recovery rate (93.7%) in children with SAM during a famine in MALAWI using a CMAM approach delivered by trained community health aids alone (Amthor et al., 2009).

2.17 Coverage levels and barriers to access for CMAM services

Severe acute malnutrition (SAM) is a major global public health problem responsible for over one million young child deaths each year (WHO/WFP/UN/UNICEF, 2007). Over the last 10 years, significant progress has been made improving the management of SAM and scaling up the coverage and public health impact of treatment programmes. Efforts have largely focused on children aged over 6 months, whose treatment has been revolutionized by Community Management of Acute Malnutrition (CMAM) using ready-to-use therapeutic foods (RUTFs). In contrast to this success, acute malnutrition among



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infants aged under 6 months old (infant <6months) has often been sidelined both in terms of research and operational focus. This was recently highlighted by the Management of Acute Malnutrition in Infants (MAMI) project, a multiagency review of current evidence, policy, practice and programme outcomes for SAM infants <6months. Key findings from MAMI include the following:

There was (and sometimes still is) a misconception that SAM in infant <6months is rare. Because infants <6months have a target diet of exclusive breastfeeding (EBF), and because EBF provides optimal nutrition and protects against infections that can precipitate malnutrition, a false logic concludes that infants <6months are, therefore, rarely malnourished. Such reasoning ignores the fact that worldwide rates of EBF are strikingly low: only 25–31% among 2–5 months old (Black RE et al, 2008). Prevalence of infant <6months with SAM will increase as World Health Organization Child Growth Standards (WHO-GS) are adopted worldwide (Kerac M et al, 2011). Compared to the United States National Center for Health Statistics (NCHS) growth references, WHO-GS have lower thresholds for undernutrition among infants <6months.

Infant <6months mortality is high but the evidence base for treatment strategies is sparse. In MAMI's meta-analysis of available programme data, case fatality of infants <6months was significantly higher (RR 1.29, 95% CI 1.08 to 1.53) than that of children admitted to the same programme. This is not unexpected given the greater vulnerability of infants <6months and greater range of possible underlying or contributing pathologies. What is unknown, however, is whether any of these deaths represent excess mortality that could have been avoided with more efficacious or better delivered (more effective) treatments. As noted by the 2004 WHO consultation on severe malnutrition (which focused on dietary management



of infant <6months with SAM), the evidence based for defining the most advantageous formulations for feeding this age group remains weak.

Reflecting the many challenges and uncertainties regarding SAM in infant <6months, the WHO 1999 guidelines for “Treatment of severely malnourished children” only allude to this age group. Infants <6months are covered by the guidelines aimed at “children below 5 years” but are only directly mentioned once: “Infants <6months should have 50 000 IU of vitamin A” (this is a reduced dose compared to older children).

To better manage infants <6months, it is important to improve the evidence based around this age group. This review contributes to that goal by exploring the evidence for current inpatient-based treatments for infants <6months. Since the issues of “which treatment” and “which admission/discharge criteria to and from treatment” are inextricably linked, it should be read together with a sister-document on “Admission and discharge criteria for the management of severe acute malnutrition in infants <6 months” (Kerac et al, 2012).

2.17.1 Household Economic Status

The economic status of a household where a child lives has been identified as one of the key determinants of child nutritional status. It is also an indicator of access to adequate food supply, use of health services, availability of improved water sources and sanitation facilities which are prime determinants of child nutrition. Studies by Smith et al, (2005) stated that household economic status significantly affects access to food (a necessary condition for food security). It also indicates possession and utilization of child care resources on a sustainable basis. In addition, it allows a more diversified diet and effective child care arrangements. A study by (Yimer, 2000), also showed that the higher the level of economic status of the house hold, the lower the level of child stunting. Increase in household income



at the community level www.udsspace.uds.edu.gh leads to improved access to quality of health care, improved water and sanitation systems and access to information.

2.17.2 Mother's Educational Status

In many developing countries particularly in Africa, tradition has laid the responsibility of child care on women saying the place for women is in the kitchen. Therefore women are the key players in the growth of and development of children (Oyekale & Oyekale, 2005). However, it is not until recently that the role of mother's education in enhancing the quality of care and nutritional status of children is being emphasized in empirical research (Smith et al, 2004). Maternal education is one of the most important resources that enable women to provide appropriate care for their children. Education improves the ability of mothers to implement simple health knowledge and facilitates their capacity to manipulate their environment including interaction with medical personnel. Furthermore, educated women have greater control over health choices for their children. Studies by Oyekale & Oyekale, (2005), showed that education of women also have positive effects on the quality of care rendered to children since women are the main caretakers of children. For instance, educated mother's may have good paid jobs, thus be able to earn higher income and take better care of their children, be resident in urban areas, where there are functioning social infrastructure, possess commendable culture of hygiene needed to protect children from diseases, be more likely to participate in child health enhancing programs like immunization and child care talks and be able to benefit maximally from nutrition and other health related programs. The mother's ability to process information, acquire skills and positive behaviors improves with education.



2.17.3 Women's Status Relative to Men

Conceptually, the status of women is multidimensional. Smith et al. (2005) define women's status as the relative power of women in household, communities, and nations they live in. The status of women is an important determinant of two resources for care: their physical and mental health status, and control over household resources (Smith & Haddad, 2000). The physical conditions of women strongly affect the quality of care they provide to their children even before they are born. Poor physical and mental status of women constrains the quality of care rendered to their children which includes the quality of breast feeding.

On the other hand, women's control over resources promotes household food security and nutrition because women show a tendency to spend resources on nutrition inputs such as food (Haddad, 1999). Improved control over resources gives women a better opportunity to provide good care which includes better food preparation and storage practices, hygienic practices, improved care for children during illness (including diagnosis of illness, care seeking and home treatment), and motivation for supporting child development. Weak control over household resources, tighter constraint on time, restricted access to information and health services, poor mental health, and lack of self confidence and self-esteem typically characterize women with relatively lower status which in turn reflect on their children's health and the quality of care provided.

2.17.4 Mother's Employment Status

Although women's employment enhances the household's accessibility to income, it may also have negative effects on the nutritional status of children as it reduces a mother's time for child care. Some studies have revealed that mothers of the most malnourished children work outside their home (Abbi et al., 1991). Another study



argued that there is no [association](http://www.udsspace.uds.edu.gh) between maternal employment and children's nutritional status. (Leslie 1988).

The effect of maternal employment on the wellbeing of children has been controversial and it appears difficult to determine the net effect. Crepinsek & Burstein (2004), underscored that employment of mothers can have both positive and negative implication on children's dietary intake. On the one hand, the employment of mothers adds to family income and this may help to ensure stable supply of quality food through increased expenditure. On the other hand, mothers' employment may leave them with lesser time for caring and supervision of the activities of their children, and preparation of food. This appears more apparent under the assumption that no care taker would be motivated as mothers.

2.17.5 Water and Sanitation

Access to and use of safe water, sanitation facilities and good hygiene have the potential to positively impact nutritional outcomes by addressing both direct and underlying causes of malnutrition. Washing of hands with soap, treatment and safe storage of drinking water, and sanitary disposal of human feces, have been shown to effectively reduce the prevalence of diarrhea, a major contributor of malnutrition. Lack of sanitation in particular is strongly correlated to stunting and even in absence of diarrhea. Essential food hygiene actions include maintenance of clean food preparation area, separation of raw and cooked food, cooking food thoroughly, strong food safety (time, temperature, covered container) and use of safe water and fresh raw ingredients prevents infants and young children from infections (USAID, 2013).

Studies by the World Bank (2006), stated that improving access and quality of water source not only reduces transmission of water borne diseases but also saves



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women the extra time they spend on carrying water which can be allotted to child care and feeding or income generating activities.

2.18 How to Prevent SAM

2.18.1 Giving Adequate Nutrition and Disease Prevention

In the prevention of SAM, exclusive breastfeeding should not be compromised because of its relevance with the developmental process of early childhood (Lenters et al., 2013). Promotion of supplementation schemes and addressing micronutrient deficiency through food-based strategies such as dietary diversification through home gardens or through other means like micronutrient fortification (Black et al., 2008). However, nutrition education is the fuel that powers the preventive intervention (Black et al., 2008). Strategies to prevent disease are significant in altering the cycle of malnutrition infections, particularly when it comes to diarrhea and repeated respiratory infections managements (Lenters et al., 2013).

2.19 Review of Other Related Works (Empirical Evidence)

This section reviewed different studies that are related to the study subject matter in different countries with their findings and methodology for further comparism with the study findings.

Sadler (2008), studied the treatment of severe acute malnutrition with community-based therapeutic care in Sub-Saharan Africa. Sadler (2008), argue that over 1.5 million preventable child deaths each year is associated with severe acute malnutrition and also affects approximately 13 million children under-five. The study test hypotheses of CTC strategy can treat children with SAM effectively and can achieve better population treatment coverage than a centre-based approach. Five studies, using primary data, are presented. The first three studies evaluate the clinical effectiveness of CTC through examination of individual outcome data



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from research programmes in Ethiopia and Malawi. The fourth study examines the coverage of a CTC programme for SAM in Malawi and compares this with coverage of a centre-based programme. The final study is a multi-country evaluation of 17 CTC programmes implemented across Africa. The results from all the studies that used the CTC treatment model showed that outcomes can meet the international Sphere standard indicators of < 10% mortality and > 50% coverage. Coverage of a CTC programme in Malawi was three times that of a centre-based programme in the same region (73.64% (95% C.I. 66.0%, 81.3%) vs. 24.5% (95% C.I. 17.8%, 31.4%). A number of factors were vital to achieving low mortality and high coverage in these programmes. These included decentralisation of outpatient treatment services and community mobilisation techniques to encourage early presentation, and the use of appropriate triage criteria, to identify children suffering from SAM with no complications that could be treated safely as outpatients. The use of triage did not appear to increase mortality (OR 0.51 95% CI 0.28, 0.94).

Mwanza et al., (2016), studied the evaluation of outpatient therapeutic programme for management of severe acute malnutrition in three districts of the eastern province of Zambia. They argued that children under five years of age face severe acute malnutrition as a major cause of child mortality during hospital admission worldwide and attribute this poor case management (Mwanza et al., 2016). The study evaluated the improvement in health outcomes and case fatality rate in children aged 6–59 months diagnosed with SAM and admitted in OTP centres, and document the barriers to a sustainable OTP intervention in the districts of Eastern Zambia. A mixed-methods design was used to assess the health outcomes of OTP intervention. Three districts where OTP centres were operational at the time of study were selected. Records of 390 eligible children admitted with SAM between



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2008 and 2010 were reviewed. The health outcomes assessed included recovery and case fatality rates, defaulter rate, and weight gain. Information on the barriers to effective implementation of a sustainable OTP intervention in the districts was collected through semi-structured key-informant interviews with stakeholders. Outcome indicators were compared with the baseline data and recommended minimum standards for therapeutic feeding centres. Of the 390 children admitted into OTP, 312 (80 %) had recovered on discharge, 11 (2.8 %) died, and 67 (17.2 %) had defaulted. Compared to the baseline data and the recommended minimum standard values, case fatality rate for this study was 2.8 % vs. 7.3 % vs. >10 % respectively, and the recovery rate was 80 % vs. 73 % vs. >75 % respectively. Barriers to effective sustainability of the programme included dependence on donor-funds, consistent stock outs of ready-to-use therapeutic food and other supplies, high volunteer dropout, and inadequate monitoring and feedback on defaulters. OTP improved health outcomes of SAM children in the Eastern Zambia when compared with accepted minimum standards and previous data. Dependent on donor funding and the resultant regular stock-out of supplies can hamper sustainability in the long-term.

Mensah (2015), studied community perceptions and management of malnutrition in Children under five years in the Central Tongu District in Ghana. The nutritional status of children influences their health status, which is a key determinant of child survival. He added that improvement of children's nutritional status increases the chances of child survival and is considered as a precondition for their contribution to community as well as human development (Mensah, 2015). A semi structured questionnaire and a vignette was used to elicit information from 133 caregivers of children under five years. For qualitative, one focus group discussion was also



www.udsspace.uds.edu.gh carried out with 12 caregivers. From the study, majority of respondents were able to mention causes of malnutrition. Causes cited included, poor feeding practices, which 85.7% caregivers agreed to, 85.7% also mentioned poor environmental and personal hygiene, 85.7% mentioned poor child care, and 86.9% mentioned poor birth spacing as a cause of malnutrition. Eighty seven percent of respondents agreed that cases of malnutrition can be managed by taking the child to the health centre, and majority (74.4%) of caregivers also disagreed that malnutrition was as a result of spiritual illness/curse and it can be prevented. Conclusion: Although, caregivers did exhibit some knowledge on malnutrition, it would be beneficial to reinforce their education with regards to the three categories of malnutrition. Especially stunting, explaining the consequences of long term malnutrition. This is very important given the fact that many cases of stunting go unnoticed to the untrained eye. Good nutrition in the first 1,000 days of a child lays the foundation for health.

Akparibo (2014), studied nutrition and Child Survival in Ghana: Realist Evaluation of a Community-based Model used to treat Children with Severe Acute Malnutrition in Non-emergency Context in Ghana. The effectiveness of community-based programmes to treat children suffering from Severe-Acute Malnutrition (SAM) is well documented following their implementation in emergency situations (Akparibo, 2014). The study evaluates the effectiveness of the implementation of the approach in a non-emergency context in Ghana. The aim was to understand the potential impact of community-based programme to treat children suffering from acute malnutrition, as well as identify factors within the Ghanaian context that could potentially influence community-based programmes effectiveness. The study adopted a realist mixed method approach to evaluate the



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effectiveness of the community-based SAM management programme in Ghana. This approach incorporates quantitative and qualitative methods to understand what works, how and why. Quantitative methods were used to retrospectively collect and analyse data of children who attended the programme between July 2010 and January 2011 in Upper East Region. STATA version 11 was used to analyse the data to estimate the proportion of children who recovered, died and defaulted. Multiple backwards logistic regression was used to assess possible predictors of the outcomes achieved. Contextual factors (barriers and facilitators of programme impact) were assessed using qualitative investigation approach. Using this method, semi-structured interviews and focus groups were conducted with stakeholders, including services providers and beneficiaries of the programme to collect in-depth data. The data were transcribed and analysed using a framework approach. A total of 525 children were enrolled in the programme within the study period. However, only 488 children data were analysed because incomplete data were recorded for 37 children. Of 488 children data analysed, 30% (n=146) did not complete the programme. Of the non-completers, 28% (n=138) has dropped out, and 1.6% (n=8) died. 72% (n=350) of the children recovered from SAM. This proportion include 2% (n=8) of the children who dropped out. Recovery and mortality rates compared favourably with the Sphere acceptable indicators. Defaulter rate however was comparatively higher and nearly double the Sphere acceptable indicators. The regression analysis suggests no correlation between the variables tested and higher dropouts. However, the qualitative findings, suggest that contextual factors: distance to treatment centre, lack of support from husbands, busy schedule of women, community believes in traditional medicine as a cure for malnutrition, and health system factors: lack of incentives for health workers and



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volunteers, and inadequate health workers leading to insufficient monitoring of the programme and lack of counselling of caregivers, were potential reasons for the higher drop outs rates recorded. The findings suggest that community-based programme can achieve success when mainstreamed within routine health services and implemented in nonemergency context. However, success in this context can be diluted by higher default, if factors causing this are not identified and addressed. Health systems strengthening could also be a sure way to ensure success, as well as improve impact of community based programmes in Ghana.

Puettl & Guerrero (2014), studied barriers to access for severe acute malnutrition treatment services in Pakistan and Ethiopia: a comparative qualitative analysis. The study understands and compared the primary barriers households face when accessing treatment for cases of childhood severe acute malnutrition (SAM) in different cultural settings with different types of implementing agencies. The study presents a comparative qualitative analysis of two SAM treatment services, selected to include: (i) one programme implemented by a Non-governmental organization and one by a Ministry of Health; and (ii) programmes considered to be successful, defined as either coverage level achieved or extent of integration within government infrastructure. Results from individual interviews and group discussions were recorded and analysed for themes in barriers to access. Common barriers were related to distance, high opportunity costs, knowledge of services, knowledge of malnutrition and child's refusal of ready-to-use foods. While community sensitization mechanisms were generally strong in these well-performing programmes, in remote areas with less programme exposure, beneficiaries experienced barriers to remaining in the programme until their children recovered. Households experienced a number of barriers when accessing



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SAM treatment services. Integration of SAM treatment with other community-based interventions, as the UN recommends, can improve access to life-saving services. Efforts to integrate SAM treatment into national health systems should not neglect the community component of health systems and dedicated funding for the community component is needed to ensure access. Further research and policy efforts should investigate feasible mechanisms to effectively reduce barriers to access and ensure equitable service delivery

Desta (2015), studied survival status and predictors of mortality among children aged 0-59 months with Severe Acute Malnutrition Admitted to Stabilization Center at Sekota Hospital, Waghemra zone of Amhara region. The mortality rate of children with complicated severe acute malnutrition that receive treatment in inpatient set ups has remained unacceptably high (Desta, 2015). Such high mortality in inpatient units has been attributed to either co-morbidity such as Human Immune Virus, Tuberculosis, diarrhea and malaria or due to poor adherence to the World Health Organization therapeutic guidelines for the management of severe acute malnutrition (Desta, 2015). A retrospective cohort was conducted on 415 children aged 0-59 months who were admitted for complicated severe acute malnutrition at Sekota hospital from January1/2011 to December 30/2013. The data collection was undertaken from March 15-25, 2014 using standardized checklist. Data were cleaned, edited and entered into Epi data version 3.1. and analysed by SPSS version 16.0. Descriptive summary of child characteristics and outcome of interests were computed by using tables, graphs and Kaplan Meier curves. After checking for assumptions, Cox- proportional regression model was used to identify the potential predictors of survival status. Finally, variables that had P-value < 0.25 in bivariate analysis were candidates for



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multivariate analysis to determine independent predictors of mortality. Results: From 441 expected samples, the data were collected on 415 children with baseline records. The most frequently 185(44.6%) associated co-morbid was diarrhoea. Independent predictors of mortality were Malaria (AHR= 2.13, 95% CI = 1.12-7.15), severe anemia (AHR = 6.71, 95% CI: 3.22, 13.97). And TB (AHR= 2.88, 95%CI = 1.72, 4.65). Other predictors of mortality of the children were: children not supplemented folic acid (AHR=2.30, 95% CI=1.54, 3.4), not supplemented for vitamin A (ARH= 1.53, 95% CI= 1.05, 2.24) and children not managed by intravenous antibiotic (AHR= 2.73, 95%CI = 1.9, 4.0). Conclusion: The overall mortality among children aged 0-59 months with complicated SAM admitted to Sekota hospital was higher than the minimum SPHERE standard for stabilization centers. The majority of death was attributed to malaria, severe anemia, TB and mismanagement of complicated severe acute malnutrition. So, improving this gap may have paramount effect on child survival (Desta, 2015)

Ramagoma (2016), studied the knowledge regarding severe acute malnutrition and its treatment among Medical Officers in the Xhariep District, Free State. According to Ramagoma (2016), severe acute malnutrition (SAM) continues to be a major public concern in developing countries including South Africa (SA). A 2007 South African study showed that 14.6% of infants younger than one year died from malnutrition (Ramagoma, 2016). The World Health Organization (WHO) Ten Step protocol for the management of severe malnutrition was developed to improve the inpatient treatment of SAM. Specific guidelines are required due to the serious physiological and metabolic changes that occur when children become malnourished. If the appropriate care is not in place for children with malnutrition, it can lead to diarrhoea, poor appetite, slow recovery and increased risk for



mortality. The study www.udsspace.uds.edu.gh assesses the knowledge of MOs regarding SAM and its treatment in Xhariep District, Free State. Fifteen MOs out of a possible twenty employed at Xhariep district in both the district's clinics and hospitals participated in this study by answering a questionnaire designed to assess knowledge on the WHO Ten Step protocol for the treatment of SAM. Eight of the MOs that answered the questionnaire were randomly selected to participate in a focus group discussion to determine the factors that influence the level of knowledge regarding the WHO Ten Step protocol for the treatment of SAM. The mean score for the knowledge questionnaire on the management of SAM in children was 74 ± 7.84 %, with none of the MOs scoring 100%. The MOs in this study had particularly poor knowledge regarding the definition of wasting according to the Road to Health Booklet, vitamin A supplementation dose according to age, the volume of feeding that should be used for a child with malnutrition and without oedema and at which stage an infant with malnutrition and anaemia should be given iron supplements. The MOs scored 100% on the abbreviation for ReSoMal, whether a child with worsening oedema should be given diuretics or not, the need for investigation and counselling on human immunodeficiency virus (HIV) and tuberculosis (TB) prior to discharge and the need for referral to the dietitian for nutritional supplementation prescription and education prior to discharge. The focus group discussions revealed that the MOs felt that there was a need for more training on management of SAM at the undergraduate level as well as in-service training at the workplace. Even when in-service training was available, MOs were unable to attend due to lack of transport and high workload. Some MOs also suggested that the undergraduate university curriculum on the management of SAM should be standardised across all South African universities. The focus group discussions



www.udsspace.uds.edu.gh also revealed that the MOs found the management of a child with malnutrition in their district challenging, because most of these children remained at home until the development of complications, some of which are life threatening. The MOs working in the Xhariep District, Free State did not have full knowledge of the WHO Ten Step malnutrition protocol. This suggests that there is a need for regular in-service training on the WHO Ten Step protocol for the treatment of SAM for MOs working in the Xhariep District. South African universities offering medical degrees should consider lengthening and standardising the undergraduate curriculum on the management of SAM in children.

Naabah (2016), studied management of Severe Acute Malnutrition in Children Under Five in the Tolon District in Ghana. According to Naabah (2016), malnutrition in children has become a major public health issue accounting for about 30% of mortality among under-five children worldwide. Bilateral pitting oedema of nutritional origin or a mid-upper-arm circumference of less than 110mm in children age 1-5years are ways to identify the presence of Severe Acute Malnutrition (Naabah, 2016). Children with SAM do not only turn to be susceptible to diseases and death but may be likely to have abnormal cognitive development, poor performance in school and makes children attain little intellectually in later age. The study assesses the management of Severe Acute Malnutrition among children under five in the Tolon district. The study was a descriptive cross-sectional study design using quantitative research tools. Simple random sampling strategy was used to recruit 182 caregivers of children under five with SAM condition in the Tolon district in the Northern region of Ghana. Data from administered questionnaires was analyzed using STATA version 13. The study found difficulty in food acquisition to be one major risk factor of SAM in the



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Tolon district. Number of children a caregiver has was significantly associated with the number of times child feed in a day ($p < 0.006$). Caregiver's occupation was significantly associated with child's first introduction to water ($p < 0.011$) and child's first introduction to household foods ($p < 0.001$). Management of SAM should be geared toward educating caregivers to increase their knowledge on the condition and its management in order to sustain SAM management practices after the children are treated and discharged.

Burtscher & Burza (2015), looked at health-seeking behaviour and community perceptions of childhood undernutrition and a community management of acute malnutrition (CMAM) programme in rural Bihar, India: a qualitative study. Burtscher & Burza (2015), indicated that since 2009, Médecins Sans Frontières has implemented a community management of acute malnutrition (CMAM) programme in rural Biraul block, Bihar State, India that has admitted over 10000 severely malnourished children but has struggled with poor coverage and default rates. The study undertook a qualitative approach to understand community perceptions of childhood undernutrition, the CMAM programme and how these affected health-seeking behaviour. Semi-structured and narrative interviews were undertaken with families of severely malnourished children, non-undernourished children and traditional and allopathic health-care workers. Analysis of transcripts was by qualitative content analysis. One hundred and fifty people were interviewed in individual or group discussions during fifty-eight interviews. Undernutrition was not viewed as a disease; instead, local disease concepts were identified that described the clinical spectrum of undernutrition. These concepts informed perception, so caregivers were unlikely to consult health workers if children were 'only skinny'. Hindu and Muslim priests and other traditional health practitioners



www.udsspace.uds.edu.gh were more regularly consulted and perceived as easier to access than allopathic health facilities. Senior family members and village elders had significant influence on the health-seeking behaviour of parents of severely malnourished children. The results reaffirm how health education and CMAM programmes should encompass local disease concepts, beliefs and motivations to improve awareness that undernutrition is a disease and one that can be treated. CMAM is well accepted by the community; however, programmes must do better to engage communities, including traditional healers, to enable development of a holistic approach within existing social structures.

Tadesse (2018), looked at identification and community management of severe acute malnutrition empirical evidence in rural Southern Ethiopia. The study assesses factors of importance for the effectiveness of management of SAM in the community. A population-based survey of households with children aged under five years and a longitudinal study among children admitted to the integrated OTPs of rural Southern Ethiopia was undertaken. For Study I, children aged 6-59 months (n=4,297) from randomly selected households were examined for differences between children identified as SAM by MUAC and WHZ. For Study II, subsets of 1,048 children admitted to OTPs were analyzed for program outcome and nutritional status at discharge (n=759) and 14 weeks after admission (n=991). For Study III, non-oedematous children (n=661) admitted to OTPs were analyzed for gains in anthropometric measures after 4 weeks of treatment. For Study IV, children with SAM (n=788) were studied in terms of factors of importance for their recovery. Home-visits were used to collect data and anthropometry was measured following standardized World Health Organization (WHO) techniques. The degree of agreement between the two anthropometric indicators of severe wasting differed



www.udsspace.uds.edu.gh depending on the sex and age of the children. The indicators' response to treatment varied according to the indicator used to define SAM at admission. While 32.7% achieved the program's recovery criteria at discharge, 29.6% had SAM at discharge and 72.1% of children were acutely malnourished at the end of 14 weeks of follow-up. Despite low recovery rate, children of caregivers with the highest decision-making autonomy recovered faster from SAM than children of caregivers with lower autonomy. The poor agreement between MUAC and WHZ in diagnosing SAM within different groups of children indicates each anthropometric indicator may select different set of children for treatment. The study provided empirical evidence that supports the current recommendation to use MUAC and WHZ independently for the management of SAM. Linking CMAM to other complementary programmes may improve the effectiveness of integrated large-scale nutrition programmes (Tadesse, 2018)

Tembo (2015), looked at the performance of the community-based management of acute malnutrition (Cmam) programme for children 6-59 months old in Lilongwe Rural, Malawi. The study assessed the performance of the programme in meeting the programme internationally set standards. This was achieved by determining the programme coverage, recovery and death rates. Secondary objectives included determination of strengths and weaknesses of the programme and the association between nutritional status of the children and their social economic or demographic characteristics. A combination of cross sectional and retrospective designs was used with both descriptive and analytical approaches. A total of 195 households with children aged 6-59 months were selected. Information on household socio-economic and demographic characteristics and children's anthropometric measurement was collected using pre-tested questionnaires with the help of trained



www.udsspace.uds.edu.gh interviewers. A 24-hour recall period was used for individual dietary diversity score of the child. The assessment of the nutrition status of children 6-59 months was used to determine the coverage. Data from the month of August 2011-July 2012 was collected from health facilities implementing the programme in the study area to determine recovery and death rates and the adherence to CMAM protocol. Focus group discussions and key informant interviews were conducted to determine the strengths and the weaknesses of the programme. Descriptive summary statistics including frequencies, means, medians and standard deviations were used to describe the characteristics of the study population. Inferential statistics; Fisher's Exact, Confidence Interval, P- value, Spearman's correlations and Logistic regression were used to determine association between various dependent and independent variables. Quantitative analysis was used to analyse performance indicators such as coverage, case fatality, defaulter and recovery rates. In total, 1012 (50.01% males and 49.9% females) were included in the study. The mean household size of 5.1 (± 1.8) was found. The age dependency ratio was 120. Stunting was detected in 47.5% of the children, placing the area at high levels of chronic malnutrition. The findings indicated higher level of wasting (7.1%) than reported in Malawi demographic health survey of 2010 which was 4%. The level of coverage was just on the borderline (50%), leaving out a substantial proportion of malnourished children in the community unidentified. The recovery and death rates were both within the minimum standard of $>75\%$, and <10 respectively as stipulated in the International Standard Sphere. There was a significant association between the educational level of the mother and the nutritional status of the child in both stunting and underweight of the children ($p < 0.05$). The individual dietary diversity score of the child had significant association ($p < 0.05$) with the



nutritional status. The www.udsspace.uds.edu.gh household monthly income had positive and significant correlation with stunting ($r = 0.130^*$, $p < 0.05$). Logistic regression analysis showed that the breastfeeding status and mothers educational level were significantly associated ($p=0.001$, $p=0.044$) respectively, with the likelihood ratio or the ODDS ratio of 13.43. Despite the inconsistent supply of stationery, anthropometric equipments and RUTF, and lack of supervision were raised as serious issues contributing to the negative performance of the programme. Most mothers with their children in the programme reported that their children benefited from the programme through the RUTF ration and the nutrition counselling received from the programme. The study concluded that malnutrition still remains a big problem among children 6-59 months old. Educational level of the mothers and breastfeeding status are a determinant of malnutrition among children 6-59 months old. This study suggests that promoting education among women in the study area could be a means of increasing income through employment and also as a means of acquiring knowledge on how to use the resources at their disposal.

2.20 Summary

The literature review showed that at the global level, acute malnutrition contributes more than 50% of childhood mortality in children under 5 years old and about 3.5 million children die from malnutrition each year (Park et al., 2012). It also revealed that Africa remains the only region in the world where progress has been slow, and reports in the last 10 years indicates that the prevalence of stunting and severe wasting has been increasing in sub-Saharan African (Gretchen et al, 2012). In spite of this, interventions that seek to treat SAM cases often perform poorly in terms of treatment and geographical coverage due to various factors which vary from place to place. For better management of SAM cases, it is important to have full understanding of these factors that are context specific. The literature reviewed



further showed that www.udsspace.uds.edu.gh some studies have been conducted on the quality and implementation of community-based management of acute malnutrition in some African countries like Malawi, Ethiopia, and Sudan which showed better coverage and cure rates than the center-based therapeutic treatment (Shaheen, 2006; Lassi et al, 2013). However, no such studies were found to have been conducted in Ghana and for that matter Northern Ghana. It is in this light that this current study is warranted.

CHAPTER THREE

METHODOLOGY

3.1 Study Area

The study was conducted in the Tamale Metropolis. Tamale Metropolis is one of the 26 districts in the Northern Region and located in the central part of the Northern Region. It is bounded by Sagnarigu Municipal to the North, Mion District to the East, Tolon District to the West, Central Gonja District to the South -West and East Gonja District to the South. The capital, Tamale is strategically located in the Northern Region and by this location, the Metropolis has a market potential for local goods from the agricultural and commercial sectors from the other districts in the region and the southern part of Ghana. By its location, the Metropolis stands to gain in trade from some neighboring West African countries such as Burkina Faso, Niger, Mali and Togo. Geographically, the Metropolis lies between latitude 9°16 and 9° 34 North and longitudes 0° 36 and 0° 57 west. The Metropolis has a total estimated land size of 550 km sq and a population of about 257,561.

The metropolis has a total of 116 communities of which 41 (35%) are urban communities, 15 (13%) being peri-urban and 60 (52%) of them being rural in



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nature. The rural parts of Tamale are the areas where land for agricultural activities is available to a large extent and serve as the food basket for the Metropolis.

3.2 Study Design

The study design used for the study was a cross-sectional study design with a mixed method of both quantitative and qualitative approaches. This allowed for data to be collected on both present and past events on the subject matter which were used in the analysis to determine the barriers to access to SAM services.

3.3 Study Population

The study was conducted among caregivers of children age 6-59 months with severe acute malnutrition, service providers (CMAM facilities) and community members. The case definition used was "all children aged 6-59 months with the following characteristics: MUAC <115 cm and/or presence of bilateral oedema, or who were in the CMAM program for the treatment of SAM at the time of the data collection"

Key informants interviews with fifteen (15) service providers; that is one from each of the OPC were conducted. Additionally, focus group discussions (FGDs) were held with selected community members in each of the sub districts.

3.4 The SLEAC method sample size estimation

The Simplified Lot Quality Assurance Sampling Evaluation of Access and Coverage (SLEAC) Method was used as a wide-area survey method to determine treatment coverage at the sub- district level. A target sample size of $n = 40$ cases from each service delivery unit (that is, sub-districts) in which coverage is to be classified is usually large enough for most SLEAC applications. The target sample size of 40 together with estimates of the prevalence of severe acute malnutrition (SAM) in the survey area and population data was used to calculate the number of villages (N villages) that was sampled in order to achieve the target sample size:



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 $N \text{ villages} = \text{target sample size divided by } [\frac{\text{average village population all ages} \times \text{percentage of population 6-59 months}}{100} \times \frac{\text{SAM prevalence}}{100}]$.

Target Sample size (n): 40

Average village population (all ages): 2346

Prevalence of SAM: 1.6 %

Percentage of children aged 6-59 months: 18%

This implies, number villages to conduct the screening (N) = $40 / 2346 \times 0.18 \times 0.016 = 6$

Therefore, the total number of communities included in order to meet target cases in each sub-district running the CMAM Programme was six (6). A total of 24 communities were selected for the study (thus 6 from each sub district).

The six (6) communities were then selected using simple random sampling procedure from a complete list of villages in each sub district catchment area where the CMAM is being run.

The simplified LQAS classification technique was then used to identify the number of cases found in the survey sample (n) and the number of covered cases found:

- i. If the number of covered cases found exceeds a threshold value (d) then coverage is classified as being satisfactory.
- ii. If the number of covered cases found does not exceed this threshold value (d) then coverage is classified as being unsatisfactory.

The threshold value (d) depends on the number of cases found (n) and the standard (p) against which coverage is being evaluated.

The following rule of thumb formula was used to calculate the decision value:

$d = [n \times p/100]$ where p was the target coverage proportion (for example 50% in rural areas).



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The coverage standards are:

For rural areas, low coverage is (Below 20%), moderate coverage (20% - 50%) and high coverage (Above 50%). For urban areas, low coverage is (Below 30%), moderate coverage (30% - 70%) and high coverage (Above 70%)

3.5 Sampling technique

The Simplified Lot Quality Assurance Sampling Evaluation of Access and Coverage (SLEAC) which is a two-stage sampling method was used. The first stage of this sampling method was to select the communities. Six communities were randomly selected from each of the four sub-districts giving a total of twenty four (24) communities sampled in this first stage.

In the second stage, the Active and Adaptive Case-Finding (AACF) method or a house-to-house census sampling method was used in tracing SAM children in the selected communities. In this method, cases were actively searched for rather than just expecting cases to be found in a sample. The active and adaptive case finding method used information about the local understanding of SAM and CMAM services to construct a case finding question. The information found during case-finding is then used to inform and improve the search for cases. This means additional children from other households were identified by mothers in each of the screened households.

Community health workers, community volunteers and other key informants were asked to take data collectors to see “children who were sick, thin, had swollen legs or feet, or had recently been sick and had not recovered fully, or were attending a feeding programme or were receiving plumpy nuts”. Mothers and neighbours of confirmed SAM cases were also asked where children with similar conditions as their children or the confirmed case could be found, which also helped to find more cases. These processes continued until all, or nearly all, cases in the sampled



www.udsspace.uds.edu.gh communities were identified. In the second stage, a total of 173 children were screened for SAM out of which 21 were found to be SAM cases and these were those that were interviewed for the quantitative aspect of the study.

Fifteen (15) health staffs who were the focal persons of the CMAM program in their respective facilities where CMAM services are being offered in the metropolis and four (4) community health volunteers from communities that were found to have the highest number of SAM cases as identified in the study were also interviewed under the qualitative aspect of the study. Four (4) focus group discussions with an average number of eight (8) participants were also conducted in the four communities with the highest number of SAM cases as part of the qualitative aspect of the study.

3.6 Independent and dependent Variables

The independent variable measured included; distance to treatment sites, transportation, attitude of service providers, commodity supply, socio-economic status, level of education, religion, socio-cultural factors and the dependent variable were treatment coverage and quality of care (recovery rate, defaulter rate and death rate).

3.7 Data Collection Methods and Tools

The main tools used for the data collection included; structured questionnaire, In-depth interview guide and Focus Group Discussion (FGD) guide. Both qualitative and quantitative data were collected. The structured questionnaire was administered to selected caregivers of children (6-59 months) with SAM. The in-depth interview guide and focus group discussion guide were used to gather detail information from the 15 selected service providers and community members respectively.



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Both primary and secondary data were collected for this study. Routine programme data was used to assess the overall quality of services, identify trends in admissions and performance, and also determine if the program needs are met. Information such as MUAC measurements at admission and number of defaulters was used to assess early detection, recruitment and effective communication channels.

3.7.1 Questionnaire

A structured questionnaire with both open and close ended questions was used and information collected included demographic characteristics, barriers to CMAM programme access, CMAM records, and discharged outcomes were collected. The questionnaire was used to collect quantitative data.

3.7.2 Collection of qualitative data

Qualitative data was collected through meetings with the community members and health facility staff involved directly or indirectly in the CMAM programme implementation. The qualitative data helped to understand the knowledge, opinions and experiences of all people concerned as well as to identify potential barriers to access.

Interview and focus group discussion guides were used to facilitate the process of obtaining information on coverage. The interview guides were based on guides already used in other semi-quantitative evaluation of access and coverage (SQUEAC) investigations but with some modifications to some of the questions to suit the context of the study environment.

Focus group discussion

A focus group discussion was conducted to gather in-depth knowledge of some members of the community with regards to health seeking behaviour for children with SAM and perceived causes of malnutrition. The discussion was held with key opinion leaders in the community. Each group was made up of eight (8) members



and information provided during the discussions was recorded and later transcribed.

In-depth interview

A designed in-depth interview guide was used to collect detailed information about the barriers to CMAM access for children with SAM. This tool was used to collect qualitative data.

3.8: Identification of High and Low Coverage Areas

The stage two of SQUEAC investigations involved the conduction of small-area surveys. The objective of the second stage of the investigation was to confirm or reject the assumptions on areas of low or high coverage as well as the barriers to access as identified in the analysis of routine data available at the various CMAM sites in the Metropolis. The small-area survey method was used to test the assumption of geographical heterogeneity of coverage. A number of locations (half of them in which coverage was potentially high or satisfactory and half in which coverage was potentially low or unsatisfactory) was selected taken into account the criteria identified to be the most relevant according to the findings from the first stage.

Sample size of the small-area survey was not calculated in advance, but rather was based on the number of SAM cases found. Regarding the case -finding methodology, door-to-door screening of all children 6-59 months was used. The active and adaptive case finding method (i.e. visiting households of potential cases) was based on key informant's information to find all severely acutely malnourished children.

The case definition that was used was "all children aged 6-59 months with the following characteristics: MUAC <115 cm and/or presence of bilateral oedema, or



who were in the CMAM program for the treatment of SAM at the time of the data collection" www.udsspace.uds.edu.gh

3.9 Recruitment of Research Assistants

Two (2) research assistants were engaged during the data collection process. they were also given special training on the purpose and focus of this study with emphasis on the tools used in the study to help them better understand all the issues related to this study and how to properly use the various data collection tools effectively to ensure good work on the field to guarantee quality data was collected.

As part of the training for the research assistance, the data collection tools were pre-tested to help test their ability to collect the needed information as well as identify and correct gaps in the data collection tools. The pre-testing was also to help the research assistants to get familiar with the data collection tools before actual data collection begun.

3.10 Data Analysis

The quantitative data was first manually cleaned by going through each questionnaire to check for completeness and consistency of the responses. During this process, responses to open ended questions were also post-coded for easy entry and analysis. The data was then entered into the epi info soft-ware and then transferred into the SPSS soft-ware and analyzed. A soft-ware called start transfer was used to transfer the data from epi info into the SPSS soft-ware. The results of the analysis were presented in a form of tables and charts for better appreciation and understanding. Both descriptive and bivariate analysis were done to determine barriers to access to CMAM services. For the test statistics, a p-value of <0.05 was considered to be significant.



The qualitative data collected was also analyzed based on thematic areas by grouping common responses and attaching more weight to the most featured common responses.

Analysis of the results from the small area survey was done using LQAS (Lot Quality Assurance Sampling) in order to obtain a classification of coverage compared to a specific threshold. According to the SPHERE standard guidelines, the expected coverage in urban and rural areas are 70% and 50% respectively. In order to be able to reveal coverage differences between potentially high and low coverage areas, the decision rule was calculated using the following formula: $d = n \times p/100$.

Where n = number of cases found, p : standard coverage defined for the area.

Where the number of cases covered was higher than the threshold value (d), then coverage was classified as satisfactory (coverage meets or exceeded the standard).

Where the number of cases covered was lower than the threshold value (d), then coverage was classified as unsatisfactory (coverage did not meet, neither exceeded the standard).

3.11 Ethical Consideration

Ethical clearance was sought from the Ethics Committee of the Tamale Teaching Hospital. Permission was also sought from the Metropolitan Health Directorate before the commencement of the study. Verbal consent was also obtained from all the study participants before each interview was conducted. The purpose of the study as well as the risk and benefit to the participant was explained to each participant during the process of obtaining consent. After all these, each participant was given the opportunity to decide whether or not to participate in the study. Only those who opted to be part of the study were included and so participation in the study was pure voluntary and for that matter the participants' decision to



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understand what the study is all about. Those who did not want to participate were exempted from the study.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the findings of the study. The results are presented in a form of frequencies, percentages, mean, minimum and maximum values in tables and charts.

4.2.1 Socio-demographic characteristics of SAM children

The details on the socio-demographic characteristics of SAM children identified are shown in Table 4.1. Majority (57.1%) of the SAM children identified were within the age range of 13-24 months. The results further indicate that the average age of SAM children identified was 14.8 ± 6.5 months. Majority (52.4%) of the



SAM children identified were males with a little below half (47.6%) of them are females.

Table 4.1: Socio-demographic characteristics of SAM children

Age category (months)	Frequency	Percentage (%)
0-12	7	33.4
13-24	12	57.1
25-36	2	9.5
Total	21	100.0
Sex of children		
Male	11	52.4
Female	10	47.6
Total	21	100.0

4.2.2 Socio-demographic characteristics of respondents

The minimum age of mothers of the SAM children was 17 years whilst the maximum age was 44 years as shown in Table 4.2. The average age of the mothers was also found to be 30.5±6.9 years. More than half (52.4%) of the mothers were illiterates while less than 5% of them had their level of education at the senior high school level. None of the mothers had their education beyond the senior high school level. All the mothers were also married with most (95.2%) of them being Muslims and more than half (52.4%) of the mothers were traders and about 30% of them being house wives. The average household size was 14.3 people. Majority (57.1%) of the households had more than ten (10) people while less than 20% of them had between two to five people.

Table 4.2: Socio-demographic characteristics of respondents

Age category of mothers		
Under 18	1	4.8
18 – 34	14	66.7
At least 35	6	28.6
Total	21	100.0
Mothers' educational level		
Illiterate	11	52.4
Primary	8	38.1
JHS/vocational school	1	4.8
SHS	1	4.8



Tertiary	0	0.0
Total	21	100.0
Marital status of mothers		
Single	0	0.0
Married	21	100.0
Total	21	100.0
Mothers' occupation		
Farmer	0	0.00
Trader	11	52.4
House wife	6	28.6
Seamstress/hair dresser	4	19.0
Total	21	100.0
Religion of mothers		
Islam	20	95.2
Christianity	1	4.8
Total	21	100.0
Number of people in mothers' households		
2-5	4	19
6-10	5	23.8
10+	12	57.1
Total	21	100.00
Level of household wealth index		
Low	13	61.9
High	8	38.1
Total	21	100.0

Field Survey, 2018

4.3 Prevalence of severe acute malnutrition (SAM)

The mean mid arm circumference (MUAC) of children identified to have severe acute malnutrition was 11.1 ±0.31 cm. The results show that 21 representing 12.1% out of 173 children screen for severe acute malnutrition were actually severely acutely malnourished as shown in Table 4.3 below, which gives the details on the point prevalence of severe acute malnutrition in the Tamale metropolis.

Table 4.3: Prevalence of severe acute malnutrition (SAM)

Is child a SAM case	Frequency	Percentage (%)
Yes	21	12.1
No	152	87.9
Total	173	100.00



4. 4 Treatment coverage for SAM

Slightly above one-third (38.1%) of the SAM children identified during the study were receiving CMAM services in the Tamale Metropolis. Figure 4.1 below gives the details on the treatment coverage for SAM in the Tamale Metropolis.

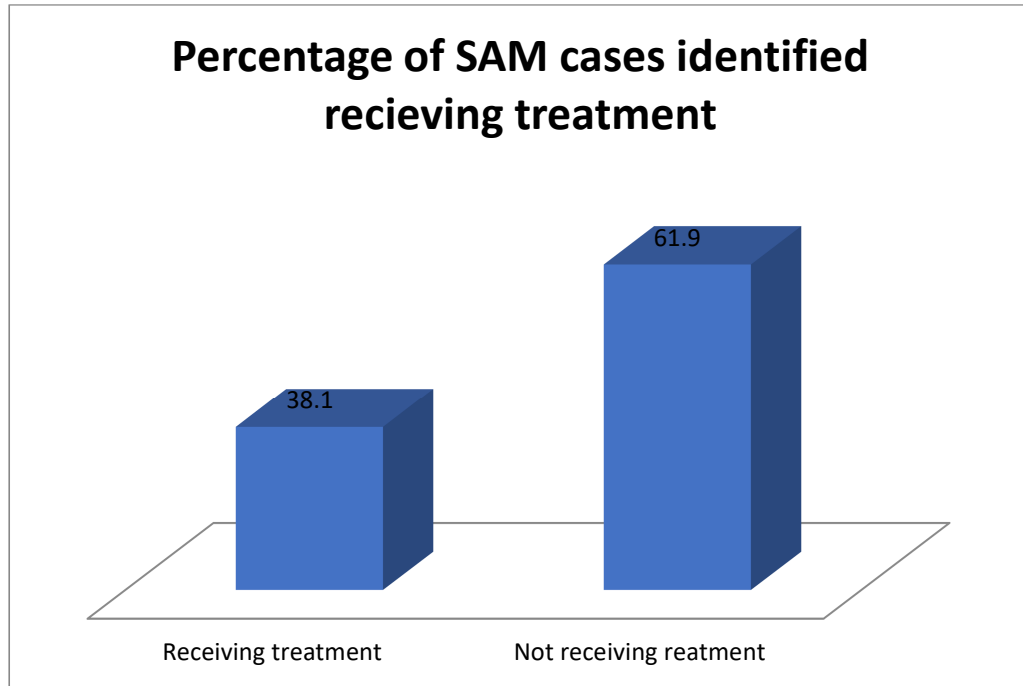


Figure 4.1: Treatment coverage of SAM, Field Survey, 2018

4.5 Distribution of high and low treatment coverage areas within the Tamale Metropolis

The minimum coverage standards set by the SPHERE project for treatment coverage are 50%, 70% and 90% for rural, urban, and camp settings respectively. Table 4.4 shows the treatment coverage in the Tamale Metropolis which is largely urban is 38.1 %. For urban areas, low coverage is (below 30%), moderate coverage (30% - 70%) and high coverage (Above 70%).

Table 4.4: Classification of treatment coverage by sub districts

Name of sub-district	SAM Cases found (n)	SAM cases in program ©	Lower decision threshold (d1) = n x 0.3	Is c > d1?	Upper decision threshold (d2) = n x 0.7	Is c > d2?	Coverage Classification



Bilpeila	7	4	2.0	Yes	5.0	No	Moderate
Nyohini	6	3	2.0	Yes	4.0	No	Moderate
Tamale central	3	1	1	No	2.0	No	Low
Vitting	5	0	2.0	No	4.0	No	Low
Total	21	8	6.0	Yes	15	No	Moderate

Field Survey, 2018

4.6 Caregivers’ knowledge on the services provided for children with severe acute malnutrition

Exactly half of the mothers of SAM children receiving treatment under the CMAM program each had adequate knowledge on a program that can treat SAM children and therapeutic foods used at the outpatient care while three-quarters of them each also had adequate knowledge on therapeutic foods used at the outpatient care and the weekly visits at the outpatient care. The result also shows that 50% of the mother had adequate overall knowledge on the CMAM program (Table 4.5).

Table 4.5: Knowledge level of caregivers on the CMAM program

Indicator	Adequate knowledge on CMAM		Inadequate knowledge on CMAM		Total	
	#	%	#	%	#	%
Do you know of a program that can treat SAM children	4	50.0	4	50.0	8	100.0
Client’s knowledge on therapeutic foods used at OPC	6	75.0	2	25.0	8	100.0
Client’s knowledge on the weekly visits at OPC	6	75.0	2	25.0	8	100.0
Client’s knowledge on the routine medications given at OPC	4	50.0	4	50.0	8	100.0
Overall knowledge of caregivers on the CMAM service provided at the OPC	4	50.0	4	50.0	8	100.0

Field Survey, 2018



Two-third (66.7%) of the mothers of SAM children identified were able to identify correctly that their children had SAM while the remaining of the mothers were unable to correctly identify that their children had SAM. Exactly two-third (66.7%) of the mothers of children with SAM indicated that they knew of a program that can treat SAM while the remaining one-third (33.3%) of them indicated that they did not know of any program that can treat SAM. Close to 80% of the mothers who indicated that they knew of a program that can treat SAM mentioned CMAM as the program that can treat SAM while more than 21% of them mentioned spiritual treatment as the program that can treat SAM. Majority (57.2%) of the mothers also mentioned health centre as the place where the program for treating SAM can be found while about 21% of them each respectively mentioned hospital and spiritualist place as the places where the program for treating SAM can be found in Table 4.6.

Table 4.6: Mothers' awareness of SAM and the CMAM program

Do you think this child is malnourished	Frequency	Percentage (%)
Yes	14	66.7
No	7	33.3
Total	21	100.0
Do you know of a program that can treat SAM		
Yes	14	66.7
No	7	33.3
Total	21	100.0
If yes, what is the name of the program		
CMAM (they give us packaged food every week)	11	78.6
Spiritual treatment	3	21.4
Total	14	100.0
Where is the program		



Health centre	8	57.2
Hospital	3	21.4
Spiritualist place	3	21.4
Total	14	100.0

Field Survey, 2018

4.7 Mothers' perspective of the causes of SAM in their children

A little above 40% of the mothers of SAM children identified mentioned disease condition as the cause of SAM in their children while close to 30% and about 15% of them also mentioned poor feeding and spiritual attacks as the causes of SAM in their children. About 15% of the mothers said they did not know the cause of the SAM in their children. Figure 4.2 below shows the details on the mothers' perspective of the causes of SAM in children.

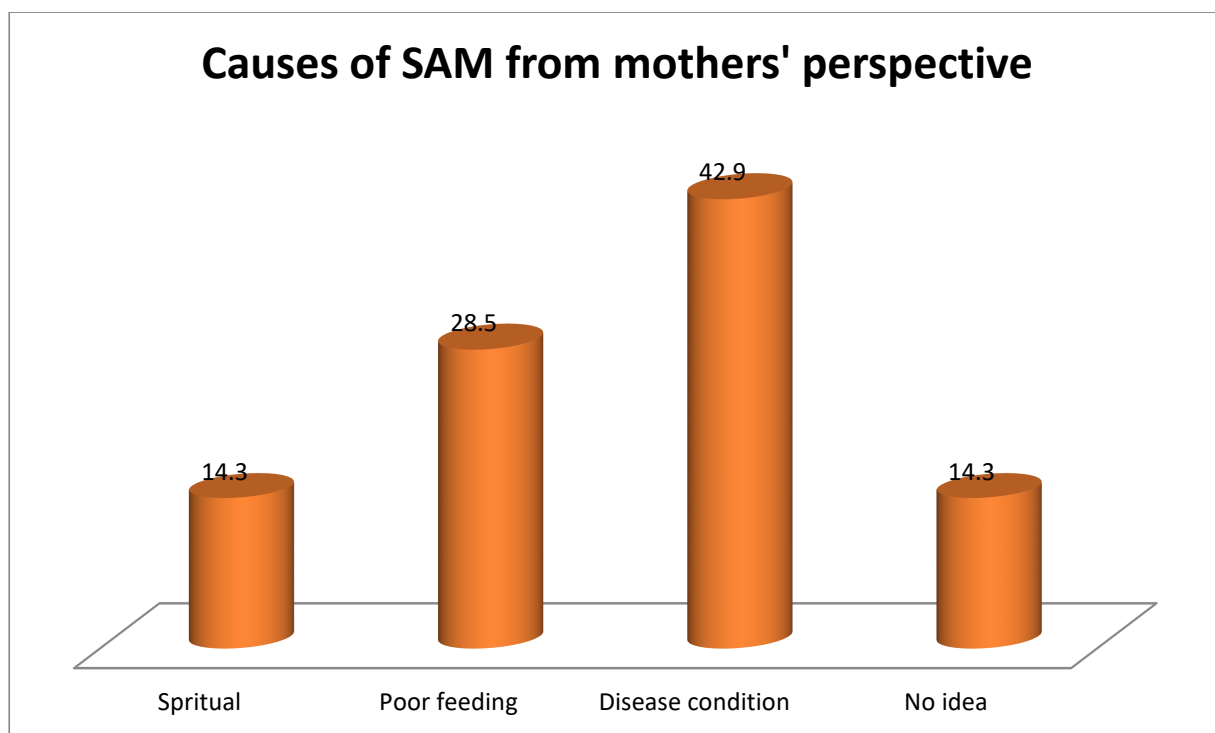


Figure 4.2: Mothers' perspective of the causes of SAM

Field Survey, 2018



4.7.1 Whether or not mothers know where SAM could be treated

More than two-third (71%) of the mothers of children identified with SAM indicated they knew where SAM could be treated while about 30% of them said they did not know where SAM could be treated. Details on mothers knowledge on where SAM could be treated is shown in figure 4.3 below.

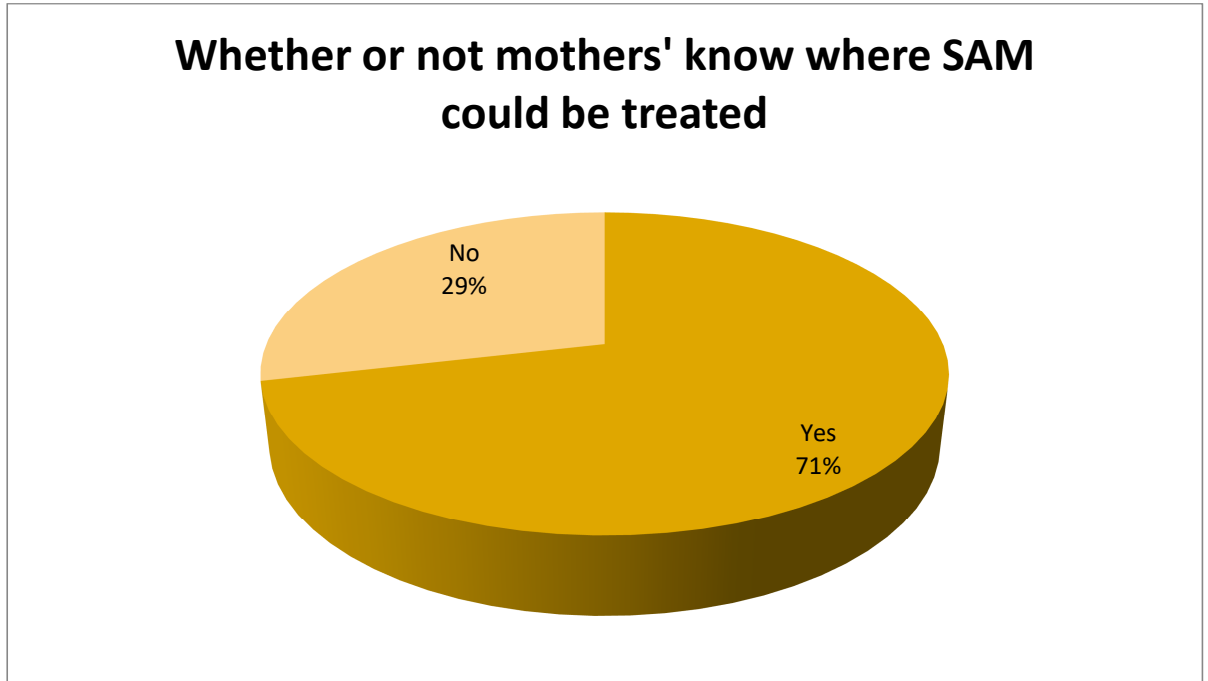


Figure 4.3: Whether or not mothers' know where SAM could be treated

Field Survey, 2018

4.7.2 Places where SAM could be treated

Exactly 70% of the mothers of SAM children identified who indicated that they knew where SAM could be treated mentioned health centre as a place where SAM could be treated while the remaining 30% of them mentioned hospital as a place where SAM could be treated. Figure 4.4 below shows the details on the places where SAM could be treated.



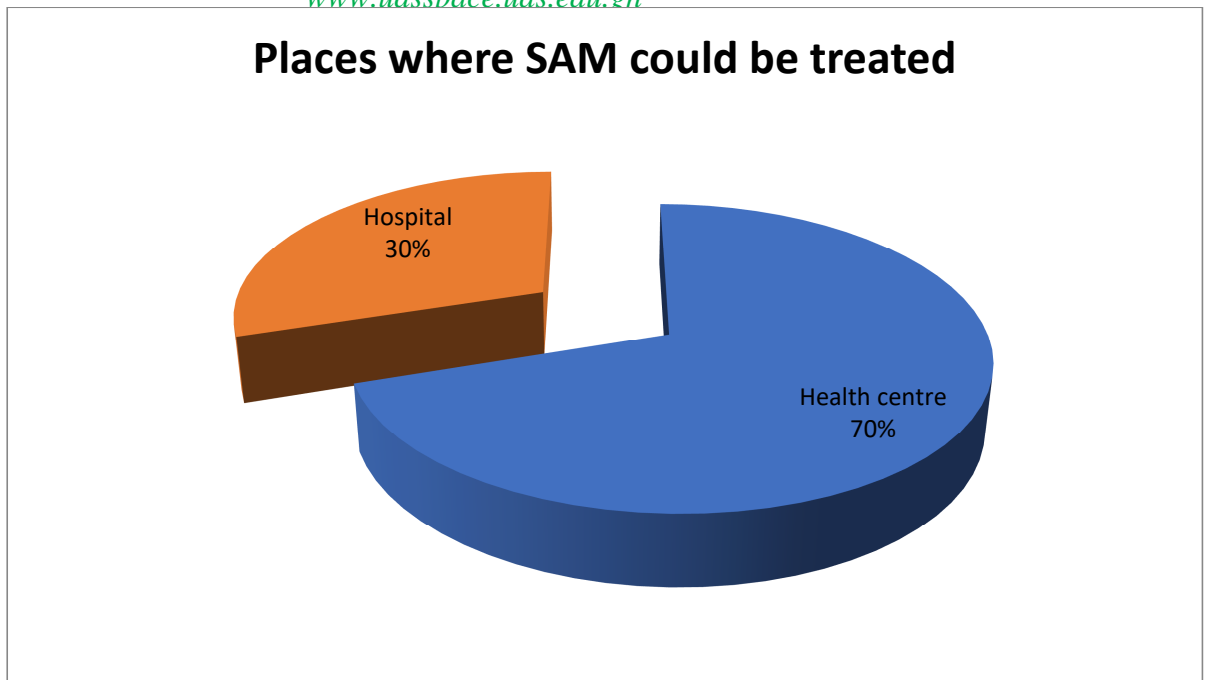


Figure 4.4: Places where SAM could be treated

Field Survey, 2018

4.8 Accessibility of CMAM service provided at OPC sites

Close to 40% of the mothers of SAM children receiving treatment under the CMAM program indicated that it takes them one hour or more to get to the outpatient care treatment site while more than 60% of them indicated they go to the treatment site on foot. About 90% of the mothers also indicated that the attitude of health staff at the outpatient care site was good or excellent while 25% of them indicated that they knew of other children suffering from SAM who are not receiving any treatment under the CMAM program with about 12% of them indicating that the spiritualist place is their first point of seeking for treatment for SAM children. The overall quality of CMAM service in the Tamale metropolis was 75% as shown in table 4.7 below which gives the details on the quality of CMAM services provided at outpatient treatment care sites.

Table 4.7: Accessibility of CMAM service provided at OPC sites

Traveling time to treatment centre	Frequency	Percentage (%)
< 1 hour	5	62.5
≥1 hour	3	37.5
Total	8	100.0
Means by which clients get to the treatment centre	Frequency	Percentage (%)
Foot	5	62.5
Car	3	37.5
Total	8	100.0
Attitude of health staff during CMAM services	Frequency	Percentage (%)
Excellent	1	12.5
Good	6	75.0
Poor	1	12.5
Total	8	100.0
Do you know of other children in your community with SAM like your child who is not receiving treatment	Frequency	Percentage (%)
Yes	2	25.0
No	6	75.0
Total	8	100.0
Where do you first seek treatment for your children with SAM	Frequency	Percentage (%)
Health facility	7	87.5
Spiritualist/home management	1	12.5
Total	8	100.0
Caregiver's knowledge on CMAM services	Frequency	Percentage (%)
Adequate	4	50.0
Inadequate	4	50.0
Total	8	100.0
Overall access to CMAM service	Frequency	Percentage (%)
Good	6	75.0
Bad	2	25.0
Total	8	100.0

Field Survey, 2018



4.9 How SAM children got onto the CMAM program

The results also shows that exactly 70% of the SAM children receiving treatment under the CMAM program got onto the program after they were diagnosed of SAM at the health facility during other health services with only about 12% of them spotted outside the health facility and referred to the facility by health workers. Mothers also diagnosed about 12% of the SAM case by themselves and took them to the health facility for confirmation and treatment. Details on how SAM children receiving treatment got onto the CMAM program are shown in table 4.8 below.

Table 4.8: How SAM children got onto the CMAM program

How child got onto the CMAM program	Frequency	Percentage (%)
Mother took child to the health facility for the CMAM service herself	1	12.5
Child was spotted and referred to a health facility by a community health nurse for the CMAM services	1	12.5
Mother took child to the health facility for weighing where child was diagnosed of SAM and placed on the CMAM program	1	12.5
Mother took child to the health facility to complain of poor feeding by child where child was diagnosed of SAM and placed on the CMAM program	1	12.5
Child was sick and taken to the health facility for treatment where child was diagnosed of SAM and placed on the CMAM program	4	50.0
Total	8	100.0

Field Survey, 2018



4.10. Relationship between socio-economic factors and access to SAM treatment services

The main health seeking behavior sought in this study was whether child was receiving CMAM services/treatment either at OPC or IPC. None of the factors with the exception of lack of childcare/help with children was a significant determinant of utilization of the utilization of CMAM services (Table 4.9).

Table 4.9: Bivariate analyses of the association between selected factors and uptake of CMAM services (*n* = 21)

Characteristic	N	Uptake of CMAM?		Test statistic
		No n (%)	Yes n (%)	
Household wealth index				
Low	14	11 (78.6)	3 (21.4)	Fisher's Exact Test = 2.7 , p = 0.2
High	7	3 (42.9)	4 (57.1)	
Residential type				
Urban	10	7 (70.0)	3 (30.0)	Fisher's Exact Test = 0.1, p = 0.8
Rural	11	7 (63.6)	4 (36.4)	
Educational level				
None	11	6 (54.5)	5 (45.5)	Fisher's Exact Test = 1.5, p = 0.4
At least Primary School	10	8 (80.0)	2 (20.0)	
Lack of childcare/help with children				
No	12	5 (41.7)	7 (58.3)	Fisher's Exact Test = 7.9, p = 0.007
Yes	9	9 (100.0)	0 (0.0)	
Age of mother (years)				
Under 35	15	11 (73.3)	4 (26.7)	Fisher's Exact Test = 1.1 , p < 0.4
At least 35	6	3 (50.0)	3 (50.0)	

Field Survey, 2018



4.11 Barriers to access for treatment of SAM

The most frequently reported barriers to access were lack of child care/help with children, health facility is too far away, needed to be referred but there is no one to do this and previous rejection of sibling. Table 4.10 below gives more details on the barriers to access to CMAM treatment.

Table 4.10: Barriers to access to SAM treatment services

Barrier	Frequency	Percentage (%)
Lack of child care/help with children	9	42.9
Ashamed to go to the health centre	1	4.8
The program is closed/not running any more	1	4.8
I need to be referred and there is no one to do this	2	9.5
Do not know where to go	1	4.8
Health facility is too far away	2	9.5
My husband or family will not let me go	1	4.8
Health facility staff request for money	2	9.5
Health facility runs on wrong days	1	4.8
Child or siblings was rejected previously	3	14.3
Child or sibling was receiving CMAM service and defaulted	1	4.8
Lack of time by mother	2	9.5

Field Survey, 2018

4.12. Results from Focus Groups Discussions, Key informant interviews and In-depth interviews

The findings from the qualitative data collected are as follows;

4.12.1 Knowledge and practice on SAM and the CMAM program at the community level

Generally, results from the key informant interview indicated that the community health volunteers are involved in education, sensitization and awareness creation on the CMAM program as well as the identification of SAM cases in the communities and that at the community level. The CMAM program is known as “bindridu” which literally means food or “gbendarima tim” which also means treatment for thin people. It was also indicated that at the community level, SAM is



called “Kpante” while www.udsspace.uds.edu.gh marasmus and kwashiorkor are called “Kpante kuuni” and “Kpante Mahali” respectively.

Focus group discussions with opinion leaders in the communities also revealed that most of the opinion leaders were aware of the CMAM program through the community health nurses which they said is a treatment for malnutrition among children but did not know the exact age category of children the program targets as well as the treatment given at the OPC level. They also indicated that the CMAM OPC services are for free but could not tell what the OPC days for their facilities were as well as the admission criteria as one of them put it “the signs they use to diagnose we don’t know”.

In focus group discussions with ordinary people in the communities, only few mentioned malnutrition as one of the common health problem of the community. It was however clear that the people knew what SAM, marasmus and kwashiorkor are, as they gave their local names as “kpante”, “kpante kuuni” and “kpante mahali” respectively as indicated by the community health volunteers. The people were also aware of CMAM as a program at the health facilities for the management of SAM as they have been told my health staff at the child welfare clinics. They also indicated that “plumpy nut” and medications are used for the treatment of SAM at the health facility.

4.12.2 Causes of SAM and misconceptions

Negative cultural beliefs, ignorance/lack of education, poverty, inappropriate feeding practices, large household sizes, lack of responsive feeding and care practices by care givers and poor hygiene and sanitary practices were mentioned by OPC health staff of various health facilities in the Metropolis through in-depth interviews as the major causes of SAM in the Metropolis. “Children are not



www.udsspace.uds.edu.gh supposed to take egg or else, they will become thieves in future” is an example of the negative cultural beliefs cited by the OPC health staff.

In focus group discussions, community members were of the view that SAM is by God’s will and He gives it to those He wants because no parent make their children sick. Others were of the view that SAM is hereditary and can be passed on from generation to generation and that fair children are those mostly affected by SAM.

4.12.3 Quality of CMAM services

The result of the in-depth interviews with OPC health staff shows that most of the OPC health staffs were not trained in the CMAM module. Only the Nutrition Rehabilitation Center, Tamale Teaching Hospital and Tamale West hospitals respectively had 50%, 44% and 100% of their health staff directly involved in the CMAM OPC services trained in the CMAM module. SDA hospital did not have any of their health staff directly involved in CMAM OPC services trained in the CMAM module, not even the Nutrition Officer. The rest of the ten (10) health facilities all had less than 25% of their health staffs directly involved in CMAM services trained in the CMAM module. Only three out of the thirteen OPC health staff interviewed had received refresher training in the CMAM module. Most (10 out of 13) of the OPC health staff also indicated through the in-depth interviews that they needed further training to help improve the quality of their CMAM services.

The OPC health staff through the in-depth interviews also mentioned reporting, routine medication, counting respiratory rate and correct filing of OPC treatment cards as areas of CMAM they had gaps in and need training on to help improve the quality of their CMAM services. They further mentioned high numbers of SAM cases at the OPC sites, lack of thermometer, shortage of the ready-to-use therapeutic food, lack of appropriate counseling space, absenteeism, lack of



contacts of other OPC sites and far distance of OPC sites from care givers as the main obstacles affecting the quality of CMAM services.

On the average most of the health facilities recorded between 1-2 defaulters per month while shortage of ready-to-use therapeutic food, family relocation, care givers traveling, long distances of OPC site from mothers and lack of proper care on the part of care givers were identified as the main causes of care givers defaulting from the CMAM treatment. Most of the OPC health staff also mentioned phone calls to mothers and asking a health volunteer to follow up as their ways of follow ups on absentees and defaulters.

Referral by a community health volunteer, screening at the health facility, referral by beneficiaries, referrals by other health facilities or IPC and referrals by other community members were identified as the main means by which SAM cases get into the CMAM OPC program. No staff mentioned active case search as a means of getting SAM cases into the CMAM OPC program.

4.12.4 Barriers that prevent mother from accessing CMAM services

Stigmatization, far distances from OPC sites, lack of means of transport, lack of family support, ignorance, financial constraints, farming activities, shortage of ready-to-use therapeutic food and poor attitude of health staff at the OPC sites were the main barriers identified by health volunteers, OPC health staff and mothers of SAM children that prevent mothers from taking their SAM children to the OPC sites for treatment. A volunteer explained that families with SAM children are stigmatized because the people hold the view that SAM children have very slim chances of survival.



DISCUSSION

5.1 Prevalence of severe acute malnutrition (SAM)

The results show that 12.1% of children screened for severe acute malnutrition were actually severely acutely malnourished. This prevalence is about twice the prevalence of SAM in the Northern region of Ghana which was 6.3% according to the GDHS (2014). This could mean that the true prevalence of SAM in the Tamale metropolis has been masked by the regional prevalence and therefore implies that care must be taken in basing on the regional prevalence to plan interventions to fight SAM at in the metropolis as that would be misleading.

5.2 Treatment coverage for SAM

The results also showed that, slightly above one-third (38.1%) of the SAM children identified in the study were receiving CMAM services in the Tamale Metropolis. This indicates a moderate coverage of SAM cases for treatment in the Metropolis contrary to the SPHERE project's standards of above 70% coverage for urban areas to indicate high coverage. This finding is consistent with that of Rogers et al., (2015) who also found CMAM coverage to be 38.3%. However, the finding is contrary to that of Lassi et al., (2015) who found average coverage in Malawi, Ethiopia and Sudan to be as high as 72.5% which makes the coverage in the Tamale metropolis to appear to be even much lower. The relatively low CMAM coverage in the Tamale Metropolis therefore means that many SAM children in the metropolis would be exposed to high risk of morbidity and mortality which are associated with malnutrition as they are not identified and put on treatment early due to the low coverage which would lead to infectious disease, complications and death. This is supported by Kauffmann et al, (1986) who noted that malnutrition could limit children's ability to respond to stress and make them more vulnerable



to infectious diseases. www.udsspace.uds.edu.gh Golden (2000) added that severe malnutrition exposes children to high morbidity and mortality risk and explained that children's resistance to infections is lowered when they are severely wasted, putting them at increased risk of death from common ailments like diarrhoea, respiratory tract infections and other infectious diseases.

5.3 Distribution of high and low treatment coverage areas within the Tamale Metropolis

From the study, the treatment coverage of SAM in the Tamale Metropolis which is largely urban is 38.1 %. Per the SPHERE standard treatment of SAM, for urban areas, low coverage is (below 30%), moderate coverage (30% - 70%) and high coverage (Above 70%). The results further show that Bilpiela and Nyohini sub-districts had moderate coverage for SAM while Tamale central and Vitting sub-districts had low coverage of SAM. This means that treatment coverage of SAM in all the sub-districts of the Tamale Metropolis is below the minimum standard for high coverage. The inability of all the sub-districts in the Tamale metropolis to meet the minimum standard coverage for high SAM coverage could be due to the lack of active case search by health staff in the Metropolis as the results of the study showed that close to 90% of the SAM cases receiving treatment were identified through passive means. It could also be due to the lack of childcare or help with children which was identified by the study as the main barrier to the uptake of CMAM services in the metropolis. Other factors that could account for the low CMAM coverage include stigmatization, far distances to OPC sites, previous rejection, lack of means of transport, lack of family support, ignorance and financial constraints as they were all identified as factors that limit access to CMAM services. This finding is consistent with the finding of Rogers et al, (2015) who showed that most of the CMAM programmes (33 of 44) failed to meet



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context-specific internationally agreed minimum standards for coverage. They also found the mean level of estimated coverage achieved by the programmes in their analysis to be 38.3% similar to what this study has found. Also the most frequently reported factors they found to affect coverage were lack of awareness of malnutrition, lack of awareness of the programme, high opportunity costs, inter-programme interface problems, and previous rejection which are also similar to what this study has found.

5.4 Caregivers' knowledge and practices on services provided for children with severe acute malnutrition

Exactly half of the mothers of SAM children receiving treatment under the CMAM program had adequate knowledge on a program that can treat SAM children and therapeutic foods used at the outpatient care. Three-quarters of the mothers each also had adequate knowledge on therapeutic foods used at the outpatient care and the weekly visits at the outpatient care. The result also shows that 75% of the mothers had adequate overall knowledge on the CMAM program. This means that caregivers of SAM children under treatment had high knowledge on the CMAM programme which is consistent with the findings of Naabah, (2016) who also found caregivers of SAM children who were or had received treatment to have high knowledge on the CMAM program. The high knowledge could be due to effective key messages which is a key component of the CMAM service delivery to caregivers by health staff at OPC sites. This is because the key messages given to caregivers during CMAM OPC services aims at helping the caregivers to understand the key aspect of the CMAM treatment package to ensure compliance with treatment directives for cure to be achieved within the shortest possible time. This is also in line with the thinking of Naabah (2016) who also attributed the high



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knowledge level of caregivers on the CMAM programme to the fact that a significant number of them had gone through and completed the CMAM treatment. In the present study, the significant number of about one-third of the mothers of SAM children who could not identify correctly that their children had SAM suggest some level of ignorance about SAM. This could be a contributing factor to the low treatment coverage identified in the study as mothers who do not know the sign and symptoms SAM would not be prompted to take them to a health facility for treatment even though such children would have exhibited clear signs and symptoms of SAM. Slightly above half of mothers of SAM children mentioned CMAM as the program that can treat SAM which means close to half of the mothers are not aware of CMAM. This constitute low level of awareness of CMAM which is consistent with the find of Rogers et al, (2015) who also identified lack of awareness to be associated with most CMAM programmes. The low level of awareness of CMAM is against the fact that Tamale Metropolis is an urban area with various channels of disseminating information and creating awareness. This suggest that health staff and authorities are not doing much in terms of awareness creation on CMAM in the metropolis and this explains the low treatment coverage in the metropolis identified by the study as lack of awareness is associated with low coverage (Rogers et al, 2015).

5.5 Mothers' perspective of the causes of SAM in their children

Less than half of mothers of children with SAM know the two immediate causes SAM which are disease and poor feeding. This inadequate knowledge on the causes of SAM can influence where mothers go to seek for care for their SAM children with the tendency of some mothers associating their children's SAM to spiritual causes other than the scientifically known causes and therefore would rather seek treatment from a spiritualist rather than in a health facility. This can



www.udsspace.uds.edu.gh affect coverage for CMAM services which has already been identified to be low, below the SPHERE project's standard of above 70%. Majority of the mothers of children with SAM knew that SAM could be treated in a health facility which is consistent with the findings of Naabah, (2016) who also found that 62% of care givers of SAM children indicated it could be treated by relying on health facility and good nutrition.

This however did not reflect into practice as the number of children receiving treatment was low, which could be due to lack of help with other children, far distances to treatment centres, lack of means of transport and financial constraints which have been identified as barriers to the uptake of CMAM services. This is also an indication that health staff in the metropolis do not engage in active case search where they go to look for SAM cases themselves but rather rely on passive case search which largely relies on mothers or care-givers' actions to get SAM cases enrolled onto the CMAM programme and so where the mothers fail to take the necessary report, such SAM cases are not identified for enrollment onto CMAM leading to low coverage which has been found to be low in the metropolis by the study.

5.6 Barriers to access for treatment of SAM

The most frequently reported barriers to access SAM treatment services from both the quantitative and qualitative data collected were lack of child care/help with children, health facility is too far away, lack of means of transport to OPC sites, financial constraints, ignorance of the CMAM programme, needed to be referred but there is no one to do so, previous rejection of sibling and shortage of RUTF. These are consistent with the findings of Rogers et al., (2015) who also identified ignorance of the CMAM programme, previous rejection of siblings, RUTF stock break, high opportunity cost and far distances from CMAM OPC site as barriers to



CMAM services. The www.udsspace.uds.edu.gh barriers identified could limit coverage and access to CMAM treatment centres in the Tamale metropolis. This is because when distance to treatment centre is far from potential clients, then means of transport and money is needed to access services and where the two are also lacking, access to service is then limited to few potential clients which defeats the CMAM principle of maximum coverage and access which requires that treatment centres are close and accessible to potential clients to ensure maximum coverage of all potential clients.

Rogers et al, (2015) also identified lack of awareness to be associated with most CMAM programmes and that it leads to low coverage as identified by this study too. The effect of lack of child care/help with children which was the most frequently mentioned barrier to CMAM services could be due to the large number of children to cater for by mothers as a results of large household sizes as the results showed that majority of the mothers (57.1%) are from large households with at least ten people. This puts a lot of pressure on mothers and so where one child becomes SAM and there is no help to take care of the other children, then it limits the mother's ability to seek for treatment for the child even if she knows where to seek for the treatment especially where far distance to the health facility or treatment centre which has also been identified as a barrier is also a challenge. This is also in line with the opportunity cost Rogers et al., (2015) identified as a barrier as the mother would have to weigh and choose between taking one SAM child for treatment for the other siblings to suffer or staying to attend to other siblings needs for the SAM child to suffer.

5.7 How SAM children got onto the CMAM program

As high as 75% of the SAM children receiving treatment under the CMAM program got onto the program after they were diagnosed by a health staff at a health facility where mothers themselves had sent their children for some form of



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medical attention. This means that health professionals in health facilities within the Tamale Metropolis over rely on passive case search to identify SAM children for treatment which is a clear indication that active case search, a key aspect of community outreach, a critical component of the CMAM programme is not adhered to by health staff in the metropolis. This has serious implications on the success of CMAM implementation as it can lead to low treatment coverage which the results actually confirms, late presentation of SAM cases with possible medical complications as mothers may not have the clinical eye to detect cases at the initial stages until there are obvious and clear signs by which time the case would have advanced to late stages making treatment difficult and expensive which may require IPC treatment. This can lead to more concentration of SAM cases at the IPC than the OPC instead of the reverse. These are against two key principles of CMAM of maximum coverage and access and early detection of cases and therefore could compromise the quality of CMAM services in the metropolis.

The fact that very few (12.5%) of the mothers of SAM children diagnosed their children of SAM and took them to the health facility for confirmation and treatment even though two-third of them were able to correctly identify that their children had SAM also suggest ignorance about CMAM, lack of support with children, far distances to treatment centres, lack of means of transport, financial constraints and other barrier to CMAM services identified by the study are really limiting access to CMAM services in the Tamale metropolis.

5.8 Accessibility of CMAM service provided at OPC sites

Close to 40% of the mothers of SAM children receiving treatment under the CMAM program indicated that it takes them one hour or more to get to the outpatient care treatment site while more than 60% of them indicated they go to the treatment site on foot. This means that CMAM OPC treatment centres are far from



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a significant number of caregivers of SAM children who need CMAM services. The fact that more than half of the caregiver's foot to the treatment centres to access services also indicates that many of the caregivers of SAM children may be poor with no support which may also be basic cause of their children being severely acutely malnourished. This can limit access to CMAM OPC services to many potential clients which has already reflected in the 38.1% coverage which is below the minimum standard coverage for an urban area like the Tamale metropolis.

About 90% of the mothers also indicated that the attitude of health staff at the outpatient care site was good or excellent. This means most health staffs conduct themselves professionally in rendering CMAM services which is key for improving access to service. One quarter (25%) of the caregivers further indicated that they knew of other children suffering from SAM who are not receiving any treatment under the CMAM program while about 12% of them indicated that the spiritualist place is their first point of seeking for treatment for SAM children. This means that access to CMAM services is still a challenge for some people while ignorance and misconception about SAM still remains a challenge. Health staffs therefore need to do more in achieving the first component of CMAM which is community outreach for community participation and involvement as it will help clear misconceptions about SAM and increase acceptance of CMAM to improve access to services.

5.9 Quality of CMAM services in the Tamale Metropolis

According to the WHO/GHS CMAM module, the quality of CMAM service is measured by the coverage rate, cure rate, death rate, defaulter rate and rate of non-recovered case and so other factors such as training of health staff in the CMAM module, accessibility issues like far distance to treatment centres, staff attitude,



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ignorance of SAM and CMAM on the part of caregiver among others which can affect coverage, cure, death, defaulter and non-recovery rates used as proxy to measure the quality of CMAM service in this study. The study revealed that most of the health staff who render CMAM services have not been trained in the CMAM module to have the understanding of the concept, components and principles of CMAM as well as the requisite knowledge and skills to deliver quality CMAM services. This therefore explains why health staff in the metropolis over rely on passive case search rather than active case search which CMAM promotes to identify and enroll SAM cases into the CMAM programme which could have contributed to the low treatment coverage identified by the study which by itself indicates poor quality of CMAM services. It further explains why OPC health staff through in-depth interviews also mentioned reporting, routine medication, counting respiratory rate and correct filing of OPC treatment cards as areas of CMAM they had gaps in and need training on to help improve the quality of their CMAM services.

An average defaulter rate of between 1-2 cases per month for facilities that record between 1-5 new cases per month means that the average defaulter rate could be between 20-40 percent per month which is higher than the <15% defaulter rate recommended by the WHO/GHS CMAM module and so this also constitute a mark of poor quality of service. The mentioned of far distances to OPC centres by both caregivers and service providers leading to caregivers traveling long distances to OPC sites indicates the lack of access to CMAM services in the metropolis by many potential clients which can affect treatment coverage, cure, and defaulter rates and so constitute a mark of poor CMAM service delivery in the metropolis. The mentioned of periodic shortages of a key commodity like the ready-to-use-



www.udsspace.uds.edu.gh therapeutic food which keeps OPC running also constitute a mark of poor CMAM service delivery in the metropolis as quality service delivery would have required the effective commodity management to avoid the shortage of such an important OPC commodity. However, the attitude of health staff which also affect quality of service was rated to be good by over 80% percent of clients receiving treatment. Therefore, the overall quality of CMAM services in the Tamale metropolis can be said to be poor as most of the indicators point to that effect.

5.10 Relationship between socio-economic factors and access to SAM treatment services in the Tamale Metropolis

Lack of child care/help with children was identified as the only socio-economic factor that had significant association with health seeking behavior of caregivers with mothers of SAM children who lack child care/help with children unable to seek for CMAM treatment for their SAM children ($p=0.007$). This means that the mentioned of lack of child care/help with children as a barrier to CMAM service by caregivers is a real one as it also appears to be a determinant of uptake of CMAM service. High wealth index, rural dwelling, lack of education older maternal age were also found to have some associations with the uptake of CMAM service even though they were not significant.



CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the summary of major findings of the study, conclusions and recommendations of the study. The study assesses treatment coverage and the barriers to access for severe acute malnutrition services in the Tamale Metropolis. The summary, and conclusion are presented based on the key findings from the study.

6.2 Summary of main findings

The following are the main findings of the study;

- ❖ The prevalence of severe acute malnutrition (SAM) in the Tamale metropolis was 12.1% as 12.1% of all children screened for SAM actually had SAM
- ❖ CMAM coverage in the Tamale metropolis was 38.1% which can be described as moderate coverage because that is below the minimum standard of above 70% for high coverage for an urban area like the Tamale metropolis.
- ❖ Exactly half of the mothers of SAM children receiving treatment under the CMAM program each had adequate and inadequate knowledge on a program that can treat SAM children.



- ❖ Three-quarters of the mothers each also had adequate knowledge on therapeutic foods used at the outpatient care and the weekly visits at the outpatient care.
- ❖ The result also shows that 50.0% of the mother had adequate overall knowledge on the CMAM program.
- ❖ Two-third (66.7%) of the mothers of SAM children identified were able to identify correctly that their children had SAM.
- ❖ Exactly two-third (66.7%) of the mothers of children with SAM indicated that they knew of a program that can treat SAM.
- ❖ Close to 80% of the mothers who indicated that they knew of a program that can treat SAM mentioned CMAM as the program that can treat SAM.
- ❖ A little above 40% of the mothers of SAM children identified mentioned disease condition as the cause of SAM in their children while close to 30% mentioned poor feeding as the cause of SAM.
- ❖ More than two-thirds (71%) of the mothers of children identified with SAM indicated they knew where SAM could be treated.
- ❖ Exactly 70% of the mothers of SAM children identified who indicated that they knew where SAM could be treated mentioned health centre as a place where SAM could be treated while the remaining 30% of them mentioned hospital as a place where SAM could be treated.
- ❖ The most frequently reported barriers to access to CMAM treatment were lack of child care/help with children, health facility is too far away, needed to be referred but there is no one to do this and previous rejection of sibling.



- ❖ As high as 70% of the SAM children receiving treatment under the CMAM program got onto the program after they were diagnosed at the health facility.
- ❖ Close to 40% of the mothers of SAM children receiving treatment under the CMAM program indicated that it takes them one hour or more to get to the outpatient care treatment site
- ❖ More than half (60%) of the caregivers indicated they go to the CMAM treatment site on foot.
- ❖ About 90% of the mothers also indicated that the attitude of health staff at the outpatient care site was good or excellent
- ❖ About 12% of the mothers also indicated that the spiritualist place is their first point of seeking for treatment for SAM children.
- ❖ The overall quality of CMAM service in the Tamale metropolis was found to be poor.
- ❖ Lack of childcare/help with children was found to be the only socio-economic determinant of uptake of CMAM services

6.3 Conclusion

Treatment coverage of SAM in the Tamale Metropolis which is largely urban was 38.1 % and that is described as moderate and Vitting and Tamale Central were the low coverage areas as most health staff relied on passive case search rather than active case search to get SAM cases enrolled onto the CMAM programme. The most frequently reported barrier to access was lack of child care/help with children, The overall mother's knowledge on CMAM service in the Tamale metropolis is 75% while overall quality of CMAM services was found to be poor. 87.5 % of the mothers indicated they go to the health facility for treatment of children with SAM.



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This means some mothers seek treatment from spiritualist/home management.

Focus group discussions revealed that some community members were of the view that SAM is by God's will and He gives it to those He wants. Others were of the view that SAM is hereditary and can be passed on from generation to generation and that fair children are those mostly affected by SAM.

6.4 Recommendations

The following recommendations are made for consideration by policy makers and health care practitioners;

- The Tamale Metropolitan Health Directorate should task all health staff to conduct periodic active case searches to improve coverage and ensure early detection and treatment of SAM cases.
- Supportive Supervision should be intensified to low coverage areas like Vitting and Central Tamale
- Nutrition education at the community level should be intensified by stakeholders. This will ensure better understanding of the need for the whole community involvement in creating awareness on the causes of SAM and effects.
- The national training curriculum for health workers should include necessary comprehension of nutrition principles and in communities, nutrition issues require much greater sensitization especially for malnutrition.
- The Tamale Metropolitan Health Directorate should consider opening more CMAM OPC treatment centres to reduce traveling time to treatment sites and improve access to service.



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 Tamale Metropolitan Health Directorate should train all health staff at OPC sites in the WHO/GHS CMAM module to improve the quality of CMAM service in the metropolis.

6.5 Study limitations

The following were some of the limitations of the study;

- ❖ Recall bias as mothers were made to recall events in the past some of which would be difficult to remember the exact situation.
- ❖ The exclusion of mothers/caretakers of non-SAM children and who were screened for SAM limited the scope of the analysis. For example, factors responsible for SAM could not be fully assessed.

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Appendix I: Consent Form

**COVERAGE AND BARRIERS TO ACCESS FOR SEVERE ACUTE
MALNUTRITION (SAM) SERVICES IN THE TAMALE METROPOLIS
OF NORTHERN REGION**

INFORMED CONSENT

Hello, my name is I am a student of the University for Development Studies offering a Masters Degree Program in Community Health and Development. I am conducting a study on “Coverage and Barriers to Access for Severe Acute Malnutrition (Sam) Services in the Tamale Metropolis of Northern Region”. I would like to have an interview with you on the topic and would very much appreciate your participation in this study. Giving your consent to participate in this study is voluntary and not under any obligation if you do not want to do so, and this will not affect the privileges you derive from any of the health institutions in this district. You are also at liberty to withdraw in the course of the study. However, I hope you will participate fully in the survey since your views are important. This information will help the Ghana Health Service, private agencies, the community and other decision-making bodies to devise ways of improving treatment outcomes of malnourished children.

The interview would last between 30 to 45 minutes to complete. Whatever information you provide will be kept strictly confidential and will only be used for the purpose of this study.

If we should come to any question you don't want to answer, just let me know and I will go to the next question; or you can stop the interview at any time. At this time do you want to ask me anything of this study? May I begin the interview now? 1. Yes 2. No



Appendix II: Field Questionnaire- Questionnaire for Households with SAM Cases

IDENTIFICATION

Date (DD/MM/YY) ___/___/2016

Household code: _

Community: _____

Urban/rural: 1=

Urban, 2= Rural

Child's Name: _____

Case code: _ _ _ _

--

Caregiver's Name: _____

Section 1: Socio-demographic Data					
1	Age of child (month)	__ __			
2	Sex of child	1	Male	2	Female
3	Age of caregiver/mother (Years)	__ __			
4	level of Education	1	No education	2	Primary
		3	JHS/Voc.	4	Secondary
		5	Tertiary	6	Other (specify)
5	Marital Status	1	Single	2	Married
		3	Devoiced/ Widowed		
6	Occupation of caregiver	1	Farmer	2	Trader
		3	Civil Servant	4	House wife
		5	Other (specify)		
7	Religion of caregiver	1	Islam	2	Christianity
		3	ATR		
8	Total Number of people in household	__			
Section 2: CMAM OPC Services					
9	Is this child/ (ren) receiving CMAM services/treatment (OPC or IPC)? <i>If YES IPC or YES OPC, skip to question 15</i>	1	Yes, IPC	2	Yes, OPC
		3	No		
10.a	Do you think this child/(ren) is malnourished?	1	Yes	2	No
10 . b	If Yes, what do you think is cause of the child's condition	1	Spiritual	2	Other (specify)
11	Do you know where this child(ren) could be treated?	1	Yes	2	No
12	For Yes response, note specific response if given (health facility, prayer camp, etc) <i>If NO, skip question 13</i>	_____			
13a	Do you know of a program that can	1	Yes	2	No



	treat malnourished children			
13b	If yes, what is the name of this program?			
13c	Where is this program?			
14	Why is this child/(ren) not being treated at a health facility for malnutrition? <i>Do not read these answers to the respondent. After each answer prompt by asking "Any other reason?" Tick the appropriate box for each answer given. More than one box may be ticked.</i>			
		Tick Box	Note	
	Lack of childcare/help with children (not willing to... detail why)			
	Mother / caretaker sick			
	Ashamed to go to the health facility/OPC			
	The program is closed / not running any more			
	I need to be referred and there is no-one to do this			
	Do not know where to go			
	Health facility is too far away			
	That service is for people in another village			
	It is too dangerous to travel			
	My husband or family will not let me go			
	Health facility staff request money (detail: heard it, experienced it?)			
	Health facility staff are rude or difficult			
	Health facility runs on the wrong days			
	Waiting times are too long			
	Child (or sibling) was rejected previously			
	Child (or sibling) was in OPC and discharged			
	Child (or sibling) was in IPC and discharged			
	Child (or sibling) was receiving			



	CMAM service and defaulted (reason?)				
	Other children were rejected				
	Program is not good (detail)				
	The sickness is not to be treated at the hospital (herbalist, shrine, church, prayer home etc)				
	Other reason (specify)				
	<i>Give the caretaker a referral slip and share location of the health facility/OPC site and days on which they can access the services.</i>				
	Administer questions 15-28 to mothers with children in the CMAM programme				
15	How did the child/(ren) come to receive treatment/services? <i>This question should gather information about the history of the case, local understanding of SAM, treatment behaviours/pathways to care. The interviewer should prompt the caretaker in order to get as much information as possible.</i>				
16	How long does it take you to travel to the facility to receive treatment				
17	How do you go to the facility	1	Bicycle	2	Motorcycle
		3	Car	4	Foot
		5	Other (specify)		
18	How would you describe the attitude of health staff in the facility	1	Excellent	2	Satisfactory
		3	Poor		
Section 3: Knowledge Level of Caregiver about the CMAM OPC Programme <i>(Please refer to leaflet for categorization of knowledge indices)</i>					
19	Do you know of a program that can treat malnourished children?	1	Adequate	2	Inadequate
20	Client's knowledge about the therapeutic food used at the OPC site	1	Adequate	2	Inadequate
21	Client's knowledge about the weekly visits at the OPC site	1	Adequate	2	Inadequate
22	Client's knowledge about the routine medications given at the OPC site	1	Adequate	2	Inadequate
23	Overall knowledge of caregiver on the SAM services provided at the OPC site <i>(Adequate=score of ≥ 3 adequate)</i>	1	Adequate	2	Inadequate
24	Do you know of any children in your village like your child/(ren) that are not receiving services/treatment?	1	Yes	2	No
25	Why do you think this child/(ren) is not receiving services/treatment?				
26	If I wanted to find children like your child/(ren) and the children				



	we have spoken about, how would I best describe them to other people?	_____			
27	If I wanted to find children like your child/(ren) and the children we have spoken about, who would best be able to help me find them?	_____			
28	Where do you usually first seek treatment for your child or any child with this kind of condition	1	Hospital	2	Clinic/health centre
		3	Home management	4	Spiritual home
		5	Other (specify)		

SECTION 4: Socio-Economic Status (Administer to mothers/caregivers with children in the CMAM program)

2.1	Do not read answers. Circle one. What kind of toilet do members of your household usually use?	1	Flush/Pour Toilet	5	Bucket/Pan
		2	Ventilated Improved Pit Latrine (VIP)	6	Composting toilet
		3	Pit latrine with slap	7	No facilities (bush, beach, etc)
		4	Pit latrine without slap/open pit	8	Other (Specify).....
2.2	Do not read answers. Circle one. What is the main source of energy for cooking?	1	Electricity	5	Kerosene
		2	Straw/Shrubs/Grass/wood	6	charcoal
		3	Liquefied Petroleum Gas (LPG)	7	solar
		4	Animal dung	8	Other (specify).....
2.3	What is the main source of lighting for this house? Circle one.	1	Oil, kerosene or gas lantern	5	Electric company
		2	Battery flashlights light	6	No lighting
		3	Electric generator/Invertor	7	Solar
		4	Candles/firewood	8	Other (specify).....
2.4	What is the main source of drinking water for members of your household? Circle one.	1	Piped water in/out side	6	Protected spring
		2	Tube well/borehole	7	Unprotected spring
		3	Unprotected dug well	8	Rain water
		4	Protected dug well	9	Tanker truck
		5	Surface water (river,dam,lake etc)	10	Other (specify).....
2.5	Record observation Main material of the floor in the dwelling.	1	Natural floor earth/sand	4	Woolen carpet/synthetic carpet
		2	Ceramic tiles/terrazo	5	Linoleum/rubber carpet
		3	Cement	6	Other (Specify).....
2.6	Record observation Main material of the roof in the dwelling	1	Thatch/palm leaf/sod	4	Cement
		2	Finished roofing metal	5	Asbestos/slate roofing sheets
		3	Wood	6	Other (Specify).....
2.7	Record observation Main material of the exterior walls	1	Stone with mud	4	Bricks
		2	Plywood	5	Cement blocks
		3	Finished walls cement	6	Other (Specify).....



2.8	Do your household own any of the following assets (should be in good working condition)? Circle all that apply. Also observe.					
	A	Bed	K	Bicycle	U	Refrigerator
	B	Table	L	Sofa	V	Freezer
	C	Generator	M	Clock	W	Computer
	D	Sewing machine	N	Radio	X	Digital camera
	E	Car/truck	O	Black-white television	Y	Non-digital camera
	F	Animal-drawn cart	P	Colour television	Z	Video deck
	G	Motorbike/scooter	Q	Land-line telephone	AA	DVD/VCD
	H	Cupboard, Cabinet	R	Axe	BB	Cooker
	I	Mobile phone	S	Tractor	CC	Fishing gear
J	Hoe	T	Cutlass	DD	Sickle (i.e. rice)	

Appendix III: Screening/case search Form

Name of Village	SAM Cases	SAM cases in program	SAM cases not in program	Recovering cases
Total				

Appendix IV: In-depth Interview Guide

QUESTIONNAIRE FOR OUTPATIENT CARE STAFF

CMAM INVOLVEMENT AND CHALLENGES

1. How long have you been working on CMAM?



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- a. Are all staff in the clinic involved/trained on CMAM?
2. Who trained you on CMAM?
 - a. Have you had refresher training?
 - b. Is there any additional training you feel you need?
 - c.
3. What difficulties, if any, do you have on the OPC day?
 - a. High number of patients
 - b. Time
 - c. Completing paperwork accurately and keeping up to date

CALENDAR

4. What are the main childhood diseases you see in the clinic?
 - a. Which is the most common? Rank.
 - b. What time of year do they occur?
5. What do you think are the causes of malnutrition here?

REFERRAL

6. How do children usually come to the clinic for CMAM?
 - a. Referred by volunteer
 - b. Heard about it from other beneficiary
 - c. Heard about it from other person in the village
 - d. Heard about it at the clinic
 - e. Heard via the radio/town crier etc.
 - f. Other source
 - g. Rank in order

REFERRAL AND FOLLOW UP

7. Does the volunteer check that children they have referred actually present at the clinic?
 - a. Do you report back to volunteers on the number of children you have seen that are referred by them?
8. Have you had any wrong referrals from the volunteer?
 - a. How many?
 - b. What was the problem?
 - c. What did you do?
 - d. Did you report back to the volunteer?
9. How do you refer patients to the stabilisation centre?
 - a. Do you give them a slip?
 - b. How do you know if they have arrived at the SC?
 - c. Do you know what happens to them?
 - d. When patients are referred back do they come with any paperwork?

REJECTION

10. How many healthy children have presented at the CMAM clinic?
 - a. How many every week?
 - b. Why do you think these mothers come with healthy children?
11. What do you say to mothers of healthy children?
 - a. What words do you use?
 - b. What explanation do you give?



- c. How do mothers react?

DEFAULTING

12. How many children are absent for more than 1 week during the course of treatment?
 - a. Why do you think this is?
13. How many children default?
 - a. Why do you think this is?
 - b. Is there a pattern
14. What do you do when a child has not turned up for treatment? Probe for:
 - a. Absentees
 - b. Defaulters
15. Do you think husbands of mothers whose children are malnourished would stop/have stopped them from taking the child to the OPC site?
16. How could we encourage children to return for treatment?
17. What barriers prevent mothers from bringing their children to the OPC site?
18. If I wanted to find children with the same problem in your community
 - a. what would be what be a better question to ask
 - b. what questions should I avoid asking
 - c. who do you think would be best to identify such children your settlement
19. Is there any stigma associated with malnutrition in this area?

COMMUNICATIONS

20. How often do you see the volunteers?
21. How do you communicate with the volunteers?
22. Do you ask volunteers to follow up on absentees / defaulters?
 - a. Why/why not?
 - b. How do they report back?
 - c. Have any children returned?

IMPROVEMENTS

23. What improvements could be made to CMAM?
24. What messages do you want us to pass to the people organising CMAM



Appendix V: Key Informant Interview

Volunteers

ROLE

1. How long have you been a volunteer?
2. What are your main activities?
3. How often do you do these activities

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4. How do you decide which children to measure?

EXPLANATION/ BARRIERS

5. What do you tell the mother when you identify a case?
a. Do any mothers refuse to go to the clinic? Why?
6. What do you say about the new treatment?
7. What name do you call the treatment?
a. What do the mothers call it?
b. If I wanted to find children with the same problem in your community
i. what would be a better question to ask?
ii. what questions should I avoid asking
iii. who do you think would be best to identify such children your settlement
8. Is there any stigma associated with malnutrition in this area/settlement?

REFERRAL AND FOLLOW UP

9. How do you know if the child actually went to the clinic?
10. Are you aware of any children who have stopped coming?
a. Why is that?
b. How can we encourage them to return?
c. Do you think husbands of mothers whose children are malnourished would stop them from taking the child to the OTP site?
11. Are you ever asked to follow up on cases who are absent / have defaulted?
a. How does the nurse communicate with you?
b. How do you report back?

COMMUNICATIONS

12. How often are you in contact with clinic staff?
13. Have clinic staff told you how many children are being treated/how many have been cured/how many have defaulted?
14. Have you had any further contact with children you have referred?
a. Do you know how many were cured?
b. Do you know if any defaulted? Why?
15. What have mothers said to you about CMAM?
a. What are people saying/thinking about CMAM?
16. Have you talked with village / religious leaders or other people about CMAM since it started?
a. Why/why not? How? On what occasion?

IMPROVEMENTS

17. How do you think CMAM could be improved?
18. What would help you in your job as a volunteer?
a. Do you enjoy being a volunteer?
b. What difficulties, if any, do you have doing your job as a volunteer?
19. Is there anything else you want to say/any messages for those running the service?



Appendix VI: Focus Group Discussion Guide
Village/religious leaders and key community figures

KNOWLEDGE OF CMAM

1. Are you aware of any nutrition service at your local clinic?
2. Who told you about it?
3. When did you hear about it?
4. What do you know about it?
 - a. Target children?
 - b. Admission criteria?
 - c. Treatment given?
 - d. Free treatment?
 - e. OPC day?
 - f. Identification of children?

ROLE / SENSITISATION

5. Have you told others about the service? How? When?
 - a. Usual channels/message dissemination?

BARRIERS

6. Are you aware of any children who need treatment but are unable to access services?
 - a. What stops them coming? (distance/family/beliefs/other)
 - b. How could we reach these children/encourage them to attend?

KNOWLEDGE OF CASES

7. Do you know any children receiving treatment?
 - a. What can you tell me about them?
8. Do you know any children who have defaulted/stopped coming?
 - a. Why is that?
 - b. How can we encourage them to return for treatment?
 - c. What do other key community figures think of it?
 - d. If I wanted to find all malnourished children with the same problem in your community
 - i. what would be a better question to ask
 - ii. what questions should I avoid asking
 - iii. who do you think would be best to identify such children your settlement
 - iv. What do people in this area say/think of families with such children? (Probe if there is any stigma of malnutrition in the area/settlement?)

COMMUNICATIONS

9. Do you know who the volunteer is for this service?
 - a. When did you last see them?
 - b. What do they do? (frequency and organisation of activities)
10. Have you had any feedback from the volunteer/clinic staff/MOH officials about the service?
 - a. Do you know what the results are?



PERCEPTIONS OF CMAM

11. What are people saying about CMAM?
12. What do you think of the service?

IMPROVEMENTS

13. How can we improve the service?
14. Do you have any messages for those running the service?



Appendix VII: FOCUS GROUP DISCUSSION GUIDE LAY PEOPLE

UNDERSTANDING OF MALNUTRITION

1. What are the common health problems that children experience here?
2. Which are the most frequent? Rank.
3. Are any more frequent at certain times of the year? When? Why?
4. Which are the most serious? Rank. Why?

If malnutrition mentioned ask:

5. What symptoms do these children have?
6. What terms do you commonly use to describe this condition?
7. Which children get this condition? Why?

HEALTH SEEKING BEHAVIOUR

8. What do you do when your child has this (insert name of most common illnesses) problem?
 - a. Probe fully for different illnesses

If clinic/hospital mentioned:

9. Which? How far is it? Why do you go there?
10. Is there any alternative/anything else you might do/anyone you might ask for advice nearer home?

11. What factors determine which treatment / approach you use for a particular illness?

Probe on:

- a. Cost
- b. Access
- c. Father permission
- d. Habit/familiarity

If malnutrition not already mentioned ask/show pictures:

12. Have you seen children like this (those who have lost weight/become very thin or whose feet/legs/hands have started to swell)?
13. What do you call this condition?
14. When do you see this condition?
15. Which children get this condition? Why?
16. What do you do when your children get this condition? Why?

AWARENESS OF CMAM SERVICE

17. Do you know of a place where this condition can be treated?
18. How did you hear about it?
 - a. Who told you?
 - b. When?
 - c. What do you know about it?
19. What are children given for this condition?

If people think the RUTF is a food ask:



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- a. What sort of food is it?
 - b. What do you call it?
 - c. Who can eat it?
 - d. What foods do you give your children to make them healthy/strong?
20. Do you know children receiving this treatment?
 21. Do you know children who have this problem but who are not going for this treatment? Why?

PERCEPTIONS OF CMAM

22. What are people saying about this service?
23. What do you think of this service?

If people say it is good ask:

- a. *What is good about it?*
24. How are children identified for treatment?
 - a. Have you seen anyone doing this in your community?

If people know the volunteer/have seen the MUAC ask:

- b. How often does the volunteer measure children?
25. Do you know of children who have been to the clinic and have not been given the treatment?
 - a. If yes, why not?
 - b. What were they told?
 - c. How did they feel?
 26. Do you know of any children who have stopped going for treatment?
 - a. Why is this?
 - b. What would encourage them to return?

If carers of beneficiaries are in the group ask separately as a case study:

27. Tell me about your experience of the service?
28. What have you said to other people about it?

If carers of defaulters are in the group ask separately as a case study:

29. Why did you stop going?
 - a. After how many weeks?
 - b. What have you said to other people?
 - c. How is your child's health now?
 - d. What would encourage you to take your child back to the clinic?
30. What messages do you want us to pass to the people organising the CMAM service



Appendix VIII: Screening Case Search Form

District: _____ **sub district** _____ **Name of community:** _____

Distance from Health Facility/OPC site (km): _____ **Date (DD/MM/YY):** _____ **Team:** _____

Case code	Household code	Sex	Age (months)	MUAC (in cm)	Oedema (0, +, ++, +++)	SAM case? Y=1 N=0	In OPC program? Y=1 N=0	Recovering case in OPC? Y=1 N=0 9 = N/A	Notes
001									
002									
003									
004									
005									
006									
007									
008									
009									
010									
011									
012									
013									
014									
015									
016									
017									
018									
019									
020									

Admission Criteria: MUAC < 11.5 cm and/or oedema. Recovering cases are children no longer meeting SAM criteria but are still receiving services.

Appendix IX: Case Search Referral Form

Referred to:	
Date:	Time:
Name of Child:	Compound
Name:	
Age:	MUAC (cm) :
Oedema: 0 + ++ +++	
Reason for referral:	
Name of officer referring case:	Signature:
Contact number of officer:	
Referred from:	

