

**PREDICTORS OF DEFAULT RATE IN THE OUTPATIENT THERAPEUTIC
MANAGEMENT OF ACUTE MALNUTRITION AMONG CHILDREN 6-59 MONTHS
IN LAMWO AND OMORO DISTRICTS-NORTHERN UGANDA**

BY

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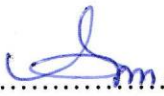
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**A DISSERTATION SUBMITTED TO THE DIRECTORATE OF RESEARCH AND
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DECLARATION

I, PASKA AMONY (21/U/3288/MFN/PS) do declare that the work presented in this dissertation is my own and has not been submitted for the award of any academic credentials in any other University or institution of learning.

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DEDICATION

I dedicate this work to my late parents Dr. Anthony Oringa Emmanuel, Mrs. Esther Oringa. I also dedicate this work to my lovely little children, Alexander and Alexia.

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LIST OF ABBREVIATIONS

CDO	Community Development Office
DHO	District Health Office
DNFP	District Nutrition Focal Person
IMAM	Integrated Management of Acute malnutrition
ITC/ITP	Inpatient therapeutic care/Inpatient therapeutic feeding program
IYCF	Infant and Young Child Feeding
MAM	Moderate Acute Malnutrition
MoH	Ministry of Health
MUAC	Mid-upper Arm Circumference
OTC	Outpatient Therapeutic Care
OTP	Outpatient Therapeutic feeding program
PHC	Primary Health Care
RUTF	Ready to use Therapeutic Feeds
SAM	Severe Acute Malnutrition
SDG	Sustainable Development Goals
UBOS	Uganda Bureau of Statistics
UDHS	Uganda Demographic Health Survey
UNICEF	United Nations Children’s Fund
WHO	World Health Organization

OPERATIONAL DEFINITIONS

Defaulting:	Missing two consecutive clinic appointments in a period of 1 month.
Adherence:	The extent to which the patient continues the agreed-upon mode of treatment under limited supervision when faced with conflicting demands as distinguished from compliance or maintenance.
Malnutrition:	Various forms of poor nutrition are caused by a multifaceted array of factors that may include dietary inadequacy, infections, and socio-cultural factors. It takes the forms of underweight or stunting and overweight.
Over-nutrition:	A situation where an individual consumes more nutrients than the body requires
Overweight:	A condition where an individual has more weight that does not match their height.
SAM:	Defined by the presence of bilateral pitting oedema or severe wasting. It is also defined as a very low weight for height, below -3 Z scores of the median WHO growth standards in children 6 to 59 months of age, or based on mid-upper arm circumference (MUAC) as less than 11.5 cm.

ABSTRACT

Severe acute malnutrition (SAM) continues to be a significant threat to the wellbeing of children, contributing to at least 10% of the reported mortality of children under the age of five in northern Uganda. This could be exacerbated by limited information about Outpatient Therapeutic Care (OTC) default rates, poor perception of OTC programs, and other factors that perpetuate default rates. A cross-sectional quantitative study was conducted among 244 Caregivers and hence children under five years in Omoro and Lamwo districts of Northern Uganda to examine factors leading to default rate in OTC management of acute malnutrition. Data was collected using a validated semi-structured questionnaire and analyzed using SPSS version 25. The OTC default rate was found to be 34%, and it is consistent across districts. Caregivers had a positive perception ($MS = 3.70$) towards the effectiveness dimension of the OTC services, and a negative perception ($MS = 2.3$) towards the accessibility and convenience dimension of OTC services. OTC default rates were influenced by marital status, the perceptions of caregivers towards accessibility and convenience of OTC services, distance to the OTC facility, and child's age, presence of other health conditions (Malaria, HIV etc) and the waiting time to see the health personnel. This indicates that OTC default rates in northern Uganda are high, and is driven by unfavorable sociodemographic, institutional, physiological, and environmental factors. These factors must therefore be considered in the design of targeted interventions such as educational programs, establishment of support systems which include reminder services, follow-up calls, and recruitment of community-based health workers to ensure all children receive comprehensive care in the management of SAM.

Keywords: *Outpatient Therapeutic Care, Malnutrition, SAM, Default rates, Northern Uganda*

CHAPTER ONE: INTRODUCTION

1.1 Background

Globally, malnutrition affects millions of children and is one of the leading causes of infant illness and mortality. According to the World Health Organization (WHO), over 52 million children below 5 years of age are considered wasted with about 17 million being severely wasted. Additionally, approximately 155 million are stunted. This has subsequently contributed to 45% of deaths of children less than 5 years old (UNICEF & WHO, 2021). Child malnutrition has also contributed to the increased frequency, severity, and duration of life-threatening infectious diseases, making it the most important risk factor for illness and death affecting over 19 million children under five years old (Isanaka, 2021). These deaths are most prevalent in low- and middle-income countries (UNICEF, 2021). Undernutrition is recognized as a medical issue of public health significance in Uganda. According to national figures, four percent of children suffer from severe acute malnutrition (SAM) (UBOS & ICF, 2018). These children have a weight for height (WFH) Z-score less than three standard deviations below the median WHO growth criteria (WHO, 2006).

Children with SAM should be treated effectively with short-term intensive therapy regimens targeted at restoring the child in a matter of weeks (World Health Organization., 2013). An Outpatient Therapeutic Center (OTC) is implemented to help patients recover quickly from SAM. Through primary health care providers, it brings SAM management services closer to the community. Every week, children admitted to the OTC get a Plumpy'Nut, a ready-to-eat rehabilitative meal that contains 500kcal in 92g of each sachet. Plumpy'Nut is a SAM-treating paste food high in energy, minerals, and vitamins. To be admitted in OTC, children should satisfy the SAM requirements, have no medical complications, and should have completed the

Plumpy'Nut appetite test. They are then given a variable number of Plumpy'Nut sachets to take home based on their body weight (Ministry of Health, 2016).

Defaulting during the management of severe acute malnutrition is one of the key factors that affect the management and recovery of severe acute malnutrition at OTC and is likely to increase malnutrition rates in communities (Akparibo *et al.*, 2017). Defaulters are patients who have been missing for two consecutive visits from the OTCs program (Sphere Association., 2018). The Sphere standards principles state that treatment programs for SAM should achieve a case fatality rate of less than 10 percent, a recovery rate greater than 75 percent, and a defaulter rate of less than 15 percent. Despite the efficacy of current treatment procedures when performed in OTC treatment centers, adherence to the recommendations is varied. Many OTC treatment centers in Uganda might have default rates of more than 15%. For instance, research conducted in Uganda to determine the cure rate and related variables for children with severe acute malnutrition in the health clinics of Kabale region in south-western Uganda found a high default rate of 58.6 percent (Ssekajja *et al.*, 2021).

A related study in Uganda's West Nile area discovered a default rate of 38.3 percent (Wanzira *et al.*, 2018), which was higher than the sphere standards' requirements. The high default rate reduces the efficacy of acute malnutrition care and will very certainly increase the incidence of acute malnutrition in the affected regions. Despite this, limited studies have been published on this subject matter, which has led to limited information about the factors that could be associated with the high default rates in malnutrition treatment centers. In Northern Uganda, the OTC program was introduced in all the health centers at levels III and IV in 2010, to ensure timely detection and management of children who were found to be severely malnourished without medical complications (Ministry of Health (MOH), 2016). Nevertheless, in 2017 the country's highest global acute malnutrition (WHZ < -3 SD) prevalence of 12.3% was found in Palabek, Northern Uganda.

Interestingly, caregivers' perceptions of outpatient therapeutic centers (OTCs) in managing acute malnutrition among children are influenced by several factors, including the quality of care, the health outcomes of their children, and the overall support provided during the treatment process. Whereas a study by Teklehaimanot et al. (2021) indicates that caregivers tend to view OTC services positively when they observe significant improvements in their children's health, such as weight gain and reduced episodes of illness, insufficient investigations have been conducted and reported on the perceptions of Caregivers and other factors that cause high default rates at various treatment centers. As a result, the purpose of this study was to analyze the rate of default in the management of SAM and the associated factors that contribute to it.

1.2 Statement of the Problem

The high prevalence of acute malnutrition in several districts of northern Uganda is a contributing factor to at least 10% of the reported mortality of children under the age of five years (UBOS & ICF, 2018). This prevalence could increase if gaps in the management of acute malnutrition at outpatient therapeutic care (OTC) are not identified and corrected. Currently, High OTC default rates translate into poor program coverage as children leave the program before they recover, increasing the relapses of severe acute malnutrition in communities which may exacerbate the mortality rate among children 6-59 months. High OTC default rates have been reported in the country with up to 58.6% in Southern Uganda (Ssekajja et al., 2021) and 38% in the West Nile region (Wanzira et al., 2018) prevalence which are greater than the 15% sphere standards. A study conducted at St. Mary's Hospital Gulu reported that the cure rate for acute malnutrition was just 66.9%, below the accepted standard of at least 75 % (Nyeko *et al.*, 2016). This low cure rate could be attributed to the high default rate at the outpatient care units. However, data on treatment outcomes and related factors for severe acute malnutrition (SAM) in outpatient care settings are scarce in Uganda. Since the program's inception, no

comprehensive research has been undertaken in northern Uganda based on Outpatient Therapeutic Centers to examine factors associated with high default rates. The purpose of this study was to establish the rate of OTC default in the management of acute malnutrition and the perception and factors that contribute to it.

1.3 Objectives of the Study

1.3.1 General objective

The general objective of this study was to assess the perception and factors influencing default rate in the management of severe acute malnutrition among children 6-59 months at outpatient therapeutic centers in Lamwo and Omoro district, northern Uganda.

1.3.2 Specific Objective

Specifically, this study was conducted to:

- i. Determine the default rates in the management of severe acute malnutrition among children 6-59 months at outpatient therapeutic centers.
- ii. Assess the perception of caregivers on the effectiveness of OTC programs for managing severe acute malnutrition.
- iii. Determine factors associated with default rate in the management of severe acute malnutrition OTC.

1.4 Research Question

- i. What are the default rates in the management of severe acute malnutrition among children 6- 59 months at outpatient therapeutic centers in Lamwo and Omoro?
- ii. What is the nature of the perception of caregivers on the effectiveness of OTC for managing severe acute malnutrition in Lamwo and Omoro?

- iii. What are the factors associated with the default rate of severe acute malnutrition OTC in Lamwo and Omoro?

1.5 Justification of the Study

High defaulter rates translate into poor program coverage as children leave the program before they have recovered increasing the level of acute malnutrition in communities despite various innovations. According to Sekajja *et al.* (2021), factors related to poor accessibility, poor satisfaction with staff and system, and factors related to treatment and acceptability of OTC services are significantly associated with high default rates. However, the factors associated with the high default rate in northern Uganda remain unknown. This study was therefore intended to ascertain the factors associated with high default rates and attempt to improve the management of acute malnutrition and hence improve OTC performance in Northern Uganda and countrywide. Therefore, the data obtained from this study could be used to reform policy around OTC and improve OTC for malnourished children 6-59 months.

1.6 Conceptual Framework

Figure 1 presents the conceptual guiding this study. The framework highlights several socio-demographic characteristics, caretaker factors, child factors, and health facility determinants that contribute to missed appointments by severely malnourished children without medical complications aged 6 to 59 months who are enrolled in OTC. The caretaker characteristics such as age, sex, educational level, level of knowledge on the nutrition program, number of children, marital status, occupation, and income levels, as well as the forgetfulness, stigma, and perceptions in the form of perceived severity, perceived benefits, perceived threats, and likelihood to take action and cues to action, are likely to contribute to the missed scheduled appointments in OTC.

The child (patient) factors such as age, sex, Infant feeding practice, type of admission, and HIV status at enrolment are likely to affect the regular attendance of OTC and therefore contribute to the defaulting in care. The health facility determinants that could also contribute to missed appointments include distance to health facility, waiting time, number of health workers, attitude of health workers, availability of health workers, and presence of essential medicines such as ready-to-use therapeutic feeds (RUTF). Lastly, Perception determinants that contribute to defaulting are the importance of the Program, finding it easy for the caregivers to access the feeding station, having time for the program, and considering the condition as severe

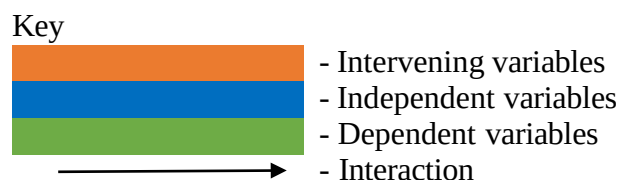
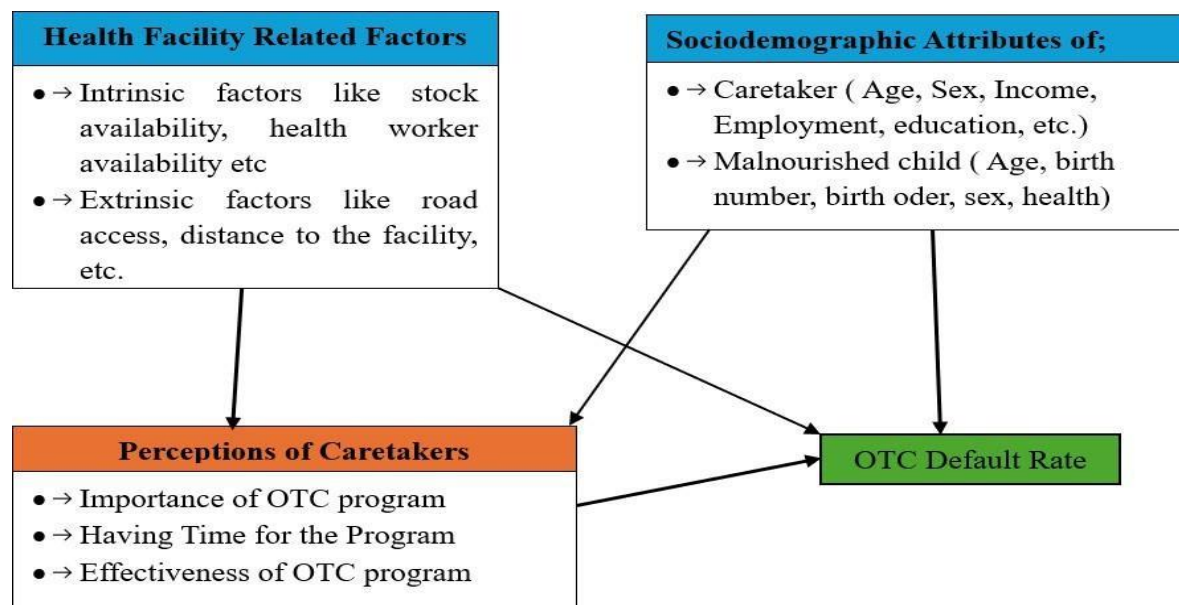


Figure 1: Conceptual Framework of the Study

1.7 Significance of Study

Uganda through the Uganda Nutrition Action Plan (UNAP) committed to ensuring that all Ugandans are properly nourished so they can live healthy and productive lives. Children with malnutrition, especially the severe form have compromised immunity and are at high risk of mortality. Despite the existence of elaborate planning frameworks in Uganda, nutrition has for many years not been adequately addressed in sector-level and local government development plans. Nutrition has often been narrowly perceived to be a health matter meaning that other sectors have not addressed it in their development plans. Yet, health practitioners have been unable to address all the multidimensional aspects of nutrition.

The consequences of malnutrition should be a significant concern for policymakers in Uganda, where 2.2 million children under 5 years (29 %) suffer from stunting (UBOS, 2016). Outpatient therapeutic care (OTC) was set up to provide home-based treatment and rehabilitation for those SAM patients with appetite and no medical complications. These OTCs are also aimed at timely detection, referral, and early treatment before the onset of medical complications. Follow-up of these patients is very critical to the proper management. However, some patients who are enrolled in the OTCs default on their agreed appointment as a result, their recovery to normal health status is compromised.

Currently, limited information exists on the barriers as to why patients miss their appointments, and no study has been conducted in Acholi sub-region to ascertain and document the reasons. This study therefore seeks to not only establish the reasons for poor adherence to the scheduled visits but also explore the motivating factors for the good behavior of adherence to the appointments. The study is thus inevitable and will provide preliminary findings that can be used to inform all other interventions and stakeholders as well as generate hypotheses for

further research. This will thus translate into improved service delivery (reduced morbidity and mortality) among the under-fives in the community.

1.8 Scope of the Study

1.8.1 Geographical Scope

The study was conducted among Caregivers of children who had been admitted for OTC services in Omoro and Lamwo districts in Northern Uganda.

1.8.2 Content Scope

This was a survey-based study that focused on assessing the prevalence of OTC default rates, perceptions of caregivers towards the effectiveness of OTC services, and importantly the factors that influenced OTC default in the management of acute malnutrition among children aged 6-59months at outpatient therapeutic centers in northern Uganda.

1.8.3 Time Scope

The study was conducted in the period between February 2023 and May 2023. This period was chosen because it helped in determining the completion rate since those who were enrolled within the period are expected to have finished the required sessions.

CHAPTER TWO: LITERATURE REVIEW

2.1 Overview of Malnutrition

Malnutrition is defined as insufficient or excessive nutrient intake, an unbalanced intake of vital nutrients, or poor nutrient use (World Health Organization (WHO), 2017). Undernutrition, overweight, and obesity, as well as diet-related non-communicable diseases, make up the double burden of malnutrition (Micha et al., 2020). Four general signs of Undernutrition include wasting, stunting, underweight, and micronutrient deficiencies (Bhutta *et al.*, 2013).

Wasting is defined as low weight-for-age. It often indicates recent and severe weight loss, although it can also persist for a long time. It usually occurs when a person has not had food of adequate quality and quantity and/or they have had frequent or prolonged illnesses (Min *et al.*, 2017). Wasting in children is associated with a higher risk of death if not treated properly. Stunting is defined as low height for age (WHO, 2014).

It is the result of chronic or recurrent undernutrition, usually associated with poverty, poor maternal health and nutrition, frequent illness, and/or inappropriate feeding and care in early life. Stunting prevents children from reaching their physical and cognitive potential. Underweight is defined as low weight-for-age (De Onis & Branca, 2016). An underweight child may be stunted, wasted, or both (Ghattas *et al.*, 2020). Micronutrient deficiencies are a lack of vitamins and minerals that are essential for body functions such as producing enzymes, hormones, and other substances needed for growth and development (Bhutta *et al.*, 2013).

2.2 Prevalence of Malnutrition in Children

Children under the age of five have the highest rates of undernutrition (UNICEF, 2021). In 2020, there were 149 million stunted children under the age of five, 45 million wasting children, and 38.9 million overweight or obese children (UNICEF, 2021). One-third of children under the age of five

suffer from vitamin A deficiency worldwide, which causes 670,000 deaths and between 250,000 and 500,000 incidents of blindness (Murarka et al., 2020). The next year, undernutrition was thought to be a contributing factor in 45% of child fatalities (UNICEF, 2019). It has been estimated that 16% of children under five in South Asia are moderately or severely wasted. With over 20% wasted children, India has one of the largest waste burdens in Asia (Ghattas et al., 2020).

According to a pooled analysis, the prevalence of chronic undernutrition among children under the age of five in East Africa is 33.3%. The prevalence of undernutrition among children under the age of five ranged from 21.9% in Kenya to 53% in Burundi (Tesema et al., 2021). In Tanzania, the prevalence of stunting among children under the age of five ranged from 41% in the lowlands to 64.5% in the highlands. Underweight and wasting rates in Tanzania were 11.5% and 2.5% in the lowlands, respectively, and 22% and 1.4% in the highlands (Mrema et al., 2021). In South Sudan, the prevalence of stunting, underweight, and wasting in children under the age of five was 23.8%, 4.8%, and 2.3%, respectively (Tesema et al., 2021). According to the most recent Demographic and Health Survey (DHS), 33 percent of Ugandan children under the age of five are stunted (have low height-for-age), while 4 percent are acutely malnourished or wasted (have low weight-for-height) (UBOS, 2018).

2.3 Outpatient Therapeutic Management of Acute Malnutrition in Children

Outpatient therapeutic feeding programs also known as outpatient therapeutic care (OTC) are designed for the management and treatment of severe acute malnutrition (SAM) among patients diagnosed without any medical complications and have an appetite (Ministry of Health Uganda (MOH), 2016) (Yebyo HG. 2013). This management of SAM brings services closer to the community by making services available at decentralized treatment points within the primary health care (PHC) points, through the use of ready-to-use therapeutic foods (RUTF), community outreach and mobilization (WHO, 2013; Yebyo, 2013). Community involvement has a very big impact on the success of these programs and the patient treatment outcomes (WHO et al., 2007).

Patients who have been clinically diagnosed with SAM and present with medical complications are managed in ITC programs (Ministry of Health Uganda (MOH), 2016). The medical complications include but are not limited to hypoglycemia, hypothermia, severe dehydration, severe diarrhea, and vomiting among others. These SAM patients also present with oedema grade 3(+++). Infants less than 6 months of age who present with any signs of malnutrition are also managed under ITC. The patients are treated with ready-to-use-therapeutic food commonly known as RUTF (MOH, 2016; GREENAWAY, 2009).

Globally, OTC provides home-based care and rehabilitation for SAM patients and MAM patients with HIV/TB who have an appetite and present with no medical complications. Children 6 to 59 months are enrolled in OTC based on the following the criteria that they; don't have any medical complications, pass appetite test for ready-to-use therapeutic food (RUTF), may or may not have bilateral pitting oedema of up to grade 2 (++) , have MUAC measurement of less than 11.5 cm and have weight for height or weight for length Z score of less than -3 SD (WHO et al., 2007; MOH, 2016).

Whereas in the past, SAM was majorly managed in the facility setting, there is a notable shift from the traditional facility-based management to a combination of facility and community- based management (Maleta, 2014). This dualapproach is what is now called Community-based Management of Acute Malnutrition (CMAM). In Uganda, the CMAM approach uses the World Health Organization (WHO) recommended management guidelines called the Integrated Management of Acute Malnutrition (IMAM). This approach has four components that complement each other to demonstrate effectiveness in achieving wide coverage, high recovery rates, low mortality, and low default rates. (MOH, 2016). The key elements include community involvement, supplementary feeding, outpatient therapeutic feeding, and inpatient therapeutic feeding programs.

Finally, although OTPs have shown remarkable effectiveness in reducing child mortality, there is a

noticeable gap in assessing quality-of-care indicators, particularly in Northern Uganda. Few studies have explored the variations in the quality of care across different outpatient therapeutic centers and how these differences may affect default rates. For example, monitoring tools, availability of resources, and staff capacity have been highlighted as areas influencing the performance of OTPs (Mbaya, 2015). Future research should focus on evaluating the quality-of-service delivery in OTPs and identifying the specific challenges in the local context of Lamwo and Omoro districts that contribute to the high default rates.

2.4 Defaulting of Patients Enrolled in Out-patient Therapeutic Care

In the sub-Saharan Africa study, the estimated proportion of non-defaulting among children with SAM attending OTC clinics is 17-26% with most of the defaulting cases presented in the last 30 days of the care when the children are showing positive signs of recovery (Källander et al. 2008). Mahgoub et al (2010) in their study on malnutrition management and the impact of socio-economic and demographic factors of households on the status of nutrition for children below 3 years in Botswana found that adherence to the scheduled appointment was significantly high at 87.3% in the whole 90 days period of treatment

Rikimaru et al. (2008) determined the risk factors for developing severe malnutrition among children under five years in the Princess Marie Louise Hospital in Accra, Ghana, and found that severely malnourished children were more likely to have defaulted from the care of SAM and defaulting rate standing at 66.9% attending OTC clinic in the study period. Teller & Yimar (2010), discovered that most of the mothers missed an appointment for different reasons, accounting for 72.1% of all the scheduled OTC visits of children with SAM.

In addition, according to Mwanza et al. (2016), 32% of the key informants said that caregivers defaulted owing to travel time from their homes to the OTP center, while 53% said that this was because RUTF and medications were out of stock. Others (15%) said that caregivers defaulted

because they considered their children were well enough to be discharged even though they had not satisfied the requirements. Respondents mentioned staffing shortfall, a persistent lack of supplies, and a lack of assistance for monitoring and following up with defaulters. The WHO (2007) states that the difficulty of accessibility and community acceptance of intervention is related to the high defaulter rate. The number of defaulters increased as parents left OTP centers believing their children were better. This emphasizes the urgent need for community-level and OTP-centered health education for OTP caregivers.

According to Murarkar et al. (2020), the high defaulter rate may also contribute to child mortality since unconfirmed defaulters are likely to pass away at home without being notified. OTC intervention should carry out routine community-level monitoring to link children discharged to future treatment and to follow-up defaulters to periodically review their nutritional condition to lessen the risks of defaulters and relapse of those cured or discharged. However, because of how expensive this is, it should be planned for and budgeted for at the beginning of the program's execution. However, given that financing for OTC therapies is now donor-dependent, achieving this may be challenging in the near term.

Nelsen et al. (1992) found that the primary justification given by defaulter moms for not visiting the OTC was that "follow-up was not needed since the child was all right." Non-defaulter moms cited "the child's improvement" as their primary reason for visiting OTC, demonstrating that the two groups' perspectives on their children's nutritional health are different. Further research by Nelsen et al. (1992) revealed that more defaulter mothers (75%) than non-defaulter mothers (41%) visited OTC with an adult companion. Identification of probable defaulters was not possible. As a result, all OTC-accepting families must get the same level of care. It is necessary to inform the mother and other family members of the child's low nutritional condition and the hazards it entails. Nelsen et al. (1992) found that the primary justification given by defaulter moms for not visiting the OTC was that "follow-up was not needed since the kid was all right." Non-defaulter moms cited "the child's

improvement” as their primary reason for visiting OTC, demonstrating that the two groups' perspectives on their children's nutritional health are different. Further research by Nelsen and al. (1992) revealed that more defaulter mothers (75%) than non-defaulter mothers (41%) visited OTC with an adult companion. Identification of probable defaulters was not possible. As a result, all OTC-accepting families must get the same level of care. It is necessary to inform the mother and other family members of the child's low nutritional condition and the hazards it entails. The benefits of OTC to the child and family must be stressed.

There is a gap in the sustainability and effectiveness of community-based follow-up mechanisms. Although many programs employ community health workers (CHWs) to track and support patients, studies have shown that follow-up services are often inconsistent due to logistical and resource limitations (Wambui et al., 2024). There is limited empirical evidence on the effectiveness of different follow-up strategies in reducing default rates, particularly in the context of Northern Uganda. More research is needed to identify the most cost-effective and scalable models of follow-up care, including the use of mobile health technologies and incentives for caregivers. This will help improve retention rates and ensure that children receive the full course of treatment necessary for complete recovery.

2.5 Factors Influencing Default Rates in the Management of Severe Acute Malnutrition

2.5.1 Caretaker Characteristics

Age of the caretaker is one of the significant aspects in the management of acute malnutrition. According to Forste (2013), there was a negative relationship between the maternal age and the following of OTC treatment for children under five years. However, the same study established that women who gave birth to children with very short birth intervals were more prone to having malnourished children compared to those who had longer birth intervals and they were poor at following appointments since they had other responsibilities to take care of the other equally young

children. Studies have identified that children born from mothers that have a young maternal age (≤ 19 years) are defaulting from care of malnourished children. This has been associated with an increased risk of premature birth and fetal growth restriction, infant mortality, and child under-nutrition which is so demanding for mothers to continue with OTC care after discharging due to other conditions (Fall *et al.*, 2015).

Education is one of the greatest assets that equip women with relevant knowledge regarding childcare and is an important determinant of a child's growth as well as maintaining appointments for clinic care (Gunda, 2007). A health facility-based retrospective cohort study conducted using data from 348 patient cards on children with SAM treated at OTP revealed that caretakers who had gained more education, more than secondary level were 59% more likely to complete the care period AOR=1.59, 95% CI (1.23, 2.06) (Melkamu *et al.*, 2016). Jacques Be-Ofuriyua *et al.* (2016) retrospective cohort study on the treatment of malnutrition among children less than five years found that keeping OTC appointments and adherence to care was linked with a good education of the mothers. The study therefore concluded that improving the education status of women strategies that can be utilized in improving or promoting child health.

Women with some level of education are by and large quite more informed than those with zero education on the importance of completion of treatment for a sick child. Several studies have associated maternal education with the ability to protect against sickness among children since women are much more informed about the appropriate nutrition of the child and treatment (Abuya *et al.*, 2012; Adekanmbi *et al.*, 2013; Marriott *et al.*, 2012). Education is likely to enable women to make independent decisions that are in turn more acceptable to other household members, as well as enabling them to have better command and accessibility to household resources that have a strong bearing on the following treatment plan in cases of sickness such as malnutrition (Das & Sahoo, 2011). It was also noted that through education, parents may acquire high-paying jobs which may in turn translate into better access to quality health care practices. Additionally, maternal education may

promote better child and healthcare awareness, improved health-seeking behaviors, reduced fertility rates, and better medical care accessibility (García-Cruz *et al.*, 2017).

Furthermore, the marital status of the women is associated with household headship and other socio-economic attributes of the women that in turn affect the attending care at OTC clinic for a child with SAM. In terms of adherence, children of single mothers are said to be better at keeping appointments followed by children of widows, the married and the divorced or separated respectively (Ntoimo & Odimegwu, 2014). The levels of defaulting among children of separated or divorced mothers were very high whilst those with married, widowed, and single mothers registered low levels of defaulting.

On the other hand, households with women who are employed or doing some kind of business can earn some income with a subsequent benefit to the overall household health service uptake and 6-59 months children in particular. On the contrary, woman employment may also have counterproductive effects on defaulting from care for the child with nutritional sickness since it may reduce the mother's time for childcare (Lahiru *et al.*, 2017). Some other studies have identified that children of unemployed mothers are better nourished and less stunted for that matter (Fotso *et al.*, 2012; Yeleswarapu & Nallapu, 2012). Employed or working fathers have been identified with providing resources to care for health care hence reducing defaulting (Lahiru *et al.*, 2017).

Additionally, the number of under-five children in the households could equally be influential in the management of OTC. For instance, a study by Lahiru *et al.* (2017) revealed that women with more than two 6-59 months children are more likely to default from care in case one of the children had SAM and had to attend OTC clinic appointments. This is because the mother's attention tends to be focused on the younger child neglecting the weaned older child.

The income levels, which is the reflection of the economic status of a household has long been a pointer to accessibility to adequate health services, utilization of health services, and general improvement in the quality of life. These together with many others are major enhancers of child

health and nutrition (Adeela & Seur, 2015). Many demographic and health surveys that have been conducted especially in developing countries have shown that 6-59-month-old children from low-economic homes suffer a high risk of defaulting from care (Richards, 2015). In general, it has been observed that higher living standards of the household imply a lower proportion of completing care for children in OTC for malnutrition (Das & Sahoo, 2011). A household with more income commands better access to adequate health services at all times (García Cruz *et al.*, 2017). In the same vein, a study undertaken by Fronczac in 2010 revealed that the attendance of mothers to the scheduled clinic appointments was characterized by occasional absenteeism since the routine attendance affected the mothers' economic undertakings as well as the care of other children (Fronczac, 2010). Other studies suggest that these defaulting mothers are likely to have limited access to financial and any other resources that can help them meet the OTC care requirements for their malnourished children (Semali *et al.*, 2015).

The perception of caretakers is yet another significant component in OTC default rates. A population-based survey of households with 4297 children aged under five years and a longitudinal study among children admitted to the integrated OTPs of rural Southern Ethiopia was undertaken and found that despite low recovery rate, children of caregivers with the highest decision-making autonomy were more likely to complete OTC treatment for SAM than children of caregivers with lower autonomy ($P=0.03$) (Amare, 2018).

Closely related to the above, the stigma, especially among HIV positive patients could also be influential in OTC default rates in some societies. A case in point, in a cohort study by Cames *et al.* (2016) in which they assessed the acceptability of ready-to-use food (RUF)-based outpatient protocols in HIV-infected children and adolescents with severe acute malnutrition (SAM) and moderate acute malnutrition (MAM) among 24 MAM and 19 SAM under 5 children revealed feelings of disgust, refusal to eat, fragmentation of intake, self-stigma, and sharing within the household as one of the main reasons for defaulting from taking the supplied feeds. Additionally, according to

UNICEF (2015), the main underlying preconditions that determine completion of OTC care without missed appointments, health, and care: are the degree of an individual's or a household's support in terms of psycho-social and economic support. This determined how well the child will be affected on health facility visits. Maternal lack of support in seeking health services had a negative effect on the OTC appointment keeping for scheduled OTC clinics, according to studies done in Cambodia, Nepal, and Namibia. Poor social support for the mothers can lead to defaulting from care for children receiving care for SAM (Kyu et al., 2009).

Importantly, caretakers' knowledge of the programs is equally important in the management of acute child malnutrition. A study in Zambia for example showed that factors such as failure to complete care by community members to realize proper nutrition were linked with, limited knowledge of signs and symptoms of malnutrition and others including lack of skilled personnel to handle cases of malnutrition and in low-level healthcare facilities makes mothers seek services from traditional healers (Khubga, 2012).

Despite the recognition of these caretaker-related factors, a significant gap remains in the integration of caregiver-focused interventions into OTPs. Most OTPs focus on treating the child without adequately addressing the challenges faced by caregivers that may prevent them from adhering to the treatment protocol (Tadesse et al., 2016). There is limited research on the effectiveness of caregiver support programs, such as psychosocial counseling or educational workshops, in improving treatment adherence. Additionally, there is a lack of evidence on how caregivers' mental health and stress levels, often heightened by the responsibility of caring for a malnourished child, affect default rates. Future studies should explore comprehensive interventions that address the holistic needs of caregivers to ensure better treatment outcomes for children enrolled in SAM programs.

2.5.2 Child or Patient Factors

Several child-related factors such as the age of the child, sex, feeding practices, birth order, childbirth

order number, and HIV status among others could significantly influence the management of SAM. For instance, a health facility-based retrospective cohort study conducted using data from 348 patient cards on children with SAM treated at OTP revealed that the age of the child was associated with defaulting from care during the ninety days, most mothers defaulted just before finishing the second month and children older than 3 years were less likely to achieve follow all the appointment schedules (Melkamu et al, 2016). According to the Independent Evaluation Group (IEG) (2016), various impact evaluations that have been carried out on the interventions used to treat child malnutrition have indeed shown that there is an influence of the child's factors like the child's age in completing the recommended treatment for malnutrition. It goes further to state that depending on the child's age of more than 24 months and where it is implemented; the dropout rate is high, hence making age one of the main factors that push the caretakers to default care or not (IEG, 2006). A study by Ali *et al.* (2016) also concluded that the risk of dropping out of care of malnutrition tends to increase with age (Ali *et al.*, 2016). When children reach the age of 3, they are usually taken to grow up and will always get better with the general family food (Rahman & Rahman, 2016).

Furthermore, a study Gunda (2007) indicated that there was no significant difference in defaulting for boys and girls on OTC care. A study conducted by Asfaw *et al.* (2015) in southern Ethiopia revealed that male children were 2.8 times more at risk of defaults from care compared to their female counterparts. Similarly, many studies in developing countries have reported that 6-59-month-old male children are more likely to become stunted than their female counterparts (Mittal & Singh, 2007; Teshome *et al.*, 2009). The majority of the studies conducted especially in sub-Saharan Africa have revealed that female children are more favored due to their perceived high value in farming and the bride price tag they possess during marriage thus rendering them maximum care at any stage including OTC care than male children (Wamani *et al.*, 2007).

Infant feeding habits are yet another crucial aspect in the management of SAM. A study by Muhimbula et al (2010) highlight the high dropout rates of malnutrition in children below five years

from OTC in Tanzania. It asserted children on only complementary feeding from six months onwards would drop out more easily from care than those who were on exclusive breastfeeding. This piece therefore sought to identify how the feeding practices influence OTC care defaulting rate. A cross-sectional study quoted by Kulwa et al. (2016), found that infant feeding practices especially after six months had a significant association with a missed opportunity for a malnourished child in care at OTC clinic (Kulwa et al, 2006). According to Bryce et al. (2015), complementary feeds given to children after six months are linked to various cases of contamination that result in diarrhea and eventually child malnutrition. The study further reported that such mothers would adhere to the treatment appointment because of the low rate at which the child recovers from the condition.

A study by Sheth & Dwivedi (2016) established that a high incidence of diarrhea among the under-fives was reported immediately after six months when children started weaning. They therefore held that because of such, it was very likely that complimentary feeds were infested with diarrhea-causing pathogens. This assertion led the mother to follow treatment appointments since she would not the child to receive both treatment for diarrhea and SAM for children with SAM. In a cross-sectional study done on the treatment of malnutrition among children aged 6 -59 months in India, it was found that exclusive breastfeeding, colostrum intake, pre-lacteal feeding, and age of complementary feeding initiation are associated with the defaulting from care among the under 5 children (Safikul *et al.*, 2014). The study discovered that the defaulting was statistically high among non-exclusively breastfed children together with those deprived of colostrum, delayed breastfeeding initiation, and complementary feeding.

It is generally known that parents tend to give less attention to older children when a new child is born who demands highly specialized attention and care. A study by Cleland *et al.* (2023) reported that following OTC appointment is uncommon among children of birth order 2-3 and higher in birth orders of 5+. Another study revealed that defaulting was comparatively less among firstborn children and higher among children of the third birth order and above (Jyothi *et al.*, 2003). This is due to the

fact that firstborn children are born where they are highly welcome and therefore, they receive high care. More research has concluded that children whose birth orders are high are prone to less care in cases of sickness (Rahman, 2016). The explanation for this is that the pregnancies of children of higher birth orders are mostly unwanted which in turn results in minimal parental attention and care (Ngianga-Bakwin *et al.*, 2011).

Pregnancies that are closely spaced have been associated with mothers having little time to regain their health and body shape (Mahande & Obure, 2016). On the other hand, a higher spacing is likely to improve childcare as the mother has the opportunity to dedicate more time to child caring and seeking health facilities care. The majority of the DHS surveys for developing countries have established that short birth interval children (less than 2 years) are more at risk of defaulting (Ikeda *et al.*, 2013). The arrival of a new and younger sibling diverts the attention of the mother from the relatively older children even when they are still in need of care by caretakers (Jyothi *et al.*, 2003).

Last but not least, complications of pediatric HIV infection are usually seen in growth failure and finally more serious malnutrition. Half of children presenting with severe malnutrition are HIV infected. In developing countries, the severity of malnutrition in HIV-infected children is greater and more severe than in uninfected children (Eley *et al.*, 2009). In Sub-Saharan Africa, the mortality rate of malnourished HIV-infected children is three times higher than in uninfected children. The study found in addition that malnourished HIV-positive children were less likely to default from care for malnutrition since the mothers have regular appointments at the health facilities (Perreira, 2011).

Finally, the caregiver's perception of the child's recovery process is another child-related factor that can lead to default. In some cases, caregivers may perceive improvement in their child's condition after a few weeks of treatment and mistakenly believe that further therapy is unnecessary (Kabongo *et al.*, 2024). This premature assumption of recovery can result in caregivers withdrawing their children from therapeutic care before the full treatment cycle is completed, leading to relapse or

worsening malnutrition. Despite these insights, there is a research gap in examining the effectiveness of educating caregivers on the full treatment process and the importance of completing it to prevent default. Addressing this gap through community education and awareness programs could be critical in reducing default rates.

2.5.3 Health Facility Determinants

Health facility-related factors such as waiting time, availability of health workers, distance to the health facility, attitudes of health workers, and availability of essential medicines and supplies among others have been cited as crucial in the management of malnutrition. For instance, a study by Rosen et al (2013) on monitoring and evaluation of malnutrition treatment of under-fives noted that waiting during the OTC Visits influence defaulting rate from care. The result for instance should show that the longer waiting time automatically translates into a high dropout rate (Rosen et al, 2013). Khubga (2012) in their study in Zambia showed that factors such as inadequate availability of health workers of absenteeism associated with failure of missed appointments for malnutrition treatment among patients malnourished children and others including lack of skilled personnel to handle cases of malnutrition in low-level healthcare facilities make mothers seek services from traditional healers.

A study by Ashworth (2015) to assess the efficacy and effectiveness of community-based treatment of severe malnutrition found that the use of high energy and high protein food substances as well as micronutrient provision is recommended and acknowledges that while the rehabilitation of malnourished children at home using homemade food is more cost- effective than when in-patient facilities are set up. The study concluded that distance to the health facility has a direct link with the defaulting from treatment of children with SAM attached to facilities. The technical paper further holds that in places where there is a fully functional primary health care facility, it is better to carry out the rehabilitation process of malnourished children from home instead of the hospital. A Cohort Study to assess the acceptability of ready-to-use food (RUF)-based outpatient protocols in HIV-

infected children and adolescents with severe acute malnutrition (SAM) and moderate acute malnutrition (MAM) among 24 MAM and 19 SAM under 5 children found that distance was significantly associated with drop-outs from the program, as 9/43 dropped out due to distance to the clinic (Cames et al, 2016).

Accessibility of services in healthcare facilities in terms of transport, distance to the healthcare facility, and cost of services among others play a great role in ensuring that malnourished children are treated and or managed in health facilities (Elizeus, 2009). Other factors such as poverty among caretakers, proximity of drug shops to households, and lack of community health workers to health diagnose children and refer them influence access to health care (Johana, 2010). In the Philippines, researchers found that major reasons for choosing health care facilities were low cost (47.5%), accessibility to transportation (29.6%) and perceived good quality of care (16.5%), payment scheme of caring for the child were no charge at the government center (67.7%), self-payment (26.3%), private insurance (2.1%) (Kim et al 2014). Another study by Johana Christina (2010) in the developing world indicated there are still high default rates due to a lack of access to healthcare services. Though it is evident that patients have little or no access to formal healthcare services, there is still a challenge that people do not utilize the available services.

Attitude of the health workers that is health worker- patient relationship is equally an important consideration in the management of malnutrition. A study by Woods & Riley (2016) on the role of community healthcare providers in neonatal follow-ups showed that the caretaker's relationship with the health workers regarding the nature of childcare practices influenced the dropping of the program. This is attributed to the fact that caretakers get maximum advice and assistance from other healthcare workers such as dietitians, medical doctors, nurses, or physiotherapists among others in charge of the care program. Mothers who share good relationships would not default from the care at the rate of those who had foil relationships with any of the health workers involved (Woods & Riley, 2016).

Availability of essential medicines and supplies has also been cited as a critical component in community-based management of malnutrition. According to Labadarios et al. (2015), the provision of effective, basic, and consistent supplies for care for children with SAM attending OTC clinics was associated with non-defaulting from care. Disease-specific nutritional support, treatment, and counseling which include nutritional and dietary practices for the prevention and rehabilitation of nutrition-related diseases and illnesses through counseling support and management was also linked with positive OTC care reporting non-defaulting. Assessment and provision of the requirements needed to run the OTC clinic is therefore paramount in avoiding defaulting from the care for children with SAM. Ayaya et al. (2014) found that defaulting from care was mainly due to a lack of resources at the clinic on visits by the mothers/caretakers and Iqbal et al. (2009) found that incomplete care against SAM by mothers increased with inconsistent supplies at the clinic. The consistent supplies of OTC resources can reduce the occurrence of defaulting (Iqbal et al., 2009).

One gap that needs to be addressed is the limited research on the role of health facility leadership and management in reducing default rates. Effective health facility management, including good leadership, proper planning, and resource allocation, has been shown to significantly influence the outcomes of SAM treatment programs (Mambulu-Chikankheni, 2023). However, most studies focus on clinical factors and ignore the administrative and managerial aspects of health facility performance. There is a need for more research on how facility leadership, including aspects like decision-making, staff motivation, and infrastructure development, can be strengthened to ensure better patient outcomes and reduce defaults in outpatient therapeutic care programs.

2.6 Strategies for Managing Default Rates

According to research by Mohammed & Yousef (2017), malnourished children who were hospitalized with a z-score of less than -3 standard deviation were more likely to default than kids who were admitted with MUACs of 11.5 cm or above. This could be the case because children who

were hospitalized based on their Z-score were more likely to be sick and unable to attend follow-up appointments every week. According to Buhwere et al. (2012), receiving care at other private sector healthcare facilities may also help to explain the findings. Lower default rates have been linked to not being nursed and referrals from other medical facilities. It appears that women who did not breastfeed their infants were more inclined to make them Plumpy'Nut as a form of restitution. Similar to this, parents whose kids were referred from another medical facility were more likely to learn the value of adhering to follow-up and so were more inclined to do so.

Surprisingly, uneducated mothers' offspring had a lower default rate than literate mothers' offspring. This might be explained by the fact that moms who lack literacy typically have lower expectations and fewer treatment alternatives, making them more unlikely to default. This study demonstrated that driving to the OTC and its location outside of the patient's neighborhood were risk factors for default. Research done in Pakistan and Ethiopia found that lack of access to OTC had a major influence on default rates and that accessibility to SAM treatment services was mostly hampered by distance (Mohammed & Yousef, 2017). The same result was shown in a 2013 SQUEAC research that was carried out in Sana'a, Taiz, and Hudidah governorates in Yemen. However, the time and money spent getting to the OTC were not linked in this study to higher default rates. Such contrasting results might be the result of respondents' inability to estimate the expense of transportation, particularly for those who drive their automobiles. Similar to that, it's possible that the time needed to go to the OTC was underestimated (SQUEAC, 2013). Long wait times, low staff trust in their capacity to treat the malnourished children, and the shortage of Plumpy'Nut and medicines, which are provided without charge, were all identified as significant default risk factors. These results concur with research done in Sana'a, Taiz, and Hudidah, three governorates in Yemen, utilizing the SQUEAC approach (SQUEAC, 2013).

This low level of satisfaction might be attributed to the fact that most OTCs only had one or two health personnel to execute all tasks required for each child. Furthermore, the lack of physicians or

specialists in OTC may contribute to a lack of trust in the staff's competence to treat the child, which may raise the default rate. As a result, increasing the number of OTC personnel and incorporating physicians/specialists in the care of malnourished children must be studied and assessed for their influence on the default rate (Puett & Guerrero, 2015). Furthermore, the initiative should acquire adequate funding to ensure the continuous provision of Plumpy'Nut and pharmaceuticals. The refusal of Plumpy'Nut by a child was reported as a barrier to SAM services. According to (SPHERE, 2011), the acceptance of OTC services is determined by the patient's satisfaction with the overall SAM program, accessibility, treatment, staff, and health system. The study discovered many acceptability-related risk factors for defaulting (e.g., difficulty attending every week, OTC working time, and lack of family support) (Al-Amad et al., 2017). As a result, such acceptability variables must be taken into account to reduce defaulting.

Training traditional healers in the identification and referral of infants and pregnant and lactating mothers to the program is another strategy employed (Mulugeta & Canaan, 2017). Many traditional healers volunteered for the initiative, examining youngsters using the Mid- Upper-Arm-Circumference (MUAC) and sending low MUAC children to it. During talks with mothers/caregivers (at health centers) and the entire family (during home visits), emphasis was focused on PlumpyNut and CSB as a therapy, not merely a meal; and the integration of health and nutrition evaluation and care (Okwaraji et al., 2017). PlumpyNut was distributed by health care providers during antenatal and prenatal visits at health clinics or through home visits by traditional birth aides or community health workers (Temere, 2014).

Lastly, the integration of outpatient therapeutic programs with broader health services has emerged as an essential strategy to manage default rates. Linking nutrition interventions with healthcare services such as immunizations, deworming, and general pediatric care increases the opportunities for caregivers to engage with the health system (Meza-Valderrama et al., 2020). This integration not only improves child health outcomes but also reduces the likelihood of caregivers discontinuing

treatment. Nevertheless, the operationalization of integrated health services in resource-constrained settings presents significant challenges, particularly in terms of logistics, funding, and staffing. The literature highlights the need for more empirical research on how health system strengthening initiatives, including infrastructure and resource allocation, can support the integration of OTPs and broader health services in regions like Northern Uganda.

CHAPTER THREE: METHODOLOGY

3.1 Study Design

The study used a cross-sectional design that employed quantitative data collection and analysis techniques. This study design was used due to its high reliability for use in understanding peoples' opinions, knowledge, attitudes, and perceptions. Face-to-face interviews were used to collect quantitative data on (i) caregiver's perception, and (ii) factors associated with default rate whereas information about default rate was obtained from the integrated nutrition register book. Overall, this kind of design was chosen because its best suited for studies to simultaneously measure the outcome and the exposures of the participants.; therefore, strengthening the ability to determine the factors associated with defaulting in care at any given point in time.

3.2 Study Area

The study was conducted in Lamwo and Omoro district, Uganda. Omoro District is bordered by Gulu District to the north, Pader District to the east, Oyam District to the south, and Nwoya District to the west. The town of Palenga, where the district headquarters are located is about 24 kilometers (15 mi), by road, south of Gulu, the largest city in the Acholi sub-region. This is approximately 311 kilometers (193 mi), by road, north of Kampala, the largest city and capital of Uganda.

Lamwo District is bordered by South Sudan to the north, Kitgum District to the east and southeast, Pader District to the south, Gulu District to the southwest, and Amuru District to the west. The town of Lamwo is approximately 66 kilometres (41 mi), by road, northwest of Kitgum, the nearest large town. This is approximately 150 kilometers (93 mi), by road,

northeast of Gulu, the largest city in the Acholi sub-region. The two districts were chosen because it has a high proportion of malnourished children (The-et al., 2020).

Childhood under-nutrition remains a significant public health problem in this region with expected high default rates. In Uganda, home-based care for children with severe malnutrition is provided in outpatient therapeutic centers (OTCs), which are usually located at HCs III,1V, and, in hospitals. Therefore, all health centers and hospitals offering Outpatient therapeutic care in the districts of Omoro, Gulu, Nwoya, and Amuru were selected. The districts were chosen because they have a functional OTC health facility.

3.3 Study Population, Inclusion, and Exclusion Criteria

3.3.1 Study Population

The target population comprised children aged 6 to 59 months, with SAM in the two districts and the information was obtained from caregivers of these severely malnourished children 6 to 59 months. The caregivers (caretakers) of severely malnourished children, aged 6 to 59 months that were enrolled and received treatment at the selected OTCs (1 per sub-county) were considered because they effectively and objectively evaluated the recovery progress of severely malnourished children.

3.3.2 Inclusion Criteria

This study only employed severely malnourished children 6 to 59 months of age who were enrolled at any of the OTC centers in Lamwo and Omoro districts. The information needed was obtained from their caregivers.

3.3.3 Exclusion Criteria

Children 6 to 59 months with other forms of malnutrition other than severe acute malnutrition (SAM) without medical complications such as moderate acute malnutrition (MAM) and severe

acute malnutrition (SAM) with medical complications were excluded from the study.

3.4 Sample Size

The sample size for this study was determined using Sloven's formula/sampling technique for sample size determination. Sloven's formula for sample size determinations is presented in equation (1).

$$n = \frac{N}{(1 + N e^2)} \text{----- (1)}$$

Where.

n = the sample size

N= Total population estimate (226 children 6-59 months receiving care of OTC within the past three to six months in OTC centers in Lamwo and Omoro districts)

e = is the level of confidence (error of margin i.e., 5% = 0.05) 1 is a constant in the formula

$$\text{Therefore; } n = \frac{226}{(1 + 226 \times 0.052)} = 144$$

No response rate of 10% i.e., $144 \times 10\% = 14$

Therefore, $n = 144 + 14 = 158$

Whereas this study targeted a sample of 158 respondents from each district, which would give a total sample size of 316, a total of 244 respondents participated in the study, with 138 and 106 participants obtained from Lamwo and Omoro districts respectively. For Omoro, the participants were selected based on the total number of severely acutely malnourished children 6 to 59 months admitted between February to May 2023, specifically from Lalogi health center IV, Bobi, and Ongeko health center III. On the other hand, a total of 138 participants were selected from the total number of severely acutely malnourished children 6 to 59 months

admitted between February to May in Lamwo, precisely at Awich and Akworo Health center III.

3.5 Sampling Procedure

A multistage sampling procedure was applied to locate the study participants. In the first stage, Lamwo and Omoro districts were purposively selected based on their poor nutrition performance indicators. Similarly, in the second stage, health facilities, precisely health center IVs in Lamwo and Omoro districts were purposively selected because they had functional OTC services. In the third stage, the severely malnourished children aged 6 to 59 months were randomly selected from the integrated nutrition register after using proportionality for determining the actual total sample from each health facility offering OTC after which the caretaker for each selected severe acute malnourished child was located and interviewed.

3.6 Data Types and Data Collection Tools

Primary data was collected primarily from caregivers of severely malnourished children enrolled in OTC and who have been in care for a period of at least one month within the last 3 to 6 months before the study.

A semi-structured questionnaire comprising four sections was administered for the collection of data. The first section consisted of questions assessing general information about the demographic factors of the caregivers, which included age, gender, education level, income level, marital status, and employment status. The second section comprised questions on the default rate. These were majorly dichotomous, single-choice, and multi-choice questions. The third and fourth sections involved questions on the perceived effectiveness of the OTC program and factors associated with the default rate. Questions in these sections were designed in the form of statements based on 5-point scale responses. Respondents were presented with

statements like “my child has gained when he/she was in OTC.” Responses were assessed using a 5-point scale ranging from 1= strongly disagree to 5= strongly agree. Concerning factors, respondents were presented with statements such as “it does not take a long time to see a clinician”, which were also assessed with 5 answer options (1= strongly disagree. 5= strongly agree).

Furthermore, a data extraction form was employed to collect information from the participant’s health facility records such as date of admission, sex, age, type of admission, nutrition status at admission, HIV status at enrollment, and possible co-morbidities at the time of enrolment and whether or not the child defaulted the OTC visit.

3.7 Data Collection Procedure

A researcher administered semi-structured questionnaires with both open and closed-ended questions to respondents who the caretakers of these severely malnourished children of 6 to 59 months were and were subjected to face-to-face interviews.

3.7.1 Assessment of Default Rates in the Management of Severe Acute Malnutrition among Children 6-59 Months at OTC

Default status of each child was obtained from an integrated nutrition register book. Other questions such as anthropometric measurements of the child at entry and exit and exit outcomes from OTC were also captured from the health facility record. The anthropometric measurements included MUAC, height/length, and weight whereas the exit outcome focused on whether the child had cured, defaulted, and transferred. The information was obtained retrospectively for the last two quotas. The recent two quotas were considered because the study only focused on the most recent information from the program.

3.7.2 Assessment of Caregiver's Perceptions of Effectiveness of OTC Program

The study applied individual face-to-face interviews using structured questionnaires to collect data on the perceived effectiveness of the OTC program. The questions were designed with responses based on a 5-point Likert scale (1= strongly disagree and 5= strongly agree). Likert scale was used in this study due to its high applicability in collecting data on individual difference estimates such as people's attitudes, opinions, and perceptions (Nemoto & Beglar, 2014). More so, it provides a wide range of categories from which caregivers choose thereby increasing data reliability. Questions on the perceived effectiveness of the OTC program were adopted with modifications from Petrescu et al., (2020).

3.7.3 Assessment of the Factors Associated with Default Rate in Severe Acute Malnutrition among Children 6-59 months in OTC

The study applied individual face-to-face interviews using structured questionnaires to collect data on factors associated with the default rate in the OTC program. The questions were designed with responses based on a 5-point Likert scale (1= strongly disagree and 5= strongly agree). Questions on factors associated with default rates in OTC programs were adopted with modifications from Petrescu et al. (2020).

3.8 Data Analysis

The data collected was entered into Microsoft Excel and imported into SPSS version 25 for data cleaning and analysis.

3.8.1 Objective One: Assessing the Outpatient therapeutic Care Default Rate

Data for the determination of the outpatient therapeutic care (OTC) default rates in the management of Severe acute malnutrition among children 6-59 months at OTCs were analyzed descriptively, with a focus on obtaining the frequencies and valid percentages of children that

defaulted OTC treatment regimes In addition to the descriptive summaries, chi-square test was run to ascertain the association between OTC default rates and socio-demographic characteristics of respondents and children in the target areas.

3.8.2 Objective Two: Assessing the Perception of Caregivers on Outpatient Therapeutic Care

Reliability and exploratory factor analysis were run to examine the Likert scale items for measurement of the perceptions of caregivers towards the effectiveness of OTC services in the management of SAM in Lamwo and Omoro districts. Descriptive statistics – specifically means as a measure of central tendency and standard deviations as a measure of dispersion were run. Decisions were made based on the mean score ranges for a 5-point Likert scale, with 1 – 1.80 interpreted as very negative, 1.81 – 2.61 – negative, 2.62 – 3.42 – Neutral, 3.43 – 4.23 – Positive and 4.24 – 5.0 interpreted as very positive (Alkharusi, 2023; Boone et al., 2012; Harpe, 2015; Scales & Sullivan, 2013). A student t-test was then run to assess the difference between the mean attitude of caregivers of OTC defaulters and caregivers of OTC non-defaulters.

3.8.3 Objective Three: Assessing the Factors Associated with Default Rate in Severe Acute Malnutrition among Children 6-59 months in OTC

Cross-tabulations were first run to ascertain the association between default rates and sociodemographic variables of study caregivers and children admitted to the different health facilities. To avoid overfitting and multicollinearity, all continuous variables were then tested for normality and correlations, with variables that were not normally distributed log-transformed, while those with paired variables whose correlation was greater than 0.65 were excluded from the analysis. A binary logistic regression was then run to determine the factors that influenced OTC default rates in the respective districts of Omoro and Lamwo and overall.

3.9 Quality Assurance

The quality of data was ensured by considering measures such as conducting pre-visits to the study area, in which at least 6 OTC units were visited to identify the number of study participants (the children 6 of 59 SAM cases enrolled in the OTC feeding program between the months of November 2022 to January 2023 and had completed at least one month in care). Additionally, research assistants were trained to equip them with adequate knowledge of collecting nutrition data were recruited and trained on how to collect data with the data collection tools that were also studied and translated into Acholi. In the same vein, the study tool - the questionnaire, was pretested to ensure that the respondents understood each question asked. Importantly, the data collected was cleaned at two levels, with the first level being immediately at the end of each data collection day to rule out any missing data, while the second level was after entry into the Stata statistical package to check for double entries and to eliminate cases with missing data.

3.10 Ethical Considerations

Approval to conduct the study was obtained from Gulu University Research Ethics Committee (GUREC) under number GUREC – 2023 - 589, and permission from the district health officers and resident district commissioners (RDC) of the respective districts as well as from the health unit in-charges of the health facilities to be visited. In the case of Lamwo district, permission was also obtained from the Office of the Prime Minister (OPM) to cater for the administrative requirements of conducting research in fragile refugee-hosting areas.

Informed consent of the caregivers of these children 6 to 59 months enrolled in OTP was obtained before enlisting them in the study. It was made clear to them that participation is voluntary, subject to no payment and they were not discriminated against in case they do not want to participate. The nature and purpose of the study were thoroughly explained to the study participants by the researcher and the information generated was confidentially managed by

assigning codes to each of the questionnaires. In addition, participants were provided with institutional contacts should they feel the need to consult further. Participants were also provided with the opportunity to receive a copy of the research report in case they wished.

CHAPTER FOUR: RESULTS

4.1 Sociodemographic Characteristics of Respondents

The sociodemographic characteristics of caregivers are presented in Tables 1 and 2. In Table 1, the result shows that of the 244 participants included in the study, the majority (66%) had recorded no defaults in the OTC. Whereas the participants were spread across the two districts with a majority (57%) coming from Lamwo districts, there was no significant association between district and OTC default rates. Of the caregivers interviewed, a large proportion (98%) were females with no significant association between gender and default rate. Most of the respondents were married (65%), with no significant association between marital status and OTC default status. It is also apparent that most caregivers (55%) were housewives, while most (57%) caregivers had attained primary education. There was a significant association ($p = 0.01$) between the level of education attained by caregivers, and OTC default status, with most caregivers of OTC defaulters having attained either primary education (44%) or non-formal education (43%), while caregivers of OTC non-defaulters had attained primary level of education (64%). Additionally, most caregivers (93%) took their children to the health facility and precisely health center III (84%) for treatment. The level of health facilities visited therefore showed a significant association ($P = 0.002$) with the OTC default status, with a great proportion across the different groups - OTC defaulters (73%) and non-defaulters (90%) having gone to health center III. It is also important to note that almost all caregivers of both OTC defaulters and non-defaulters received health education on severe acute malnutrition (SAM).

Table 1: Categorical sociodemographic characteristics of caregivers

Variables		Overall		D		ND		χ^2	P-Value
		N	%	N ¹	%	N ²	%		
District	Omoror	106	43	37	45	69	43	0.142	0.707
	Lamwo	138	57	45	55	93	57		
Sex of Caregiver	Male	4	2	1	1	3	2	0.135	0.713
	Female	240	98	81	99	159	98		
Marital status	Single	5	2	0	0	5	3	3.108	0.375
	Married	159	65	57	69	102	63		
	Divorced	71	29	22	27	49	30		
	Widowed	9	4	3	4	6	4		
Occupation	Housewife	133	55	43	52	90	56	0.213	
	Others*	111	45	39	48	72	44		
Level of education	Non-formal	80	33	35	43	45	28	9.205	
	Primary	140	57	36	44	104	64		
	Post-primary	24	10	11	13	13	8		
Had Health education on SAM	Yes	243	99	82	100	161	99	0.508	
	No	1	1	0	0	1	1		
Place of Treatment	Health facility	227	93	77	94	150	93	0.144	
	Other**	17	7	5	6	12	7		
Health Facility Level	HC III	205	84	60	73	145	90	60.43	0.002
	HC IV	39	16	22	27	17	10		

Note: D – Defaulters, ND – Non-defaulters; N – Sample size (244), N¹, and N² – frequency of defaulters and non-defaulters respectively, % - proportion, SD – Standard deviation, * - Formal employment, casual laborer, subsistence farmer; ** - VHT & Traditional Practitioner, χ^2 – Chi-square value.

In Table 2, the results indicate that respondents were on average 28.6 years old, with no significant differences between the mean ages of caregivers of defaulters and caregivers of non-defaulters. In the same way, respondents earned an average monthly income of 8.0×10^4 Uganda shillings, with no significant difference in monthly income earnings between the caregivers of OTC defaulters and caregivers of OTC non-defaulters. Whereas the average household size of the respondents was six, the caregivers had family sizes averaging five members.

Table 2: Continuous sociodemographic characteristics of caregivers

	Means			t-values	p-values
	Overall	D	ND		
Age of caregiver (Years)	28.6 ± 6.6	29.3 ± 5.8	28.2 ± 7.0	-1.18	0.238
Family Size	5 ± 2	5 ± 2	5 ± 3	0.50	0.621
Household size	6 ± 3	6 ± 2	6 ± 3	0.10	0.925
Average Monthly Income (Uganda Shillings)	8.0×10^4 $\pm 7.5 \times 10^4$	$7.3 \times 10^4 \pm$ 7.1×10^4	8.3×10^4 $\pm 7.7 \times 10^4$	0.76	0.448

Note: D – Defaulters, ND – Non-defaulters.

The sociodemographic characteristics of children studied are presented in Tables 3 and 4. Results in Table 3 showed that the majority (52%) of children taken to the OTC facility were female, with no significant association between the sex of the child and OTC default status. Most children (41%) that were taken to the OTC facility were of a birth order of more than three. Notably, a significant proportion of children (95%) visiting the OTC health facilities were newly admitted, with negative HIV status (73%). Similarly, a slightly higher percentage of children (52%) admitted didn't have other health conditions like malaria, and pneumonia among others. This presence of other health conditions, however, had a significant association ($p = 0.047$), with OTC default rates among children, with the majority (61%) of those who defaulted OTC visits not having any health conditions, while most (52%) of those who had not defaulted had other health complications. Most children (68%) admitted to OTC health facilities had a non-edematous form of SAM, and a significant proportion (97%) of children were given RUTF.

Table 3: Categorical sociodemographic characteristics of children

Variables		Overall		D		ND		χ^2	P-Value
		N	(%)	n	%	n	%		
Child's sex	Male	117	48	39	48	78	48	0.008	0.931
	Female	127	52	43	52	84	52		
Birth number	One	10	4	0	0	10	6	5.629	0.131
	Two	59	24	22	27	37	23		
	Three	75	31	27	33	48	30		
	More than Three	100	41	33	40	67	41		
Type of Admission	New Admission	233	95	80	98	153	94	1.228	0.268
	Re-admission	11	5	2	2	9	6		
HIV Status	Negative	178	73	55	67	123	76	2.924	0.232
	Others*	66	27	27	33	39	24		
Type of SAM	Edematous	77	32	30	37	47	29	1.446	0.229
	Non-edematous	167	68	52	63	115	71		
RUTF given	No			4	5	3	2	1.789	
	Yes	237	97	78	95	159	98		
Other health conditions	Yes	117	48	32	39	85	52	3.943	0.047
	No	127	52	50	61	77	48		

Note: D – Defaulters, ND – Non-defaulters; N – Sample size (244), n – frequency, % – proportion, SD – Standard deviation, * – Positive & Unknown, χ^2 – Chi-square value.

The children admitted had an average age of 21.9 months, with notable significant ($p = 0.001$) differences between the mean age of OTC defaulters and non-defaulters. The average birth order of the children visiting the OTC facility was four. Additionally, the average weight, height/length, and MUAC of children admitted were eight kilograms, 74.0 cm, and 12.1 mm respectively. In the same vein, WHZ, WAZ, BAZ, and HAZ of children admitted were -1.9, -2.8, -1.7, and -2.8 Z-scores respectively. There was, however, a significant ($p = 0.001$) mean difference between the MUAC scores of children who defaulted and those who were non-defaulters.

Table 4: Continuous sociodemographic characteristics of children

Variables	Means			t-values	p-values
	Overall	D	ND		
Age of the child in months	21.9 ± 12.9	25.7±13.7	19.9± 12.1	-3.35	0.001
Birth order	4 ± 2	4 ± 1	4 ± 2	0.28	0.778
Child's weight (Kg)	8.0 ± 2.5	7.9 ± 2.5	8.0 ± 2.5	0.48	0.634
The child's height/length (cm)	74.0 ± 9.2	73.5 ± 8.0	74.2 ± 9.7	0.58	0.562
Child's MUAC (cm)	12.1 ± 1.2	12.3 ± 1.5	11.9 ± 1.1	-2.39	0.018
WHZ	-1.9 ± 1.7	-1.8 ± 1.5	-2.0 ± 1.8	-0.55	0.585
WAZ	-2.8 ± 1.9	-3.0 ± 1.7	-2.7 ± 2.0	1.40	0.393
BAZ	-1.7 ± 1.8	-1.6 ± 1.6	-1.7 ± 1.8	0.86	0.609
HAZ	-2.8 ± 2.5	-2.9 ± 2.4	-2.4 ± 2.7	-0.51	0.164

Note: D – Defaulters, ND – Non-defaulters; N – Sample size (244), n – frequency, % - proportion, WHZ - Weight for Height Z-scores, WAZ – Weight for Age Z-scores, BAZ – BMI for Age Z-scores, Height for Age Z-scores.

4.2 The Default Rates in the Management of Severe Acute Malnutrition among Children

6-59 Months at Outpatient Therapeutic Centers in Lamwo and Omoro districts.

The overall OTC visit default rate across both Omoro and Lamwo districts is presented in Figure 2. The results indicate that the overall OTC default rate is 34%. Upon segregating by district, it is evident that the default rates among children from Omoro and Lamwo districts are 35% and 33% respectively. This implies that there was no significant difference between the default rates of Lamwo and Omoro districts.

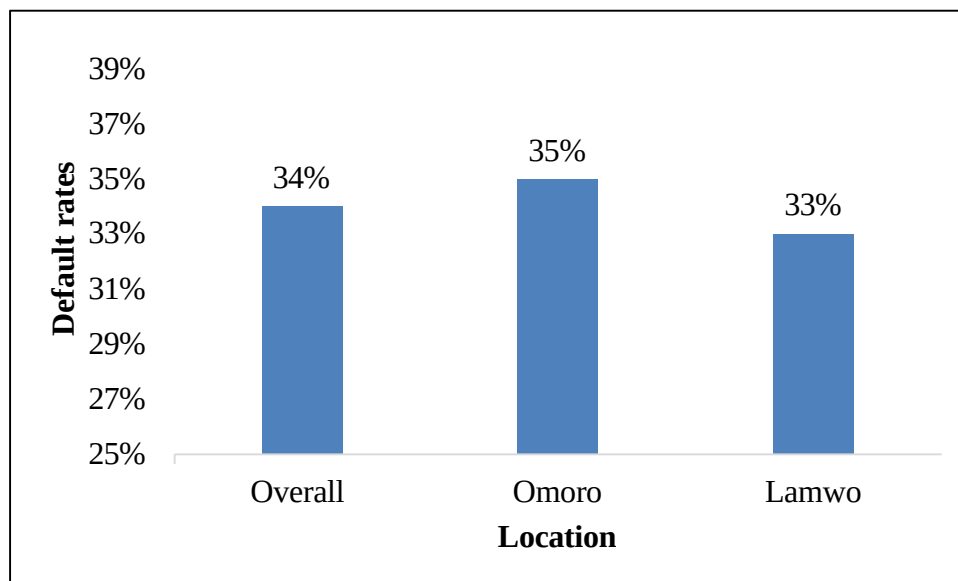


Figure 2: Overall default rate of OTC visits among children sampled from Omoro and Lamwo districts

4.3 The Perception of Caregivers towards the Effectiveness of OTC Programs for Managing Severe Acute Malnutrition

The results of exploratory factor analysis of Likert scale items for measurement of the perception of caregivers towards the effectiveness of OTC services in managing SAM in Omoro and Lamwo districts are presented in Table 6. The model that was run based on principal component analysis to extract key factors from Likert scale items showed a good fit (KMO = 0.808, Bartlett's Test of Sphericity ($\chi^2 = 863.796$, $p < 0.001$), extracting two factors, F1 (Labeled as effectiveness of OTC services) and F2 (Labeled as accessibility and convenience of OTC services), respectively explaining 33.5% and 25.6% of the variation in the perceptions of caregivers towards the overall effectiveness of OTC services in managing SAM. Thus, the results showing the responses of the caregivers to the statements measuring their perceptions towards the effectiveness of OTC programs in northern Uganda are presented in Table 7. The results indicate that overall, caregivers had a positive perception (Mean Score = 3.70) towards the effectiveness dimension of the OTC services as represented by 6 scale item statements. However, there was a significant ($p < 0.001$) difference in the mean perception towards the

effectiveness dimension between Caregivers from Omoro and Lamwo, with those in Omoro scoring higher in mean perceptions (MS = 3.91) than those in Lamwo (MS = 3.51).

Considering the 6 specific scale items of this dimension, it is evident that caregivers had a positive perception of all the scale items, overall and across respective districts, with significant difference in the scores for some of the statements between the two districts of study.

Table 5: The outcome of exploratory factor analysis indicating the factors extracted from 10 perception scale items

Scale Items	F1	F2
Consider the child's condition severe at the time of OTC admission	0.809	
OTC program is Safe	0.797	
OTC is best for curing Child malnutrition	0.765	
Child Appetite Test makes OTC effective	0.655	
OTC physical environment healthy for children	0.655	
Easy for mothers and caregivers to feed their children on RUTF	0.638	
Have enough time to attend feeding programs at the clinic		0.841
OTC Staff are friendly		0.827
It is easy to bring the child for Weekly OTC Review		0.823
Easy to come and collect OTC supplements at the clinic		0.803
Eigenvalue	3.346	2.559
Percentage of variance	33.457	25.588
Cronback's Alpha	0.844	0.817
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO = 0.808)		
Bartlett's Test of Sphericity ($\chi^2 = 863.796$, $p < 0.001$)		

Note: F1 = Effectiveness of OTC services; F2 = Accessibility and convenience of OTC services

On the other hand, the results indicate that caregivers generally had a negative perception (MS=2.3) towards the accessibility and convenience dimension of OTC services, with significant ($p = 0.009$) differences observed in the perception scores of this dimension between caregivers from Omoro and those from Lamwo district, in which those from Lamwo (MS = 2.15) had a more negative perception towards this dimension than those from Omoro (MS = 2.50). This dimension was represented by 4 scale item statements, in which caregivers had a negative attitude toward 3 of the 4 scale item statements. These include, being easy to collect OTC supplements at the clinic (MS = 2.02), having enough time to attend feeding programs at the clinic (MS = 2.18), and being easy to bring the child for Weekly OTC review (MS = 2.43). It is also important to note from the results that caregivers were undecided in their perceptions

of the statement that OTC is staff-friendly ($MS = 2.57$). Interestingly, it is apparent from the results that there was a significant difference in the mean perceptions of caregivers towards the scale item statement that it is easy to come and collect OTC supplements at the clinic ($t = 4.01$, $p < 0.001$), with caregivers from Lamwo ($MS = 1.75$) being more negative towards this item statement score than those from Omoro ($MS = 2.38$).

Thus, overall, the results indicate that the caregivers generally had a neutral perception ($MS = 3.14$) towards the general effectiveness, accessibility, and convenience of OTC programs for managing acute malnutrition in northern Uganda, as extrapolated from results from both Lamwo and Omoro districts. Despite this, it is also apparent that there were significant ($p < 0.001$) differences in the level of perceptions between caregivers from Lamwo and Omoro districts, with those from the Omoro ($MS = 3.35$) having a more positive attitude than those from Lamwo district ($MS = 3.0$).

Table 6: Perception of caregivers towards the effectiveness of OTC programs for managing SAM in Lamwo and Omoro

F	Scale Items	Overall			Lamwo			Omoro			t	p
		MS	Std	Decision	MS	Std	Decision	MS	Std	Decision		
1	Consider the child's condition severe at the time of OTC admission	3.64	1.16	Neutral	3.38	1.17	Neutral	3.99	1.06	Positive	4.30	< 0.001
	OTC program Safer	3.78	1.11	Positive	3.57	1.17	Positive	4.06	0.96	Positive	3.60	< 0.001
	OTC is best for curing Child malnutrition	3.78	1.13	Positive	3.61	1.24	Positive	4.00	0.94	Positive	2.81	0.005
	Child Appetite Test makes OTC effective	3.62	1.13	Neutral	3.53	1.15	Neutral	3.75	1.10	Positive	1.49	0.137
	OTC physical environment healthy for children	3.65	1.08	Positive	3.50	1.13	Positive	3.84	1.00	Positive	2.49	0.013
	Easy for mothers and caregivers to feed their children on RUTF	3.70	1.05	Positive	3.60	1.14	Positive	3.82	0.90	Positive	1.68	0.094
	Weighted average	3.70	0.80	Positive	3.53	0.80	Positive	3.91	0.76	Positive	3.75	< 0.001
2	Have enough time to attend feeding programs at the clinic	2.18	1.23	Negative	2.08	1.08	Negative	2.30	1.40	Negative	1.36	0.177
	OTC Staff friendly	2.57	1.33	Neutral	2.46	1.23	Negative	2.72	1.44	Neutral	1.55	0.123
	Easy to bring the child for Weekly OTC Review	2.43	1.34	Neutral	2.30	1.14	Negative	2.59	1.56	Neutral	1.65	0.100
	Easy to come and collect OTC supplements at the clinic	2.02	1.20	Negative	1.75	0.99	Negative	2.38	1.34	Neutral	4.01	< 0.001
	Weighted average	2.30	1.05	Negative	2.15	0.82	Negative	2.50	1.27	Neutral	2.63	0.009
	Overall weighted average	3.14	0.60	Neutral	3.0	0.25	Neutral	3.35	0.82	Neutral	4.96	< 0.001

Note: F1 - Effectiveness of OTC services, and F2 - Accessibility and convenience of OTC services, MS – Mean Score; Perception decision made based on the cutoffs; - 1.0-2.33 [Negative], 2.34-3.67 [neutral]; 3.68 -5.0 [positive] (Harpe, 2015; Scales & Sullivan, 2013).

Furthermore, the results on the level of understanding about SAM among Caregivers from both Omoro and Lamwo districts are presented in Table 8. The results indicate that most respondents not only understood the meaning of SAM but also were well knowledgeable of the signs of SAM and complications associated with it. For instance, the loss of weight (100%), sunken eyes (94%), and loss of appetite (91%) were the most known signs of SAM among caregivers. On the other hand, respondents noted that death (98%), frequent illness (98%), slowed growth (94%) and mental retardation (86%) were the most known complications associated with SAM.

Table 7: The level of understanding about SAM among Caregivers

Variables		Overall		D		ND	
		N	%	n	%	n	%
Meaning of SAM	Wasting (Low Weight - for - height/Length.)	193	79	53	65	140	86
	Stunting (Low height -for - age)	195	80	54	66	141	87
	Underweight (Low Weight-for-age)	231	95	80	98	151	93
Signs of SAM	Loss of Weight	244	100	82	100	162	100
	Severe Dehydration	218	89	72	88	146	90
	Oedema	204	84	71	87	133	82
	Loss of Appetite	223	91	75	91	148	91
	Sunken Eyes	230	94	81	99	149	92
	Potbelly	216	89	73	89	143	88
	Thinning of Hair	186	76	62	76	124	77
	Others (Specify)	13	5	6	1	7	1
Complications associated with SAM	Slowed growth milestones	230	94	77	94	153	94
	Mental Retardation	211	86	72	88	139	86
	Frequent illness	238	98	81	99	157	97
	Psychological Trauma	161	66	60	73	101	62
	Death	239	98	81	99	158	98

Note: *N* – frequency (*N* = 244), *n* – sub-frequencies, % - percentage, *D* – Defaulters, *ND* – Non-defaulters.

4.4 Factors associated with default rate in severe acute malnutrition OTC in Lamwo and Omoro district.

The results of binary logistic regression for drivers of defaulting across both Lamwo and Omoro districts are presented in Table 9. The model was a correct fit for the analysis ($\chi^2 = 59.684$, $p < 0.001$), with the variables correctly describing variations in child OTC default rate

across the two districts ($\chi^2 = 10.9$, $p = 0.207$). The parameters considered measured between 22.5% (Cox & Snell R^2) and 31.2% (Nagelkerke R^2) of the variations in the overall OTC default rate among children from Lamwo and Omoro districts.

Table 8: Predictors of overall OTC default rates in Northern Uganda

Variable		β	S.E.	p-value	OR	95% C.I. for OR	
						Lower	Upper
Perceived effectiveness of OTC Services		-0.284	0.236	0.230	0.753	0.474	1.196
Perceived accessibility and convenience of OTC		-0.190	0.209	0.364	0.827	0.549	1.246
Education	Post-primary	0.349	0.573	0.543	1.418	0.461	4.360
HIV Status	Negative	-0.126	0.452	0.781	0.882	0.363	2.140
Household size		-0.243	1.118	0.828	0.784	0.088	7.014
Age of caregiver		1.040	2.136	0.626	2.830	0.043	186.360
Waiting time	> 60minutes	-1.139	0.482	0.018	0.320	0.124	0.824
Marital Status	Married	0.668	0.422	0.113	1.951	0.853	4.460
	Widowed	0.211	0.928	0.820	1.235	0.200	7.611
Child's height at admission		-11.33	5.110	0.027	0.000	0.000	0.269
Distance to OTC facility							
	<5km	-0.651	0.355	0.067	0.521	0.260	1.047
	> 10km	0.074	0.643	0.908	1.077	0.306	3.799
Health facility level	HCIV	0.982	0.592	0.097	2.669	0.837	8.511
Child's age in Months		0.059	0.019	0.002	1.061	1.021	1.102
Child's sex	Male	-0.224	0.344	0.515	0.799	0.407	1.569
Admission Type	Re-admission	-1.108	0.956	0.246	0.330	0.051	2.151
Type of SAM	Non-edematous	-0.876	0.611	0.152	0.417	0.126	1.380
RUTF	Yes	0.408	1.023	0.690	1.504	0.203	11.163
Other Health conditions	Yes	-0.993	0.376	0.008	0.370	0.177	0.775
Occupation	Others*	0.083	0.455	0.855	1.087	0.446	2.649
Constant		18.526	9.353	0.048	1.1e+8		

Note: Variable(s) in the equation include; The perceived effectiveness of OTC services among Caregivers, Perceived accessibility and convenience of OTC services among Caregivers, Marital status of Caregivers (Dummy coded 1 = Married), Household size, Sex of the Caregiver (Coded 0 = female, 1 = male), Occupation of the Caregiver (Dummy coded 1 = Housewife), Sex of the child (Coded 0 = female, 1 = male, Height of the child at admission, Type of SAM (Coded 0 = edematous, 1 = Non -edematous), Presence of other health conditions (Coded 0 = No, 1 = Yes), Waiting time (Dummy coded 1 = More than 1 hour), Caregiver's level of education (Dummy coded 1 = Post-primary, 0 = Otherwise), Level of Health Facility (Dummy coded 1 = HC IV), and Age (Years) of the Caregiver, RUFT given (Coded 1 = Yes, 0 = No), Distance to the health facility (Dummy coded < 5km = 1, & < 10 km = 1). Dependent variable OTC default status (Dummy coded 1 = Defaulters, 0 = Non-defaulters).

The results indicate that three factors had a significant negative effect on the OTC default rate in northern Uganda. These include waiting time to see the health personnel, the child's height at the time of admission, and the presence or absence of other health conditions. Specifically, the caregivers whose waiting time to see the health workers was more than 1 hour before seeing the medical personnel ($\beta = -1.139$, $p = 0.018$) were 1.139 times less likely to default OTC visits than those who took less than 1 hour of waiting time to see the doctor or medical personnel. An increase in the child's height at the time of admission ($\beta = -11.33$, $p = 0.027$), led to an 11.33 decrease in OTC default rate. Furthermore, children who had other underlying health conditions such as malarial infections, pneumonia, and HIV among others ($\beta = -0.993$, $p = 0.008$) were 0.993 times less likely to default OTC visits than children without any underlying health condition. On the other hand, only one factor - the child's age ($\beta = 0.059$, $p = 0.002$), had a positive influence on the child's OTC default rate, with an increase in age leading to a 0.059 increase in OTC default rates. Among these significant variables, the child's height at admission ($\beta = -11.33$, $p = 0.027$), had the strongest effect on the child OTC default rate.

The results of binary logistic regression for factors influencing child OTC default rate in Omoro district are presented in Table 10. The model was a correct fit for the analysis ($\chi^2 = 73.849$, $df = 20$, $p < 0.001$), with the variables correctly describing variations in child OTC default rate across the Lamwo district ($\chi^2 = 3.559$, $df = 8$, $p = 0.895$). The parameters considered measured between 53.3% (Cox & Snell R^2) and 73.0% (Nagelkerke R^2) of the variations in OTC default rate among children from Omoro district.

Table 9: Predictors of overall OTC default rates in Omoro district

Variables		β	S.E.	p-value	OR	95% C.I.for OR	
						Lower	Upper
Perceived effectiveness of OTC services		-0.201	0.568	0.724	0.818	0.268	2.492
Perceived accessibility and convenience of OTC		-1.389	0.594	0.019	0.249	0.078	0.798
Education	Post-primary	1.669	1.441	0.247	5.308	0.315	89.458
HIV Status	Negative	27.224	2.3 x10 ⁴	0.999	6.7 x10 ¹¹	0.000	.
Household Size		-0.515	2.307	0.823	0.598	0.006	55.024
Age of Caregiver		9.861	6.151	0.109	1.9 x10 ⁴	0.111	3.3x10 ⁹
Waiting time	> 1 hour	15.666	4.0 x10 ⁴	1.000	6.4 x10 ⁶	0.000	.
Marital status	Married	3.350	1.532	0.029	28.508	1.414	574.646
	Widowed	0.308	1.997	0.878	1.360	0.027	68.160
Child's height at admission		-3.718	15.071	0.805	0.024	0.000	1.6 x10 ¹⁰
Distance to OTC facility							
	< 5 km	-3.407	1.511	0.024	0.033	0.002	0.640
	> 10 km	0.568	1.320	0.667	1.764	0.133	23.449
Health facility level	HCIV	0.281	1.163	0.809	1.324	0.136	12.928
The child's age in months		0.109	0.044	0.014	1.115	1.022	1.217
Child's sex	Male	-0.890	0.866	0.304	0.411	0.075	2.240
Type of Admission	Re-admission	0.225	1.592	0.887	1.253	0.055	28.360
Type of SAM	Non-edematous	19.082	4.0 x10 ⁴	1.000	1.9 x10 ⁸	0.000	.
RUTF	Yes	-0.734	2.063	0.722	0.480	0.008	27.407
Other Health conditions	Yes	-0.050	0.971	0.959	0.951	0.142	6.386
Occupation	Other*	20.480	1.3 x10 ⁴	0.999	7.8 x10 ⁸	0.000	.
Constant		-77.179	4.8 x10 ⁴	0.999	0.000		

Note: Variable(s) entered include: Perceived effectiveness of OTC services among Caregivers, Perceived accessibility and convenience of OTC services among Caregivers, Marital status of Caregivers (Dummy coded 1 = Married), Household size, Sex of the Caregiver (Coded 0 = female, 1 = male), Occupation of the Caregiver (Dummy coded 1 = Housewife), Sex of the child (Coded 0 = female, 1 = male, Height of the child at admission, Type of SAM (Coded 0 = edematous, 1 = Non -edematous), Presence of other health conditions (Coded 0 = No, 1 = Yes), Waiting time (Dummy coded 1 = More than 1 hour), Caregiver's level of education (Dummy coded 1 = Post-primary), Level of Health Facility (Dummy coded 1 = HC IV), and Age (Years) of the Caregiver, RUFT given (Coded 1 = Yes, 0 = No), Distance to the health facility (Dummy coded < 5km = 1, & < 10 km = 1), Dependent variable OTC default status (Dummy coded 1 = Defaulters, 0 = Non-defaulters).

The results indicate that only four factors that are marital status, the attitude of caregivers towards accessibility and convenience of OTC services, distance to the OTC facility, and child's age had a significant influence on OTC default rates. Precisely, marital status positively

influenced the OTC default rate, in that children or infants whose caregivers were married ($\beta = 3.35$, $p = 0.029$) were 3.35 times more likely to default OTC visits than those whose caregivers were either single, divorced, or widowed. Similarly, the age of the child ($\beta = 0.109$, $p = 0.014$), had a positive influence on the child's OTC default rate, with an increase in the child's age leading to a 0.109 increase in OTC default rates. On the other hand, the results indicate that the perceived accessibility and convenience of OTC ($\beta = -1.389$, $p = 0.019$) negatively influenced the child OTC default rate, with an increase in the mean perception towards accessibility and convenience factor leading to a 1.389 decrease in OTC default rate. Similarly, the distance to the OTC facility negatively influenced OTC default rates, with children residing less than five kilometers (5km) ($\beta = -3.407$, $p = 0.024$) from the OTC facility being 3.407 times less likely to default OTC visits than those staying beyond five kilometers from the OTC facility. Of all these significant factors, the distance to the OTC facility being less than five kilometers ($\beta = -3.407$, $p = 0.024$) had the strongest impact on child OTC default rates in the Omoro district.

The results of binary logistic regression for factors influencing child OTC default rate in Lamwo district are presented in Table 11. The model was a correct fit for the analysis ($\chi^2 = 47.627$, $df = 18$, $p < 0.001$), with the variables correctly describing variations in child OTC default rate across Omoro districts ($\chi^2 = 15.088$, $p = 0.411$). The parameters considered measured between 29.4% (Cox & Snell R^2) and 41.1% (Nagelkerke R^2) of the variations in OTC default rate among children in Lamwo district.

The results indicate that only two factors had a significant effect on the child OTC default rate in Lamwo district. These include the perceived accessibility and convenience of OTC, and the presence of other health conditions.

Table 10: Predictors of overall OTC default rates in Lamwo district

Variable		β	S.E.	p-value	OR	95% C.I. for OR	
						Lower	Upper
Perceived effectiveness of OTC Services		0.596	0.563	0.289	1.815	0.603	5.467
Perceived accessibility and convenience of OTC		1.669	0.673	0.013	5.306	1.418	19.865
Education	Post-Primary	0.423	0.932	0.650	1.527	0.246	9.489
HIV Status	Negative	-0.639	0.516	0.216	0.528	0.192	1.452
Household size		0.403	1.972	0.838	1.496	0.031	71.331
Age		-1.304	3.208	0.684	0.272	0.001	145.986
Waiting time	> 60 minutes	-0.925	0.551	0.093	0.397	0.135	1.168
Marital status	Married	0.303	0.560	0.588	1.354	0.452	4.055
	Widowed	22.591	4.0	1.000	6.5	0.000	.
			$\times 10^4$		$\times 10^9$		
Child's height at admission		-6.902	8.114	0.395	0.001	0.000	8.1 $\times 10^3$
Distance to OTC facility	< 5km	-0.845	0.485	0.081	0.429	0.166	1.111
	> 10 km	-20.454	2.3	0.999	0.000	0.000	.
			$\times 10^4$				
Child's age in Months		0.022	0.034	0.512	1.022	0.957	1.093
Child's sex	Male	0.205	0.478	0.668	1.228	0.481	3.130
Admission Type	Re-admission	-19.820	1.4	0.999	0.000	0.000	.
			$\times 10^4$				
Type of SAM	Non-Edematous	-0.308	0.795	0.698	0.735	0.155	3.491
Other health conditions	Yes	-1.134	0.545	0.037	0.322	0.111	0.935
Occupation	Others	-0.650	1.037	0.531	0.522	0.068	3.984
Constant		14.969	14.980	0.318	3.2		
					$\times 10^6$		

Note: Variable(s) entered include; Perceived effectiveness of OTC services among Caregivers, Perceived accessibility and convenience of OTC services among Caregivers, Marital status of Caregivers (Dummy coded 1 = Married), Household size, Sex of the Caregiver (Coded 0 = female, 1 = male), Occupation of the Caregiver (Dummy coded 1 = Housewife), Sex of the child (Coded 0 = female, 1 = male, Height of the child at admission, Type of SAM (Coded 0 = edematous, 1 = Non -edematous), Presence of other health conditions (Coded 0 = No, 1 = Yes), Waiting time (Dummy coded 1 = More than 1 hour), Caregiver's level of education (Dummy coded 1 = Post-primary), Level of Health Facility (Dummy coded 1 = HC IV), and Age (Years) of the Caregiver, RUTF given (Coded 1 = Yes, 0 = No), Distance to the health facility (Dummy coded < 5km = 1, & > 10 km = 1), Dependent variable OTC default status (Dummy coded 1 = Defaulters, 0 = Non-defaulters).

Precisely, the results indicate that the perceived accessibility and convenience of OTC ($\beta = 1.669$, $p = 0.013$) positively influenced child OTC default rate, with an increase in the mean perception towards accessibility and convenience factor leading to a 1.669 increase in OTC default rate. On the other hand, the results indicate that the presence of other health conditions

negatively influenced child OTC default rates, with children that had other health conditions ($\beta = - 1.134$, $p = 0.037$) being 1.134 times less likely to default OTC visits than those that did not have any other health condition such as malaria, and pneumonia, among others. Among these predictors, the perceived accessibility and convenience of OTC services had the strongest influence on OTC default rates in the Lamwo district ($\beta = 1.669$, $p = 0.013$).

CHAPTER FIVE: DISCUSSIONS

5.1 Introduction

The study aimed at investigating the perceptions and factors influencing default rate in the management of severe acute malnutrition among children 6-59 months at outpatient therapeutic centers in Lamwo and Omoro district, northern Uganda. Specifically, it sought to determine the default rates in the management of acute malnutrition among children 6-59 months at outpatient therapeutic centers in Lamwo and Omoro districts, northern Uganda, assessed the perception of caregivers on the effectiveness of OTC programs for managing acute malnutrition in Lamwo and Omoro districts, Northern Uganda the factors associated with default rate in the management of acute malnutrition OTC in Lamwo and Omoro district, Northern Uganda. This section therefore presents discussion to the key findings from the study according to the stated objectives.

5.2 Prevalence of OTC Default Rates in Northern Uganda

Outpatient therapeutic care (OTC) – an approach designed for the management and treatment of severe acute malnutrition (SAM) among patients diagnosed without any medical complications and has appetite (MOH, 2016; Yebyo, 2013), is essential in SAM management services closer to the community through decentralized treatment points at selected primary health care (PHC) points, use of ready to use therapeutic foods (RUTF), as well as community outreach and mobilization (WHO, 2013; Yebyo, 2013). As a result, the community's active involvement in, and adherence to this program is not only critical for its success but also attainment of desired patient treatment outcomes. This study therefore aimed at assessing the default rates of OTC programs – which is the proportion of individuals who fail to adhere to the recommended dosage and administration schedule (MOH, 2010), in northern Uganda, with reference to Lamwo and Omoro districts,

The observation that about one-third of the OTC patients do not follow through with their OTC regimens - default OTC visits could be attributed to the prevailing economic constraints that lead to non-adherence. This is because individuals prioritize other commitments and financial needs over either taking back their children for further management or purchasing OTC medications. This implies that economic challenges may influence caregiver's ability to consistently purchase and use OTC medications, as well as spare time to take children for OTC reviews. Additionally, the lack of knowledge about the importance of adhering to medication schedules can also result in higher default rates in the region. This is particularly driven by the observed low levels of education levels among caregivers across both regions. This greatly affects adherence to OTC programs, an outcome that is likely to endanger the lives of children in this region. The high prevalence of OTC default rates in this area could also be attributed to variations in the availability of medications and access to pharmacies. Given that Omoro and Lamwo districts are primarily rural and underserved areas with a heightened proportion of marginalized communities, limited access to OTC medications at health facilities may contribute to higher default rates. These findings highly contrast with studies conducted by Kabalo & Seifu (2017), Mbaya (2015), Yebyo et al. (2013), Okello (2016), Abate et al. (2020), Mwanza et al. (2016), and a report by WHO reported a 2.2%, 2.8%, 13.85%, 15%, 16%, 17.2% default rates. This is an indication that the rate of OTP default among children under five years in Lamwo and Omoro districts, and by extrapolation, Northern Uganda remains alarmingly higher than the global standards (Yebyo et al., 2013). These findings are similar to those by Al Amad et al. (2017) and Saaka et al. (2015) who reported that there were high OTC default rates in Yemen and Ghana respectively. This poses a significant threat to public health as it can lead to relapse or re-occurrence of SAM among defaulters and hence prolonged illness, development of complications, and increases the overall disease burden in the community (Teshale et al., 2023). This not only strains healthcare resources but also results in higher morbidity and mortality rates, and increased healthcare costs due to more frequent hospital visits, additional

treatments, and extended illness durations. Additionally, OTC default rates can potentially lead to the development of antibiotic-resistance - a serious threat to public health. Thus, adherence to prescribed dosages is crucial in mitigating this risk.

Whereas the findings of this study are similar to findings by Ssekajja et al. (2022), who reported a 58% prevalence of OTC default rate in western Uganda, it is imperative to note that the prevalence of OTC default rates in northern Uganda is approximately 20% lower. This positive outlook can be attributed to continued awareness creation programs spearheaded by both the government and NGOs to reduce SAM, especially among refugee populations.

5.3 Perception of Caregivers on the Effectiveness of OTC Programs for Managing Severe Acute Malnutrition in Lamwo and Omoro Districts.

The study provides a comprehensive analysis of caregivers' perceptions regarding the effectiveness of Outpatient Therapeutic Centers (OTCs) in managing Severe Acute Malnutrition (SAM) among children aged 6-59 months in Lamwo and Omoro districts. The exploratory factor analysis of Likert scale items revealed two key factors: the effectiveness of OTC services and the accessibility and convenience of these services. These findings align with and contribute to the existing body of literature on the management of acute malnutrition in similar settings.

The high mean scores and factor loadings associated with these items indicate that caregivers generally perceive OTC services as effective in managing SAM. This positive perception is crucial as it suggests a high level of trust in the therapeutic interventions provided by OTCs, which is consistent with the findings of Owour *et al.*, (2015), who noted that the perceived safety and efficacy of therapeutic programs are critical for caregiver compliance and successful SAM management.

Despite the high loadings, the mean scores for these items were relatively low, indicating negative perceptions regarding accessibility and convenience. This aligns with previous research by Carr *et al.* (2016) and Passwater & Itano (2018), who highlighted those logistical challenges, such as travel time and clinic visit frequency, can significantly impact caregivers' ability to adhere to treatment protocols.

Caregivers' positive perceptions regarding the effectiveness of OTC services resonate with the broader literature, which underscores the importance of structured therapeutic interventions and supportive environments in the management of SAM (Ruel *et al.*, 2013; Toth *et al.*, 2023).

The negative perceptions related to accessibility and convenience highlight significant barriers that can lead to higher default rates. This finding is supported by previous studies that emphasize the critical role of service accessibility in healthcare utilization and adherence (Jamison *et al.*, 2017; Berglund *et al.*, 2019).

The study also found significant differences between caregivers' perceptions in Lamwo and Omoro districts. Caregivers in Omoro had higher positive perception scores for the effectiveness of OTC services, while those in Lamwo reported more challenges with accessibility and convenience. These differences could be attributed to variations in the implementation and infrastructure of OTC programs, which warrants further investigation to tailor interventions more effectively.

5.4 Factors Influencing OTC Default Rates in Lamwo and Omoro

Several factors ranging from environmental, socio-economic, individual demographic, and institutional factors among others influence the rate of outpatient therapeutic care (OTC) default rates, and hence determine its effectiveness in managing SAM across different societal settings. Similarly, this study's findings present an overview of the factors influencing the

outpatient therapeutic care (OTC) default rate in the management of severe acute malnutrition (SAM) in northern Uganda.

Firstly, the finding that longer waiting time (i.e., more than one hour) negatively influenced OTC default rates may be associated with better retention in care. This could be attributed to the fact that caregivers are often motivated to ensure that their children obtain the necessary care and hence committed and willing to wait longer. Longer waiting times could be reflective of the higher perceived value and quality of OTC healthcare services being provided, leading to increased adherence. Interestingly, given the average distance to OTC facilities, longer waiting times also give caregivers and their children enough time to get enough rest (Kabalo & Seifu, 2017). This is further explained by the observation that caregivers had a negative perception of the accessibility of OTC facilities. This implies that reducing waiting times alone may not significantly reduce OTC default rates, but rather, improving healthcare experience, caregiver engagement, and logistical requirements may be more effective strategies. Additionally, the preference for longer waiting times may be explained by the fact that caregivers have a higher level of commitment and patience, which leads to increased adherence to the OTC visit schedule. These caregivers may also have a greater understanding of the importance of follow-up visits, and the risks of non-compliance and may possess fewer competing responsibilities that allow them to wait longer for care. However, these findings contrast with those by Rosen et al. (2013) who adduce that longer waiting times often increase the healthcare default rates. Nonetheless, health facilities ought to consider an integrated approach in designing interventions like the provision of education and childcare support services during wait times that maintain caregiver motivation and commitment.

Additionally, the finding that existing comorbidities like malaria, pneumonia, and HIV negatively influenced OTC default rates are synonymous with those by Yebyo et al. (2013)

who adduce that the presence of other health conditions influenced OTC treatment outcomes. Abate et al. (2020) in their study also assert that the presence of comorbidities such as diarrhea and cough significantly influence OTC treatment outcomes. This can be explained by the fact that children with additional health conditions often receive more comprehensive and frequent medical attention. This enhances caregiver engagement and adherence to OTC visits. In the same vein, the complexity of managing multiple health issues could also increase caregivers' awareness of the significance of regular medical follow-ups as well as their commitment to the designed treatment regimes. As such, OTC programs ought to put in place integrated and comprehensive healthcare approaches that not only address SAM but also consider treating coexisting health conditions.

On the other hand, the finding that a child's age positively influenced OTC default rates can be attributed to variations in the perceived urgency of treatments, with younger children considered more fragile and hence requiring comprehensive attention than older children. This ultimately leads to increased OTC default rates among older children. These findings are synonymous with those by Ali *et al.* (2016) who assert that the age of the child is an influential factor in OTC default rates, with an increase in age leading to an increase in OTC default rate. Rahman & Rahman (2016) also note that once children reach the age of 3, caregivers often treat them as grownups and hence will always get better with the general family food. According to Waruguru & Kamau (2024), age significantly influences OTC outcomes, including default rates. This, therefore, calls for tailored interventions especially the provision of age-specific education and support to address both specific needs and challenges of older children in SAM programs.

Contrastingly, the observation that the child's height at the time of admission negatively affected the OTC default rate could be attributed to the fact that taller children at the time of

admission may represent cases with less severe malnutrition. This leads to positive outcomes and higher caregiver confidence in the treatment process, an aspect that increases adherence to the therapeutic regimen. Therefore, to enhance this, early detection and interventions during routine child growth monitoring and nutritional support should be prioritized to improve treatment outcomes and reduce default rates.

Furthermore, the observation that accessibility and convenience of OTC services negatively affected default rates can be explained by prevailing logistical challenges and long distances to OTC facilities that hamper the ease of collecting supplements, attending feeding programs, and importantly adhering to weekly reviews. This finding agrees with a study by Al Amad et al. (2017) in Yemen, who reported that poor accessibility affects OTC treatment outcomes. Ashworth (2006) also asserts that the cost of RUTF and the associated sustainability of the logistics required during procurement and distribution, and sustainability must be considered during the implementation of OTC programs. Odikro et al. (2021) in their study further adduce that distant movements to OTC facilities lead to the loss of time, a significant resource that could have been invested in livelihood and economic activities. This implies that improving transportation options, in addition to optimizing clinic schedules, increasing the number of OTC service facilities to reduce distances, as well as reducing wait time could enhance caregiver engagement and adherence to OTC programs. Sserwanja et al. (2023) also note that ensuring easy access, providing proper infrastructure, and enhancing community engagement are essential for optimizing the outcomes of OTC in the management of SAM.

Marital status emerged as a significant predictor in Omoro district, where married caregivers were more likely to have children default on OTC visits. This finding suggests that family dynamics and responsibilities could play a role in healthcare-seeking behaviors, aligning with studies that highlight socioeconomic factors influencing healthcare utilization (Warth *et al.*,

2019). Specifically, the increased odds of OTC defaults among children of married caregivers can be attributed to increased responsibilities among married caregivers. This resultantly leads to limited time as they devote most of much time to other household chores, livelihood, and income-earning activities. Given that the majority of caregivers were female, the difficulties associated with finding alternative caretakers for other children at home could have also exacerbated OTC treatment default rates.

Lastly, from the outcomes of this study, it is evident that waiting time to see health personnel, the child's height at admission, and the presence of other health conditions significantly reduce default rates. On the other hand, an increase in children's age leads to a rise in OTC default rates in this region. This therefore calls for the adoption of multifaceted and comprehensive approaches ranging from early detection, comprehensive care, and tailored interventions to address the unique challenges across child demographics. This is not only essential for improving adherence to therapeutic care and ultimately enhancing the health outcomes of malnourished children but also improves the establishment of public health strategies and policies targeting SAM management.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of Results

From the aims of this study, that is to determine the default rates in the management of Severe acute malnutrition among children 6-59 months at outpatient therapeutic centers in Lamwo and Omoro districts, northern Uganda, assess the perception of caregivers on the effectiveness of the OTC programs and lastly to determine factors associated with default rate in Severe acute malnutrition OTC management. The following key findings have been found.

The overall OTC default rate in northern Uganda is 34%, with only a slight variation between the districts studied. Regarding the perceptions of caregivers towards the effectiveness of OTC services in managing SAM, the results indicate that overall, caregivers had a positive perception (MS =3.70) towards the effectiveness dimension of the OTC services, with significant ($P < 0.001$) variations in the perceptions as caregivers from Omoro district were more positive (MS = 3.91) towards OTC effectiveness than those in Lamwo (MS = 3.51). On the other hand, caregivers generally had a negative perception (MS=2.3) towards the accessibility and convenience dimension of OTC services.

Marital status, distance to the OTC facility, child's age influenced OTC default rates in Omoro district, while the presence of other health conditions influenced OTC default rates in Lamwo district. The perceived accessibility and convenience of OTC influenced default rates in both districts. For the pooled Northern Uganda samples, the waiting time to see the health personnel, the child's height at the time of admission, and the presence or absence of other health conditions had a significant effect on the OTC default rate.

6.2 Conclusions

The prevalence of OTC default rates is significantly high in northern Uganda, and it is consistent across Lamwo and Omoro districts. This poses a significant challenge in the management of SAM in this region. Whereas caregivers have a positive attitude toward the effectiveness of OTC services, they have a negative attitude toward its convenience and accessibility. This can potentially increase the rate of OTC defaults in the region. The fact that waiting time to see health personnel, marital status, child's height at admission, distance to OTC facility, child's age and the presence of other health conditions significantly influenced OTC default rates in this region re-emphasizes the significant role of sociodemographic, and institutional factors, as well as the physiological state of the child in the community management of SAM.

6.3 Recommendations

6.3.1 Recommendations for practice

- i. Tailored educational programs on the importance of OTC adherence and the risk of non-compliance should be implemented to reduce default rates. This can be done in conjunction with clear communication by health providers during caregiver OTC facility visits.
- ii. Targeted interventions like the establishment of support systems which include reminder services, follow-up calls, and recruitment of community-based health workers can help patients adhere to their OTC medications.
- iii. Regular nutritional assessments through tailored interventions such as community-based monitoring, tailored nutritional support, and follow-up visits should be implemented to ensure all children receive comprehensive care.

6.3.2 Recommendations for Policy

- iv. Policy interventions such as increased funding for healthcare services or subsidizing the cost of OTC medications in rural and underserved areas will not only improve access to medications and healthcare professionals but also alleviate financial barriers that facilitate OTC defaulting.
- v. Efforts should be made to increase OTC facility staffing during peak hours, efficient appointment scheduling, and streamline administrative processes to not only reduce the waiting time but also improve caregiver perceptions towards OTC services.
- vi. Since presence of other medical conditions enhanced adherence to OTC treatment, policies that support integrated care models addressing both malnutrition and comorbidities should be adopted to enhance adherence to OTC treatments and improve the general wellbeing of children under the age of five years.
- vii. Equitable investment in infrastructure, such as more accessible clinics, road networks, and mobile health units, can alleviate some of the logistical challenges faced by caregivers (such as long travel distance) and hence improve the accessibility of OTC products and services.

6.4 Limitations of the Study

This study was limited by the fact that being a retrospective design, it was subject to recall bias. Similarly, the community interviews were complicated by difficulties in accessing participants' homes due to poor terrain and bad weather conditions. This significantly affected the expected number of respondents for this study

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APPENDICES

Appendix I: Inform Consent Form

Title of the study: Factors influencing default rate in the management of acute malnutrition among children under 6-59months at outpatient therapeutic center in northern Uganda

Investigator: Amony Paska

Institution: Gulu University

Introduction:

My name is Amony Paska, a student of Master of Science in Food Security and Community Nutrition at Gulu University. I am conducting research on “**Factors influencing Default rate in the management of acute malnutrition among children under the age of 6-59 months at outpatient therapeutic care.**” The study is disclosed to you in this informed consent, after which any questions you may have are answered. Having decided to participate in the study, you will be asked to sign a consent.

Purpose: This study seeks to determine factors that influence the default rate in the management of acute malnutrition at out-patient therapeutic care in northern Uganda.

Procedures:

Your participation in this study will involve filling out a questionnaire with the researcher, taking part in the measurement of the child's nutrition status, and allowing the researcher to take anthropometric measurements such as height/length, weight, MUAC, and Z-scores.

You have been chosen to participate in this study because you are a caregiver of a child between 6-59months

Who will participate in the study? Caregivers of malnourished children aged 6-59 months at outpatient therapeutic care.

Risks/discomforts:

There is no foreseeable risk of harm or discomfort that will arise from your participation in this study.

Benefits:

There will be no financial benefits from this study however one bar of soap will be given to each participant after the 1hour interview. If interested as a participant, you will get feedback on the findings and progress of the study and any new information that affects the study participants (including incidental findings).

Confidentiality:

Your identity will not be revealed to anyone as we shall only use codes to identify participants.

Information obtained will only be accessible to the research team. Soft copies of the data will be protected by password and hard copy files will be kept under lock and key. Confidential information will only be accessed by the principal investigator.

Alternatives:

You do not have to participate in this study if you are not interested.

Cost:

There will be no additional cost incurred as a result of participating in this study.

Questions:

If you have any questions related to the study or your rights as a research participant, you can contact the principal investigator, Amony Paska by telephone number 0777673039 or via email at papaskline91@gmail.com

Statement of voluntariness:

Participation in the research study is voluntary, and you may join on your own free will. You have a right to withdraw from the study at any time without penalty.

If you have any issues pertaining to your rights and participation in the study, please contact the Chairperson, Gulu University Research Ethics Committee, Dr. Gerald Obai Tel: No., 0772305621; email: lekobai@yahoo.com/lekobai@gmail.com; or the Uganda National Council for Science and Technology, on plot 6 Kimera Road, Ntinda, Kampala on Tel 0414705500.

Statement of consent:

The research team has described to me what is going to be done, the risks, the benefits involved, and my rights as a participant in this study. I understand that my decision to participate in this study will not affect me in any way. In the use of this information, my identity will be concealed. I am aware that I may withdraw at any time. I understand that by signing this form, I do not waive any of my legal rights but merely indicate that I have been informed about the research study in which I am voluntarily agreeing to participate.

Name of child.....

Name of the caregiver/parents/guardian.....
signature/thumbprint.....Date.....

Name of the witness.....signature/thumbprint.....Date.....

Name of the interviewer.....Signature/thumbprint.....Date.....

Appendix II: Data Collection Tools - Questionnaires

Institution: Gulu University

Faculty: Agriculture and environment

Department: Food Science and Post-Harvest Technology

Title of Study: Factors influencing default rate in the management of acute malnutrition among children under 6-59months at outpatient therapeutic center in Northern Uganda

Survey Questionnaire

Introduction

Dear Respondent!

I am **AMONY PASKA**, a student at Gulu University, pursuing a Master of Science in food security and community nutrition. I am carrying out research titled **“factors influencing default rate in the management of acute malnutrition among children aged 6-59 months at outpatient therapeutic center using a case study of northern Uganda”**. I therefore humbly request you to spare your time and fill out this questionnaire. Please be assured that all the information you give here will be strictly for academic purposes and will be treated with great confidentiality. Furthermore, there will be no financial gain from this activity.

Thanks for your time.

Part 1: General Information

S/ No	Part 1: General Information	
1.0	Household ID number:	
1.1	Interviewer's initials	Date of Interview
1.2	Time of Interview: Start	End
1.3	Location of Residence	Sub county..... Parish..... Village/ LC 1 Zone:
1.4	Name of Health Facility	
1.5	Level of health facility	1=HC III 2=HC IV 3=General/District Hospital 4=Referral Hospital
1.6	Location of health facility	1=Urban 2=Rural
Part 2: Socio-demographic characteristics of the respondent		
2.0	Age (years)	
2.1	Sex	1. Male

		2. Female
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2.2	Marital Status	1. Single 2. Married 3. Divorced/separated 4. Widowed
2.3	Level of Education	i) No formal education ii) Primary iii) Secondary iv) Tertiary v) University vi) Others, specify.....
2.4	Main Economic occupation	1. Formally employed 2. Casual laborers 3. Self-employed/Business 4. Subsistence Farmer 5. Domestic house worker 6. Other (specify)
	Estimated Monthly income	
2.5	Family size	
2.6	Household size	
2.7	Have you heard of any health education on Malnutrition?	1. Yes 2. No
2.8	What do you understand by the term severe acute malnutrition (SAM)?	1. Wasting 2. Stunting 3. Underweight
2.9	What are some of the signs of severe acute malnutrition? (Tick as many as applicable)	1. Loss of weight 2. Severe dehydration 3. Oedema 4. Loss of appetite 5. Sunken eyes 6. Pot belly 7. Thinning of hair 8. Others-specify..... ...
2.10	What are some of the complications associated with SAM? (Tick as many as applicable)	1. Slowed growth milestones 2. Mental retardation 3. Frequent illness 4. Psychological trauma 5. Death

		6. Others specify
2.1 1	Where do you usually take children with SAM for treatment?	1. Health facility 2. VHT 3. Traditional practitioner 4. No action
2.1 2	If yes, how frequently do you receive this support	1. Every time you request 2. Sometimes
2.1 3	What type of socio-economic support do you receive? (Tick as many as applicable)	1. Financial 2. Material 3. Psycho-social e.g., peer counseling, neighbor staying with other children as you take a sick child to the health facility.
Part 3: Determination of the default rate in the management of acute malnutrition <i>(This information is to be extracted from the INR-integrated Nutrition Register)</i>		
Facility Name		
Study Number		
Date		
Child's demographic information		
3.0	Age (months)	
3.1	Sex	1. Male 2. Female
3.2	Birth Order	1. One 2. Two 3. Three 4. More than three (specify)
3.4	Religion	
3.5	Residence	0. Urban 1. Rural
3.6	Type of admission	0. New admission 1. Re-admission
3.7	HIV Status	0. Negative 1. Positive 2. Exposed

		3. Unknown
3.8	If HIV infected or exposed, is the child on CTX?	1. Yes 2. No 3. Unknown
3.9	If HIV infected or exposed, is the child on ART?	1. Yes 2. No 3. Unknown
3.10	If on ART, how long was the child on ART?	
3.11	Initial date of admission	
3.12	Was the Appetite test done?	1. Yes 2. No
3.13	If yes, did the child pass the appetite test?	1. Yes 2. No
3.14 Admission Anthropometry		
	Weight	
	Height/Length	
	MUAC	
	WFH/L z-score	
3.15	Type of SAM	1. Oedematous 2. Non-Oedematous
3.16	Was RUFT given	1. Yes 2. No
3.17 Treatment outcome		0. Cured 1. Non-response 2. Died 3. Defaulted 4. Transfer out
3.18 Date of outcome/exit		
3.19 Time interval to the reported outcome		
	If cured, the length of stay for patients cured	
	If died, the time between admission and death (days/hours)	
	If defaulted, the time between admission to defaulting	
	If non response, the overall duration in the program	
	If transferred out, the time between admission to transfer	
3.20 Exit Anthropometry		
	Weight	
	Height/Length	
	MUAC	
	WFH/L z-score	
3.21	Did the child suffer from any other health condition apart from SAM in the last three months?	1. Yes 2. No

3.2 2	If yes, what conditions did the child suffer from? (Tick as many as applicable)	1. Malaria 2. RTIs/Cough 3. Pneumonia 4. TB 5. HIV 6. Others				
Other information						
A	Has the child attended all the required visits after admission to OTC?	1. Yes 2. No				
B	If no, how many visits (s) have the child missed?	1. Once 2. Twice 3. More than two times				
C	If more than two times, has the child consecutively missed visits?	1. Yes 2. No				
Part 4: Assessment of caregiver's perception toward the effectiveness of OTC Instruction: Please answer the following questions according to this rating scale. 5= strongly agree (SA); 4= Agree (A); 3= Not sure (N); 2= Disagree (D); 1= Strongly disagree (SD)						
		S A 5	A 4	N 3	D 2	S D 1
4.0	OTC has made my child gain weight.					
4.1	It is easy to come and collect the supplements at the OTC clinic					
4.2	I have enough time to attend feeding programs at the clinic					
4.3	I consider the child's condition very severe by the time I brought him/her to OTC					
4.4	OTC treatment program is safer for a malnourished child					
4.5	It's easy for me to feed my child on RUTF prescribed in OTC					
4.6	I am able to bring my child every week to the OTC for review					
4.7	The physical environment of OTC is healthy for the malnourished child					
4.8	I believe that OTC best way to cure children of malnutrition					
4.9	Staff greet mothers/caregivers and are friendly					
4.10	Childs appetite test is done using RUTF upon admission					
4.11	Health and nutrition education sessions held					
4.12	Correct quantities of RUTF distributed are adequate for my child					

SUGGESTIONS		
Instruction: Give any three ways how the program can be improved		
1.....		
2.....		
3.....		
Part 5: Assessment of factors associated with the respondents' failure to adhere to OTC		
5.0	Waiting time	
	a) How long does it take you to see the clinician/nurse once you have been registered?	1. within 30 minutes 2. 30-60 minutes 3. More than 60 minutes
	b) Do you think this time affects your decision for the repeat visits?	1. Yes 2. No
5.1	Health facility staffing	
	a) During your stay on the program, have you ever come to the health facility and there is no health worker available to serve you?	1. Yes 2. No
	b) Would it affect your decision to come back for repeat visits?	1. Yes 2. No
	c) Please explain in what way.	
	d) How do you rate the health workers' attitude toward providing you with OTC services?	1. Strongly negative 2. Moderately negative 3. Slightly positive 4. Moderately positive 5. Strongly positive
	e) Does this attitude of the health workers affect your decision to come back for repeat visits?	1. Yes 2. No
	f) Specify in which way it affects you	
	g) Have you ever been to the OTC clinic and found the medicines or feeds out of stock	1. Yes 2. No
5.2	Proximity to OTC facility	
	a) What is the distance in kilometers from your home to the nearest OTC facility?	1. Less than 5 Km 2. 5-10 Km 3. More than 10 Km
	b) How long does it usually take you to reach the OTC facility?	1. Less than 30 minutes 2. 30 to 60 minutes 3. More than 60 minutes

	c) What means of transport are available for you to move to the OTC facility?	1. Foot 2. Bicycle 3. Motor vehicle 4. Other specific
	d) Do you have to pay for transport to the facility?	1. Yes 2. No
	e) If yes, are you able to pay?	1. Yes 2. No
	f) How much do you usually pay?	
	g) Does proximity to the facility affect your decision to attend the OTC clinic?	1. Yes 2. No
	h) Is the OTC facility reachable to you throughout the year?	1. Yes 2. No
	i) If not, what are the reasons	1. Transport is hard to find 2. Poor roads due to bad weather 3. Unfriendly terrain 4. Other (Specify)
	j) General comments	
	k) What would motivate you to adhere to all the patient visits at the Individual/Household level?	
	l) What would motivate you to adhere to all the patient visits at the community level?	
	m) What would motivate you to adhere to all the patient visits at the health facility level?	

Thank you

Appendix III: Approval from GUREC

GULU UNIVERSITY

P.O. Box 166, Gulu (U)
Website: www.gu.ac.ug
Email: gurec@gu.ac.ug



Tel: +256 471 432 096
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RESEARCH ETHICS COMMITTEE

16/08/2023

To: PASKA AMONY

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Type: Initial Review

Re: GUREC-2023-589: FACTORS INFLUENCING DEFAULT RATE IN THE MANAGEMENT OF ACUTE MALNUTRITION AMONG CHILDREN 6-59 MONTHS AT OUTPATIENT THERAPEUTIC CARE IN LAMWO AND OMORO DISTRICT, NORTHERN UGANDA

I am pleased to inform you that at the 102nd convened meeting on 18/05/2023, the Gulu University REC meeting voted to approve the above referenced application.

Approval of the research is for the period of 16/08/2023 to 16/08/2024.

As Principal Investigator of the research, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the REC for re-review and approval **prior** to the activation of the changes.
3. Reports of unanticipated problems involving risks to participants or any new information which could change the risk benefit: ratio must be submitted to the REC.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by participants and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Continuing review application must be submitted to the REC **eight weeks** prior to the expiration date of **16/08/2024** in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. You are required to register the research protocol with the Uganda National Council for Science and Technology (UNCST) for final clearance to undertake the study in Uganda.

The following is the list of all documents approved in this application by Gulu University REC:



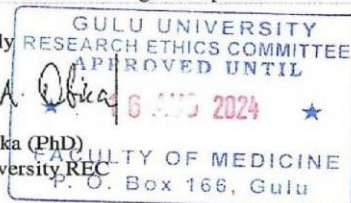
No.	Document Title	Language	Version Number	Version Date
1	Informed Consent forms	ACHOLI	3.0	2023-08-14
2	Informed Consent forms	ENGLISH	3.0	2023-08-14
3	Data collection tools	ENGLISH	3.0	2023-08-14
4	Protocol	English	2.0	2023-07-29
5	Covid -19 risks management plan	English	2.0	2023-07-28

Yours Sincerely

Julaina A. Obika

Julaina A. Obika (PhD)

For: Gulu University REC



Appendix IV: Plagiarism Check

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PLAGIARISM CHECK

Declaration for Originality Form

This form must be completed and signed for all scholarly work produced.

Name: AMONY PASKA (MS.)

Personal File No.(staff) Reg. (student). 21/U/3288/MFN/PS

Faculty/Institute: AGRICULTURE AND ENVIRONMENT, GULU UNIVERSITY

Department: FOOD SCIENCE AND POSTHARVEST TECHNOLOGY

Title and bibliographic description of the work

**FACTORS INFLUENCING DEFAULT RATE IN THE MANAGEMENT OF ACUTE
MALNUTRITION AMONG CHILDREN 6-59 MONTHS AT OUTPATIENT
THERAPEUTIC CENTERS IN LAMWO AND OMORO DISTRICT,
NORTHERN UGANDA**

Declaration.

1. I understand what plagiarism is and I am aware of the University policy on this regard,
2. I declare that this ..., **Dissertation** ... (thesis, Proposal, essay, assignment, paper, report etc.) is my original work and has not been submitted elsewhere for examination, award of a degree or publication. Where other people's work or my work has been used, this has been properly acknowledged and referenced in accordance with Gulu University requirements,
3. I have not sought or used the services of any professional agency to produce this work,
4. I have not allowed, and shall not allow anyone to copy my work with the intention of passing it off as his/her own,
5. I understand that any false claim of this work shall result in disciplinary action in accordance with University Policy on Plagiarism.

Signature 

Date 11/10/2024

Originality Report

The article/thesis/document titled above have been subjected to plagiarism check and the level was found to be.....**18%** (percent) this is classified as:

- ☒ Minor
☐ Moderate
☐ Serious

Yours sincerely,


Manana N Herbert
Ag. University Librarian

