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COLLEGE OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF DEPARTMENT OF HEALTH SYSTEM MANAGEMENT AND HEALTH ECONOMICS

I hereby certify that I have supervised, read, and evaluated the research thesis titled treatment outcomes of outpatient therapy & identify associated factors among 6–59 months of children enrolled in outpatient therapeutic programs (OTP) in Fogera district, Northwest Ethiopia." by Nigussie Wale, prepared under my guidance. I recommend the dissertation be submitted for defense.

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COLLEGE OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF HEALTH SYSTEM MANAGEMENT AND HEALTH ECONOMICS

TREATMENT OUTCOMES AND ASSOCIATED FACTORS AMONG CHILDREN AGED 6–59 MONTHS ENROLLED IN OUTPATIENT THERAPEUTIC PROGRAMS IN FOGERA DISTRICT, NORTHWEST ETHIOPIA

By: NIGUSIE WALE (BSc)

Advisors: **Melese Belayneh (MPh, PhD fellow)**

Tsion Adebabay (Mph)

A THESIS SUBMITTED TO THE DEPARTMENT OF HEALTH SYSTEM MANAGEMENT AND HEALTH ECONOMICS, SCHOOL OF PUBLIC HEALTH, COLLEGE OF MEDICINE AND HEALTH SCIENCES BAHIR DAR UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS IN GENERAL PUBLIC HEALTH

JULY, 2025

BAHIR DAR, ETHIOPIA

BAHIR DAR UNIVERSITY COLLEGE OF MEDICINE AND HEALTH SCIENCES, SCHOOL OF PUBLIC HEALTH, DEPARTMENT OF HEALTH SYSTEM MANAGEMENT AND HEALTH ECONOMICS

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Full title of the thesis	Treatment Outcomes and Associated Factors Among Children Aged 6–59 Months Enrolled In Outpatient Therapeutic Programs in Fogera District, Northwest Ethiopia, 2024.
Total Budget	32,000 ETB
Study period	FROM 1st JUNE 2023- 30th MAY, 2024 G.C
Project Area	Fogera District

✓ Declaration

This is to certify that the thesis on Treatment outcomes of outpatient therapy & identify associated factors among 6–59 months of children enrolled in outpatient therapeutic programs (OTP) in Fogera district, Northwest Ethiopia, submitted in partial fulfillment of the requirements for the degree of masters in general public health Bahir Dar University, is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates.

Nigussie Wale	07/5/2025	Bahir Dar, Ethiopia
Name of the candidate	Date of submission	Place

BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF DEPARTMENT OF HEALTH SYSTEM MANAGEMENT AND HEALTH ECONOMICS

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Approved by

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Department Head Signature
Date

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First and foremost, I would like to thank the Almighty God for granting me the strength, health, and patience to accomplish this thesis.

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Acronyms and Abbreviations

AOR…….. Adjusted Odds Ratio

CI…….. Confidence Interval

CM…… Centimeter

COR…….. Crude Odds Ratio

EDHS…… Ethiopian Demographic and Health Survey

MUAC……. Mid Upper Arm Circumference

OTP…….. Outpatient Therapeutic Program

SAM…….. Severe Acute Malnutrition

SPSS……. Statistical Package for the Social Sciences

TP…… Treatment Period

WHO…… World Health Organization

TABLE OF CONTENTS

Contents

ACKNOWLEDGMENT II
ABSTRACT ..... **Error! Bookmark not defined.**
ABBREVIATIONS ..... **Error! Bookmark not defined.**
TABLE OF CONTENTS IV
LIST OF TABLES VI
LIST OF FIGURES VII
1. INTRODUCTION 1
1.1. Background of the study 1
1.2. Statement of the problem 3
1.3. Significance of the study 4
2. LITERATURE REVIEW 5
2.1. Outcome of treatment of severe acute malnutrition among children 5
2.2. Factors associated with treatment outcomes of severe acute malnutrition 6
2.2.1. Socio-demographic factors 6
2.2.2. Type of malnutrition 7
2.2.3. Routine medication 7
2.3. CONCEPTUAL FRAMEWORK 9
3. OBJECTIVE 10
3.1. General objective 10
3.2. Specific objectives 10
4. METHODS & materials 11
4.1. Study area and period 11
4.2. Study design 11
4.3. Source population and study population 11
4.3.1. Source population 12
4.3.2. Study population 12
4.3.3. Study unit 12
4.4. Inclusion and Exclusion Criteria 12
4.4.1. Inclusion criteria 12

4.4.2. Exclusion criteria 12
4.5. Variables 13
4.5.1. Dependent variable 13
4.5.2. Independent variables 13
4.6. Operational definitions 14
4.7. Sample size determination 14
4.8. Sampling Techniques and Procedures 16
4.9. Data Quality Control Mechanisms 18
4.10. Data processing and analysis 19
5. ETHICAL CONSIDERATION 20
6. RESULT 21
6.1. Sociodemographic characteristics of 6-59 months of children 21
6.2. Anthropologic description of children engaged in OTP in Fogera district 2024 21
6.3. Malnutrition status of children admitted to OTP in Fogera district in 2024..... **Error! Bookmark not defined.**
6.4. Treatments are given to children of 6-59 months undergone OTP 23
6.5. Treatment outcomes of 6-59 months of children in Fogera district. 25
6.6. Bivariate & multivariable analysis 25
7. Discussion 29
8.1. Strength ..... **Error! Bookmark not defined.**
8.2. Limitation ..... **Error! Bookmark not defined.**
9. Conclusion & recommendation ..... **Error! Bookmark not defined.**
9.1. Conclusion 32
9.2. Recommendation 32
10. REFERENCES 34
11. Annex: Questionaries' 37
11.1. Annex 1: Informed consent 37
11.2. Annex 2: English Version Questionnaire 38
Amharic Version Questionnaire 40

LIST OF TABLES

1. Table 1: Sample size calculation of the second objective for a study conducted on treatment outcome of OTP among under-five children in Fogera district, Northwest Ethiopia, 2024.....15
2. Table 2: Sociodemographic characteristics of 6-59 months children undergoing outpatient therapeutic program in Fogera district 2024. from 1st June 2023- 30th May 2024 North west Ethiopia (n=369).....21
3. Table 3: Anthropometric description of 6-59 months of children undergoing outpatient therapeutic program in Fogera district 2024. from 1st June 2023- 30th May 2024 North west Ethiopia (n=369).....21
4. Table 4: Treatment outcomes of OTP of children of 6-59 months in Fogera district from 1st June 2023- 30th May 2024, North West Ethiopia 2024 (n=369).....24
5. Table 5: Bivariate and Multivariable logistic regression analysis of factors affecting treatment outcomes of OTP among 6-59 months of children in Fogera district from 1st June 2023 – 30th May 2024, North West Ethiopia (n=369).....- 20 -

LIST OF FIGURES

Figure 1: conceptual framework for treatment outcome of OTP among under-five children in Fogera district, Northwest Ethiopia, 2024 (11, 12, 14, 16, 19-24). 9

Figure 2: Schematic presentation of sampling procedure of 6-59 months of children in Fogera district in selected health institutions 2024, northwest, Ethiopia.....17

Figure 3: Features of malnutrition of 6-59 months of children admitted to the OTP program in Fogera district from 1st June 2023- 30th May 2024 North West Ethiopia (n=369).....23

Figure 4: overall treatment outcomes of OTP among 6-59 months of children in Fogera district from 1st June 2023 – 30th May 2024, North West Ethiopia (n=369). 25

ABSTRACT

Introduction: Malnutrition, particularly severe acute malnutrition (SAM), remains a major cause of child mortality in low-income countries. While Ethiopia implements the Outpatient Therapeutic Program (OTP) to manage SAM, evidence on treatment outcomes at the district level is limited. Local performance data is essential for improving recovery rates and service quality. This study assesses OTP treatment outcomes and associated factors in Fogera District.

Objective: To assess the magnitude of treatment outcomes and associated factors among children aged 6–59 months enrolled in outpatient therapeutic programs in fogera district, northwest ethiopia, 2024.

Methods: A retrospective facility-based cross-sectional study was conducted using 385 medical records of children from 11 randomly selected health institutions from from 1st june 2023- 30th may, 2024 G.C. Data were collected from August 14 to September 30, 2024, using a structured checklist. After entry into EPI-data version 4.2, then exported to SPSS version 26 for analysis. Bivariable logistic regression identified variables for multivariable analysis ($p<0.25$), Adjusted Odds Ratios (AORs) with 95% Statistical significance was declared at $p < 0.05$.

Results:A favorable treatment outcome (recovered) was attained by 74.0%. At the time of admission, 85.1% of the participants were nursing, and 56.6% of the participants were male. Five factors were found to be significantly related to recovery using multivariable logistic regression. Children discharged with a MUAC between 11.5 and 12.4 cm were five times more likely to recover compared to those with MUAC ≥12.5 cm [AOR = 5.209; 95% CI: 2.244–12.094]. A MUAC gain of 2–5 cm during the treatment period was associated with threefold higher odds of recovery [AOR = 3.008; 95% CI: 1.032–8.770]. In addition, children who received folic acid supplementation had significantly lower odds of recovery [AOR = 0.187; 95% CI: 0.052–0.675], while antibiotic use [AOR = 7.825; 95% CI: 2.914–20.997] and being a new admission [AOR = 4.519; 95% CI: 2.039–10.009] were significantly associated with improved recovery outcomes.

Conclusion and recommendations: The study showed that 85.9% of child 6-59 month age had OTP recovery rate. the predictors of recovery included MUAC at discharge, weekly MUAC gain, folic acid, antibiotics, and new admission. Health workers should strengthen MUAC monitoring and timely treatment. Institutions and health offices must ensure supplies, supervision, and training. Further research is needed to explore broader factors influencing SAM recovery.

Keywords: Treatment outcome, under-five children, Fogera district, Ethiopia

1. INTRODUCTION

1.1. Background

An imbalance in energy or nutrient intake deficit, excess, or inappropriate use causes malnutrition. It can be broadly divided into two categories: undernutrition (which includes micronutrient deficiencies, stunting, wasting, and underweight) and overnutrition (overweight and obesity) (1,2). One of the main types of undernutrition is acute malnutrition, which is especially dangerous for vulnerable groups like children under five, expectant and nursing mothers, and people with long-term illnesses (3). Acute malnutrition frequently coexists with infections and can be caused by an abrupt decrease in the amount or quality of food consumed. It is further divided into two categories: severe acute malnutrition (SAM) and moderate acute malnutrition (MAM) (4). A mid-upper arm circumference (MUAC) of less than 11.5 cm, obvious wasting, nutritional edema, or extremely low weight-for-height (below –3 Z-scores of the WHO growth standard or less than 70% of the NCHS median) are characteristics of SAM (2).

Under nutrition is still a major problem in Ethiopia. The 2016 Ethiopian Demographic and Health Survey (EDHS) found that 24% of children under five were underweight, 10% were wasted, and 38% were stunted (5). These disorders reflect larger health and developmental challenges rather than just nutritional ones. They are caused by underlying issues like poverty, food insecurity in the home, poor child care practices, unsanitary water and sanitation conditions, and restricted access to necessary medical care. Furthermore, by upsetting food systems, frequent natural disasters (such as droughts and floods) and conflict exacerbate the nutritional crisis.

SAM puts additional strain on already overburdened healthcare systems and contributes significantly to child morbidity and mortality. Despite this, a lack of trained staff, therapeutic foods, and monitoring systems makes it difficult for many healthcare facilities in low-resource environments to promptly identify and effectively manage SAM. Ethiopia has responded to this by implementing the Community-Based Management of Acute Malnutrition (CMAM) strategy, which includes the Outpatient Therapeutic Program (OTP) as a crucial element for community-level management of uncomplicated SAM cases.

Nevertheless, in spite of these initiatives, regional variations in the OTP's efficacy and implementation continue to exist. There is a dearth of district-level data on the contextual factors that affect re-

covery and treatment outcomes. By generating evidence at the community level, the research aims to inform local decision-makers, health professionals, and policy actors to strengthen OTP performance and reduce child malnutrition and mortality. (6).

1.2. Statement of the problem

Despite coordinated international efforts to meet global nutrition targets, severe acute malnutrition (SAM) continues to be a serious global health concern, especially in low- and middle-income countries. An estimated 52 million children under five suffer from acute malnutrition worldwide, with 17 million of them being considered severely wasted. Notably, poverty, food insecurity, and limited access to healthcare worsen the situation in South Asia and Sub-Saharan Africa, where over half of the world's wasted children live (7,8). About 14 million children under five are wasted in Africa alone, with 4.1 million of them being severely wasted (8).

Because of the consequences, severe acute malnutrition continues to be a significant public health issue in many African nations, impacting development and general health priorities. Of the 14.0 million wasted children under five in Africa, 4.1 million are severely wasted (8).

According to the 2016 EDHS, 3% of Ethiopian children under five are severely wasted, with the highest rates occurring in the Afar and Somalia regions (6.1% and 5.3%, respectively) (5).

In addition to prevention measures, the World Health Resolution on Infant and Young Child Nutrition calls for better management of SAM in order to increase child survival and lower the burden of disease worldwide.

WHO has created clinical guidelines on the management of children with severe acute malnutrition because of the high mortality rates associated with intensive re-feeding before metabolic and electrolyte imbalances have been corrected in children with SAM due to their profoundly disrupted physiology and metabolism (2).

There is little data on the OTP treatment outcome of SAM and related factors in the Fogera district, despite the fact that malnutrition is one of Ethiopia's main public health issues. Therefore, the purpose of the study is to describe the treatment outcome for children aged 6 to 59 months and to identify the factors that influence the treatment outcome. Additionally, it aims to provide actionable suggestions to legislators and healthcare organizations on how to enhance the treatment results for children suffering from severe acute malnutrition.

Significance of the study

In Ethiopia, severe acute malnutrition (SAM) remains a leading cause of inpatient morbidity and mortality among children. There is a critical lack of local evidence in the study area because there has been little to no recently published research on the treatment outcomes of SAM. By contrasting important clinical indicators with globally recognized standards, this study offers valuable information on the results of managing SAM. It also advances knowledge of the risk factors that affect the success or failure of treatment in this situation. The results will help administrators, non-governmental organizations, health facilities, and zonal health departments working on therapeutic feeding programs find gaps in current practices, assess the success of current interventions, and create better SAM management plans. Furthermore, by supporting initiatives to lower the prevalence of SAM and improve treatment outcomes, the findings can direct evidence-based decision-making, enhance service delivery, and eventually benefit all children in the district. Additionally, this study provides baseline data for upcoming investigations and program assessments in comparable contexts.

2. LITERATURE REVIEW

2.1. Outcome of treatment of severe acute malnutrition among children

The treatment of severe acute malnutrition (SAM) is guided by globally recognized protocols, particularly the World Health Organization (WHO) and Sphere Standards. These recommend a recovery rate of ≥75%, death rate of <10%, and default rate of <15% as minimum acceptable outcomes for Outpatient Therapeutic Programs (OTP) (1,2). The Ethiopian National Guideline for the Management of Acute Malnutrition (2019) has adapted these standards to guide national programming (3).

However, studies across sub-Saharan Africa and within Ethiopia show mixed adherence to these benchmarks. A prospective study in Nigeria involving 12,073 under-five SAM children reported a recovery rate of 58%, a default rate of 40%, and a death rate of 2%, all falling below Sphere Standards (4). In Zambia, a mixed-methods study among 390 children revealed recovery, death, and default rates of 80%, 2.8%, and 17.2% respectively, with the defaulter rate exceeding recommended levels (5).

In Ethiopia, a retrospective facility-based study in Wolaita found recovery, false recovery, death, and default rates of 64.9%, 23.9%, 1.2%, and 2.2%, respectively. Average weight gain was 4.2 g/kg/day and the length of stay was 6.8 weeks, which is below Sphere Standards (6). In contrast, a retrospective cohort study in Debre Markos and Finote selam hospitals reported recovery and death rates of 77.9% and 5.5%, aligning with WHO benchmarks, and a median recovery time of 11 days (7).

A study from Bahir Dar Felege Hiwot Referral Hospital found recovery and default rates of 58.4% and 21.7%, and a mortality rate of 8.5%, all indicating a failure to meet acceptable minimum standards (8).

A prospective study conducted on16 OTP sites in a rural Nigerian show that among 12,073 under 5 SAM children admitted to the OTP program, the rate of cured and defaulted were 58% and 40% respectively which is below the accepted minimum sphere standard, and death occurred in 2% of the cases(9).

In a mixed-methods design done in Zambia out Of 390 severely malnourished children admitted into OTP recovered, died, and defaulted were 80%, 2.8%, and 17.2%. However, the defaulter rate was higher than the minimum standard expected(10).

A retrospective facility-based cross-sectional study conducted in the Wolaita zone shows that among 794children treated at OTP, the rates of treatment outcomes were 64.9%, 23.9%, 1.2%, 2.2%, 4.2 g/kg/days, and 6.8 weeks for recovery, false recovery, death, default rate, weight gain, and length of stay respectively. The recovery rate and weight gain were lower than the sphere standard(11).

A retrospective cohort study conducted by Debre Markos and Finote Selam shows that outcomes of children in OTP were within sphere standards with proportions of cured and died being 77.9% and 5.5% respectively and the overall median recovery time was 11 days(12).

According to a hospital-based cross-sectional study done at Bahir Dar Felege Hiwot Referral Hospital inpatient therapeutic feeding unit, out of 401 severely malnourished children, recovery and defaulter rates were 58.4%, and 21.7% respectively which is below the accepted minimum Sphere standard and death occurred in 8.5% of the cases(13).

2.2. Factors associated with treatment outcomes of severe acute malnutrition

2.2.1. Socio-demographic factors

Socio-demographic characteristics have been shown to influence SAM treatment outcomes. A retrospective study in Uganda involving 251 children found that the majority (61.4%) were aged 3–24 months and that 61.0% were male. This suggests that age and sex distributions can shape both susceptibility to SAM and response to treatment (14). Similarly, a study in a Zambian OTP clinic reported that among 390 children, 83.9% were between 12 and 59 months, and 57.4% were female (15). These findings imply potential biological and caregiver-related differences in health-seeking behavior and recovery.

Anthropometric Indicators

Anthropometric measurements such as mid-upper arm circumference (MUAC), weight-for-height z-score (WHZ), and weight gain velocity are commonly used to evaluate treatment progress. A study in the Tigray Region found that children discharged with a MUAC of ≥12.5 cm were significantly more

likely to recover, while those discharged with a lower MUAC had higher chances of relapse (24). Another study in Jimma showed that children who gained ≥5 g/kg/day had faster recovery and shorter treatment duration than those with less weight gain (25). Furthermore, weekly MUAC improvement has emerged as a practical and effective predictor of recovery, with some studies suggesting that an increase of ≥2 cm over the treatment course is significantly associated with better outcomes (26).

2.3. Type of malnutrition

A retrospective study conducted in Hadiya Zone, South Ethiopia showed that among 500 under-five children admitted with severe acute malnutrition, kwashiorkor was found to be the most frequent cause of morbidity which accounts for 43%. Another retrospective study conducted in Yirgalem Hospital showed that 50% of edematous children had Grade II edema followed by Grade III edema at 32.4%. A study from Woldiya Hospital reported that the probability of recovery among edematous children was reduced by 73% as compared to wasted children(16, 17).

2.4. Routine medication

A study finding from Southern Ethiopia also showed that Children provided with amoxicillin were 1.52 times more likely to recover compared to their counterparts(11).

A retrospective cohort study comprised of 340 under-five children admitted for treatment of complicated severe acute malnutrition in two hospitals of Wolaita Zone reported that children who did not have antibiotics at admission were 3.7 times more at risk of death compared to those who had had it(18).

According to a study done at Bahir Dar Felege Hiwot Referral Hospital inpatient therapeutic feeding unit, children who were fully and partially vaccinated, who stayed longer in the hospital, and children who took routine vitamin-A supplementation had better recovery rate and also recovery rate were increased by 44% for every one-centimeter increase in MUAC(13).

A study conducted in Debre Markos and Finote Selam Hospital reported that children who didn't take folic acid supplements had a 65% lower probability of recovery from SAM compared to children who took folic acid supplements. A retrospective cohort study conducted at Sekota Hospital also showed that children not supplemented with folic acid, not supplemented for vitamin A, and children not managed by intravenous antibiotics were found to be predictors of mortality. Findings from Bahir Dar

Felege Hiwot Referral Hospital also reported that children who did take vitamin A as routine medication were 2.8 times more likely to recover as compared to those who did not take vitamin A(12, 13).

Despite these positive results, the literature currently in publication has some significant shortcomings. Numerous earlier studies used retrospective chart reviews that lacked complete data or reliable quality assurance. It was challenging to identify independent recovery predictors in some because they lacked multivariable analysis. Additionally, results are frequently derived from urban or facility-based contexts, which restricts their applicability to rural areas where access to healthcare is more limited.

Additionally, there is little data on program-specific issues like caregiver follow-up adherence, front-line health worker performance variability, or ready-to-use therapeutic food (RUTF) stockouts. The impact of these operational factors on recovery outcomes has not received much attention in research, particularly in underserved or remote areas like Fogera District.

In order to fill these gaps, this study examines not just the treatment results of kids who are enrolled in OTP in a rural setting but also by identifying independent predictors of recovery using multivariable logistic regression. The study aims to provide localized evidence that can inform district-level strategies to strengthen OTP implementation and improve the quality of SAM care.

Conceptual Framework

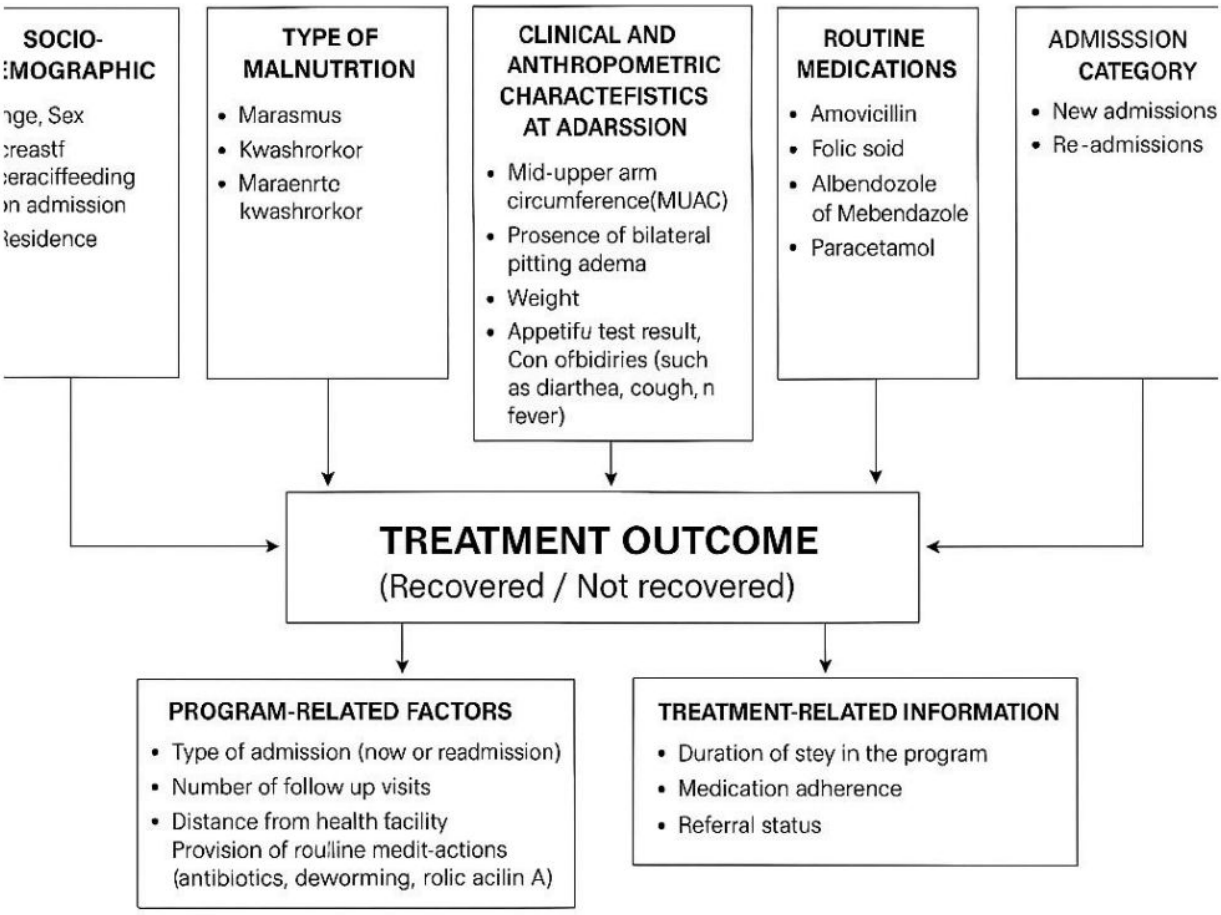


Figure 1: Conceptual framework showing factors associated with treatment outcomes (recovered/not recovered) among 6–59 month children enrolled in OTP in Fogera District, Northwest Ethiopia. 2024 (11, 12, 14, 16, 19-24).

3. OBJECTIVE

3.1. General objective

- To assess the magnitude of treatment outcomes of outpatient therapy & identify associated factors among 6–59 months of children enrolled in outpatient therapeutic programs (OTP) in Fogera district, Northwest Ethiopia, 2024.

3.2. Specific objectives

- To determine the prevalence of treatment outcomes of outpatient therapy among 6-59 months of children enrolled in outpatient therapeutic programs (OTP) in Fogera district, Northwest Ethiopia, 2024.

- To identify the factors associated with treatment outcomes of outpatient therapy among 6-59 months of children enrolled in outpatient therapeutic programs (OTP) in Fogera district, Northwest Ethiopia, 2024.

4. Methods and materials

4.1. Study area and period

The study was conducted in the Fogera district. According to the Fogera district administration office; Fogera district is found 42, 58, and 589 kilometers (km) away from Debre Tabor, Bahir Dar, and Addis Ababa respectively. It is among 15 woredas found in the South Gondar zone.

Fogera district is located East of Lake Tana, West of Farta woreda, North of Dera woreda, and South of Libo Kemkem woreda. This district has a latitude and longitude of 11°55′N 37°42′E with an average elevation of 1828 meters above sea level (https://en.wikipedia.org/wiki/Wereta). The weather condition is categorized as Woyna Dega.

According to the Fogera agricultural office; regarding the dietary practice teff, rice, lentil, sorghum, maize, oats, chickpeas, nuts, other cereals, other legumes, fruits, and vegetables are the common food sources. Fish and other seaweeds are found in the area even though they are not the usual foods in the community(25).

According to the Fogera district health office; the district has 39 kebeles (33 rural and 6 urban kebeles), the smallest administrative units, with a total population of 330,667. Fogera district has 42,591 children who are under five years old. The district has 1579 expected numbers of under-five children with severe acute malnutrition (SAM)(26). Fogera district has one primary hospital, ten health centers, and 51 health posts of which 6 are urban health posts. The urban health posts did not give outpatient therapeutic program (OTP) services(26). The study was conducted in Fogera district from 1st june 2023- 30th may, 2024.

4.2. Study design

A retrospective facility-based cross-sectional study was conducted to assess the treatment outcomes of the outpatient therapeutic program (OTP) and associated factors among children aged 6 to 59 months with severe acute malnutrition (SAM). The study involved the review of existing OTP records and child treatment charts from selected health facilities in Fogera District, Northwest Ethiopia.

4.3. Source population and study population

4.3.1. Source population

The source population included all under-five children (6–59 months) admitted to OTP sites in Fogera District.

4.3.2. Study population

The study population consisted of all children with complete records enrolled in the OTP during the study period.

4.3.3. Study unit

The study unit was each medical record (OTP card/chart) of a child aged 6 to 59 months who was admitted and managed for severe acute malnutrition in the OTP sites of selected health facilities in Fogera District.

4.4. Inclusion and Exclusion criteria

4.4.1. Inclusion criteria

Children aged 6 to 59 months were included in the study if they met all of the following conditions: Diagnosed with severe acute malnutrition (SAM) based on national protocol, defined as:

- Mid-upper arm Circumference (MUAC) < 11.5 cm, or
- Bilateral pitting edema, or
- Weight-for-height z-score (WHZ) < -3 SD
- Managed under the Outpatient Therapeutic Program (OTP) for uncomplicated SAM
- Had a complete medical record with documented admission criteria, type of SAM, follow-up data, and final treatment outcome.

4.4.2. Exclusion criteria

- Children with complicated SAM were referred for inpatient care at the time of admission.
- Incomplete records, missing discharge outcomes, or lacking key treatment information.
- Children outside the 6–59 months age range.

4.5. Variables

4.5.1. Dependent variable

Treatment outcome (Recovered / Not recovered)

4.5.2. Independent variables

- **Socio-demographic:** e.g. child's age, sex, maternal education (literacy), breastfeeding at admission, household food security and residence (For example, maternal illiteracy and long travel distance to an OTP site have been linked to slower recovery.)
- **Type of malnutrition:** e.g. marasmus, kwashiorkor or marasmic-kwashiorkor. (Children admitted with marasmus often recover more slowly than those with kwashiorkor.)
- **Clinical/anthropometric (at admission):** e.g. MUAC and weight, presence of bilateral edema, appetite test result, and co-morbid illnesses (diarrhea, cough, fever). (For instance, having edema at admission or receiving an amoxicillin dose predicts faster recovery, whereas diarrhea or pneumonia delays recovery.)
- **Immunization & supplements:** e.g. immunization status (measles vaccine) and micronutrients (vitamin A). (Not being fully immunized or lacking vitamin A supplementation has been associated with longer recovery times.)
- **Routine medications:** e.g. whether the child received routine antibiotics (amoxicillin), deworming (albendazole/mebendazole), folic acid, or antipyretics at admission. (Access to amoxicillin at admission is linked to improved recovery.)
- **Admission category:** i.e. whether the child is newly admitted or a re-admission into OTP (New admissions tend to recover faster than re-admissions.)
- **Program-related factors:** e.g. number and timing of follow-up visits, distance to the OTP site, adequacy of RUTF provision (and whether RUTF is shared), scheduling of follow-ups, and availability of other program services. (Shorter travel distance and adequate RUTF supply are linked to better outcomes.)
- **Treatment-related factors:** e.g. duration of stay in OTP, adherence to RUTF/medications, and any referral at discharge. (These capture the child's engagement with the treatment protocol.)

Operational definitions

- **Treatment outcome**: grouped as recovered and not recovered from SAM management at outpatient therapeutic feeding units in this study(27).
- **Recovered**: children with severe acute malnutrition declared as cured or recovered in the log-book of outpatient therapeutic feeding units(27).
- **Not recovered**: defined as children discharged from outpatient therapeutic feeding units with outcomes other than recovery in this study (death, default, and non-responder)(27).
- **Severe acute malnutrition (SAM)**: the weight-for-height ratio of less than minus 3 standard deviations below the median WHO growth standards or weight-for-height ratio of below 70% of the median NCHS reference or presence of nutritional edema(27).
- **Outpatient Management**: Management of SAM of children without medical complications or pass appetite test(27).
- **Defaulter**: A SAM patient who becomes absent continuously from the therapeutic feeding program of outpatient care(27).
- **Non-responder**: SAM patient admitted to inpatient who does not reach discharge criteria after 40 days in the inpatient program(27).
- **Died:** Severe Acute Malnutrition Patient in OTP has died(27).
- Type of malnutrition: grouped as marasmus (non-edematous), kwashiorkor (edematous), marasmus kwashiorkor (both edema and severe writing), and visible severe writing (27).
- **Good MUAC Recovery:** When a child's MUAC at discharge is ≥12.5 cm or the child has gained 2 cm or more during treatment, indicating successful nutritional recovery.
- **Poor MUAC Recovery:** When a child's MUAC at discharge is <12.5 cm or the MUAC gain is less than 2 cm, indicating incomplete recovery.

4.6. Sample size determination

For the first objective, the sample size was computed based on a single population proportion formula assuming the prevalence (p) of treatment outcome 65%(19), 95% confidence level (1.96), and 5% margin of error.

$$n = (z\propto/2)^2 * p(1-p)/d^2$$

$$n = (1.96 * 1.96)^2 * 0.65 * (1-0.65)/(0.05)^2$$

$$n = 349.58350$$

Where;

- n = estimated sample size
- Zα/2 = a standard normal value which corresponds to 95% of the confidence level = 1.96
- p = prevalence of recovery rate is 0.65.
- d = tolerable sampling error = 0.05

After substitution, the estimated sample size is 350. Taking 10% of the non-response rate, the sample size was 385.

The sample size for the second objective was determined using the double population proportion formula by using Epidemiology Information (Epi info TM) version 7 statistical calculation considering 95% confidence level, 80% power, and recovered and not recovered ratio is 1:1.

Table 1: Sample size calculation of the second objective for a study conducted on treatment outcome of OTP among under-five children in Fogera district, Northwest Ethiopia, 2024.

Characteristics	**% Outcome in exposed group**		**AOR**	**Sample size**
	Yes	No		
Residence				
Rural	35.0	65.0	2.93	168
Urban	13.8	86.2	1	
Type of malnutrition				
Marasmus	46.3	53.7	5.51	64
Kwerehiorkor	12.0	88.0	1	
Admission category				
Re-admission	26.9	73.1	1.77	316
New	12.7	87.3	1	

- The sample size of the second objective is found to be less than the first objective. Therefore, the final sample size is 385.

4.7. Sampling Techniques and Procedures

Systematic random sampling techniques were used to select the study units. From the 45 health posts, all health posts and 10 health centers 11 and 2 were selected respectively. The total sample size was proportionally allocated for all the selected health posts and health centers based on the number of under-five children with SAM at OTP units and stabilization centers (SC) to obtain the required number of study participants. The total numbers of under-five with SAM at OTP units and stabilization centers (SC) were taken from the health extension workers and health workers.

The sample frame is the list of under-five with SAM at OTP units and stabilization centers (SC). It was identified after checking all the selected 9 health posts and 2 health centers for identifying charts of children and coding of those charts was done to prepare a sampling frame for each health post and health center. Those children with incomplete charts are considered non-respondents.

The sampling interval of under-five with SAM in each health post and health center was determined by dividing the total number of under-five children with SAM at OTP units and stabilization centers (SC) by the allocated sample size to select the study units. Systematic random sampling was used with sampling interval k^{th} which will be calculated as k = 1579/350 = 4.51 = 5. 1579 children with SAM were obtained from the health extension workers and health workers. Out of the first 5 children with SAM, the initial one was determined by using the lottery method. Finally, the OTP and SC record cards of each child were selected using systematic random sampling until a sample of 385 participants.

- Sampling techniques and sampling procedure of selecting health institutions who undergo outpatient therapeutic program for 6-59 months of children in Fogera district from 1st June 2023-30th May 2024, North West Ethiopia

45 health post & health centers in Fogera district

11 health institutions were selected by lotery method

Total number of children who entered to OTP in selected health institutions
=1579

Deba	Woji	Tiwa	Rib	Zeng	A/A	Quar	Shaga	H/sel	Kint	Mene
133	190	128	126	140	112	146	130	150	145	179
34	45	32	31	33	27	35	32	36	35	45

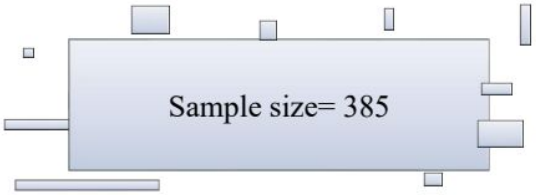


Figure 2: Schematic presentation of sampling procedure of 6-59 months of children in Fogera district in selected health institutions 2024, northwest, Ethiopia

4.8. Data Collection Tool and Data Collection Approach

4.8.1. Data Collection Tool

A structured data extraction checklist was used to collect information from the medical records of under-five children enrolled in the Outpatient Therapeutic Program (OTP). The checklist was adapted from the national SAM management protocol and relevant literature. It was designed to capture both dependent and independent variables relevant to the study objectives.

The checklist was pre-tested on 5% of the sample at a similar facility outside the study area to ensure clarity and completeness. Based on the pre-test results, minor adjustments were made to improve the tool's accuracy and consistency.

4.8.2. Data Collection Approach

The data were collected through a retrospective chart review of OTP records and individual patient cards from selected health facilities in Fogera District. Eleven health institutions were selected using a lottery method. For each health facility, OTP registration logbooks, follow-up charts, and patient monitoring cards were reviewed to extract data on eligible under-five children treated for SAM between January 2022 and December 2023.

Data collection was conducted by trained BSc-level health professionals with experience in child health services and nutrition programs. One supervisor with a master's degree in public health oversaw the entire process to ensure data completeness and quality. The data collectors received two days of training on how to use the data extraction tool, the study objectives, definitions of key variables, and data confidentiality.

Efforts were made to include only children with complete records on admission criteria, treatment given, follow-up visits, and discharge outcomes. Records with missing or inconsistent key outcome variables were excluded from the analysis.

4.9. Data Quality Control mechanisms

The data collection tools were adapted from different literature and guidelines and prepared in English language. They were translated into Amharic, the local language of the study area, and then back to the English language to see their consistency. Standard questionnaires were used to collect data on the OTP and SC record cards of each child on selected charts.

The training was given to supervisors and data collectors for one day on data collection tools, ethics, approach the interviewing techniques, and the importance of disclosing the possible purposes of the study to the study participants before the start of data collection.

Pre-tests were done on 5% of the study participants at Libokemkem district (from two health posts and one health center) which is not included in the actual sampling. Then pre-test responses were discussed and modifications were made to data collection tools accordingly.

Regular supervision, spot-checking, and reviewing the completed questionnaire on a daily basis were done by the investigator and the supervisor to maintain the quality of the data.

Each questionnaire and data sheet were checked before the data entry. The data were entered on EPI data version 4.2 daily and missing data were identified.

4.10. Data processing and analysis

Data were cleaned and entered into the EPI-data version 4.2 statistical software and exported to the statistical package for social science (SPSS) statistical software package, version 26 for analysis. Before analysis, missing values and outliers were checked and corrected by cross-checking with the original questionnaire. Frequencies and proportions were used to summarize variables. Besides frequencies and proportions, each variable was presented using tables and figures. The association between treatment outcome and each categorical variable was assessed using the binary logistic regression model. All independent variables with a P-value < 0.25 in the bi-variable analysis were the candidates for multivariable analysis. The significance of the association was determined at a P-value of < 0.05 in the multivariable analysis, while the strength of the association was measured by adjusted odds ratio (AOR) with a 95% confidence interval.

4.11. ETHICAL CONSIDERATION

The Institutional Review Board (IRB) of the College of Medicine and Health Sciences, Bahir Dar University, approved the study protocol. Since this study was based on retrospective chart review and did not involve direct interaction with patients or their caregivers, no individual interviews were conducted. Permission to access medical records was obtained from the Amhara Public Health Institute (APHI), as well as from the Fogera District Health Office and each respective kebele administration. Although informed consent was not applicable due to the retrospective nature of the study, confidentiality was strictly maintained by anonymizing all data and removing any personal identifiers from the data collection tools.

5. RESULT

5.1. Socio-demographic characteristics

A total of 369 complete cards were viewed which made a response rate of 95.8%. Among these, 209 (56.6%) of them were female children and the majority of them were under breastfeeding 314 85.1%. Three-fourths of them were rural inhabitants 370 73.2%) (Table 2.)

Table 2: Sociodemographic characteristics of 6-59 months of children undergoing outpatient therapeutic program in Fogera district from 1st June 2023- 30th May 2024 North west Ethiopia 2024 (n=369).

Variables	Category	Frequency	Percentage
Age in months	6-23	300	81.3
	24-59	69	18.7
Sex	Male	160	43.4
	Female	209	56.6
Residence	Urban	99	26.8
	Rural	270	73.2
Breastfeed	Yes	314	85.1
	No	55	14.9

5.2. Anthropologic description of children enrolled in OTP in Fogera District 2024

Regarding children who entered OTP in the study area, almost all of them 365 /98.95%/had an initial weight of less than 11 kg. After treatment, this low weight was reduced to 259 /84.4%/. Two-thirds 265 / 72.6%) of the children who entered OTP were diagnosed with severe acute malnutrition. Finally, (80.5%) of the children leave the OTP with significant improvement in MUAC > 12.5 CM. (Table 3).

Table 3: Anthropometric description of 6-59 months of children undergoing outpatient therapeutic program in Fogera district North west Ethiopia 2024 (n=369).

Variables	Category	Frequency	Percentage
Initial weight /Kg	<=11	365	98.9
	>11.01	4	1.1
Last weight at leaving OTP/Kg	<=11	259	84.4
	> 11.01	48	15.6
Weight gain over the treatment period	Good	209	56.6
	Poor	160	43.4
Admission length/CM	<= 63.9	101	27.4
	> 63.91	268	72.6
MUAC status at Entry/CM	<11.5	281	76.2
	11.5-12.4	84	22.8
	>=12.5	4	1.1
MUAC at Discharge	<11.5	16	4.3
	11.5-12.4	56	15.2
	>=12.5	297	80.5
MUAC Status over the treatment period	Significantly improved	257	69.6
	Poorly improved	112	30.4
Duration of OTP/Month	Normal response	199	53.9
	Poor response	170	46.1
Overall duration of Children under OTP/day	Less than 60	199	53.9
	60-90	162	43.9
	More than 90	8	2.2
Admission status	New	338	91.6
	Repeat	31	8.4
Admission criteria	MUSIC	245	66.4
	Wasting	84	22.8
	Edema	40	10.8
Malnutrition status	Marasmus	329	89.1

	Kwerehakor	35	9.5
	Marasmickuash	5	1.4

In this study, the type of malnutrition that affected the study area was Marasmus 329 /89.1%), followed by Kwerehakor which figures 35 /9.5%). /figure 3. /

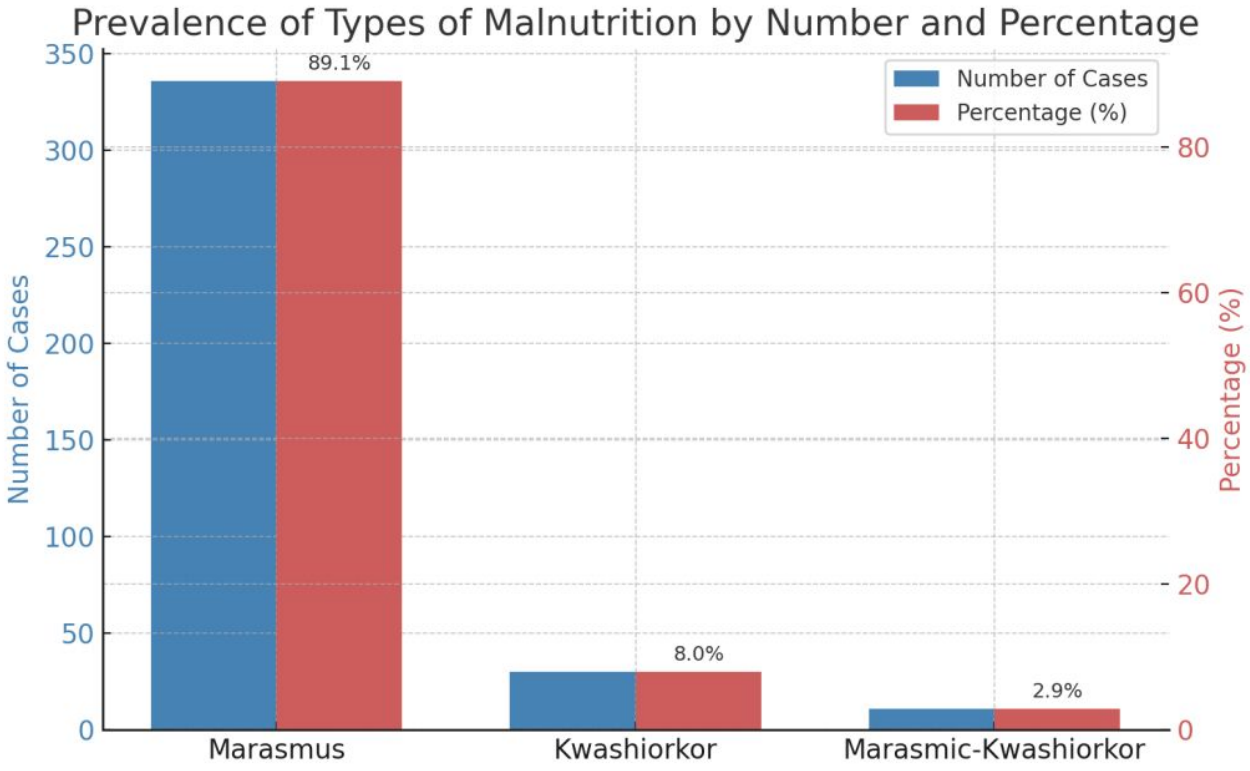


Figure 3: Features of malnutrition of 6-59 months of children admitted to the OTP program in Fogera district North West Ethiopia 2024 (n=369).

5.3. Treatments are given to children of 6-59 months undergone OTP.

In this study, children enrolled in the Outpatient Therapeutic Program (OTP) were supplemented with different types of therapeutic foods based on their nutritional status and clinical condition. The most commonly used supplement was Plumpy'Nut, a ready-to-use therapeutic food (RUTF) designed for the treatment of uncomplicated severe acute malnutrition. A total of 272 children (73.7%) received Plumpy'Nut during their treatment course. Additionally, 53 children (14.4%) were supplemented with F-100, a therapeutic milk formula primarily used during the transition or catch-up phase in mal-

nourished children, while 44 children (11.9%) were given F-75, a low-energy therapeutic milk used mainly in the stabilization phase of complicated SAM cases. Some children received more than one type of therapeutic food depending on their clinical progression.

Regarding medical treatments provided alongside nutritional support, almost all of the children—346 (93.8%)—received antibiotics as part of the routine care protocol integrated within the OTP. However, a large proportion of the children, 345 (93.5%), did not receive folic acid supplementation, despite recommendations in the national SAM management protocol. On the other hand, 302 children (81.8%) were supplemented with vitamin A, which is critical for immune support and recovery in malnourished children. In addition, 300 children (81.3%) had received at least one dose of the measles vaccine. Participation in deworming programs was low, with 309 children (83.8%) not dewormed, mainly because the majority of them were under 24 months of age, which is below the recommended age for routine deworming interventions. (Table 4)

Table 4: Treatment outcomes of OTP of children of 6-59 months in Fogera district North West Ethiopia 2024 (n=369).

Variable	Category	Number	Percent
Taking antibiotics	Yes	346	93.8
	No	23	6.2
Getting Vitamin A	Yes	302	81.8
	No	67	18.2
Vaccinated for measle	Vaccinated at least one dose	300	81.3
	Unvaccinated at all	69	18.7
Fully vaccinated	Yes	155	42.0
	No	214	58.0
Supplemented with folic acid	Yes	24	6.5
	No	345	93.5
Taking of antipyretics /PCM/	Yes	69	18.7
	No	300	81.3
Dewormed	Yes	60	16.3
	No	8	2.2

	Not eligible	301	81.6
Weight gain/weekly/GM	<100	221	59.9
	100-200	130	35.2
	>200	18	4.9
Progress of MUAC/wk/CM	Poor MUAC recovery	253	68.6
	Good MUAC recovery	116	31.4

5.4. Treatment outcomes of 6-59 months of children in Fogera district.

In this study, the outcome of the outpatient therapeutic program was 317 /85.9%/ at 95% (82.1-89.4) with SD + 3.48. (figure 4).

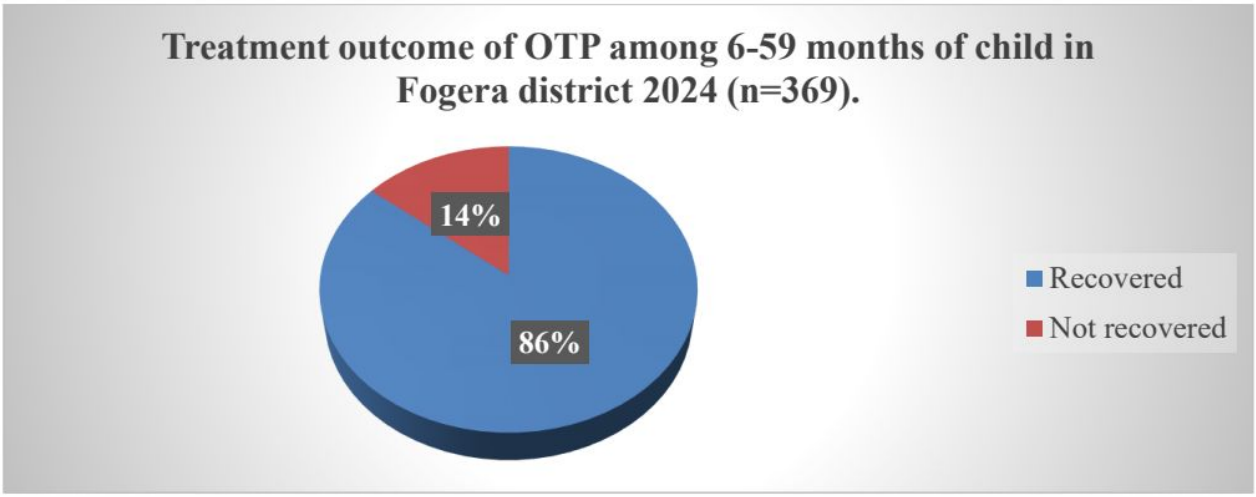


Figure 4: overall treatment outcomes of OTP among 6-59 months of children in Fogera district Northwest Ethiopia 2024 (n=369).

5.6. *Factors associated with Treatment outcomes of OTP among 6-59 months of children*

In the bivariable logistic regression analysis, variables such as child sex, age, residence, breastfeeding status, MUAC at discharge, MUAC recovery progress, folic acid supplementation, antibiotic use, admission status, discharge weight, and weight gain during OTP were analyzed. Of these, several showed associations with treatment outcomes at $p < 0.25$ and were considered for multivariable logistic regression.

Mid Upper Arm Circumference (MUAC) at Discharge was significantly associated with positive OTP treatment outcomes. Children discharged with MUAC values of 11.5–12.4 cm were about five times more likely to recover compared to those discharged with MUAC ≥12.5 cm [AOR = 5.209; 95% CI: (2.244, 12.094); p < 0.001]. This suggests that measurable nutritional improvement—even if not yet fully recovered—plays a crucial role in successful recovery from SAM.

Progressive MUAC Recovery also showed a significant relationship with treatment outcome. Children with a weekly increase in MUAC (2–5 cm) were three times more likely to achieve recovery than those with poor progress [AOR = 3.008; 95% CI: (1.032, 8.770); p = 0.042]. This highlights the importance of routine MUAC monitoring during OTP.

Folic Acid Supplementation emerged as another strong predictor. Children who received folic acid supplementation were 81% less likely to experience poor outcomes compared to those who did not receive it [AOR = 0.187; 95% CI: (0.052, 0.675); p = 0.007]. This supports existing evidence that folate is essential for immune function and tissue repair.

Antibiotic Use was highly associated with successful outcomes. Children who received antibiotics were nearly eight times more likely to recover than those who did not [AOR = 7.825; 95% CI: (2.914, 20.997); p < 0.001]. This finding aligns with WHO recommendations advocating routine antibiotic therapy for children admitted to OTP.

Admission Status also showed significance. Children newly admitted to the OTP were more than four times more likely to recover compared to those who were readmitted [AOR = 4.519; 95% CI: (2.039, 10.009); p < 0.001]. New admissions may represent less complicated cases, contributing to better outcomes. (Table 5)

Table 5: Bivariate and Multivariable logistic regression analysis of factors affecting treatment outcomes of OTP among 6-59 months children in Fogera district, North West Ethiopia 2024 (n=369).

Variable	Category	Recovered (n)	Not Recovered (n)	COR (95% CI)	AOR (95% CI)	p-value
Sex	Female	179	39	1.05 (0.59–1.85)	1.08 (0.59–2.0)	0.789
	Male	88	63	1	1	
Age	6–23 months	243	57	1.31 (0.60–2.86)	1.14 (0.519–2.53)	0.734
	24–59 months	24	45	1	1	
Residence	Urban	82	17	1.27 (0.63–2.58)	1.11 (0.50–2.43)	0.791
	Rural	185	85	1	1	
Breastfeeding	Yes	278	50	0.96 (0.42–2.16)	0.872 (0.371–2.050)	0.752
	No	33	8	1	1	
MUAC at Discharge	11.5–12.4 cm	38	18	11.3 (5.44–23.7)	5.209 (2.24–12.094)	<0.001*
	≥12.5 cm	229	68	1	1	
MUAC Recovery	Good	95	21	3.369 (1.470–7.721)	3.008 (1.032–8.770)	0.042
	Poor	172	81	1	1	
MUAC/TP	Improved	91	15	3.85 (1.59–9.306)	2.891 (1.057–7.909)	0.038*
	Unimproved	176	87	1	1	
Folic Acid Supplement	Yes	22	2	0.02 (0.01–0.079)	0.187 (0.052–0.675)	0.007*

Variable	Category	Recovered (n)	Not Recovered (n)	COR (95% CI)	AOR (95% CI)	p-value
	No	245	100	1	1	
Antibiotic Use	Yes	266	80	33.0 (11.53–94.6)	7.82 (2.91–20.99)	<0.001*
	No	1	22	1	1	
Admission Status	New	274	64	0.131 (0.06–0.28)	4.51 (2.039–10.00)	<0.001*
	Repeat	12	19	1	1	
Discharge Weight	>11 kg	41	7	10.81 (1.44–80.7)	3.54 (1.102–11.392)	0.033*
	≤11 kg	232	89	1	1	
Weight Gain During OTP	Good	174	35	6.20 (3.07–12.53)	4.93 (2.103–11.56)	<0.001*
	Poor	93	67	1	1	
Deworming	Yes	58	2	18.3 (3.3–100.26)	4.762 (1.32–17.134)	0.017*
	Non-eligible	212	97	1	1	
MUAC at Entry	11.5–12.4 cm	58	26	1.62 (0.86–3.039)	1.118 (0.532–2.348)	0.768
	≥12.5 cm	209	76	1	1	
Measles Vaccination	Yes	231	69	1.75 (0.89–3.45)	1.211 (0.582–2.519)	0.609
	No	36	33	1	1	

Discussion

In settings with limited resources, the Outpatient Therapeutic Program (OTP) serves as a critical intervention for managing severe acute malnutrition (SAM) in children aged 6 to 59 months. This study assessed both the treatment outcomes of children enrolled in OTP and the key factors influencing recovery in Fogera District, Ethiopia.

The overall recovery rate was 85.9%, which exceeds the minimum Sphere standard of 75% [1] and is comparable to or better than findings reported in regions such as Addis Ababa (77.4%), Somali (81.7%), Afar (83.2%), and Dire Dawa (79.8%) [2]. These similarities suggest consistent application of national OTP protocols and accessibility to treatment in urban and semi-urban areas. However, the recovery rate in this study was lower than the Ethiopian national target (90%) for SAM recovery (2011–2015) [3], indicating room for improvement in program effectiveness. On the other hand, this rate is substantially higher than that observed in regions such as Wolaita (65%), Tigray (62%), Jimma (45%), and Bahir Dar (51.9%), and countries such as Uganda (36%), Kenya (43.5%), and Nigeria (48.1%) [4], suggesting potential advantages of district-focused implementation and better community engagement in Fogera.

Regarding the factors associated with treatment outcome, five variables were found to be significantly linked with recovery in multivariable logistic regression:

Children discharged within this MUAC range had five times higher odds of recovery compared to those with MUAC ≥12.5 cm. While this may seem unexpected, it likely reflects that children discharged just above the minimum recovery threshold had demonstrated active weight gain during treatment. This finding reinforces the clinical value of MUAC as both a recovery and discharge criterion [5].

A threefold increase in recovery odds among children with this MUAC progression supports the use of weekly MUAC monitoring as a practical and predictive tool for program performance [6].

Children who received folic acid had significantly greater odds of recovery. Folate supports immune function, DNA synthesis, and cellular repair, which are essential during recovery from SAM [7]. This aligns with WHO recommendations to include folic acid in the treatment of uncomplicated SAM.

The finding that children receiving antibiotics were nearly eight times more likely to recover confirms WHO guidance for routine empirical antibiotic use in all SAM cases, due to high susceptibility to subclinical infections [8]. This supports the integration of infection control into nutrition programs even when no clinical signs are evident.

Newly admitted children were more likely to recover than readmitted cases. This may reflect that re-admissions often involve chronic malnutrition, comorbidities, or household-level factors such as food insecurity or caregiver burden, which compromise treatment success [9].

These findings showed the importance of early detection, nutritional monitoring using MUAC, and the integration of supportive treatments (antibiotics, micronutrients) in outpatient SAM care. The relatively high recovery rate in this study suggests that focused OTP implementation, consistent follow-up, and adherence to national guidelines can significantly improve child survival outcomes, even in rural settings.

Program managers should prioritize early admission, ensure regular MUAC measurement, and maintain an uninterrupted supply of Ready-to-Use Therapeutic Foods (RUTF), antibiotics, and micronutrients. In addition, health workers should receive ongoing training on OTP protocols and community engagement to reduce readmissions and non-recovery cases.

Strength and limitations

This study used data collected from multiple health facilities, increasing the representative and practical relevance of the findings for policymakers working in Outpatient Therapeutic Programs (OTP). The analysis incorporated both anthropometric (MUAC, presence of edema) and clinical factors (medical complications, routine medication), offering a comprehensive understanding of treatment outcomes and performance of the OTP in the local context.

Limitations

Being a retrospective record review, the study depended on the completeness and accuracy of existing data recorded in OTP registers, which may be subject to errors or missing information.

Key socio-demographic and household-level factors, such as maternal education, household income, and food security status, were not available in the registers and thus could not be included in the analysis.

Due to incomplete records, some important clinical and anthropometric indicators such as weight-for-height z-scores and appetite test results were excluded from the analysis, which may have limited the depth of assessment.

Conclusion

In this study, the treatment outcomes of the Outpatient Therapeutic Program (OTP) among children in Fogera District were found to be lower than the minimum standards set by the Sphere nutrition evaluation guidelines. A significant proportion of the children recovered and were discharged from the program within a relatively short period of time.

The outcomes observed were largely associated with improvements in nutritional status, particularly increased Mid-Upper Arm Circumference (MUAC) during the treatment phase. This improvement reflects the effectiveness of nutritional rehabilitation, likely driven by the adequate use of therapeutic foods and the body's storage of energy. Moreover, the provision of folic acid supplementation, although limited in coverage, appeared to play a role in facilitating early stabilization and recovery for those who received it.

However, gaps in the provision of essential treatments such as folic acid and deworming indicate the need for strengthening the implementation of national OTP protocols to ensure that all children receive comprehensive care. Overall, while the program shows positive results, addressing these gaps would further improve treatment outcomes and reduce the burden of severe acute malnutrition in the district.

Recommendation

Based on the findings of this study, the following recommendations are proposed for different stakeholders to improve the treatment outcome of outpatient therapeutic programs (OTPs) among under-five children in Fogera District and similar settings.

1. For Health Care Providers

Strengthen routine MUAC monitoring: Ensure that MUAC is measured at each follow-up visit to track recovery progress and guide decisions.

Adhere to treatment protocols: Consistently follow national OTP guidelines for administering antibiotics and folic acid.

Provide nutrition counseling: Educate caregivers on the importance of early treatment seeking, continued breastfeeding, and home-based care to enhance recovery.

Document carefully: Improve the accuracy and completeness of patient records to support quality follow-up and better monitoring.

2. For Health Institutions (Health Centers and Posts)

Ensure uninterrupted supply of essential medications and supplements: Maintain stock of antibiotics and folic acid at all OTP sites to support standardized care.

Organize regular supervision and mentorship: Conduct on-site supportive supervision to reinforce correct case management practices.

Create a follow-up mechanism for defaulters: Develop a community-based tracking system to reduce dropout and increase recovery rates.

3. For the District Health Office

Strengthen community mobilization: Engage Health Extension Workers (HEWs) and local leaders to raise awareness on early SAM identification and treatment.

Support data use for decision-making: Regularly analyze and use OTP performance data to address gaps in service quality.

Allocate budget for nutrition programs: Ensure that SAM management, particularly OTP, receives dedicated resources within the district health plan.

4. For Researchers

Conduct prospective studies: Future research should use prospective or mixed-methods designs to better capture variables like maternal knowledge, food security, and child feeding practices.

Investigate barriers to protocol adherence: Understanding why some children do not receive folic acid or antibiotics as recommended could improve OTP quality and outcomes.

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1. Annex: Questionaries'

1.1.Annex 1 : Informed consent

Title of the study: Treatment outcome of OTP and associated factors among 6-59 months children in Fogera district, Northwest Ethiopia, 2024.

The objective of the study: To assess treatment outcome of OTP and associated factors among 6-59 months children in Fogera district, Northwest Ethiopia, 2024.

The benefit of the study: There is direct benefit for participants. It may also be used by policymakers to evaluate the service and help them indirectly to improve treatment outcome of OTP of 6-59 months children.

Risk of the study: This study has no any risk for participants.

Name of the Sponsor: principal investigator

Principal investigator Name: Nigusie Wale

Principal investigator Address:

- Mobile number: +251911593744

Supervisor address:

- Mobile number: _____
- E-mail: _____

1.2.Annex 2: English Version Questionnaire

1 Socio-demographic and economic variables

Code	Questions	Response	Skip
101	Sex of the participant	1. Male 2. Female	
102	Age of the child in months	_____	
103	Breast feeding on admission	1. Yes 2. No	
104	Place of residence	1. Urban 2. Rural	

2 Anthropometric finding

Code	Questions	Response	Skip
201	Weight at admission (kg)	_____	
202	Weight at discharge (kg)	_____	
203	Height /length (cm)	_____	
204	MUAC at admission(mm)	_____	
205	MUAC at discharge (mm)	_____	
206	Date of admission	_____	
207	Date of discharge	_____	
208	Admission type	1. new admission 2. re-admission	
209	Admission criteria	1. only edema (kwerehiorkor) 2. only wereting (W/H) (marasmus) 3. both edema and wereting 4. MUAC	If the answer is 1and4 skip to 211

210	If edema is present, what grade?	1. Grade 1 2. Grade 2 3. Grade 3	

3 Treatment is given at admission

Code	Questions	Response	Skip
301	Amoxicillin given	1. Yes 2. No	
302	Vitamin A given	1. Yes 2. No	
303	Measles vaccine given	1. Yes 2. No 3. Not applicable	
304	Fully immunized	1. Yes 2. No 3. Not applicable	
305	Folic acid given	1. Yes 2. No	
306	Albendazole / Mebendazole given	1. Yes 2. No 3. Not applicable	
307	A Paracetamol Tab/syrup given	1. Yes 2. No	

4 Treatment Outcome

Code	Questions	Response	Skip
401	Treatment response of the child?	1.Cure/Recovered 2. Defaulter 3.Non-responder 4. Died	If the answer is 1, 402
402	Treatment response for those who had been cured	Weight gain(g/kg/week)_____ Length of stay (weeks)_____	

		MUAC gain (mm/week_____	

Amharic Version Questionnaire

1. ሶሺዮ ዲሞግራፊክ መረጃዎች

ኮድ	ጥያቄዎች	መልስ	ይለፉ
101	የህፃኑ ፆታ	3. ወንድ 4. ሴት	
102	ዕድሜ በወር	_____	
103	ጡት ይጠባል	3. ይጠባል አይጠባል	
104	የመኖሪያ ቦታ	3. ከተማ 4. ገጠር	

2. አካላዊ ልኬታ

ኮድ	ጥያቄዎች	መልስ	ይለፉ
201	ወደ ህክምና ሲገባ የህፃኑ ክብደት (ኪግ)	_____	
202	ከህክምና ሲወጣ የህፃኑ ክብደት (ኪግ)	_____	
203	የህፃኑ ቁመት (ሳ.ሜ)	_____	
204	ወደ ህክምና ሲገባ MUAC ስንት ነበር (ሚሜ)	_____	
205	ህፃኑ ከህክምና ሲወጣ MUAC	_____	

	ስንት ነበር (ሚሜ)		
206	ህፃኑ ወደ ህክምና የገባበት ቀን	_____	
207	ህፃኑ ከህክምና የወጣበት ቀን	_____	
208	ወደ ህክምና የገባው	አዲስ የገባ በድጋሜ የገባ	
209	ህክምና የገባበት ምክንያት	1. በእብጠት ብቻ 2. በመቀጨጭ ብቻ 3. በእብጠት እና በመቀጨጭ 4. በ MUAC	
210	የገባው በእብጠት ከሆነ፣ ግሬዱ የትኛው ነው?	1. ግሬድ 1 2. ግሬድ 2 3. ገሬድ 3	

3 የተሰጠ ህክምና

ኮድ	ጥያቄዎች	መልስ	ይለፉ
301	አሞክሳሲሊን ተሰጥቷል	1. አዎ 2. የለም	
302	ቫይታሚን ኤ ተሰጥቷል	1. አዎ 2. የለም	
303	የኩፍኝ ክትባት ተሰጥቷል	1. አዎ 2. የለም 3. እድሜው አልፏል	
304	ክትባት ጨርሷል	1. አዎ 2. የለም 3. እድሜው አልፏል	
305	ፎሊክ አሲድ ተሰጥቷል	1. አዎ 2. የለም	
306	አልቤንዳዞል/ሜቤንዳዞል ተሰጥቷል	1. አዎ 2. የለም 3. እድሜው	

		አይመለከተውም	
307	ፓራሲታሞል ተሰጥቷል	1. አዎ 2. የለም	

4. የህክምና ውጤት

ኮድ	ጥያቄዎች	መልስ	ይለፉ
401	የህክምና ውጤት?	1. የዳነ 2. ያቋረጠ 3. ያልዳነ 4. የሞተ	መልስዎ ከሆነ 1, ወደ 402
402	የህክምና ውጤቱ የዳነ ከሆነ	የክብደት ጭማሪ (ግ/ኪግ/በሳምነት) _____ የMUAC ጭማሪ (mm/በሳምንት) _____	