

PERFORMANCE OF THE COMMUNITY BASED MANAGEMENT OF ACUTE
MALNUTRITION (CMAM) PROGRAMME FOR CHILDREN 6-59 MONTHS OLD IN

LILONGWE RURAL, MALAWI

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HUMAN NUTRITION

THE DEPARTMENT OF FOOD SCIENCE, NUTRITION AND TECHNOLOGY
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2015

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DEDICATION

To my dear husband Autman Tembo whose love, support and encouragement has facilitated my success, and to my children Chawezi, Malumbo and Emmanuel for their understanding. God bless you.

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ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ANOVA	Analysis of Variance
BMI	Body Mass Index
CFR	Case Fatality Rate
CMAM	Community-based Management of Acute Malnutrition
CTC	Community-based Therapeutic Care
ENA	Essential Nutrition Actions
FANTA	Food And Nutrition Technical Assistance
FGD	Focus Group Discussion
GOM	Government of Malawi
HDDS	Household Dietary Diversity Score
IDDS	Individual Dietary Diversity Score
KII	Key Informant Interview
MDHS	Malawi Demographic Health Survey
MDG	Millenium Development Goal
MK	Malawi Kwacha
MOH	Ministry of Health
MUAC	Mid-Upper Arm Circumference
NCHS	National Center for Health Statistics
NGO	Non Governmental Organisation
NRC	Nutrition Rehabilitation Center
NRU	Nutritional Rehabilitation Unit
NSO	National Statistic Office
OPC	Office of the President and Cabinet
OTP	Outpatient Therapeutic Programme
PEM	Protein Energy Malnutrition
P-Value	Probability Value
RUTF	Ready to Use Therapeutic Food
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SFP	Supplementary Feeding Programme

SPSS	Statistical Package for Social Sciences
TA	Traditional Authority
TFP	Therapeutic Feeding Programme
UNICEF	United Nation Children Fund
USD	United States Dollar
WFH	Weight For Height
WFP	World Food Programme
WHO	World Health Organisation

OPERATIONAL DEFINITION

Acute Malnutrition	A condition in the body brought about by inadequate intake of food and diseases resulting in children 6-59 months old having weight-for-height measurement of <-2 Z scores.
Anthropometry	The measurements of human body height, weight, and the middle upper arm circumference, that assist in determining the nutritional status of children 6-59 months of age.
Client	A child between the age of 6-59 months of age.
Coverage	Is the ratio of children with SAM enrolled in the programme to the total number of children with SAM identified in the community at a particular time $\text{Coverage} = \frac{\text{Children with SAM receiving therapeutic care}}{\text{Total number of SAM children}} \times 100$
House-hold	A domestic unit consisting of the members of a family who live and eat together along with nonrelatives such as servants.
Impact	This is effectiveness (cure rate) \times coverage.
Moderate malnutrition	A weight-for-height measurement of <-2 z-scores and \geq -3z-score no oedema or <70% of the reference median.
Nutritional knowledge	Awareness of nutrition information and skills gained through nutrition communication offered by community health workers.
Nutrition status	A measurement of the extent to which a child physiological needs for nutrients are met.

Severe Acute Malnutrition A weight-for-height measurement of <-3 Z scores and /or bilateral oedema and/or MUAC < 11.5 cm).

Protocal Accepted code of procedures or rules or instructions governing course of nutrition and drug treatment.

ABSTRACT

Since the inception of the community based management of acute malnutrition in 2006 in Lilongwe rural the process has not been assessed to gauge its performance. The main objective of this study was to assess 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 anthropometry measurement was collected using pre-tested questionnaires with the help of trained 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 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, default 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%) resulting in the programme 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 household monthly income had positive and significant correlation with stunting ($r = 0.130^*$, $p < 0.05$). Logistic regression analysis showed that the breast feeding 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 equipment and RUTF, and lack of supervision which 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 concludes that malnutrition still remains a big problem among children 6-59 months old. Educational level of the mothers and breast feeding status are a determinant of malnutrition among children 6-59 months old.

This study suggest 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.

CHAPTER ONE: INTRODUCTION

1.1. Background

Malnutrition as defined by standard medical dictionary (Wikipedia, 2012) is the disorder of the body resulting from a deficiency or excess of one or more essential nutrients. It is an important public health issue particularly for children under five years of age who are significantly at higher risk of mortality and morbidity if not well-nourished. Malnutrition is directly or indirectly responsible for about half of the 10.8 million deaths per year in under-five year's old children in developing countries (WHO, 2009). The leading cause of death in children in developing countries is protein energy malnutrition (PEM). PEM is a result of inadequate intake of energy giving foods and proteins in the body. About 38% of all child deaths beyond early infancy in Malawi are associated with PEM (Government of Malawi (GoM), 2009).

There are two categories of under nutrition: Acute Malnutrition and Chronic Malnutrition. Children can have a combination of both acute and chronic malnutrition. Acute malnutrition occurs when there is inadequate intake of food resulting in sudden loss of weight of up to <-2 z score. It is categorized into Moderate Acute Malnutrition and Severe Acute Malnutrition (SAM) which is determined by the patient's degree of wasting (Ministry of Medical Services (MOMS), 2009). Severe acute malnutrition is a life threatening condition requiring urgent treatment. The Ministry of Health in Malawi adopted a Community based Management of Acute Malnutrition (CMAM) approach which brings the services for Severe Acute Malnutrition (SAM) closer to the beneficiaries, due to the availability of a ready-to-use therapeutic food (RUTF). The approach prevents the deaths of many children affected by

acute malnutrition in emergency and development settings because of its decentralized community outreach (Government of Malawi (GoM), 2009).

CMAM approach was adopted to manage malnutrition in children following extensive evidence from pilot service sites and experiences of non governmental organisations (NGOs) in Malawi. The shift in policy to community based care was strengthened by the evidence of success and effectiveness of CMAM in management of acute malnutrition in other countries (Hedwig, 2008). CMAM model is rooted in public health principles of coverage and access. It is designed to achieve population-wide impact by focusing primarily on treatment of the majority of the acutely malnourished patients as out-patients, using existing community structures, rather than in Nutrition Rehabilitation Units (NRU) unless necessitated by the severity and simultaneous complications of the case. This allows NRUs to provide intensive in-patient care only where it is necessary to do so. CMAM therefore is an approach intended to complement facility-based management of severe malnutrition, and to facilitate community capacity development in identifying and managing malnutrition in children (Government of Malawi (GoM), 2012). CMAM involves timely detection and referral of children with acute malnutrition but without complications in the community, to out-patient care while those with medical complications are referred to in-patient care for both medical and diet therapy (Food and Nutrition Technical Assistance (FANTA), 2007). The underlying aims of CMAM are to increase coverage and service provision basing on the international standards. This is made possible by community mobilisation techniques used which engages the affected population, early identification of undernourished children through house to house screening using mid-upper arm circumference (MUAC) and edema checks, and the provision of treatment at the community level (Sadler, 2008).

Malawi is one of the poorest countries in the world. The country has long had a problem with food insecurity and high levels of malnutrition. It was among the first Countries to adopt community based approach of treating acute malnutrition after the pilot programme in 2002. In 2004, Malawi had 48 percent stunting, 5 percent wasting and 22 percent underweight for children under five years of age (National Statistic Office (NSO), (2004). By 2010, stunting came to 47%, wasting 4% and underweight to 13% (National Statistic Office (NSO), 2010).

Since 2002, Malawi has managed severely malnourished children with no complications and a good appetite in the community with regular, usually weekly visits to the health facility for evaluation and supplies of RUTF while those with medical complications are referred to Nutrition Rehabilitation Units as in-patients (Government of Malawi (GoM), (2012).

1.2. Problem Statement

The problem of malnutrition has been persistently high in Malawi. The government in partnership with international organisations has made an effort to address this problem with appropriate nutrition intervention programmes that uses expensive imported ready to use therapeutic food. Since inception of CMAM programme in Lilongwe in the scale- up phase, its performance has not been assessed. Since the programme utilizes scarce resources there is need to assess the programme to know whether the resources spent are yielding expected results.

1.3. Study Justification

The consequences of malnutrition are harmful to personal health and development of the child. If not addressed, malnutrition can also result in costly infections. The affected child

may be shorter than the unaffected ones (Black, 2003). Children under five years of age have been considered to be at high risk of malnutrition in many parts of the world, Malawi inclusive. Therefore, it is important to assess the performance of an intervention programme that combat malnutrition in this age group to ensure effectiveness of the programme.

1.4. Study Aim

The aim of the study is to contribute towards the improvement of the nutritional status of children between 6-59 months.

1.5. Study Purpose

The purpose of the study is to generate useful information on the performance of the programme in ensuring that the programme meets its objectives through re-alignment of activities in response to the findings.

1.6. Study Objective and Specific Objectives

The main objective of this study is to assess the performance of a Community based Management of Acute Malnutrition Programme for children 6-59 months old, in relation to meeting the minimum international standards

The specific objectives were:-

1. To determine the socio-economic and demographic characteristics of the study household.
2. To determine the nutritional status of under five children in the programme area.
3. To determine the level of coverage, recovery and death rates of the programme comparing with minimum international standards.
4. To establish whether there is an association between the nutritional status and the household socio economic and demographic characteristics.
5. To assess the implementation of the programme in comparison with CMAM guidelines.

1.7. Hypotheses

The following hypotheses were advanced:

1. CMAM programme is meeting international standards in terms of the level of coverage, recovery and death rates among children aged 6-59 months in Lilongwe rural.
2. Nutritional status in terms of stunting, underweight and wasting is associated with household socio-economic and demographic factors.
3. The implementation of the programme in Lilongwe rural is in line with the CMAM guidelines.

1.8. Limitation of the Study

The study design was cross-sectional in nature; therefore, it was difficult to explain any seasonal variation in nutritional status of the children. Furthermore, it was not possible to determine whether the programme was improving the nutritional status of malnourished children due to lack of baseline data in the area.

CHAPTER TWO: LITERATURE REVIEW

2.1 Malnutrition

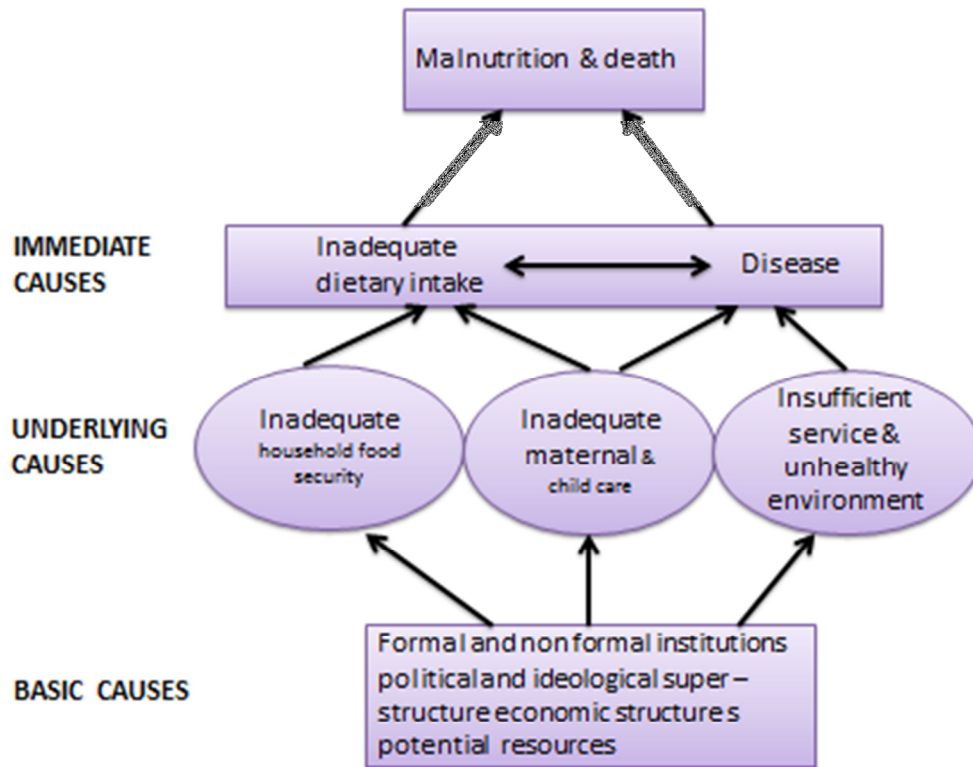
2.1.1 Overview of malnutrition

Malnutrition is any disorder of the body resulting from a deficiency or excess of one or more essential nutrients (Wikipedia, 2012). There are two broad categories of malnutrition, Protein-energy malnutrition and Micronutrient malnutrition. Protein-energy malnutrition, as its name implies, is the imbalanced protein and calories intake. This can be acute or chronic. Chronic protein-energy malnutrition is manifested by stunting, which means short height or length for an age. Stunting occurs as a result of lack of food, or an illness which has been there for a long period of time. Acute malnutrition is the term used to cover both moderate and severe wasting and nutritional oedema, which is swelling of parts of the body due to fluid building up in the tissues (also known as kwashiorkor). Acute protein-energy malnutrition occurs as a result of a recent inadequate of nutrients or illness (Sadler, 2008). In developing world kwashiorkor is generally characterised as under-nutrition or protein energy malnutrition (PEM) whereby there exists varying degrees of deficiencies in essential nutrients (Sadler, 2008).

SAM affects approximately 20 million children under five years of age and contributes to more than one million child deaths in the world each year, even in countries not recently affected by an emergency. In fact, non-emergency levels of global acute malnutrition in some countries are as high as 15 percent during seasonal peaks (Food and Nutrition Technical Assistance (FANTA), 2007).

2.1.2 Causes of malnutrition

There are several causes of malnutrition that vary from country to country. They can be classified as root/basic, underlying and immediate causes (Figure 1).



Source: UNICEF (1990) From (GoM, 2012)

Figure 2. 1: Conceptual Framework of Causes of Malnutrition

Immediate Causes of Malnutrition

Inadequate food intake refers to a lack in either quality or quantity of the food eaten by the child. A varied diet complete in macro and micronutrients is essential to health and normal growth. A lack of either quality or quantity of food may lead to malnutrition. Disease or its symptoms may cause reduced intake or malabsorption of any food eaten (e.g. vomiting and

diarrhoea). It may also raise the metabolic rate of the child such that a previously sufficient diet is now inadequate. Malnutrition is particularly lethal when in combination with infectious diseases such as malaria, measles and diarrhoea. These are the major killer diseases affecting children. Infection and micronutrient deficiencies can induce immunodeficiency in healthy children, increasing susceptibility to diarrhoea and other infections. This can lead to a vicious cycle of repeated infections, reduced immunity and deteriorating nutritional status. Malnutrition magnifies the effects of many diseases (GoM, 2012).

Underlying Causes of Malnutrition

Three major underlying causes of malnutrition include:

Food: Inadequate household food security (limited access or availability of food);

Health: Limited access to adequate health services and/or inadequate environmental health conditions;

Care: Inadequate social and care environment in the household and local community, especially in regard to women and children (GoM, 2012).

Basic Causes of Malnutrition

The basic causes of malnutrition in a community originate at the regional and national levels, where strategies and policies that affect the allocation of resources (human, economic, political and cultural) influence what happens at community level. Geographical isolation and lack of access to markets due to poor infrastructure can have a huge negative impact on food security. In combination, these complex factors have a direct effect on the health of the

individual and may lead to underweight (low weight for age), stunting (low height for age) or wasting (low weight for height). In the worst cases malnutrition leads to the death of the child.

Acute malnutrition is an underlying factor in almost 50% of the 10 to 11 million children under 5 years of age who die each year of preventable causes. In-patient treatment for severe acute malnutrition is associated with high opportunity and economic costs for affected families and health service providers. Approximately 9% of sub-Saharan African children and 15% of South Asian children suffer from moderate acute malnutrition (Collins et al, 2006).

2.2 The Malawi CMAM Programme

CMAM programme in Malawi started as a humanitarian response following a drought emergency in 2002. It was a joint effort between the MoH and Concern Worldwide (Gatchell and Dent, 2008). Humanitarian crises are often marked by large-scale, externally funded, and vertically managed responses. From 2002 to 2005, CMAM was piloted and expanded by NGOs in Dowa district. The approach proved to be highly effective and exceeded Sphere minimum standards for recovery, case-fatality and coverage rates (The Sphere Project, 2011).

The pilot programme was significantly dependent upon external resources and expertise. The drought of 2005 served as a catalyst to scale up CMAM services throughout the country. During the 2005 drought emergency, the MoH took the lead role in guiding the gradual expansion of CMAM programme and further encouraged involvement of district-level MOH managers and staff. Malawi CMAM programmes have been indicated to serve as important national as well as international learning site for CMAM good practices and integration of services. In Malawi, the CMAM program serves children less than 12 years of age, pregnant and lactating women (GoM, 2012). The CMAM model combines the following components:

Community outreach: This component is aimed at stimulating the understanding, engagement and participation of the communities in prevention, identification and treatment of malnutrition.

Supplementary Feeding Programme (SFP): The SFP supports children with moderate acute malnutrition who have good appetite and no complications, or those discharged from NRU (under classical approach) or Outpatient Therapeutic Programme (OTP) for continued nutritional support. The programme aims at supplementing energy and nutrients that may be insufficient in their diet by providing them with dry take-home rations. This programme also supports malnourished visibly pregnant women in the 2nd or 3rd trimester, lactating women with an infant < 6 months and mothers of infants < 6 months discharged from NRU. It provides dry take-home rations to moderately acute malnourished children aged 6 months to 12 years and pregnant or lactating women. The ration is distributed as a premix rather than as separate ingredients to avoid being used for other purposes. The premix should be utilized within two weeks. The same ration sizes are given to the child, pregnant woman, and lactating woman.

Outpatient Therapeutic Programme (OTP): The OTP treats severely acute malnourished children aged 6 months to 12 years who present with appetite and without medical complications using ready-to-use therapeutic food (RUTF) and given routine systematic medications as outpatient. The children attend an OTP site weekly for check-up and re-supply of RUTF.

Nutrition Rehabilitation Unit (NRU): NRUs provide in-patient care to all severely acute malnourished children up to 12 years (including those less than 6 months) of age with severe acute malnutrition (SAM) and poor appetite or complications until stabilized and suitable for

continuing treatment in OTP. These children are at the highest risk of death and therefore need intensive 24-hour medical and nutrition care until their condition is stabilized and appetite returns (Government of Malawi (GoM), 2012).

Table2. 1: Progressive data of CMAM Programme in Malawi (2004 to February 2012)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	Cummulative
Districts implementing CMAM ¹	2	2	5	20	21	24	29	29	29	
OTP ² sites	32	32	116	236	292	349	418	430	490	
Children admitted in OTP	2,170	3,927	15,393	23,029	23,407	25307	24591	24471	5347	147,642
NRUs reported	8	8	20	72	73	81	100	100	100	
Children admitted in NRU ³	1319	1125	1915	9,650	8,467	12646	12705	10812	2780	61419
SFP ⁴ s reported						344	344	346	350	
Children admitted in SFP						46408	42597	36321	7971	133297

Source: Government of Malawi 2012

CMAM implementation started in two districts of Malawi (Dowa and Nsanje) as a pilot survey. The approach was initially centralised in nutrition rehabilitation units (NRUs). In 2007, there were 20 districts which implemented CMAM programme and 32,679 children with SAM were treated; almost two-thirds (20,189) of these were managed through the outpatient therapeutic programme (OTP) component of the CMAM programme. In the same

¹ CMAM: Community-based Management of Acute Malnutrition

² OTP: Outpatient Therapeutic Programme

³ NRU: Nutrition Rehabilitation Unit

⁴ SFP: Supplementary Feeding Programme

year 2007, the programme had acceptable outcomes with a cure rate of almost 86 percent, a death rate of 2.9 percent and a defaulter rate of 9 percent (Mathisen, 2008). CMAM is now being implemented in all the 29 districts of Malawi.

2.3 Treatment of Malnutrition

2.3.1 Traditional treatment of acute malnutrition

Before the development of CMAM, the traditional way of treating malnutrition was through therapeutic feeding centers. After treating the life-threatening problems in a hospital, the child with acute malnutrition would be transferred to Nutrition Rehabilitation Centre (NRC) for intensive feeding to recover lost weight, development of emotional and physical stimulation, capacity building of the primary caregivers of the child with acute malnutrition through sustained counseling and continuous behavioral change. In NRC, patients are admitted for an average of 30 days. Caregivers of malnourished children often have to travel long distances to access these centers', many having to leave the rest of their children at home for three weeks or longer (Concern Worldwide Concern's Mission, 2008). The rehabilitation phase focuses on rebuilding wasted tissues which may take several weeks. Because of the relatively long duration of rehabilitation, families may request that their children be discharged early from hospital. Reasons include concern for the care of other family members and loss of earnings (Ashworth, 2007).

Under the traditional approach of NGO-run, center-based programs for the management of SAM during emergencies, the NGO departs afterwards and services are closed down as the emergency subsides. However, with the shift to the community-based approach, CMAM services remain relevant even in a stable situation (FANTA, 2007).

2.3.2 Community-based approach of treating acute malnutrition

CMAM is an approach intended to complement facility-based management of severe malnutrition, and to facilitate community capacity development in identifying and managing malnutrition in children. Admissions to CMAM programs are determined by the nutritional status of the child by measuring the mid-upper arm circumference (MUAC), checking for the presence of nutritional oedema and measuring weight for length/height (WFH). Selecting the proper component for care for the child also rests on an assessment of the child clinical status. Clinicians should examine children on admission for any signs of severe illnesses. The child's appetite is also tested on admission and at every visit (Chaiken et al, 2006).

In CMAM, MUAC, oedema and weight for length / height or Body Mass Index (BMI) for age are all independent criteria for admission. If the child satisfies any one of the admission criteria, he/she may be admitted for treatment (Collins et al, 2006). A CMAM training guide is available and is designed for health care managers and health care providers who manage, supervise and implement the program. These include health care providers who are involved in health outreach activities, as well as MoH officials at the national, regional and district levels, health and nutrition program managers of NGOs and United Nations technical staff. The guide uses admission and discharge criteria that was consistent with international guideline for management and treatment of SAM at the time of publication. Since then, WHO has updated some of its recommendations on the management of SAM in children of 6-59 months. WHO now recommends: (besides MUAC and presence of oedema) using weight-for-height (WFH) z-score based on the WHO child growth standards instead of WFH as a percentage of the median based on NCHS growth reference for identifying acute malnutrition and for admission/discharge criteria; Raising MUAC admission cutoff to 115 mm from 110 mm for severe acute malnutrition; Using new criteria for discharge based on weight gain of 15

percent, oedema free for 2 consecutive visits, and child is clinically well and alert. These discharge criteria are used for all admissions, regardless of the admission criteria used (GoM, 2012).

Table 2. 2: Summary of admission and discharge criteria for CMAM Malawi

Programme	Admission	Discharge
NRU	MUAC < 11.5 cm WFH < - 3 Z scores Oedema + 1 or + 2 *No appetite Any medical complications	MUAC ≥11.5cm WFH ≥ -2 Z scores for 3 consecutive days Oedema is absent for 10 days Clinically well Others: Defaulters and death
OTP	MUAC < 11.5 cm WFH < -3 Z scores Oedema +1 or +2 With an appetite for RUTF and Clinically well * If child is HIV+ admit to OTP with MUAC < 12.5cm & WFH < -2Z	MUAC ≥11.5cm*and WFH ≥-2Z scores No oedema and Clinically well For two consecutive visits *Children admitted with MUAC minimum stay of 8 weeks in OTP *If child is HIV Positive
SFP	MUAC 11.5 to < 12.5 cm WFH -3Z to < -2 Z scores <ul style="list-style-type: none"> • No oedema • With appetite • Clinically well * If child is HIV+ then admit to OTP	MUAC ≥ 12.5cm <ul style="list-style-type: none"> ▪ Cured ▪ Defaulters ▪ Non-cured Deaths

Source: GoM, 2012

Appetite is classified as follows;

Good: The child eats two small spoonfuls of RUTF without hesitation and is eager for more.

Poor; The child is reluctant to eat the full amount of two small spoonfuls.

None; Child refuses the RUTF.

2.3.3 Rolling out CMAM

Community mobilisation and outreach are essential for the roll-out and success of CMAM.

Enhanced community mobilization improves CMAM services such as, early detection, referral of children with SAM, and follow-up of problem cases, as well as linking formal and

informal community channels. In addition to detection and referral of children with SAM, community outreach promotes understanding of acute malnutrition treatment, and identifies and addresses common barriers to access CMAM services (e.g. distance, cost of transport, mistrust of health care, ingrained cultural practices). (Collins et al, 2006).

Community outreach that includes links with the informal health sector and involvement of traditional healers and religious leaders in CMAM outreach is critical, given the role and influence the informal health care sector has on care-seeking and caring behaviors. Integrated community outreach is possible through skillful planning and linking of CMAM community outreach with other community activities. Quick and visible outcomes of CMAM services can be a powerful engine for strengthening community participation in general. There are numerous challenges to achieving good outreach in integrated programmes. First, not all countries have a MoH community outreach network and, where these exist, they may only be active during campaigns. Volunteerism varies considerably and has a limited shelflife, with personnel often demanding payment or other incentives. Another challenge to outreach relates to the issue of rejection. Furthermore, country programmes are often concerned that active community outreach will overwhelm the health system, particularly if there are “false positives” identified through the incorrect use of MUAC (Collins et al, 2006).

2.4 Assessment of Nutritional Status

A child’s body responds to PEM in two ways that can be measured by anthropometry: i) a deceleration or cessation of growth, which in the long term results in low height for age or stunting; and ii) 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 bilateral pitting oedema. 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 conflates stunting and wasting and is used as an official indicator of progress towards achieving the first Millennium Development Goal (MDG), (Sadler. 2008). MUAC is an indicator for monitoring and discharge. It is used as an indicator for admission in a viable way of promoting sustainability of services because of its simplicity and compatibility, with easy and early case finding and referral in the community.

2.5 Review of Study Methodology

The various studies that have been conducted in the areas of Community-based therapeutic care (CTC) differ depending on the objectives of the study. The methods that have been used include retrospective studies, prospective studies, historical prospective studies and cross-sectional studies. Therapeutic feeding programmes typically use weight-for-height percentage of median (WHM) and/or the presence of bilateral pitting oedema as admission criteria. Mobile teams screen communities in a two-stage process using both WHM and MUAC measurement. The use of a two-stage referral and admission system, in which referral is based on mid-upper-arm circumference (MUAC) measured in the community by community-based volunteers, and admission is based on W/H measured at the treatment site by program staff, has proved to be a barrier to accessing care. The use of an adequately sensitive MUAC threshold (i.e., a MUAC threshold likely to identify all or almost all persons meeting the W/H-based admission criteria) results in many patients being referred for care who are then

refused treatment because they do not meet the W/H-based admission criteria. This results in reduced coverage by creating confusion and disillusionment. Most of studies were based on NCHS as the reference. These references were developed using children who were not breastfed but were given commercial infant formulas. Interpretation of nutrition situation using NCHS as references yields biased interpretation among breast fed infants.

2.6 Knowledge Gap

It is well documented that the community based approach of treating acute malnutrition by providing therapeutic ready to use food has proved to be highly effective and exceeding the international minimum standard for recovery death and coverage rates (Sadler, 2008). The community-based management of acute malnutrition programme was introduced in Lilongwe district in 2006. To the best of our knowledge there is no study that has been done to assess the performance of the programme in Lilongwei. There is therefore a need to assess the programme if it is meeting the international minimum standard for recovery death and coverage rates.

CHAPTER THREE: RESEARCH METHODS

3.1 Study Site and Population

3.1.1 Study site

The study was conducted in Lilongwe rural. Lilongwe as a district owes its name to a river, which flows almost across the centre of the district. It is located in the central region of the republic of Malawi and is bordered by Dedza district to the east, Salima to the north east and Mchinji district to the west. It also shares borders with Dowa district to the north of Lilongwe with Kasungu to its north-western tip and the republic of Mozambique to the south west. The total land area is 6159 Square Kilometres representing 6.5% of Malawi's total land area, which is subdivided into 18 Traditional Authorities (TAs') with 18 chiefs (refer appendix 1). The district assembly is the highest policy-making body responsible for promoting infrastructural and economic development in the district. Lilongwe district assembly has 437 villages. The Traditional Authorities under study were TA Masula, TA M'bang'ombe and TA Khongoni (refer appendix 1), (National Statistic Office (NSO), 2008).

3.1.2 Study population

The population of Lilongwe was 1,346,360 in 1998 (NSO, 2008). The study population comprised mainly of people of one tribe, Chewa, which is the major tribe in the district. It accounts for 99% of the total population in the rural areas. However, there are three other minor tribes namely: Tumbuka, Yao and Ngoni. Other tribes are found in the district either due to migration in search for employment or other economic gains in the urban areas of the district and through marriages. Christianity is the predominant religion in the district, which

accounts for 1,077,434 out of the total population of 1,346,360. Muslims account to 67,979 and 42,798 people are of other religions. There is also a substantial number of people without religion (158,149) in the district. Based on poverty mapping analysis, 64.3% of Malawi's population lives in poor households; of these 63.9% live in central region and 76.7% in Lilongwe rural (NSO, 2008).

3.2 Study Design

A cross sectional survey was used with both descriptive and analytical component. While a retrospective approach was used to collect secondary data from the Health facilities implementing the programme in the study area. The survey was conducted in the month of August 2012 to determine the nutritional status of children between the ages of 6 months to 5 years in order to establish whether the programme is performing according to its objectives.

3.3 Sample Size

3.3.1 Sample size determination

The sample size was calculated using Fisher's formula and based on the proportion of children who were underweight in Lilongwe (NSO, 2010). This proportion of acute malnutrition gave a more representative sample size than wasting. Fisher's formula is appropriate for cross sectional study and since the population was greater than 10,000, Fisher et al (1991) recommends application of the formula $n = Z^2 pq/d^2$

Where

n: The desired sample size (when population is greater than 10,000).

Z: The standard normal deviate set at 1.96

P: Prevalence of indicator. The probability was the underweight percent of children under five years old in Lilongwe district which was 13.3% or 0.133 (NSO, 2010).

q: $1.0 - p$, which is $1 - 0.133 = 0.867$.

d: Degree of precision = 5% or 0.05.

Sample size was as follows: $n = Z^2 pq/d^2$

$$n = \frac{1.96^2 \times 0.133(1-0.133)}{0.05^2}$$

$n=177$ plus 10% attrition.

$n= 195$ households with children less than 5 years old.

The total of 195 children under five years old formed a study sample.

Sample size for Focus Group Discussion

A total of three Focus Group Discussions (FGDs) were conducted, one from each traditional authority. The traditional authorities were TA Masula, TA M'bang'ombe and TA Khongoni and the FGDs had 11, 9 and 8 people respectively. The participants in the FGDs were guardians of the children in the programme and community members residing in the study area.

Sample size for Key Informants

A total of twelve people were interviewed, of which six were service providers and six community leaders. From each traditional authority, two community leader and two service providers were interviewed.

3.3.2 Sampling procedure

Lilongwe district was purposively sampled as a study area because of higher levels of malnutrition. It had stunting of 45.5%, underweight of 13.3% and wasting 6.1% (National Statistic Office (NSO), 2010). The district has 18 Traditional Authorities (TAs) out of these, three rural TAs were randomly selected. Random sampling using a lottery technique was used to select three villages from each Traditional Authority. A random walk technique was used to select households. With this technique, interviewers began the interview process at a central point in the village or a well defined geographic point, and then following a specified path of travel, they systematically selected households to be interviewed (UNICEF, 2010).

The estimated population size for the three traditional authorities Khongoni, M'bang'ombe and Masula were 47130, 14996 and 34277 respectively. In order to determine the desired number of households from each traditional authority the population proportionate sampling procedure was used. The calculation was done as follows: $nf = nl \times n/N$.

Where:

nf: The desired sample size.

n: The desired sample size when population is more than 10,000 which is 195.

nl: The estimate of the population size of each TA under study.

N The total population size for the three TAs' under study which is (47130+14996+ 34277).

Sample size for Khongoni Traditional Authority

$$nf = nl \times n/N.$$

$$nf = \underline{47130 \times 195}$$

96403

$nf = 95.$

Sample size for M'bang'ombe Traditional Authority

$nf = \frac{14996 \times 195}{96403}$

96403

$nf = 30$

Sample size for Masula Traditional Authority

$nf = \frac{34277 \times 195}{96403}$

96403

$nf = 70$

Sampling for Focus Group Discussion

Participants in FGDs were conveniently sampled from the community with assistance from the community health workers. These were mothers who were primary caregivers of children less than five years of age plus mothers who had their children enrolled in the programme.

Sampling for Key Informants

Key Informants were purposely selected from the community leaders and the programme service providers basing on their in-depth knowledge of the programme.

Figure below shows how study household were sampled.

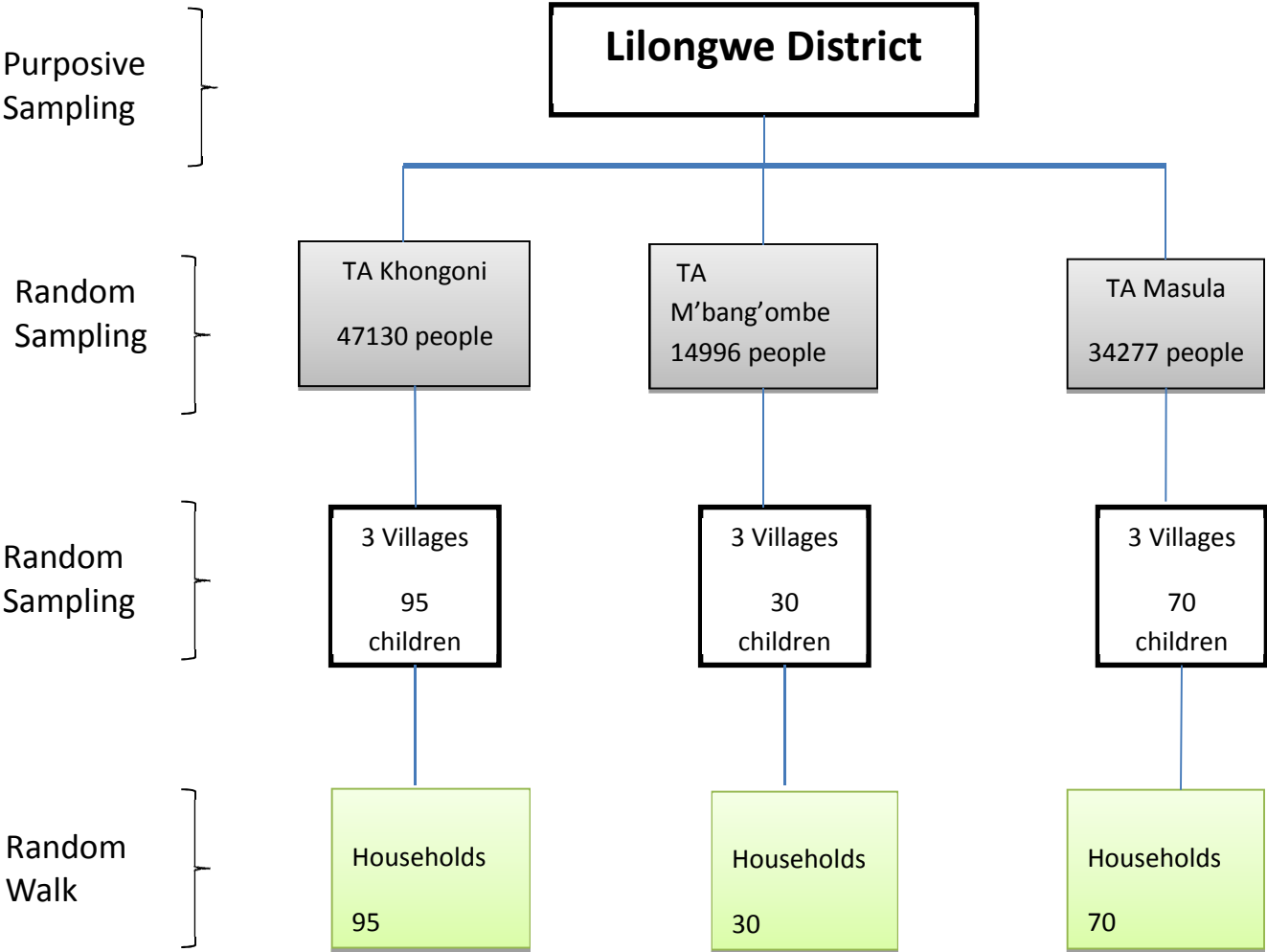


Figure 3. 1: Household Sampling Procedure

3.3.3 Inclusion and exclusion criteria

The Sampling unit was the household. All households with children from the age of 6 to 59 months both beneficiaries and non-beneficiaries of CMAM programme were eligible for the study. If the household had more than one child aged 5-59 months all the children were eligible for the study. Households without children 6-59 months old and those eligible for the study but not willing to participate were excluded in the study.

3.4 Study Tools and Equipment

Study tools such as semi-structured questionnaire, Focus Group Discussions guide, Key Informant Interviews guide, checklist to counter check all the required equipment /supplies and record sheet were used. The study also utilized equipment such as salter scales for weight measurement, Length/height board and the MUAC tape

3.5 Recruitment and Training of Field Assistants

Nine field assistants were recruited to assist in data collection. These field assistants were required to have at least a form four certificate and knowledge of nutrition. A three day training was conducted. The training covered the following; background and the objective of study; Field study ethics, methods of interaction, team spirit, selection of respondents, understanding sections of the questionnaire, data collection techniques and measuring weight, height or length and MUAC. This was done in two days and on the third day there was pre-testing of the data collection tools, (Refer appendix 2). Training helped to standardize data collection in order to minimize variations in data collection procedures that could bias the results.

3.6 Pre-testing Study Tools

Pre-testing was done on the third day of the training. The semi-structured questionnaire and the anthropometric tools were pre-tested. This assisted in making vital adjustment to enhance reliability and validity of the study findings. A total of ten households in an area with similar

population to the study population were used. This was done to avoid double inclusion of pre-tested sample in the main study. The anthropometric equipment (Salter scales, height/length boards and MUAC tape) were examined by professionals (researcher and health workers) and adjusted based on obtained responses. This was done to ascertain the degree to which the test measured what it purports to measure. The data collected from pre-testing exercise was used to gauge validity of the data collection tools. Revision was done based on the response from the pre-test exercise.

3.7 Data Collection Techniques Procedure

Pre-tested questionnaire was used to collect both quantitative and qualitative data. Focus Group Discussion guide, Key Informant interview guide, and template were also used (Refer appendix 3, 4, 5 and 6).

Socio-demographic and Socio-economic Characteristics

Data on demographic and socio-economic characteristics were captured at household level. This included demographics (age, sex, ethnic and marital status, education), housing (quality and cost) and economics (personal incomes and occupations). This information was collected using a semi structured questionnaire where mothers were interviewed (refer appendix 3).

Health and Nutrition

Information was also sought on whether the child was enrolled in CMAM or not, child feeding practices and water and sanitation situation in the household. Data on individual dietary diversity of the index child aged 6- >24 months was collected from mothers or primary caregivers. Respondents were asked to mention all the foods and beverages the child had eaten during the preceding 24-hours (from the time they woke up the previous day up to

the time they woke up again on the day of interview). The individual dietary diversity was determined by summing all the food groups consumed by the child. Seven food groups (grains, roots and tubers, legumes and nuts, dairy products (milk, yogurt, and cheese), flesh foods (meat, fish, poultry and liver/organ meats), eggs, vitamin-A rich fruits and vegetables, other fruits and vegetables) were used in the analysis (WHO/UNICEF, 2007).

Anthropometric data

Anthropometry measurements were used to determine the nutritional status of the index child (6-59 months) from each household. With reference to methods described by Gibson,(2005), the anthropometric measurements were done as follows:

Date of birth: The date of birth of the child was inquired from the caretaker or the mother by recall or checking from immunization or clinic card. Age in months was calculated from the date of birth to the date of the survey.

Length/ height: Length for children below 24 months was measured lying flat and centrally on measuring board placed on hard flat surface on the ground (head and feet against the base of the board and foot piece respectively). The length was read to the nearest 0.5 cm.

Height of the child above 24 months was measured standing straight on measuring board placed on hard flat surface against a wall with line of sight perpendicular to the horizontal surface. When measuring height clothing was minimal for posture to be clearly seen. Shoes and socks were not worn. The child's height was measured by gradual lowering of head piece on top of the head to compress the hair. The reading of the height between head piece and base of the board was taken to the nearest 0.1 cm.

Weight: Weight was measured with portable salter scales and an improvised pant was made from the child wrapping cloth. After slipping the child into the pant, the part was hooked on the scale and the weight was recorded as soon as the indicator on the scale stabilized. The

wrapping cloth was weighed as well and the weight was being deducted from the child weight. The scales were being calibrated regularly. The body weight was recorded to the nearest 0.1kg.

MUAC: This was a quick and simple way to determine whether or not a child was malnourished using a simple colored plastic strip. In using MUAC tape, first the mid-point between the elbow and the shoulder of the left arm was determined. Then the tape was placed around the determined mid-point (the arm being relaxed and hanging loosely by the side of the body). The measurement was taken while ensuring that the tape did not pinche and it was recorded to the nearest 0.1 cm.

Clinical data

This was collected by recognizing clinical signs as expressed in Table 3.1:

Table 3.1 Clinical assessment

Condition	Clinical signs
Marasmus	Prominent bones (ribs), loose skin (on lifting), skinny limbs and loose skin around the buttocks (buggy pants).
kwarshiokor	Bilateral pitting oedema, hair change (brownish, scanty, straight), skin change (dermatosis) and a large protuberant belly

In order to determine the presence of bilateral oedema, firm thumb pressure was applied to the top of the foot or lower leg over the shin-bone for three seconds. When a depression persisted after removing the thumb, the child was classified as having oedema (Government of Malawi, 2012).

Assessment of health workers

The community health workers were interviewed on the adequacy of the anthropometric equipments, MUAC, RUTF and stationary supplies in their facilities. This was to ascertain whether the equipments and supplies they have were enough for their work load. The success of the programme relied on the availability and adequacy of the equipments, stationary and diet therapy supplies. The health workers were also asked on how they identified malnutrition cases, how they carried out referral and follow-up, and the problems they encountered while offering their services (refer appendix 4).

Key Informant Interviews

Key informant interviews (KII) were used to collect in-depth qualitative data. The purpose of key informant interviews was to collect information from community leaders and community service providers who had first hand information and knowledge about the programme. These people provided an insight on the nature of problems and recommended solutions to the problems the programme had. This was done using question guide (refer appendix 6). To collect in-depth information probing questions were being used based on the question guide.

Focus Group Discussion

Focus group discussion (FGD) was conducted to provide information on the strengths and weaknesses of the programme. Participants were asked to provide their perception of how the programme was being run. This included issues of accessibility and factors affecting utilization of the available services and recommendations for improvement (appendix 5).

Secondary Retrospective data

Retrospective data was obtained from the programme registers, childrens' master cards and monthly monitoring reports. This collected data on the programme admission and discharge

(as cured, deaths defaulters and length of stay) during the period between August 2011 to July 2012. A case study was used to assess the implementation of the programme in comparison with CMAM guidelines. A total of 26 children aged 6-59 months enrolled in the programme from the health centres under the study area were assessed.

3.8 Data Quality Control

The data quality aspect was being integrated in the whole data collection process. This was made possible through intensive training of the enumerators with emphasis on data quality. Close supervision of these enumerators lead to use of appropriate interviewing techniques. The data was also checked in the field to ensure that all the information was being properly collected and recorded. Before and during data processing, the information was checked again for completeness and internal consistency. If the inconsistency was clearly due to a mistake made by the researcher, the researcher was requested to correct the mistake but if the inconsistency was a mistake in recording, the interviewer was requested to return to the respondent and ask for clarification. If it was not possible to correct the information that was clearly inconsistent, then that particular part of the data was excluded from further processing and analysis as it could affect the validity of the study. For computer data analysis, quality control checks of data included verification of how the data had been transformed into codes and subsequently entered into the computer.

3.9 Data Analysis

The data entry was done using SPSS version 17, ENA was used to analyze child's nutritional status and Excel windows 2010 was used to transfer data from SPSS to ENA. Exploratory Data Analysis was used to determine the test appropriate for analysis of different variables.

Descriptive summary statistics such as frequencies, means, medians and standard deviations were used to describe the characteristics of study population.

Inferential statistics; Fisher's Exact, Confidence Interval, P-value, Spearman's correlations were used to determine association between various dependent and independent variables. Multiple regression was used to determine whether demographic and social economic characteristics could influence the nutritional status of the children under five years of age. The children's nutritional status was determined using anthropometric indices weight-for-age, height-for-age and weight-for-height. The WHO reference standard was used for the nutritional status. Stunting, underweight or wasting were defined by Z score <-2SD of anthropometric indices.

Quantitative analysis was used to analyse performance indicators such as coverage, case-fatality, and default and recovery rates over the one year period preceding the study. Coverage is the proportion of children with severe acute malnutrition (SAM) who receive therapeutic care to total number of SAM in the community (Government of Malawi (GoM), 2012). Point coverage was the one used in the study. This estimator uses data for current cases only. It provides a snapshot of service performance and placed a strong emphasis on the timeliness of case finding and recruitment. Point coverage was calculated using the following formula:

$$\text{Point coverage} = \frac{\text{Children with SAM receiving therapeutic care}}{\text{Total number of SAM children}} \times 100$$

Following WHO guidelines, which Ministry of Health had adopted, the following formulae were used to calculate cure rate, death rate and default rate:

$$\text{Cure rate} = \frac{\text{Total number of children cured}}{\text{Total exit}} \times 100$$

$$\text{Death rate} = \frac{\text{Total number of children died}}{\text{Total exit}} \times 100$$

$$\text{Default rate} = \frac{\text{Total number of children defaulted}}{\text{Total exit}} \times 100$$

The following indicators were then compared with the minimum acceptable levels. CMAM Malawi uses the international standard and the targets used for, recovery case-fatality, default and coverage rates were >75%, <10%, <15%, and >50% respectively (The standard Sphere, 2011). The outcome on coverage and discharge rates were compared with the minimum acceptable levels set by the international standard sphere and the decision was made whether they were within normal range.

Descriptive analysis was used to analyse data from KII and FGD.

3.10 Ethical Consideration

To ensure that the five principles guiding ethics in research were followed namely; scientific merit, equitable selection of subjects, seeking informed consent, confidentiality and avoidance of coercion, the Ministry of Health was given the proposal, reviewed the study tools and had given an approval before commencement of the study. A letter of study approval from Ministry of Health was used to inform the local authorities and Health Centres of the study (refer Appendix 10). In addition, the respondent was asked to sign an informed consent form prior to data collection (refer Appendix 7).

CHAPTER FOUR: RESULTS

4.1 Social-Economic and Demographic Characteristic

Data was collected from 195 households of which 95, 70 and 30 households were from traditional authority Khongoni, Masula and M'bang'ombe respectively. The population covered was 1012 persons of whom 50.01% were males and 49.99 % females. The minimum household size was 2, maximum was 10 and mean was 5.1 ± 1.8 . The proportions of the under fives and those above 65 years were 25.62% and 0.5% respectively. The dependency ratio was 120. The ages of mothers of the study children were in the range of 15 years to 48 years of whom majority 76.7% were within the age of 20-35 years. Most (74.7%). of mothers attained basic education (primary education). Table 4.1 has details of selected demographic characteristics of the study households.

Table 4. 1: Demographic characteristics of the study household

Characteristics	n	%
Population	1012	100
Age distribution of the populatiom		
0-<5 years	259	25.6
0-<15 years	549	54.2
Between 15-65 yrs	458	45.3
>65	5	.5
Mothers'age distribution (N=198)		
15-19 years	12	6.2
20-35 years	150	76.7
>35 years	33	17.4
Mothers level of education(N=198)		
Never gone to school	17	8.7
Primary education	145	74.1
High school	32	16.4
College	1	.5
Marital status of the population (Aged ≥ 15 years)		
Married	371	36.7
Widowed, separated, single, divorced	92	9.1

Table 4.2 provides details of age and sex of the study children. Age distribution of children aged 6-59 months was highly varied. The proportion of boys in the study unit was slightly higher (51.5%) than that of girls which was 48.5%.

Table 4. 2: Distribution of boys and girl according to age

AGE (mo)	N=198 n	Boys %	Girls %	Ratio Boy:girl
6-17	77	49.4	50.6	1.0
18-29	48	58.3	41.7	1.4
30-41	39	53.8	46.2	1.2
42-53	22	40.9	59.1	0.7
54-59	12	50.0	50.0	1.0
Total	198	51.5	48.5	1.1

Table 4.3 indicated that majority over 70% of the mothers were housewives and had a households monthly income of less than Malawi Kwacha (MK) 10, 000 (US\$33.6) which translates into living on less than \$1 a day

Table 4. 3: Selected socio-economic characteristics of the study households

Characteristics	N= 195		Mean ± SD
	n	%	
Sources of livelihood			
Occupation of household head			
Farmers	113	57.1	
Salaried	9	4.5	
Small scale business	52	26.3	
Casual labour	22	12.1	
Occupation of household mother			
Farmers	19	9.6	
Small scale business	15	7.6	
Casual labour	15	9.6	
Housewife	145	73.2	
Household income			MK7038± 6276.39
Monthly Proportion of Income			
>MK5000 (16.8 US dollar)	92	46.5	
MK5000-MK10000(16,8-33.6 USD)	62	31.3	
>MK10000	44	22.2	
Time taken to get water			
<15 minutes	135	69.2	
>15-30 minutes	38	19.7	
>30 minutes	22	11.1	
Land ownership			
Own land	182	92.9	
Rent	13	7.1	
Land size in acres			
	minimum	maximum	
	0.25	6.00	1.9± 1.09

Figure 4-1 shows that the majority (75.3%) of households depended on protected boreholes and wells as their main source of water. A total of 88.9% households took less than 30 minutes to fetch water which was within the range recommended by the international standard sphere.

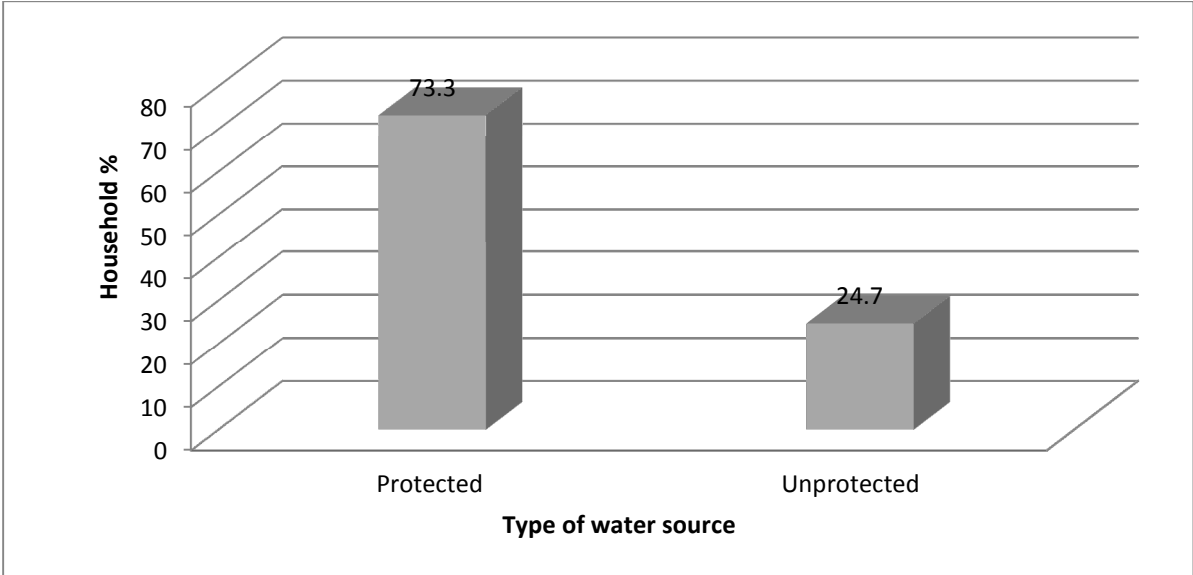


Figure 4. 1: Household water sources

About the type of sanitary facilities for disposal of faecal matter, the majority (77.3%) of the households had access to traditional pit latrines where as 11.1% had none and 1.0% had open pits (Figure 4.2).

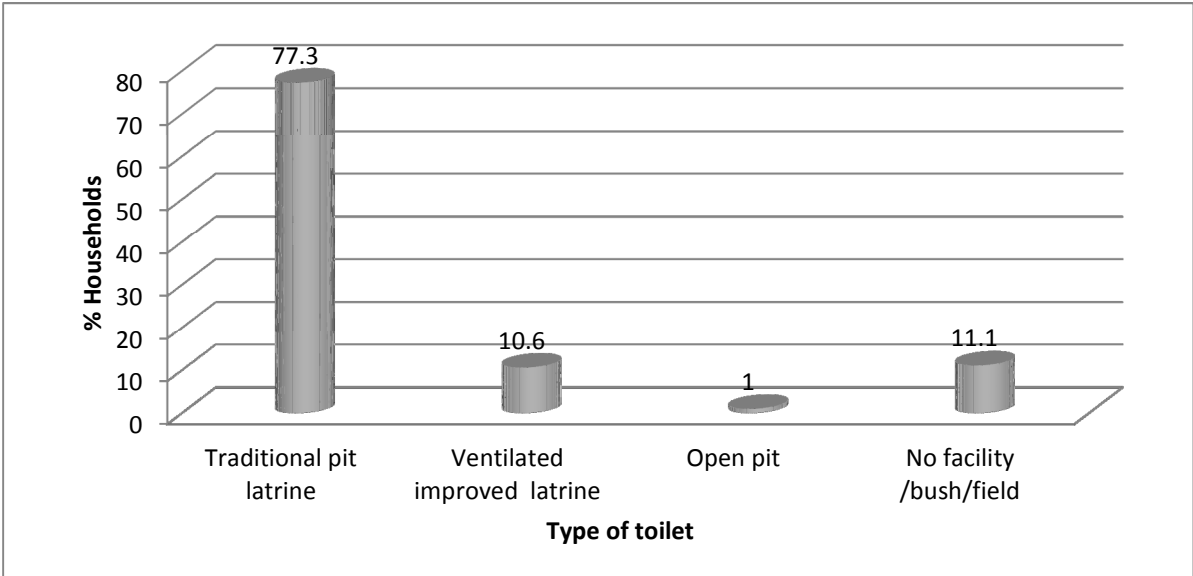


Figure 4. 2: Household toilet access

4.2 Infant and Young Child Feeding Practices

As shown in figure 4.3 the main food groups consumed by children were starches and Vegetables. Generally, foods of animal origin were least consumed with only 22% and 25% of children who consumed meat and dairy products respectively. Vitamin A rich fruits and vegetables were consumed by less than half of the children.

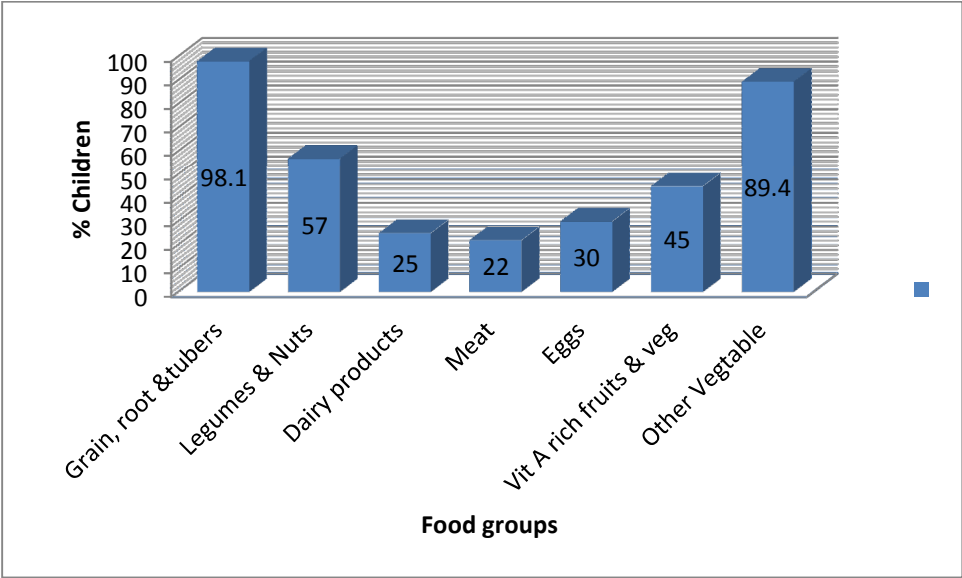


Figure 4. 3: Distribution of children 6->24 months old by food groups consumed

The individual dietary diversity scores were calculated based on 7 food groups (WHO, 2007). The mean individual dietary diversity score was 4.0 (SD, 2.04). Children consuming between 1 and 5 food groups were the majority while 37.5% consumed 3 food groups out of the possible 7 food groups included in the analysis. Children consuming ≤ 3 food groups were considered to have low IDDS while those consuming 4 or 5 and ≥ 6 were considered to have medium and high IDDS respectively. Based on this classification, only 3.8% of the children had high IDDS. Most of the children (58.7%) had medium IDDS while 37.5% of the children had low IDDS. Table 4.4 shows the IDDS of children aged between 6 - < 24 months old.

Table 4. 4: Individual Dietary Diversity Score of children aged 6 -< 24 months old

DDS Category	Frequency	Percent		
		N=104	Mean	SD
Low DDS (≤ 3)	39	37.5	4.0	2.04
Medium DDS (4-5)	61	58.7		
High DDS (≥ 6)	4	3.8		

4.3 Nutrition Status of the Study Children

Table 4.5 shows the nutrition status of study children by gender. The study shows that chronic malnutrition (stunting at 47.5 %) was the main nutrition problem in the area. This corresponds to the national stunting status of 48% (NSO, 2010). The nutrition status between boys and girls for all the three indicators were almost similar.

Table 4. 5: Nutrition status of children by gender

Nutrition status Indicators	Global malnutrition >-2z-score		Global malnutrition (Total) N=198 (%)
	Boys N=102 (%)	Girls N=96 (%)	
Wasting	7.9	6.1	7.1
Stunting	47.1	47.9	47.5
Underweight	12.7	12.5	12.6

Table 4.6 shows prevalence of wasting which is the nutritional indicator used for admission in the programme. The table shows 4.6 % global wasting for children 6-17 months old of which 2% had severe wasting. This result shows higher global wasting than the national prevalence of 4% (NSO, 2010). The study also indicated higher prevalence (6.6%) of moderate wasting among children of age group 6-17 months.

Table 4. 6: Prevalence of wasting by age group

Age (months)	N=198	Severe wasting (<-3 z-score)	Moderate wasting (>= -3 and <-2 z- score)	Normal (> = -2 z score)
	n	%	%	%
6-17	77	2.6	6.6	90.8
18-29	48	2.1	4.2	93.7
30-41	39	0.0	5.2	94.8
42-53	22	4.5	4.0	91.5
54-59	12	0.0	0.0	100.0
N	198	2.0	5.0	97.0

4.4 Level of Admission and Coverage, Recovery and Death rates in the Programme

4.4.1 Admission levels

Figure 4.4 shows admission levels of under five children in the programme in the three health facilities Nsaru, M'bang'ombe and Masula from T.A's Khongoni, M'bang'ombe and Masula respectively for the period of August 2011 to July 2012. The levels of admissions across the period in question varied in all the three health facilities. M'bang'ombe recorded a low admission trend of < 15 through out the year. Chiunjiza reported the highest admission level of 28 children in the month of February while Nsaru had 27 children admitted in the month of November. The month of March recorded a drastic drop in admission in all the health facilities of up to zero in the month of April.

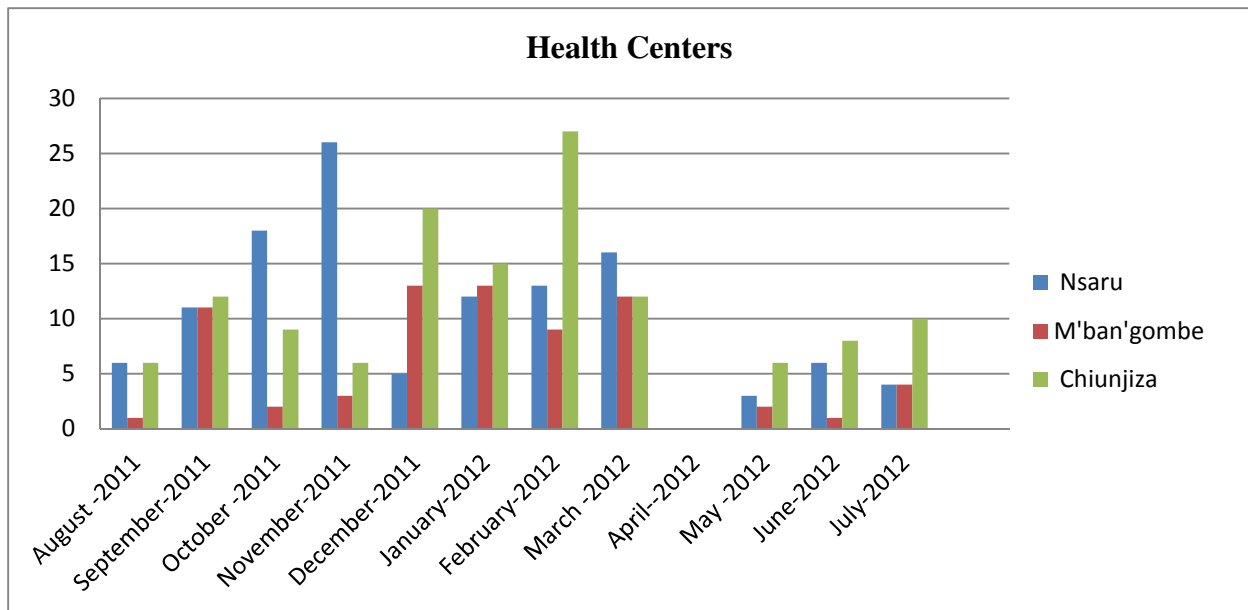


Figure 4. 4: Admission trends of CMAM cases from August 2011 to July 2012

4.4.2 Recovery and death rates

Figure 4.5 shows the cumulative discharge trends of the three health facilities from the three traditional authorities under study for the period of August 2011 to July 2012. The OTPs achieved higher cure rates of over 90% for SAM cases, while default and death rates were 0% and 3% respectively. There is variations in the rates of the discharges (cured/recovery and death rates) across the period in question. The months of April, May and June had recorded the highest (100%) cure rate. This is a period of food abundance according to Malawi's seasonal food calendar (Government of Malawi, 2007).

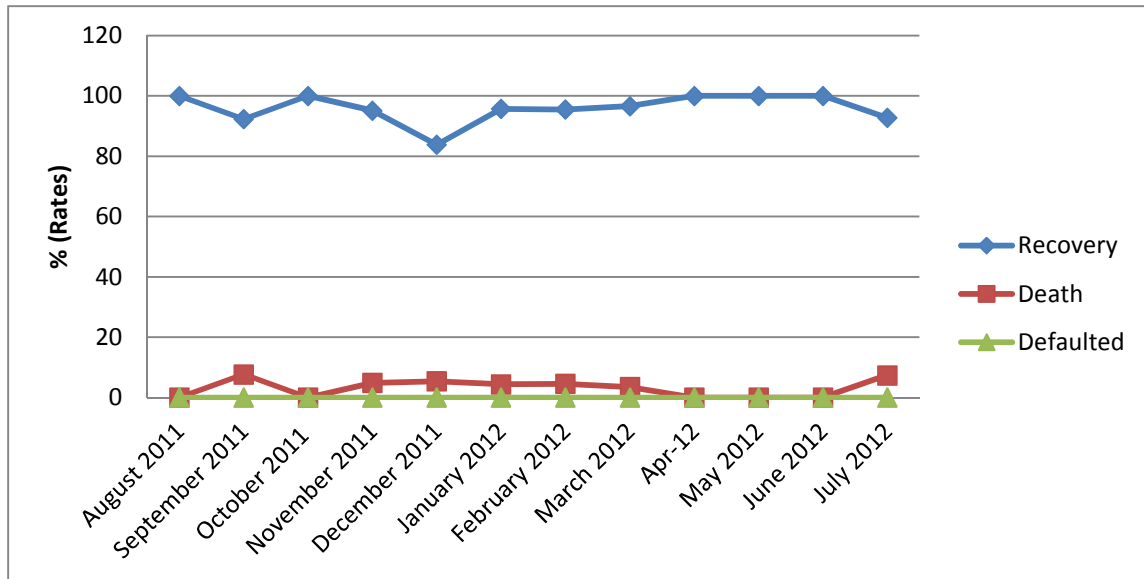


Figure 4. 5: Trends of discharge rates

4.4.3. Level of coverage

Coverage is the ratio of children with severe acute malnutrition in treatment (a) to the expected number of children with severe acute malnutrition in the community (a+b) (Government of Malawi, 2012). Table 4.7 shows a total of 2% children with acute malnutrition in the programme of which half had severe malnutrition. The proportion of those with severe malnutrition outside the programme was also 1%. The normal children outside the programme were 98%. Using Table 4.7, the proportion of coverage was calculated as $(a/a+b) \times 100$. $=2/4 \times 100 = 50\%$. This shows that the calculated coverage was just in the borderline of the minimum standard as stipulated in The Sphere Standard, 2010 (refer appendix 4C).

The impact on the other hand is the product of coverage and the cure rate = coverage \times cure rate \times 100 (Guevarra et al, 2012). Using the cure rate from Figure 4.5 impact was calculated as follows; $\text{Impact} = \frac{50}{100} \times \frac{90}{100} \times 100 = 45\%$.

The result shows that the programme was meeting 45% of need.

Table 4. 7: Level of malnutrition in the community

Wasting Status	Number of children		
	In programme	Outside Programme	Total
Severe wasting(<-3z-score)	2	2	4
Moderate wasting (>= -3 and <-2 z-score)	0	10	10
Normal (>-2z-score)	2	182	184
Total	4	194	198

4.5 Implementation of the Programme in Comparison with CMAM Guidelines

Table 4.8 shows 26 cases of children aged 6-59 months who were in the programme during the time of study. When the amount of RUTF received was compared with the amount stipulated in CMAM guidelines (refer appendix 4D), the study indicated that 57.7% of the children were not receiving the recommended amount of the daily ration of which 92.2% of these children were moderately malnourished and 7.8% were normal waiting to be discharged from the programme. When asked, health workers providing the services indicated that shortage of stock of RUTF ration in health facilities contributed to the compromise in distribution. On the number of days stayed in the programme, 92.3% were within the recommendation as stipulated in CMAM guidelines, (Government of Malawi, 2012). Only a few (7.6%) had over stayed in the programme which indicated that the supplement provided by the programme did not bring about supposed weight gain within the recommended time of stay.

Table 4. 8: Adherence to CMAM protocol

N=26	Meeting CMAM recommendation	
	Yes %	No %
RUTF ration received	42.3	57.7
Days stayed in programm	92.3	7.6

4.6 Relationship between Nutrition Status and some Socio-economic and Demographic Characteristics

In order to assess the degree of association, various independent variables (demographic and socio-economic factors) were cross tabulated with nutritional status. The education level of mothers, breast feeding status and individual dietary diversity score of children 6-24 months old were individually correlated with nutritional status. Then spearman correlation and logistic regression were applied.

4.6.1 Association between nutritional status and education level of the mothers

During the study, it was observed that the majority (74.4%) of the mothers had primary education while 8.6 % were illiterate. High acute malnutrition was reported among mothers with primary education and those without education. Fisher's Exact test found an association between nutritional status of the children aged 6-59 months old and the educational level of their mothers. Stunting and underweight were both significant with p-value of <0.05. Prevalence of 54.1% and 16.7% were reported for stunting and underweight respectively among mothers with primary education. Table 4.9 provides details of the association between nutrition status of children and educational level of mothers.

Table 4. 9: Association of nutritional status of the children by education level of the mother

Nutritional Status	Level of education	Malnutrition Category		
		Malnourished (%)	Normal (%)	P value
Stunting	Illiterate	37.5	62.5	P=.005
	Primary	54.1	45.9	
	Higher Education	24.2	75.8	
Wasting	Illiterate	0	100	p =.76
	Primary	4.1	95.9	
	Higher Education	0	100	
Underweight	Illiterate	6.2	93.8	p =.012
	Primary	16.9	83.1	
	Higher Education	8.8	91.2	

4.6.2 Association between Nutritional Status and Breast feeding Status

Fisher’s Exact test found no association between nutritional status and the breast feeding status of children < 24 months of age, those who were still breastfeeding and those who had stopped breastfeeding at the time of the survey. Prevalence of stunting was high 39.8%. Table 4.10 provide the results of the test.

Table 4. 10: Nutritional status of the children 6-24 months by breast feeding status

Nutritional Status	Malnutrition Category	Breast Feeding Status		P-Value
		Yes (%)	No (%)	
Stunting	Stunted	39.8	52.0	p=.112
	Normal	60.2	48.0	
Wasting	Wasted	2.2	4.0	p =.4
	Normal	97.8	96.0	
Underweight	Underweight	10.8	15.0	p =.5
	Normal	89.2	85.0	

4.6.3 Association between nutritional status and household income

Table 4.11 shows the nutritional status of the children by household income. Fisher’s exact test found no association between the nutritional status and household income. There was

higher prevalence of stunting (53.3%) among household with income of less than MK5000 in a month.

Table 4. 11: Association between nutritional status and household income

Nutritional Status	HH income	Malnutrition Category		P- Value
		Malnorished (%)	Nomal (%)	
Stunting	<MK5000	53.3	46.7	p=.29
	MK5000-10000	42.6	57.4	
	>MK10000	40.9	59.1	
Wasting	<MK5000	4.3	95.7	p =.14
	MK5000-10000	1.5	98.4	
	>MK10000	2.3	97.7	
Underweight	<MK5000	17.4	82.6	p =.8
	MK5000-10000	6.6	93.4	
	>MK10000	11.4	88.6	

4.6.4 Relationship between nutritional Status and Child Dietary Diversity Score

Fisher's Exact test found an association between nutritional status and the child's dietary diversity score. The p-value of stunting was <0.05. Table 4.12 presents the nutrition status of children by Child dietary diversity score.

Table 4. 12: Nutritional status of the children by the child dietary diversity score

Nutritional Status	Dietary Diversity Score	Malnutrition Category		P-Value
		Malnorished (%)	Nomal (%)	
Stunting	Low DDS	50.7	49.3	p= .01
	Medium DDS	25.0	75.0.	
	High DDS	1.5	98.5	
Wasting	Low DDS	4.5	95.5	p =.56
	Medium DDS	0	100	
	High DDS	0	100	
Underweight	Low DDS	13.4	86.6	p=1,00
	Medium DDS	11.1	88.9	
	High DDS	0	100	

4.6.5 Correlation and regression of the factors associated with nutritional status

Table 4.13 reported a spearman correlation of selected demographic and social-economic characteristics that affect the nutrition status of the under-five children in the study. The breast feeding status of the child and household income were found to be correlating. The breast feeding status and household monthly income correlate with stunting at P-value of >0.05.

Table 4. 13: Correlation of factors affecting nutrition status

Characteristics	Wasting		Underweight		Stunting	
	coefficient	P-value	coefficient	P-value	coefficient	P-value
Child age group	0.007	0.175	0.098	0.175	0-.134	0.062
Mothers level of education	0.33	0.324	0.098	0.086	0.116	0.052
Child feeding frequency	0.29	0.770	0.113	0.254	0.133	0.180
Household monthly income	0.062	0.192	0.095	0.092	0.130*	0.035
Type of water	-0.021	0.772	-0.356	0.000	0.111	0.120
Child breast feeding	0.052	0.236	-0.087	0.115	0.146	0.022

*. Correlation is significant at the 0.05 level (2-tailed).

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

The regression analysis for wasting was done using forward logistic regression method. Wasting was chosen being the index that describes current nutrition situation (NSO, 2012), and also an index for the programme admission. The variables that were significantly associated with wasting were mothers level of education and breast feeding status. Exp (B) 13.3 was the likelihood ratio or the ODDS ratio. The details of regression are presented in table 4.14.

Table 4. 14: Regression of factors affecting wasting of the under 5 children

Characteristics	Score	df	Sig.
Child age group	.617	1	.432
Feed freq	.508	1	.476
breastfed	11.636	1	.001
water treat	.189	1	.663
Household Income	2.146	1	.143
Education of mothers	4.057	1	.044
Score	.408	1	.523
Overall Statistics	19.163	7	.006

	B	S.E.	Wald	df	Sig.	Exp(B)
Constant	2.587	.392	43.558	1	.000	13.286

4.7 Strengths and Weaknesses of the Implementation of CMAM Programme

The results from key informants and FGDs provided information on the weaknesses and the strengths of CMAM programme. Most of the key informants did not know when the programme started but they were aware of the programme. Six health workers and three community leaders were interviewed while three FGDs were conducted. Table 4.15 gives a summary of the strengths and weaknesses of the programme.

Table 4. 15: The Strength and Weaknesses of the Programme

STRENGTH	WEAKNESS
<ul style="list-style-type: none"> • Promising performance indicators, such as high cure rates and low death rates • The programme has been integrated in already existing structures, providing an opportunity for sustainability as the structures will always be there. • The programme has guidelines and training manuals • Availability of a basic package of health care and nutrition actions • The programme is addressing and 	<ul style="list-style-type: none"> • Some mothers/care givers have to walk very long distances to what can be the nearest health facility. • No transport facilities in health centers which could help in follow up. • Inconsistent supply of stationery, and anthropometry equipment • Old equipment for anthropometry, which are rarely serviced. • The training manual has not been aligned with the WHO recommendations especially

<p>meeting the intended objectives,</p> <ul style="list-style-type: none"> • Children have improved their nutritional status • The services are good. • The programme is recognized by the community. • No stigmatization is associated with RUTF. 	<p>on the admission criteria</p> <ul style="list-style-type: none"> • Absence of base line data at the health center even at district level • Lack of supervision from the higher level. • Technical staffs rarely take part in nutrition activities even when they were trained. Most of the work ends up in the hands of volunteers. • Ration distribution happens on weekly basis Some women find it tough especially those who have to walk long distances to the health centre. • Erratic supply of RUTF to the sites compromises service delivery. • No feedback after supervisory visit
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CHAPTER FIVE: DISCUSSION

5.1 Introduction

Community based management of acute malnutrition has been reported to be an effective model of addressing the needs of children with acute malnutrition in developing countries including Malawi, (Ashworth, 2007; Republic of Ghana, 2011; Collins et al, 2006). The present study aimed at investigating the prevalence of malnutrition and the implementation of the programme in relation to CMAM protocol in Lilongwe rural.

5.2 Demographic and Socio-economic Characteristics

The mean household size of 5 people found in this study is slightly higher than the national figure of 4.7 and 4.4 reported by 2004 population and housing census (NSO, 2010) and the Malawi demographic health survey of 2010-2012 respectively (NSO, 2012). The study was conducted in the rural area while the national report combines both rural and urban hence the difference in the house hold size. The dependency ratio of 120 is higher than the national figure of 117 reported by the National Statistical Office and ICF Macro. (2011), probably because the proportion of population below 15 years was high since the study targeted households with children under 5 years old.

Most of the women attend primary school and only 8.6% had no education. This is lower than the nation results reported in NSO 2010 in which over 20% of women in Lilongwe rural had no education. The study indicated 74.7 % women with primary education which is higher than the 64 %. reported in MDHS of 2010 which had combination of urban and rural women.

Higher levels of low education in women could explain the poor nutritional status of the under fives. This is in agreement with Katundu and Geresomo,(2011) that mothers with low level of education could lack the knowledge to improve the total welfare of the household which in turn has an effect in the nutritional outcome of the under five children.

It was found that 75.3% households had access to improved drinking water which was not very different from 77.1% reported in MDHS 2010. This result supports the MDHS 2010 report that Malawi has adopted the millennium development goal of increasing the percentage of the population with sustainable access to an improved water source in both rural and urban areas. The study reported 88.9 % households taking less than 30 minutes to obtain drinking water which is much higher than the 53.7 % reported by the Malawi Demographic Health Survey, (NSO,2010). This shows that the majority of the population 88.9% are within the recommendation as stipulated by the international standard sphere of the amount of time taken to go fetch water and return back home (The Sphere project, 2011).

The main type of toilet facility used by majority (77.3) of the households was pit latrine without slab. NSO, (2010) reported much higher results for rural areas than the study. This could contribute to poor sanitation in the study area.

5.3 Nutritional Status of Children Aged 6-59 Months

The nutritional status of children below 5 years of age is an outcome of immediate, underlying and basic causes of malnutrition (UNICEF, 1990). The three anthropometric indices, height-for-age, weight-for-age and weight-for-height were used. Height-for-age is the measure of linear growth. A child who was below minus two standard deviations (SD) from

the reference mean for height-for-age was considered short for his/her age or stunted, a condition reflecting the cumulative effect of chronic malnutrition (Katundu and Geresomo, 2011). The percentage of children who were stunted (below -2 SD) in the study was 47.5 % and the Malawi demographic health Survey of 2010 had 48% which is slightly higher than the study outcome (NSO, 2010). The national survey results indicated a higher proportion of males (51%) than females (43 %) who were stunted (National Statistical Office and ICF Macro, 2011). The findings of this study reported higher stunting proportion of girls (47.9%) than boys (47.1%). According to the threshold defined by World Health Organisation, the reported prevalence of stunting which was $\geq 40\%$, places the area at a very high level of chronic malnutrition (WHO, 1999).

Weight-for-age is a composite index of weight-for-height and height-for-age. A child can be underweight for his or her age because she or he is stunted, wasted, or both. Weight-for-age is an overall indicator of a population's nutritional health (Katundu and Geresomo, 2011). The study found underweight prevalence of 12.6 %, slightly lower than the 13.3% indicated in Malawi Demographic Health Survey of 2010 (NSO, 2010).

Weight-for-height describes current nutritional status. A child who is below minus two standard deviations from the reference mean for weight-for-height is considered too thin for his/her height or wasted, a condition reflecting acute or recent nutritional deficit (Katundu and Geresomo, 2011). The programme uses weight-for height percentage of median (WHM) and/or the presence of bilateral pitting oedema as admission criteria. The study had 7.1 % of the children wasted, of which 2.1 % of the children were severely wasted which is higher than the 6.1% reported by the 2010 MDHS of the same district. The prevalence of moderate wasting for children of the age group 6-17 months was 6.6%. Since this age is in a weaning

period it could explain why there was high deterioration in nutritional status for the age group. The higher prevalence of wasting in this age groups (6-17 months) may be attributed to inappropriate introduction of complementary food and the inadequate feeding as evidenced by feeding frequency of 2-3 times in a day instead of the recommended five or more times in a day (WHO, 2003). In general, high wasting prevalence in Malawi is contributed by lack of food diversity regardless that Malawi is enjoying the status of producing surplus food especially in the context of staple foods. This can be evidenced by the food groups consumed in figure 4.3 where over 90% consumed staples in the previous 24 hours preceding the study.

5.4 Level of Coverage, Recovery and Death rates in the Programme

Coverage is an important indicator of programme impact. To maximise impact, a programme must have both high coverage and high cure rates. High coverage but low cure rate programmes meet a higher proportion of need in a population than those with low coverage and high cure rates (Collins et al, 2006). The level of coverage in the study was 50% which was just in the borderline. The study find out that the programme in the study area is not using community identification of malnourished children as a mode of admission which could result into a substantial proportion of malnourished children in the community that remain unidentified as long as they do not go to the health facility. The international standard recommend the coverage of >50% for rural populations (The Sphere Project, 2011). The outcome on coverage was much lower to what Collins et al (2006) observed in rural populations in 2005 of 72.0% - 82.2% and even lower than the 65.7-86.2% obtained in 2004 (Collins et al, 2006). The higher rates of coverage in 2005 and 2006 could be possible due to an influx of emergency funds as reported in the case study of Kenya (UNICEF, 2012). The programme was meeting only 45% of need which is slightly lower and could be the result of

poor community outreach. The programme in Lilongwe is managed without NGO support and lacked adequate capacity in supervision and logistics which could contribute to low coverage.

The study reported the recovery rate of 95%, which is exceedingly higher than what Collins et al (2006) observed in rural population which was 78.1%. The international recommendation of recovery rate is >75% (The Sphere Project, 2011). The study death rate and default rate were both within the normal range as stipulated in the international standard sphere of <10 and <15% respectively (The Sphere Project, 2011). The normal ranges of death and default rates could contribute to the higher recovery rate reported in the study. The SAM treatment met international standards for cured, default, and death rates (Government of Malawi, 2005). The findings agree with the study hypothesis that the programme is meeting the international standard targets in recovery, death and default rates.

5.5 Implementation of the Programme in Comparison with CMAM Guidelines

Patients in the OTP receive routine medicines for severe malnutrition and 200 Kcal/kg/day of RUTF to eat at home. They attend the OTP every week to have a medical check-up, receive additional medical treatments if required, and are given a supply of RUTF sufficient until their next appointment. The results indicated 57% of the children who were enrolled in the programme to be receiving less than the recommended amount of RUTF as stipulated in the CMAM guideline (GoM, 2005). On the length of stay, 92 % were within the range while 7.2% exceeded the recommended length of stay in the programme. The irregularity in distribution of RUTF and poor supervision could contribute to the longer length of stay in the programme. As reported in Republic of Ghana, 2011. The main determinant of good adherence to CMAM protocol is intensity of supervision.

5.6 The association between Nutrition Status and some Socio-economic and Demographic Characteristics

The study found no association in the nutrition status by the children age groups, household income, child feeding frequency and child breast feeding status. The education level of the mothers in the study showed a significant different in stunting and underweight with the p-value of 0.005 and 0.012 respectively. This indicates that as the education level of the mother increases the nutrition status of the child improves as well. This agrees with the study of Katundu et al (2011), that attainment of higher levels of education in women provide higher levels of welfare for the households.

Dietary diversity score was found to be significant in stunting. All the children in the study consume foods made from cereals, roots and tubers within 24 hours. Consumption of animal rich proteins is lowest in all the children. The implication of this kind of diets is inadequate intake of essential nutrients. The result of continued deprivation of these essential nutrients result in high levels of stunting as the case observed in this study.

Spearman correlation results were showing the monthly household income correlating with stunting at coefficient levels of 0.130*. This means that there is a positive relationship between the monthly household income and the nutrition status of the child at >0.05 significant level. A positive relationship means that as household monthly income increases, the nutrition status of the child improves as well (Mugenda and Mugenda, 2003). Breast feeding status for children 6->24 months old was found to be significant (>0.05). The variables that were significantly associated with wasting in the regression analysis were breast feeding and mothers education level at 0.001 and 0.044 respectively. The Exp (B) or

likelihood ratio was 13.43. This means children from mothers with low level of education and those who are not breastfed were 13.4 times likely to be wasted.

5.7 Strengths and Weaknesses of the Programme

The strengths and weaknesses of the programme were derived from the key informant interviews and FGDs conducted during the study. In summary the report from the three health facilities on the strength of the programme agreed with Collins et al (2006) and other studies that community based management of acute malnutrition are associated with high coverage and high recovery rates. The study outcome also indicated a strong positive effect of the programme on the nutritional status of malnourished children through the coverage which was within the range and the recovery rate which exceeded the recommended rate in the international standard sphere. 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. This agrees with Katundu et al, (2011) study that Community-based Therapeutic Care (CTC) programmes improves the nutritional status of malnourished children.

The inconsistent supply of stationery, anthropometric equipment and RUTF, and lack of supervision were the serious issues raised that contributed to the negative performance of the programme. This is a common issue in government health facilities (Nduku, 2006). In general in all the three health facilities under study the anthropometry equipment they had were either not enough or in poor condition.

CHAPTER SIX: CONCLUSION AND RECOMMENDATION

6.1 Conclusion

CMAM intervention programme is aimed at treating acute malnutrition by providing therapeutic ready to use food at the health care centres. The general objective of the study was to assess the performance of CMAM programme if it is meeting the minimum international standard set for a rural home intervention programme in combating malnutrition among children of 6-59 months old.

Based on the findings of the study, it is evident that malnutrition, both acute and chronic remains a problem in children aged 6-59 months. The high prevalence of stunting places the area at a very high level of chronic malnutrition based on WHO cut offs (WHO, 1995).

Majority of the demographic and socio-economic characteristics of the households are not predictors of nutrition status of the under five children. Educational level of mothers and individual dietary diversity score of the children are all associated with the nutritional status of children 6-59 months old.

The programme is found to be meeting the international targets in recovery, death and default rates. Weak outreach component partially explain the observed borderline coverage.

Although there were concerns from health workers regarding stock out of supplies, poor condition of the anthropometry equipment and inadequate technical support especially from

the top level, the programme is still achieving the target in recovery and death rates. There is generally positive perception of the programme from mothers of the children and the community.

6.2 Recommendations

There is need to promote education among women in the study area as a means of increasing income through employment and also as a means of acquiring knowledge on how to use the resources at their disposal. Households need to be helped to locally process food and produce safe and nutritious therapeutic food for managing cases of malnutrition at household levels. This can save mothers from walking long distances to health facility centres and as a remedy when RUTF supplies are out of stock.

Family and community interventions in improving sanitation and child care including agricultural projects should be intergrated in the curative focus of the programme in order to improve nutrition and health status of the households. This might help in addressing both the underlying and immediate causes of malnutrition.

The programme should improve in health systems support which include higher level of supervision in order to deliver simple out-patient therapeutic protocol with consistency. Supervisions are essential to improving the performance of health workers.

REFERENCE LIST

Ashworth A., (2007). Efficacy and effectiveness of community-based treatment of severe malnutrition. In.WHO, UNICEF, and SCN Informal Consultation on Community-Based Management of Severe Malnutrition in Children. SCN Nutrition Policy Paper No. 21. (Eds) C. Prudhon, A Briend, Z. W .Prinzo, B.M.. Daelmans, J.B. Mason. Food and Nutrition Bulletin. The united Nations University; 27 (3): 24-26.

Black MM, (2003). Micronutrient Deficiencies and cognitive functioning. J Nutr; 133:3927-1331.

Central Bureau of Statistics (CBS), (2009). Ministry of Health (Kenya) and ORC Macro. Kenya Demographic and Health Survey, 2008. Maryland: CBS, MOH and ORC Macro.

Chaiken M.S., Deconinck H., and Degeffie T., (2006). The promise of a communiy-based approach to managing severe malnutrition. A case study from Ethiopia. Food and Nutrition Bulletin.The United Nations University. Volume; 27 (2): 99- 100.

Collins S., Sadler K., Dent. N, Gurrero. S., Myatt. M., Saboya M., and Walsh A., (2006). Key issues in the success of community- based management of severe malnutrition. In WHO, UNICEF and. SCN Informal Consultation on Community-Based Management of Severe Malnutrition in Children. SCN Nutrition Policy Paper No 21. (Eds) C. Prudhon, A Briend, Z. W .Prinzo, B.M. Daelmans, J.B. Mason. Food and Nutrition Bulletin. The united Nations University; 27 (3): 49-53.

Concern Worldwide Concern's Mission, (2008): Community-Based Management of acute malnutrition. CMAM Concern worldwide.htm, accessed on 28-03-2012 02:04.

Designing and Conducting Health Systems Research Projects. Volume 1, Module 13, plan for data processing and analysis, Document(s) 19 of 27. From http://web.idrc.ca/en/ev-56622-201-DO_TOPIC.html. (accessed on 04/05/2012).

Fisher A., Laing J. E., and Townsend J. W., (1991). Handbook for family Planning Operations Research Design. Second Edition. The Population Council. New York. USA: 18-22, 41 and 63.

Food and Nutrition Technical Assistance (FANTA), (2007). Review of Community-based Management of Acute Malnutrition in the Post-emergency Context. FANTA Project, Synthesis of Lessons on Integration of CMAM into National Health System Ethiopia, Malawi and Niger. Hedwig, D., Swindale, A. And Colorado, N. C. April-June 2007. Academy for Education Development. Washington DC; 4,5,13-19.

Gatchell V., and Dent N., (2008). Summary of Outcomes from Localised Effort in Malawi, International Workshop on the Integration of Community-Based Management of Acute Malnutrition. Workshop Report; 28th - 30th of April 2008, Washington; DC: 9.

Gibson R. S., (2005). Principles of Nutritional Assessment. Oxford University Press; Inc: 198 Madison Avenue. New York; 254-257.

Government of Malawi (GoM), (2007). Field Crops Production Estimation Methodology Manual. Ministry of Agriculture and Food Security. Lilongwe. Malawi, 8-9.

Government of Malawi (GoM), (2009). Nutrition Policy and Strategic Plan. Office of the President and Cabinet. Department of Nutrition, HIV and AIDS. Lilongwe, Malawi; 6-7 and 18-21.

Government of Malawi (GoM), (2012). Ministry of Health: Interim Guidelines for the management of Acute Malnutrition. Through Community-Based Care. UNICEF, Lilongwe, Malawi; 14-19.

Guevarra E., Norris A., Guerrero S., and Myatt M., (2012). Assessment of Community-based Management of Acute Malnutrition .CMAM Forum Technical Brief 1: October 2012; 2-3.

Hedwig D., (2008). Integration of CMAM into National Health Systems. International Workshop on the Integration of Community-Based Management of Acute Malnutrition. Workshop Report; 28th - 30th of April 2008, Washington DC; 7-8.

Katundu M., and Geresomo N., (2011). Gap Analysis for the National Health Research Agenda of Malawi: Research Priorities for the Theme of Nutrition. Chancellor College, Zomba, Malawi; 15-25.

Mathisen R., (2008). Integrating CMAM into Policies and Health Care System in Malawi International Workshop on the Integration of Community-Based Management of Acute Malnutrition Workshop Report; 28th - 30th of April 2008, Washington DC: 11

Ministry of Medical Services (MOMS), (2009). National guidelines for integrated management of acute malnutrition: 1-9

Mugenda M. O., and Mugenda G. A., (2003). Research Methods: Quantitative and Qualitative Approaches. Acts Press, Nairobi, Kenya; 133-137.

National Statistic Office (NSO), (2008). Lilongwe Social Economic Profile. Zomba, Malawi.: 3, 8, 11-14 and 18.

National Statistic Office (NSO), (2010). Malawi demographic Health Survey, 2009. Zomba, Malawi. ORC Macro. Calverton, Maryland, USA; 18-21.

National Statistical Office and ICF Macro. (2011). Malawi: Demographic and Health Survey 2010. Zomba, Malawi and Calverton, Maryland, USA.

National Statistic Office (NSO), (2004). Malawi demographic Health Survey, 2005. Zomba, Malawi. ORC Macro. Calverton, Maryland, USA; 178-181.

Nduku M.E., (2006): “Evaluation of Hospital- Based Child Growth Monitoring Programme and Assessment of Child’s Nutritional Status in Machakos District” MSc Thesis, University of Nairobi; 47.

Republic of Ghana, (2011): Ministry of Health: Report on the review of the Integration of Community Based Management of Acute Malnutrition into the Ghana Health System. August / September 2010, Food and Nutrition Technical Assistance II Project (FANTA 2), FHI 360 1825 Connecticut Avenue, NW Washington, DC 20009-5721: 17-19.

Sadler K., (2008). Community-based Therapeutic Care. Treating severe acute malnutrition in sub-Saharan Africa. Thesis, Ph D University College London: 22-24.

The Sphere Project, (2011). Humanitarian Charter and Minimum Standards in Humanitarian Response: Belmont Press Ltd, Northampton, United Kingdom; 104.

UNICEF, (1990). Strategy for improved nutrition of children and women in developing countries: A UNICEF policy review (1990-91) UNICEF, New York.

UNICEF, (2010). Rapid Assessment Sampling in Emergency Situations. UNICEF Asia-Pacific Shared Services Centre. Keen Media (Thailand) Co., Ltd., Bangkok 10200 Thailand.

UNICEF, (2012). Evaluation of Integrated Management of Acute Malnutrition (IMAM). Kenya country case study, United Nations Children's Fund, New York 2012, Three United Nations Plaza, New York 10017; 52.

WHO, (1999). Management of severe malnutrition: a manual for physicians and other senior health workers. Geneva.

WHO, (2003). Global strategy for infant and young child feeding. WHO. Switzerland, Geneva. (accessed 16,03.2013).

WHO, (2006). Child Growth Standards and the Identification of Severe Acute Malnutrition in infants and children. A joint statement by the WHO and UNICEF: 3-4. Available at http://www.who.int/childgrowth/standards/ac_for_age/en/index.html.

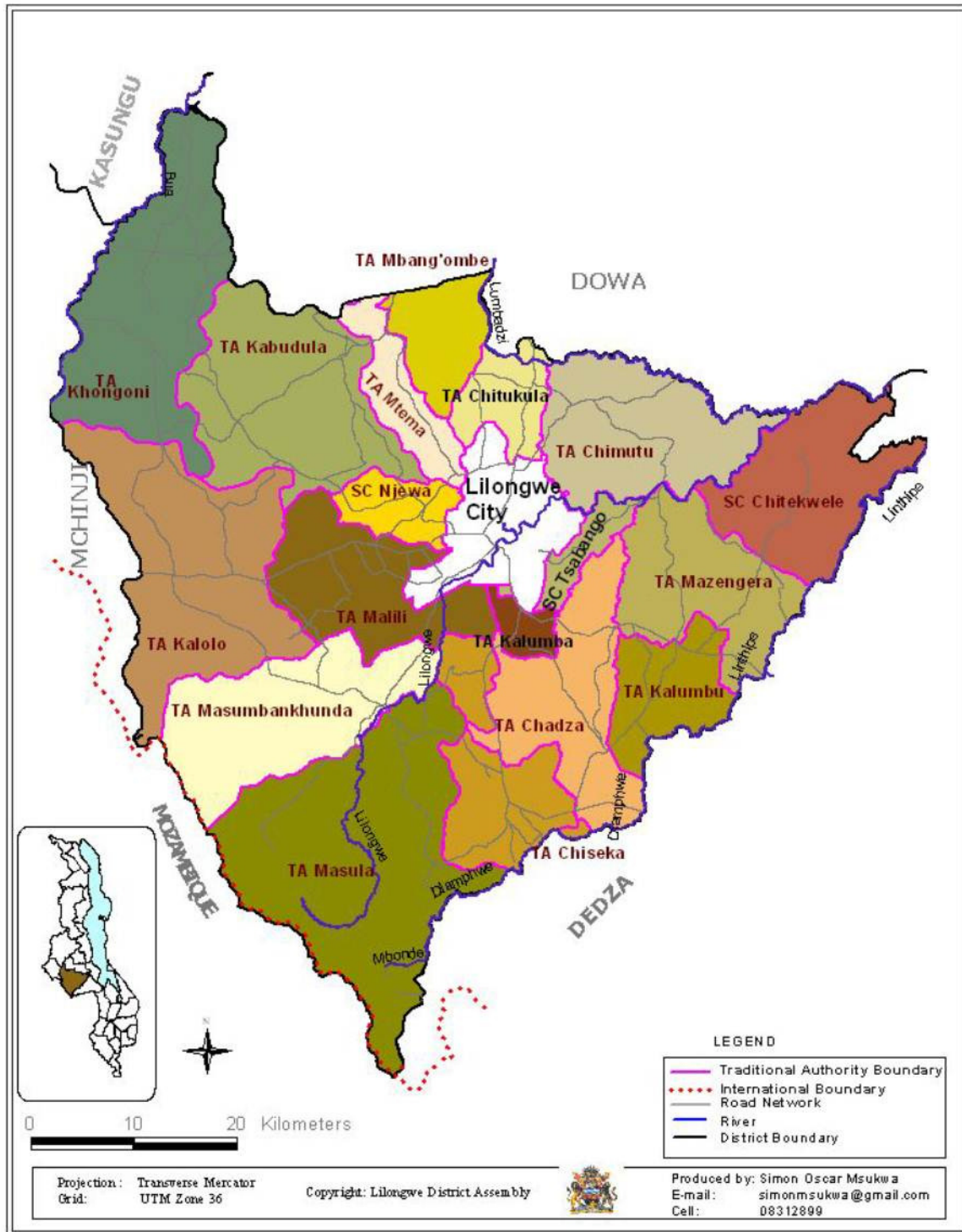
WHO, (2009). Nutrition: challenges; World Health Organization press, Geneva
<http://www.who.int/nutrition/challenges/en/index.html>.

WHO/UNICEF, (2007). Planning Guide for national implementation of the Global Strategy for Infant and Young Child Feeding. Geneva, World Health Organization,
http://www.who.int/child_adolescent_health/documents/9789241595193/en/index.html.

Wikipedia,(2012).Standard medical dictionary,1986. <http://medanth.wikispaces.com/Malnutrition>.
Accessed on 06-04-2012.

Appendix 1: Map of Lilongwe

**TRADITIONAL AUTHORITIES
LILONGWE DISTRICT**



Source: NSO, 2008

Appendix 2: Training Programme

DAY ONE: 13-08-2012				
Time	Activity	Teaching methods	Teaching Aids	Facilitator
9: 00 to 12:00	-Introduction -Background and objective of study -Understanding sections of questionnaire	Lecture Discussion	Flip charts Copies of questionnaire	Principal Investigator
1:30 To 4:30	-Questionnaire translation and coding -Interviewing techniques -Understanding of FGD and Key informant	Demonstration Lecture	Copies of question guides and questionnaire	Principal investigator
DAY TWO: 14-08-2012				
9:00 To 12:00	-Selection of households -Anthropometric measurements -Enumerators administering the instrument to each other	Lecturing Demonstration Practical exercise	Flipcharts Anthropometric tool: Salter scale, Length board and MUAC	Principal Investigator
1:30 To 4:30	-Methods of interaction -Team spirit -Field study ethics -Establishing rapport with respondent - community entry process	Discussion Lecture	Flip charts	Principal Investigator
DAY THREE: 15- 08-2012				
8:00 am To 5:00 pm	Pre-testing tools	Field exercise	Data collection tools and materials Anthropometric instruments	Researcher and Enumerators
DAY FOUR: 16-08-2012				
8: 00 am To 5:00 pm	-Debriefing -Revising the instrument	Discussion	Pre-tested tools	Principal Investigator

Appendix 3: Mothers / Guardians Questionnaire

Questionnaire No:.....

PERFORMANCE OF THE COMMUNITY BASED MANAGEMENT OF ACUTE MALNUTRITION PROGRAMME FOR THE CHILDREN
6-59 MONTHS OLD IN MALAWI. A CASE OF LILONGWE RURAL

Identification

TA Name..... Village Head man.....Name of Interviewer..... Date of interview.../.../2012 Respondent's
name..... Sex Male Female

Household Profile: Monogamous Polygamous Other ()

SECTION A: DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

Q1. Household Characteristics

S/No	Name	Relationship to HH head codes-	Sex M=1F=2	Age (years)	Marital status - codes-	Religion -codes-	Level of Education	HH head Main Occupation codes-
1								
2								

RHHH	Marital Status	Religion	Education	Occupation
1=HHH 2=spouse	1=married		1=in primary	1=salaried employee
3=son 4=daughter	2=separated	1=Christian	2=Primary drop-out	2=farmer
5=grandson	3=widowed	2=Muslim	3=Primary complete	3=self-employment
6=grand daughter	4=single	3=Traditions	4=Secondary drop-out	4=casual labourer
7=relative	5=divorced	4=others (specify	5=In Secondary school	5=student
8=parent	6=<15 yrs		6=Completed secondary	6=housewife
9= Employee			7=college/university	7 = unemployed
			8=Adult education	8 =others (specify)
			9=Other (Specify)	

1. What is the household income per month?

MK.....

2. What type of materials are the walls of the main house made of?

1. Mud 2. Wood 3. Iron sheets 4. Stone 5. Other (specify)_____

3. How many rooms are in the house? _____

4. What type of materials is the roof of the main house made of?

1. Grass thatch 2. Iron sheets 3. Others (specify)_____

5. What type of material is the floor of the main house made of?

1. Mud 2. Wood 3. Concrete 4. Other (specify)_____

6. Do you own livestock? 1. Yes 2. No

7. If Yes, list them _____, _____, _____, _____, _____,

SECTION B: NUTRITIONAL STATUS OF CHILDREN 6-59 MONTHS

(a) Q8-Q16 Anthropometry for children aged 6- 59 in the household

S/NO	Q8 Child Birth order	Q9 Child's Name	Q10 Sex 1 = M 2 = F	Q11 Date of birth (Verify from Clinic card)	Q12 Age (mths)	Q13 Weight (to nearest 0.1 kg)			Q14 Height (to the nearest 0.1 cm)			Q15 Bilateral oedema 1 = Yes; 2 = No	Q16 MUAC (cm)				
						1	2	ave	1	2	ave		1	2	ave		

(b) Q 17-Q 21 Water and Sanitation

Q17. What is your main source of drinking water?

- 1 =Tap 2= Well (not protected) 3= Well (protected) 4 = spring
5 =Borehole (protected) 6=Borehole (not protected)
8=other (specify)...

Q18. Do you treat your drinking water? _____

- 1=Yes 2=No If no go to Q20

Q19. If yes, how do you treat your water? _____

- 1=boiling, 2=use traditional herbs, 3=use chemicals (water guard),
4=filters/sieves 5=other (specify).....

Q20 Presently, how much water do you use for domestic purposes in litres per day? _____

Q21. How far is the water source to and fro including waiting time? _____minutes

Q21. What kind of toilet facility does your household has

- 1=Flush toilet 2=traditional pit latrine
3 =Ventilated improved latrine 4= Open pit
5= No facility/bush/ field

(c) Q22-Q26 Child Feeding (6-24 Months)

Q22. Date of birth of the child

Day.....MonthYear.....

Q23 Is the child still breastfed?

- 1= Yes 2= No.....

Q24If yes, how often do you breastfed?

- 1= On demand 2= Own mothers choice 3=Other (specify)

Q25. At what age did you start giving your child other food other than breast milk?

- 1= Less than a month 2= One month 3= two months
4= Three months 5= Four months 6= Five months
7= Six Month 8= don't know

Q26. How often do you feed your child with other feed other than breast milk?

- 1= Once 2= Twice 3= Three times 4=others specify

Q27. Name the food/drink given to the child in the last 24 hours

- 1= Breast milk 6= Fish
2= Water 7= Vegetables
3= Milks (cow/goat/pkt of milk) 8= Fruit
4= Nsima 9= Porridge
5= Meat 10= Other solid/ semi- solid

Q 28 –Q 34 Only those on CMAM programme (6- 59months)

Q 28 Do you share the RUTF with other household members?

- 1= Yes 2= No

Q29. If yes, why?

.....

Q30. Do you mix RUTF with porridge or other food?

- 1= Yes 2= No

Q31. How many Packets of RUTF do you give the client in a day?

- 1= One 2= Two 3= Three 4= other (specify)

Q32. When do you feed your child with RUTF?

- 1= Before breastfeeding 2=After breastfeeding
3= Before other food 4= After other food

Q33. Do you give your child water to drink while eating RUTF?

1= Yes 2= No

Q34. If yes how much?

Q35. Do you wash your hands/child's hands when feeding the child?

1=Yes 2= No

SECTION C: PROGRAMME ACCESSIBILITY AND UTILIZATION

Q36	Date of admission (confirm with card or other records)/...../2012
Q37	Severity of malnutrition on admission	1=Severe..... 2=Moderate.....
Q38	Type of food supplement received	1= RUTF 2=Cereals
Q39	How much ration do you receive How often Are you satisfied with the amount received If yes or no, why	In grams..... 1=Daily 2=Weekly 3=Every two weeks 1=Yes 2=No
Q40	How far is the nearest health facility where You get your servicesminutes
Q41	Which means of transport do you use to get there	1=Walking 2= Bicycle ride 3= Cart 4=Taxi (Matola) 5=Others (specify)
Q42	Current weight of the client Weight of the client the past two measurements	Kg...../...../2012 Kg...../...../2012 Kg.....
Q43	Number of days the client has been in the programme	
Q44	Have you ever been referred to other programmes	1=Yes 2= no
Q45	If yes, which programme	1=Outpatient Therapeutic Programme 2=Supplementary Feeding Programme 3=Nutrition Rehabilitation Unit
Q46	Do you experience any problem with the service providers If yes what problem	1=Yes 2=No
Q47	How can the programme be improved	

Appendix 4: Health Workers Question Guide

Date _____

Form Number _____

Name of Health Facility _____

Type of Health facility _____

Name of interviewer : _____

1. Demographic Data

SEX	AGE	RELIGION	MARITAL STATUS	QUALIFICATION

SEX	RELIGION	MARITAL STATUS	QUALIFICATION
1=male 2=female	1=Christian 2=Muslim 3=Tradition	1=married 2=separated 3=widowed 4=single 5=divorced	

2. Which year did CMAM programme start in this community? _____

3. What are the objectives of the CMAM programme? _____

4. How long have you worked with the programme? _____

5. Have you received any training from the MOH?

If yes.

When was the training done? _____

6. How do you identify those eligible for the programme? _____

7. Are you aware of the guidelines?

1= yes 2= no

8. How often are guidelines used?

1= All the time

2=Not at all

3= When supervised

9. How do you carry out the following:

(a) Follow up activities _____

(b) Discharge _____

10. From records/ registers, for the past twelve months how many malnourished children have been:

(a) Admitted into the programme

(b) Discharged

(c) Relapsed

(d) Lost to follow-up

11. What food supplement do you give?

1= cereals

2= RUTF

3= Others specify

12. How much do the client gets?

13. How do you determine the amount a client gets? _____

14. How often do the clients gets the supplements?

1= daily 3= twice monthly

2= weekly 4= monthly

15. How many of the following do you have at the health center

Facility/Equipment	Available	Sufficient	Condition
RUTF			
Scales			
Height/Length board			
MUAC tapes			
Child health card			
Ration cards			
CMAM guidelines			
Registers			

Codes

Available	Sufficient	Condition
1= available	1= sufficient	1= good
2= not available	2= not sufficient	2= bad

16. How often do you receive supplies

1= once a year 4=once a month

2=twice a year 5= on demand

3=quarterly 6= when available

17. Do you have any constraints in delivering your services?

1= yes 2= no

If yes what are the constraints?

1= lack of funds 3= lack of service supplies
2= shortage of staff 4= lack of transport

18. How often are you supervised?

1= monthly 4= once a year
2= quarterly 5= never supervised
3= twice a year

19. What level of supervision do you receive?

1= center level
2= district level
3= national level

20. Do you receive feedback after the supervision?

1= yes 2= no

21. Is the programme meeting its objectives?

1= yes 2= not 3= don't know

22. How would you want the programme to be run to meet its objectives?

Appendix 5: Focus Group Discussion Question Guide

Date

Name of the Village

Name of the Moderator

1. When did CMAM programme start?
2. What are the objectives of the programme?
3. How important is the programme?
4. Does the programme meet its intended objectives?
5. What food supplement do the beneficiaries receive? Does it benefit the clients? If not why?
6. Do health workers hold counselling sessions? How often? If no Why? If yes, how is it benefiting the clients?
7. How do you find the CMAM services?
8. How would you want the programme to be run?

Appendix 6: Key Informant Interview Guide for Community Leaders

Date

Name of respondent

Sex **Age**.....

Title

1. Which year did CMAM programme start in this community?
2. What food supplement do the client get?
3. How much do the client gets?
4. How often do the clients gets the supplements?
5. Does the food suplement benefits the client?
6. Is there stigma associated with the supplement?
7. How do you find the CMAM services?
8. Are the health workers friendly?
9. How would you want the programme to be run?
10. Are there problems with the programme?

Appendix 7: Consent Form

Request for consent to participate in CMAM evaluation study

My name is_____. I am a student at the university of Nairobi doing nutrition.

In order to get information about the performance of CMAM programme for children under five years of age, we are conducting a survey in the area and your household has been selected by chance from all household in the area.

The aim of the study is to assess the programme and determine how the programme can improve the nutritional status of children under five years of age.

The information you provide will be useful in assessing the performance of CMAM in this district. All information you give will be confidential. The information will be used to prepare general report but will not include any specific name. there will be no way this information will be linked with your identify. We encourage you to participate in this study and your cooperation will be highly appreciated.

Do you agree to be a respondent in this study? _____ 1= yes 2=No

Date:

Name of the respondent Signature

Signature of the interviewer Signature

Appendix 8: Spearman Correlation between different variables

Spearman's rho		Household income category in MK per month	Wasting	Underweight	Stunting
Stunting	Correlation coefficient	1.000	.098	.382	.130*
	Sig. (1-tailed)	.	.084	.000	.035
	N	198	198.	198	197
Wasting	Correlation Coefficient	1.000	.062	.487	.095
	Sig. (1-tailed)	.	.192	.000	.092
	N	198	197	198.	197
Underweight	Correlation Coefficient	1.000	.382	.487	.062
	Sig. (1-tailed)	.	.000	.000	.192
	N	198	198.	198	197

*. Correlation is significant at the 0.05 level (1-tailed).

Spearman's rho		Stunting	Underweight	Wasting	Is the child still breastfed
Stunting	Correlation Coefficient	-.146	.382	.098	1.000
	Sig. (1-tailed)	.022	.000	.084	.
	N	193	198	198	198
Underweight	Correlation Coefficient	-.087	.382	.487	1.000
	Sig. (1-tailed)	.115	.000	.000	.
	N	193	198	198	198
Wasting	Correlation Coefficient	.098	-.052	.487	1.000
	Sig. (1-tailed)	.084	.236	.000	.
	N	198	193	198	198

Spearman's rho		Household income category in MK per month	Wasting	Underweight	Stunting
Stunting	Correlation coefficient	1.000	.098	.382	.130*
	Sig. (1-tailed)	.	.084	.000	.035
	N	198	198.	198	197
Wasting	Correlation Coefficient	1.000	.062	.487	.095
	Sig. (1-tailed)	.	.192	.000	.092
	N	198	197	198.	197
Underweight	Correlation Coefficient	1.000	.382	.487	.062
	Sig. (1-tailed)	.	.000	.000	.192
	N	198	198.	198	197

Appendix 9: CMAM Guidelines

Table 4A: Summary of international standards (SPHERE 2004)

Indicator	Standard
Recovered	>75%
Default	<15%
Died	< 10%
Non responders	No standard
Length of stay	40-60 days
Rate of weight gain	5g/kg/day
Coverage 'Urban'	>70%
Coverage 'Rural'	>50%

Table 4B: NCHS Growth reference 1977

Classification	Cut off points
Normal	>80% Median >-2z-score
Moderate malnutrition	≥70- 80% >-2z-score and >-3z-score No oedema
Severe malnutrition	<70%+/or oedema >3-3z-score+/or oedema

4C: Calculation of Performance indicators

$$\text{Cure rate} = \frac{\text{Number of children cured (K)}}{\text{Total Exit (K+L+M+N)}} \times 100$$

$$\text{Death rate} = \frac{\text{Number of children died (L)}}{\text{Total Exit (L+K+M+N)}} \times 100$$

$$\text{Default rate} = \frac{\text{Number of children defaulted}}{\text{Total Exit}} \times 100$$

$$\text{Coverage} = \frac{\text{Children with SAM receiving therapeutic care}}{\text{Total number of SAM children}} \times 100$$

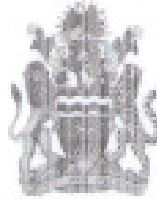
Table 4D: RUTF ration

92g sachets containing 545 kcal/100g (Average 175 – 200kcal/kg/day)	Weight of Child (kg)	Sachets per Week	Sachets per Day
	3.5 – 3.9	10	1.5
	4.0 – 4.4	11	1.5
	4.5 – 4.9	12	1.75
	5.0 – 5.9	14	2
	6.0 – 6.9	17	2.5
	7.0 – 7.9	20	3
	8.0 – 8.9	23	3.25
	9.0 – 9.9	26	3.75
	10.0 – 11.9	28	4
	12.0 – 14.9	35	5
	15.0 – 19.9	45	6.5
20.0 – 24.9	60	8.5	

Appendix 10: Letter of Study Approval from MOH

Telephone: + 265 789 400
Facsimile: + 265 789 431

All Communications should be addressed
to:
The Secretary for Health



In reply please quote No.
.....

MINISTRY OF HEALTH
P.O. BOX 30377
LILONGWE 3
MALAWI

REF. No CD/55

8th June, 2014

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LETTER OF STUDY APPROVAL

The bearer of this letter is Alice Tembo. She has been authorized to conduct a study Titled "Performance of a Community Based Management of Acute Malnutrition Program (CMAM) for children 6 - 59 months old in Lilongwe rural Malawi". This is in fulfilment of the requirement for the qualification of her Masters degree.

Janet Gufa (Mrs.)
DEPUTY DIRECTOR FOR CLINICAL SERVICES (NUTRITION)