TREATMENT OUTCOMES OF OUTPATIENT THERAPEUTIC FEEDING PROGRAM AND ITS DETERMINANTS IN ENDERTA WOREDA, TIGRAY REGION, ETHIOPIA

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A Thesis Submitted to Department of Epidemiology, College of Public Health and Medical Sciences, Jimma University in Partial Fulfillment for the Requirement of Masters of Public Health (MPH) Degree in Epidemiology

June, 2012

Jimma, Ethiopia

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Treatment Outcomes of Outpatient Therapeutic Feeding Program and it's Determinants in Enderta woreda, Tigray region, Ethiopia.

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ABSTRACT

Background: *Ethiopia has long history of food insecurity and nutritional problems affecting large proportion of the population caused by successive droughts. Even during the relatively good non-drought seasons, levels of malnutrition in children and women in Ethiopia were extremely high. Outpatient therapeutic feeding program, which is one of the nutritional intervention programs, is used to treat severe acute protein energy malnutrition without complication. In Tigray Region the recovery rate (72%) and defaulter rate (8.8%) of outpatient therapeutic feeding program were below the Sphere standards.*

Objective: *To asses treatment outcomes of outpatient therapeutic program and its determinants among malnourished children in Enderta woreda, Tigray, Ethiopia, 2012.*

Methods: *A prospective institution based cohort study was employed. The respondents were 332 children of 6-59 months age who were routinely admitted to OTP providing health facilities and their mothers/caregivers in Enderta woreda, Tigray Region from January-April, 2012. After determining the average number of admissions for each of the 11 health facilities; the sample size was proportionally allocated according to their size and selected consecutively.*

Results: *Concerning the outcomes of treatment, 255 patients (76.8%) have recovered, with a median time to recovery of 49(28–56) days and mean rates of weight gain were 8.3 (±3.7) g/ kg/ day. Fifty eight patients (17.5%) defaulted and their median stay in the programme was 28 (14–49) days. This study showed that, the Mean weight for height and mid upper arm circumference while defaulting were 73.3(±6.5) and 11.3(±0.7) respectively. The Kaplan Meier survival curve showed difference in time to recovery in variables such as: sex of the child, age of the child, weight/height of the child at admission, maternal age at first marriage, distance of health facility, means of water storage at home way of food preparation for < 5 children . All these variables had statistically significant association with treatment outcome of malnutrition on multiple variable proportional hazard Cox model except age of the child and way of food preparation.*

Conclusions and recommendations: *Treatment outcomes in terms of recovery rate, death rate and non response rate were within the sphere standards but the defaulter rate, mean length of stay and weight gains were below the sphere standards. Sex of the child, , weight/height of the child at admission, maternal age at first marriage, distance of health institution and means of water storage at home were the independent predictors of treatment outcomes. To reduce child*

mortality and morbidity from mal nutrition; it is better to direct efforts to address the high defaulter rate, longer length of stay and low weight gain.

Key words: *Treatment outcomes, Outpatient therapeutic program, Under five children*

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ACRONYMS/ABRIVATIONS

AIDS	Acquired Immunodeficiency Syndrome
CMAM	Community-based Management of Acute Malnutrition
CSO	Central Statistic Office
CTC	Community-based Therapeutic Care
DHS	Demographic Health Survey
DPPC	Disaster prevention and preparedness commission
GAM	Global Acute Malnutrition
GDP	Gross Domestic Product
HIV	Human Immunodeficiency virus
IQR	Intra Quartile Range
LOS	Length of stay
MDG	Millennium Development Goal
MOH	Ministry of Health
MUAC	Middle Upper Arm Circumference
NCHS	National Centre for Health Statistics
OTP	Outpatient Therapeutic Feeding Program
PEM	Protein Energy Malnutrition
RUTF	Ready to Use Therapeutic Food
SAM	Severe Acute Malnutrition
SD	Standard deviations
SFP	Supplementary Feeding Program
SNNPR	Southern Nations and Nationalities Peoples' Region
TB	Tuberculosis
TFC	Therapeutic Feeding Center
WFH	Weight for Height Measurement

WFP   World Food Program

CHAPTER ONE: INTRODUCTION

1.1. Background

Although the world produces enough food to feed everyone, in 2011 almost 1 billion children, men and women go to bed hungry every night. Millions of these, particularly young children, suffer the dire effects of under-nutrition [1].

As a policy report prepared for the United Kingdom government states; "Half of the world's undernourished people, three-quarters of Africa's malnourished children, and the majority of people living in absolute poverty can be found on small farms" [2].

Every year some 9 million children across the world die before they reach their fifth birthday, and about one-third of these untimely deaths are attributed to under-nutrition [3]. For every child who

dies as a result of under-nutrition, there are many millions more who suffer permanent damage to their health; this impairs the rest of their lives. Today, some 178 million children under the age of five suffer from stunted growth as a result of under-nutrition [4].

In spite of important advances in prevention and treatment, malnutrition continues to be a worldwide problem. Internationally, some 55 million children under the age of five are estimated to be wasted, of whom 19 million (35%) are severely wasted or severely malnourished [5].

Millennium development goal number 1 (MDG 1) dealing with poverty and hunger will certainly not be met considering the recent food price crisis which has increased the number of hungry and food insecure people in the developing world. MDG 4 seeks to reduce under-five mortality by two thirds. The existing evidence from controlled clinical studies indicate that there are demonstrated effective interventions, which if implemented to scale would reduce by 30-50 % the burden of death and disability within a 3-5 year period for most countries. As an example if exclusive breast feeding from birth to six months was achieved for all children (promoted, protected and supported) the expected impact would include a reduction of severe/moderate malnutrition by 30-50 %

leading to a reduction of 11 % in mortality of under-five children. The impact on economic development has been quantified recently as 7-8 % of Gross domestic product (GDP) in severely affected countries and down to 3-4 % in less affected countries. Progress in Latin America and Asia has been made, however the situation in sub Saharan Africa has gotten worse [6].

Ethiopia has long history of food insecurity and nutritional problems affecting large proportion of the population caused by successive droughts. Even during the relatively good non-drought seasons, levels of malnutrition in children and women in Ethiopia were extremely high putting the survival of these groups of the population at a greater peril [7].

The most important forms of malnutrition in Ethiopia are protein energy malnutrition (PEM), vitamin A deficiency, Iodine deficiency disorders, and Iron deficiency anemia [5]. The National

Demographic Health Survey (DHS) conducted by Central Statistic Agency (CSA) in Ethiopia in 2011(Preliminary Report) showed that the prevalence of wasting, under weight and stunting was 10%, 29% and 44%, respectively which is very high. This report also showed that a higher percentage of males are underweight compared with females (31% and 27 %, respectively); thirty percent of rural children are underweight compared with 16 percent of urban children; and the percentage of children who are underweight is eight times higher for those born to uneducated mothers as for those whose mothers have more than secondary education (32 % versus 4 %) [8].

In Tigray the prevalence of wasting, under weight and stunting was very high; 10.3%, 35.1% and 51.4 %, respectively [7]. The level of chronic child malnutrition was worst in the eastern (15.6%)

and the central (11.2%) zones as compared to the north western (7.5%) and southern (8.4%) zones. Older children were more likely to be malnourished. Child age, maternal anthropometric characteristics, inadequate complementary foods, and area of residence were the main contributing factors to child malnutrition [9].

1.2. Statement of the problem

In response to the high malnutrition rate UNICEF launched Enhanced Outreach Strategy (EOS) Program all over Ethiopia in collaboration with other partners (WFP, MOH & DPPC) and has been

operationalized in Tigray since 2005. The strategy involved the screening of under-five children, pregnant and lactating mothers in food insecure areas to identify acutely malnourished cases. This program is intended to bridge the Health Extension Package.

The national strategy for the treatment of severe acute malnutrition is based on therapeutic feeding units (TFUs) carried out at the local hospitals and health centers, using national protocols to treat severe acute malnutrition. Based on that, there are 18 (TFU, In patient) and 132 (OTP, Out Patient) sites for case management of severe acute malnutrition in Tigray which are supported by UNICEF. They have a capacity of managing about 13,200 malnourished children per month. On the other hand, Out Patient Therapeutic Program (OTP) roll out to health posts is promising. Currently 150 Health Posts are treating Severe Acute Malnutrition (SAM) without complication in 23 districts [10].

In Tigray region, the recovery (cure) rate of OTP, is 72% which is below the sphere standard (the 2nd lowest in the country next to Oromia i.e 66%).The defaulter rate was also lower (8.8%) next to Oromia (9%). In this region a few randomly selected cards of the defaulters were analyzed, and the average mid upper arm circumference (MUAC) when defaulting was 10.2 cm. This indicates that children defaulted when they were still at a high risk of mortality. Length of stay (50.7 days) and average weight gain (4.6g/kg/day) are the lowest scores when compared with the standard set by the National Guidelines. The practice of documenting SAM cases as unknown does not distinguish which cases were deaths, defaulter or other. This tendency gives false confidence to the health workers that they are reaching the Sphere standards, as any defaulter recorded as unknown has not been counted as a defaulter. The relapse (4%) of malnutrition after OTP is the highest in the country followed by SNNPR region, i.e. 2% [11].

According to the 2004 E.C first quarter OTP activities report of Tigray region, in Enderta worada there were 516 children on OTP at the beginning of the month of the quarter. There was also 299 children discharged from the program at the end of this month; out of which only 205(68.56%) were cured. This shows under-performance of OTP, when it is compared with the sphere standard which is required to be > 75%. The rest, 48(16.05%), 45(15.05) and 1 are defaulters, non-response and deaths respectively. These results of defaulter and non-response also show poor performance of OTP when compared with the sphere standards [12].

Important causes associated with failure of treatment were considered to be limited practical competency of health professionals and restrictions in the supply and materials needed for effective treatment. An important limiting factor that has not yet been adequately resolved/studied are individual factors like infections such as malaria, TB and HIV/AIDS, maternal factors and distance of residence from OTP site [6,11]. From reports reviewed and discussions made, the

main reported causes of absent or default has not been established. Distance was analyzed and, it seems not to be a contributing factor even though those who defaulted seem to have to travel twice the distance compared to those discharged as cured. The calculated defaulter distance is less than three hours which is considered the maximum distance the mother should travel. So distance has no contribution to defaulting. There is need for more investigation to be done as to establish the reasons for defaulting [11].

Therefore, the aim of this study is to describe the treatment outcomes of out-patient therapeutic feeding program and to identify their determinants. The treatment outcomes like cure rate, death rate and non-response will accurately be described by investing the health status of children who lost from follow-up (un-known status). This will avoid the under estimation of death rates or defaulters by solving misclassifications. Concerning the determinants, they will exhaustively be assessed prospectively.

CHAPTER TWO: LITERATURE REVIEW

2.1. Burden of child malnutrition

FAO 2010 report showed that 925 million people are undernourished. This constitutes 13.6 % of the estimated world population of 6.8 billion. Almost all of the undernourished people are living in developing countries i.e developed world 19 million, near east & north Africa 37 million(26%), Latin America & Caribbean 53 million(4%), Sub-Saharan Africa 239 million(26%), Asia & the pacific 578 million(70%)[13].

According to the most recent estimate that Hunger Notes could find, malnutrition, as measured by stunting, affects 32.5 % (one in three) of children in developing countries [14]. Geographically, more than 70 % of malnourished children live in Asia, 26 % in Africa and 4 % in Latin America and the Caribbean. Under-nutrition among pregnant women in developing countries leads to 1 out of 6 infants born with low birth weight. This is not only a risk factor for neonatal deaths, but also causes learning disabilities, mental retardation, poor health, blindness and premature death. The adverse effects of under-nutrition span through the lifetime of the children who survive into adolescence and adulthood. Stunted women are likely to have obstetric complications such as obstructed labor [15].

In Ethiopia, following successive seasons of below-average rains, since 2009 an estimated 6.2 million people remain food insecure, mainly in the eastern half of the country, and require emergency food assistance [16]. The roll-out of OTP continues to increase the coverage of nutrition intervention in the country, allowing communities to access life saving treatments at nearby health posts. Since the beginning of February 2010, UNICEF reports that an additional 318 TFP sites have been established, increasing the total number of TFP sites in the country to 5,018. In addition; the coverage of nutrition intervention with a combination of Therapeutic Feeding and Targeted Supplementary Feeding Programmes has increased from 58.8 % in December 2009 to 69.6 % in January 2010 in 'Priority 1' hotspot woredas in Oromia, Amhara, Tigray, Somali, Afar and SNNPR [17].

2.2.   Treatment Outcomes of OTP

Regarding the characteristics of admitted children, the proportion presented with edema at admission was 57.1%. In terms of outcomes out of 379 children admitted during the intervention period, successful treatment rate and fatality rate were 82.6% and 8.7% respectively. Withdrawal rates were 5.8% [18]. A study conducted in Ethiopia in 2007 showed that more children defaulted (47%) than recovered (45%). Seven % of admissions were referred to hospital and the case fatality was only 1%. For recovered children, the median rate of weight gain was approximately 5-6 g/kg/d and the median length of stay was approximately 30-45 days [19].

According to a prospective cohort study conducted in southern Bangladesh, by June 2010 community health volunteers had identified and treated over 700 children with severe acute malnutrition in one district of Barisal Division in southern Bangladesh. Over 92% of these children recovered and only one child died during treatment. A preliminary analysis of study data shows that average length of stay for the first 211 recovered children was around 32 days and average weight gain was 7.9g/kg/day. The coverage (i.e., number of children suffering from SAM reached by this program) was also extremely good, which is 89% (95 CI: 78.0% - 95.9%) [20].

A retrospective cohort study conducted in Ethiopia in 2000/01 showed, the mean scores of weight for height (WFH) at admission for all survivors were $-3\cdot03$ $(0\cdot77)$ and $-3\cdot65$ $(0\cdot63)$ for patients who died. Concerning the outcomes of treatment, 144 patients (85%) recovered, with a median time to recovery of 42 (28–56) days. Seven patients (4%) died; median time to death was 14 (7–26) days. Eight patients (5%) defaulted; their median stay in the programme was 14 (7–28) days. Overall Median time to clinical resolution of oedema was $28\cdot0$ $(21\cdot0–35\cdot0)$ Days. Overall, median rate of weight gain was $3\cdot2$ $(1\cdot9–5\cdot6)$ g/kg/day. In patients who recovered, median rates of weight gain were $4\cdot8$ $(3\cdot0–8\cdot1)$ g/ kg/ day in marasmic, $4\cdot0$ $(2\cdot7– 4\cdot3)$ g/kg/day in marasmic kwashiorkor, and $2\cdot7$ $(0– 4\cdot8)$ g/kg/day in kwashiorkor patients. At the end of the programme, 11(6.4%) patients were discharged after a median stay of 70 (42–105) days in the program. Mean weight-for height in standardized score (*z* scores) on discharge to the supplementary feeding programme was $-1\cdot88$ [21].

According to ENN Special Supplement Series, No. 2, November 2004, the recovery rate among malnourished children in Hadiya, Wolayta, South Wolo, Sidamo and Harargie were 85%, 69.6%, 74.6%, 83.8% and 81.5% respectively. In the same study, the rate defaulting from OTP in Hadiya,

Wolayta, South Wolo, Sidamo and Harargie were 4.7%, 5.2%, 9.7%, 4.4% & 15.4% respectively. And the death rate in Hadiya, Wolayta, South Wolo, Sidamo and Harargie were 4.1%, 1.5%, 7.5%, 1.3% & 1.4 % respectively [22].

Length of stay (LOS) and average weight gain are two of the programme's lowest scorers when compared with the standard set by the National Guidelines. However compared to valid standards they are well within range. An analysis of discharge cards at the health facilities revealed a mean LOS of 50.7 days in both Oromia and Tigray with an average weight gain of 4.6g/kg/day. The average LOS expected in OTP is less than 60 days with an average weight gain of more than 8.0g/kg/day. Any deviation from this would mean, a decrease in the cost efficiency of the programme, as children would be kept in the programme for longer unnecessarily. The overall national trend of relapses over the review period seems to have an increasing trend [11].

The timely and appropriate management of severe acute malnutrition (SAM) in hospitals and community settings using standardized criteria significantly improves clinical outcomes and survival. Studies suggest that home and community-based management strategies with new ready-to-use therapeutic foods (RUTF) have considerable potential for treating SAM at scale. Appropriate management of SAM could reduce deaths due to this condition by 55%, averting 3.6 million disability adjusted life years (DALYs) lost [23].

2.3. Determinants of treatment outcomes

The median age of participants was 36 (IQR 24–48) months for girls and 36 (12–48) months for boys. About 99 (58%) participants were girls, 64 (38%) had oedema caused by malnutrition (50 [29%] had kwashiorkor malnutrition and 14 [8%] marasmic kwashiorkor), and 106 had marasmus. Overall, mean WFH ratio at admission, in z scores, was –3·05 (SD 0·77). The Mean scores of WFH at admission were -3·34 (0·47) for marasmic, –3·77 (0·41) for marasmic kwashiorkor, and –2·20 (0·68) for kwashiorkor admissions. The median time to clinical resolution of oedema was 28·0 (24·5–38·5) days for marasmic kwashiorkor and 27·0 (21·0–35·0) days for kwashiorkor patients respectively [20].

In sub-Saharan countries, mortality is three times higher in HIV infected children with malnutrition than in non infected children. There was significant difference in cure rate (X^2 = 336.5, p-value=0.0001) and death rate (X^2 = 13.9, p-value=0.008) by age [24].

In line with expectations, the overall mortality rate in under the age of 6months was significantly higher than children aged 6 to 59 months (4.7% vs. 4.0% respectively, p<0.01). A risk ratio of 1.29 (95% CI: 1.08-1.53, p<0.01) was observed. It is important to note that the lack of contextual and survey data on infants under the age of 6 months meant it was not possible to compare inpatient mortality with mortality amongst infants under the age of 6 months in the general population [25].

According a follow up study conducted in Senegal, four variables were linked (P, 0.05) to change in weight for age (WFA) in the univariate analysis for each of the 14 variables. Change of WFA was higher in underweight children (mean (SD): +0.70 (0.61), +0.42 (0.61) and-0.16 (0.62) in the, < -2, (-2;-1) and $\leq$-1 Z-score WA categories, respectively. In boys the Change of WFA was higher {+0.6(0.68)} than that of girls {+0.49(0.61)}. The Change of WFA in relation to age of the children is +0.40(0.72), +0.63(0.64), +0.56(0.64), and +0.63(0.55) in the 6-11, 12-17, 18-23 & 24[+] months respectively. It was also higher in children whose mother was not working outside the home (+0.55 (0.65), +0.55 (0.66) and+0.40 (0.62) in the housewife, unemployed worker and working outside the home categories of mother's occupation, respectively) [26].

Important causes associated with failure of treatment were considered to be limited practical competency of health professionals and restrictions in the supply and materials needed for effective treatment. An important limiting factor that has not yet been adequately resolved is the need to address the treatment of children who present with SM but have underlying severe infections such as malaria, TB and HIV/AIDS [6]. Malnutrition is the end result of chronic nutritional and, frequently, emotional deprivation by caregivers who, because of poor understanding, poverty or family problems, are unable to provide the child with the nutrition and care he or she requires(27).

From reports reviewed and discussions made the main reported causes of absent or default has not been established. Distance was analyzed and, as explained in the Semi-quantitative Evaluation of Access and Coverage (SQUEAC) report, it seems not to be a contributing factor even though those who defaulted seem to have to travel twice the distance compared to those discharged as cured. The calculated defaulter distance is less than three hours which is considered the maximum distance the mother should travel. So distance has no contribution to defaulting. There is need for more investigation to be done as to establish the reasons for defaulting [11].

Conceptual framework

Socio-economic factors

- Age of the mother
- Place of Residence
- Ethnicity
- religion
- Maternal/paternal education
- Maternal/paternal Occupation
- Family income
- Agricultural production
- Livestock availability
- Distance of HI

Environmental factors

- Housing
- Water supply,
- Sanitation
- Personal hygiene

Individual variables

- Sex, Age, Birth order
- Breast feeding
- Immunization status
- Vit A supplementation
- Health status/diseases
- Nutritional diagnosis
- WFH at admission
- Presence of edema
- MUAC at admission

Maternal variables

- Maternal age at marriage
- Maternal age at 1st birth
- No of children
- Way of food preparation
- Care during illness

Treatment outcomes of OTP

- Recovery status
- Length of stay
- Mean weight gain(gkg^{-1}day^{-1}

Figure 1: Conceptual l framework of the determinants of treatment outcomes of OTP
(*Source: Adapted by the principal investigator through reviewing different litratures*)

2.4.   Significance of the study

Severe malnutrition is both a medical and a social disorder. That is, the medical problems of the child result, in part, from the social problems of the home in which the child lives. Malnutrition is the end result of chronic nutritional and, frequently, emotional deprivation by caregivers who, because of poor understanding, poverty or family problems, are unable to provide the child with the nutrition and care he or she requires.

The effectiveness of a nutritional intervention among severely undernourished children may depend on the specific context of its implementation. However, among reasons why programmes should work in theory but do not work in practice could be that some causes of malnutrition which depend on the individual cannot be addressed by the intervention. Moreover, individual determinants of differential benefit from the intervention can differ from the targeting criteria or the risk factors of malnutrition. Consequently characterization of the determinants of benefit, which are rarely addressed/studied, would be useful in order to help improve intervention outcomes.

Therefore, the aim of this study is to describe the treatment outcomes of out-patient therapeutic feeding program and to identify their determinants. The treatment outcomes like cure rate, death rate and non-response will accurately be described by investigating the health status of children who lost from follow-up (un-known status). This will avoid the under estimation of death rates or defaulters by solving misclassifications. Concerning the determinants, they will exhaustively be assessed prospectively. As a result, this study will help OTP care providers to improve the quality of OTP service by addressing the determinants that will be identified. This study will also help planers and policy makers as input for decision making and it will serve as reference for those who are interested. In turn, these all benefits are expected to contribute for the reduction of child morbidity, mortality and disability from under-nutrition.

Above all, since there is no research conducted in similar area of interest, in the study area, the finding of this study will help as a baseline data for those who are interested in carrying out further research.

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2.5. Research questions

This study will try to answer the following questions:

- Does time to recovery differ among the different groups of children on OTP?
- What are the independent predictors of survival among children on OTP?

CHAPTER THREE: OBJECTIVE

3.1. General Objective

- The main objective of this study is to assess treatment outcomes of outpatient therapeutic feeding program and its determinants among under-nutrition children in Enderta woreda, Tigray region, Ethiopia, 2012.

3.2. Specific Objectives

- To assess treatment outcomes of OTP among under-nutrition children.
- To assess the time to recovery of OTP among under-nutrition children.
- To compare the time to recovery among the different groups of children on OTP.
- To identify the independent predictors of survival among children on OTP.

CHAPTER FOUR: METHODS AND MATERIALS

4.1. Study area and period: The study was conducted in Enderta woreda, Tigray region which is located at around 10.5 km east of Mekelle and 776.5 km north of Addis-Ababa. It has 114,277 population of those male 57,472 (50.29%) and female 56,805 (49.71%) (28). It is bordered by Afar region in east, Killete-Awulaelo woreda in north, Hintalo-wajirat and Saharti-Samire woreda in south and Degua-Temben Woreda in west. It has an altitude ranging from 1500m-2600m above sea level, annual average rain fall of 760mm, and average temperature of 21^0c. It has an area of 1,361.92 Square kilometers. The woreda has 17 kebelles. There are 15 health facilities (6 health centers and 9 health posts), all of them currently provide OTP service. The study was conducted from January-April, 2012.

4.2. Study design

An institutional based prospective cohort study was conducted in Enderta woreda, Tigray region.

4.3. Population

4.3.1. Source population:

- All 6-59 months age children who have been routinely admitted to OTP and their mothers/caregivers in Enderta woreda, Tigray region.

4.3.2. Study population:

- Selected 6-59 months age children who have been routinely admitted to OTP and their mothers/caregivers in Enderta woreda, Tigray region.

4.4. Inclusion and Exclusion Criteria

- *Inclusion criteria* - 6-59 months age children who have been routinely diagnosed and admitted to OTP with severe acute protein-energy malnutrition without complication.
- *Exclusion criteria:* 6-59 months age children who have been routinely diagnosed and admitted to OTP sites which have work experience of less than six months.

4.5. Sample size and Sampling technique /Sampling procedures

4.5.1. Sample size:

sample size was determined by using **COMPARE2 (**WINPEPI program, Abramson 2004 **Version 1.45)** using 5% level of significance, 80% power, 0.05, power=80%, ratio 1:1, P_1 (death rate among marasmic-kwashiorkor) is 14.3% and P_2 (death rate

among marasmic) is 4.7% which provided maximum sample size. The rate was taken from a study conducted in Bedawacho, Ethiopia, between 16th October 2000 and 31st January 2001 (27). This provides a total of 332 sample size. See table 1.

Table 1: Sample size determination using different parameters for the assessment of treatment outcomes and its determinants of OTP in Enderta woreda, Tigray regional state, 2004 EC

Predictors	Proportion outcome among exposed(1)	Proportion outcome among unexposed(2)	n_1	n_2	total	Reference
HIV status +ve(1) &-ve(2)	19%(death)	3.6%(death)	78	78	156	(29)
Marasmus(1) Vs Marasmic kwashiorkor(2)	4.7%(death)	14.3%(death)	166	166	332	(30)
Non edematous(1) Vs Edematous(2)	68.4%(cure rate)	84.61%(cure rate)	119	119	238	(31)
Marasmus(1) Vs kwashiorkor(2)	3.59%(non response)	20%(non response)	137	137	274	(32)
Marasmic-kwashiorkor(1) Vs kwashiorkor(2)	13.4%(non response)	28%(non response)	134	134	268	(33)

4.5.2. Sampling Technique

Out of the 15 health facilities which were providing OTP service in the woreda, only 11 (6 health centers and 5 health posts) were included in the study. The rest 4 health posts were excluded because these facilities have started OTP program a couple of months before the initiation of the study. After determining the average number of admissions for each of the health facilities; the sample size was proportionally allocated according to their size. Then participants were selected consecutively. For more information see figure 2.

Schematic presentation sampling
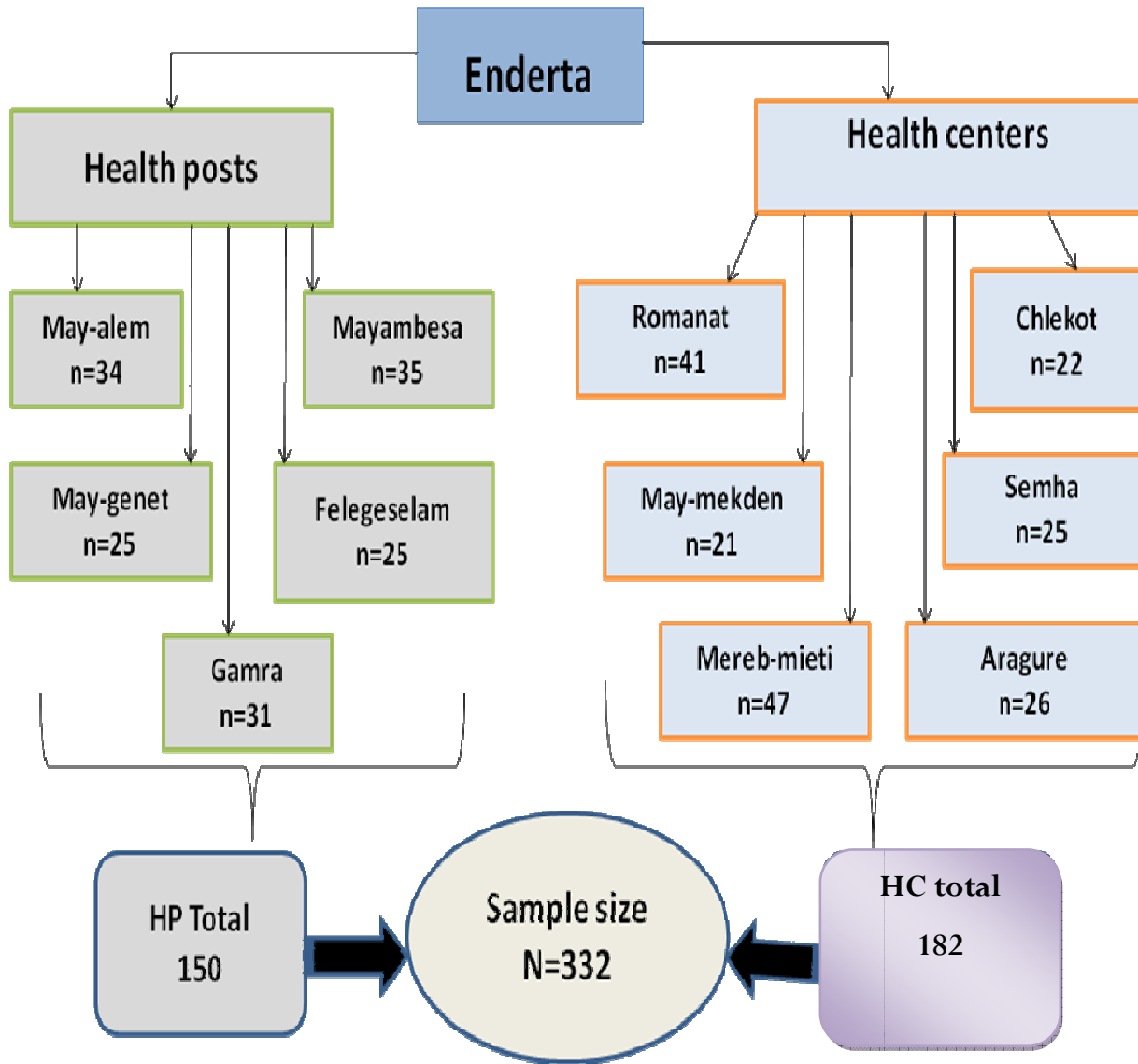
Figure 2: Schematic presentation of sampling procedure of treatment outcomes of OTP and its determinants Enderta woreda, Tigray regional state, 2004 EC.

4.6. Data collection and measurement

4.6.1. Variables

Dependent variables:

- Treatment outcome of OTP
  - Recovery status malnutrition
    - ✓ Recovered
    - ✓ Censored
      - Death
      - Defaulter
      - Unknown
      - Transferred to in-patient therapeutic feeding unit (non-response).
  - Weight gain
  - Length of stay (LOS)

Independent variables: The independent variables are;

- **Socio-demographic variables**: age, religion, maternal educational level, paternal educational level, ethnicity, marital status, number of dependent children at home, family size, employment/occupation in-come and distance of health institution from residence.

- **Environment variables** – housing condition, water supply, sanitation and personal hygiene.

- **Maternal practice variables-** Breast feeding, food preparation, time available to feed child, place where the mother seeks care when the child gets ill, maternal age at first marriage, frequently works out side home or not.

- **Individual variables-** sex, age, birth order, Health care services (immunization, vit-A supplementation) before admission to OTP, Health care services after admission to OTP, Health status of the child at admission (nutritional diagnosis, presence of edema, MUAC, weight for height, severity of malnutrition).

4.6.2. Data collection instrument (tool)

A structured questionnaire was adapted after reviewing relevant literatures in English and it was translated to the local language (Tigrigna) and back translated to English language to check for its

consistency. Home visit record form was adopted to collect information about status of the child who lost with unknown status. Then Data collection instrument was also pre-tested on 17(5% of the sample size) that is not included into the main study.

4.6.3. Data Collection

Structured interviewer administered questionnaire and measurements had been used to collect information from each participant. Anthropometric measurements and physical examination was made to collect data about children's treatment outcomes and their health status. Mothers or caregivers of the selected children were interviewed for the other variables through face to face at the health institution.

Eleven data collectors; health workers who took training on TFP and currently working in each OTP sites (one in each health facility) was recruited to collect the required information. The principal investigator and one Health Extension program supervisors in each health center had supervised the data collection process. All data collectors and supervisor were trained for two days by the principal investigator before the data collection on the objectives of the study and how to interview, measure, fill the questionnaire and handle questions asked by subjects.

Admission and follow-up weights and heights were taken with calibrated standard 'Salter' spring scales accurate to 100 g and locally constructed height boards accurate to 0.5 cm. All measurements including medical complications and the presence of bilateral pitting edema was recorded on admission and at follow-up on a standard individual treatment card. The Scales were calibrated before and after the programme using a 1 kg weight, and were regularly adjusted to zero.

Each participant on OTP was visiting to their closest site weekly to receive food and a medical assessment. During every visit, the child was examined and given a weekly supply of RUTF. At admission, the data collectors were assessing degree of pitting edema, hydration, dysentery, diarrhea, anemia, and other signs of infections. At each follow-up visit weight of the child, existence/extent of pitting edema, presence of disease, drugs prescribed and outcome (death, discharge cured, default, or transfer) had been recorded on patients' treatment cards and in the programme's register. Lastly it was extracted using data extraction form from the cards and registration forms. The maximum follow up period for the children on OTP was 8 weeks or 56

days (34). Home visit was made for children who lost from follow up due to unknown status in order to know their treatment response status.

4.7. Operational definitions

Severe acute protein energy malnutrition (SAM): W/H or W/L < 70% or MUAC < 110 mm with a Length > 65 cm: see annex 4

Recovery statuses are defined as:
- **Cured/recovered:** Patient that has reached the discharge criteria
- **Death:** Patient that has died while he was in the programme at your facility or in transit to another component of the programme but has not yet been admitted to that facility. For the out-patient programme, the death has to be confirmed by a home visit.
- **Unknown:** Patient that is absent for 3 consecutive weighing in out-patient care (21 days) but the outcome (actual defaulting or death) is not confirmed/ verified by a home visit.
- **Defaulter:** Patient that is absent for 2 consecutive weighing (14 days), confirmed by a home visit for out-patient component of the programme.
- **Non-responder:** Patient that has not reached the discharge criteria after 2 months in the out-patient programme.
- **Primary failure to respond OTP**:
  - Failure to gain any weight (non-edematous children) after 21 days of admission or
  - Failure to start to lose oedema after 14 days of admission or
  - Oedema still present after 21 days of admission

Discharge criteria: In facilities that has the capacity to measure the height of the children
- participants who have the following for two consecutive weeks:
  - W/L>=85% or W/H>=85% on more than one occasion. (Two weeks for out-patients).
    And
  - no oedema for 14 days (out-patient)
- for children being admitted on MUAC criteria to peripheral OTP sites without the facilities or staff skills to measure height
- Target weight gain reached (see table in annex 6) **and** no oedema for 14 days (out-patient)

Performances Indicators
- **Recovery rate:** Recovery rate = No of patient discharged for recovery / Total No of exits

- **Death rate:** Death rate = No of patient died in the programme / Total No of exits
- **Defaulter rate=** Defaulter rate = No of true defaulters / Total No of exits
- **Non responder rate=** Non-responder rate = No of non-responder / Total No of exits
- **Transfer out rate=** Transfer Out rate = No of pts transferred to other site /Total No of exits
- **Weight gain (g/kg/day):** is average weight (in gram) increase for every kg of body weight of the child per day. It is determined by;
  - Individual weight gains in marasmic patients were calculated with:

$$\left(\frac{\frac{[\text{discharge weight} - \text{admission weight}]}{\text{admission weight}}}{\text{number of days in programme}} \right)$$

For children admitted with oedema, rates of weight gain after oedema had disappeared were calculated with:

$$\left(\frac{\frac{[\text{discharge weight} - \text{weight at disappearance of oedema}]}{\text{weight at disappearance of oedema}}}{\text{number of days between disappearance of oedema and discharge}} \right)$$

Type of malnutrition:

- Kwashiorkor: the presence of any bilateral pitting oedema

- Marasmus: weight for height $\leq$ -3 z scores or $\leq$ 70% of the median NCHS reference W/H

- Marasmus kwashiorkor: weight for height $\leq$ -3 z scores or $\leq$ 70% of the median NCHS reference weight-for-height and bilateral pitting oedema.

Table 2: classification of edema

Localization	Degree of severity	Classification
Both feet/ankles	Mild: pitting barely detectable	+(1)
Both feet plus lower legs	Moderate: pitting in between mild and severe	++ (2)
Generalized, including both feet plus legs, hands, arms and face	Severe: skin very tense, pitting deep	+++ (3)

4.8. Data analysis procedures

Data were entered to and analyzed using SPSS version 16.0 for windows. The data were cleaned and edited before analysis. Data exploration was undertaken to see if there are odd codes or items that were not logical and then subsequent editing was made. The main end point in this study is recovery from malnutrition. Individuals defaulted, died, and non-response at the end of the study period has been considered as censored. Finally, the out-come of each subject has been dichotomized in to censored or recovered.

The patient cohort characteristics was described in terms of mean, median, standard deviations, and range values for numerical data; percentage, frequency tables, and charts/graphs for categorical data. For the comparison of time to recovery among the different groups of children on OTP, Kaplan Meir curve has been used and significance test for these differences was assessed by log rank test. Then proportional hazards Cox model with stepwise variable selection procedural was used to identify independent predictors of survival. The assumption for proportional hazard was assessed graphically by log minus log survival curve. P-value less than or equal to 5% had been considered significant.

4.9. Data quality management

Data collection instrument was pre-tested in 17 (5%) of the study population in Quiha health center which has similar characteristics with the study participant (mothers/caregivers) before 5 days of the actual data collection to ensure clarity, wordings, logical sequence of the questions and the pre-tested sample was not included in the study and necessary modification was done accordingly to the final data collection tool. All completed data collection forms were examined for completeness and consistency during data management, storage, cleaning and analysis. Data collectors and supervisors had been trained for two days. The administered questionnaires had been checked for completeness and consistency on daily basis by the supervisors and every other day by the principal investigator.

4.10.   Ethical consideration

Ethical clearance was obtained from the health research and post graduate coordinating office of college of Public Health and Medical sciences, Jimma University. Official letter of co-operation was also written to concerned bodies in the study area.

Written informed consent was obtained from every mother or care giver before the interview by explaining the objective of the research. All the information collected from the study subjects was handled confidentially through omitting their personal identification, conducting the interview in private place and the data were used for the research purpose only.

4.11. Dissemination plan

The result of the study will be presented and submitted to Jimma University, College of Public Health and Medical Sciences School of Graduate Studies and Department of Epidemiology. The final report will be communicated to different stakeholders including the district health offices, health centers and other agencies engaged in OTP. Further effort will be made for publication on peer reviewed journal.

CHAPTER FIVE: RESULTS

5.1. Socio-Demographic /Economic Characteristics of the Participants

A total of 332 children aged 6-59 months and their mothers living in Enderta woreda had participated in the study. The response rate was 100%. The mean age of the children was 15.8 (±8.0) months. One hundred forty four (43.4%) of the children were aged between 12-23 months age interval. Out of the 332 children 174(52.5%) were females. Regarding their mothers age, more than one third (36.4%) of them were aged between 26-30 years and the mean age was 27.9(±6.3) years. Majority of the participants, 308(92.8%) were followers of Orthodox followed by Islam 18 (5.4%). Among the participants 301 (90.7 %) belong to Tigray ethnic group. Regarding the educational status of mothers 210(63.3%) were illiterate and only 19(5.7%) had attended formal education. During the study period, most of the mothers were house wives 187(56.3%). The mean family size of the household was 5.6(±2.1). The median time lapse/distance to reach the health facility by the mothers was 2 hours walking (Table 3).

Table 3: Socio-demographic characteristics of the participants of outpatient therapeutic feeding program in Enderta woreda, Tigray regional state, 2004 EC

Variables		Cured No (%)	Defaulted No (%)	Died No (%)	Non-response No (%)	Overall No (%)
Age of the children(in months)	6-11	105(41.2)	10(17.2)	0	9(52.9)	124(37.3)
	12-23	107,42.0	33(56.9)	2	2(11.8)	144(43.4)
	>=24	43,16.9	15(25.9)	0	6(35.3)	64(19.3)
	Total	255	58	2	17	332
	<=20	38(14.9)	6(10.3)	0	0	44(13.3)
	21-25	68(26.7)	11(19.0)	0	9(52.9)	88(26.5)
Age of the Mothers/care givers	26-30	89(34.9)	24(41.4)	0	8(47.1)	121(36.4)
	31-35	28(11.0)	9(15.5)	2	0	39(11.7)
	36-40	23(9.0)	8(13.8)	0	0	31(9.3)
	>=41	9(3.5)	0	0	0	9(2.7)
	Total	255	58	2	17	332
	<=25	19(7.5)	0	0	0	19(5.7)
	26-30	72(28.2)	12(20.7)	0	5(29.4)	89(26.8)
Age of the fathers	31-35	39(15.3)	6(10.3)	0	4(23.5)	49(14.8)
	36-40	64(25.1)	28(48.3)	0	6(35.3)	98(29.5)
	41-45	22(8.6)	6(10.3)	0	2(11.8)	30(9.0)
	>=46	39(15.3)	6(10.3)	2	0	47(14.2)
	Total	255	58	2	17	332
	illiterate	128(50.2)	31(53.5)	0	10(58.8)	169(51.0)
Educational status of the fathers	read & write only	91(35.7)	16(27.6)	2	7(41.2)	116(34.9)
	1-4	13(5.1)	2(3.5)	0	0	15(4.5)
	5-8	14(5.5)	9(15.4)	0	0	23(6.9)
	9-12	9(3.5)	0	0	0	9(2.7)
	Total	255	58	2	17	332
	illiterate	153(60.0)	43(74.1)	0	14(82.4)	210(63.3)
Educational status of the mothers	read & write only	85(33.3)	13(22.4)	2	3(17.6)	103(31.0)
	1-4	10(3.9)	2,(3.4)	0	0	12(3.6)
	5-12	7(2.8)	0	0	0	7(2.1)
	Total	255	58	2	17	332

Residence	rural	242(94.9)	50(86.2)	0	15(88.2)	307(92.5)
	urban	13(5.1)	8(13.8)	2	2(11.8)	25(7.5)
	Total	255	58	2	17	332
Ethnicity	Tigray	228(89.4)	56(96.6)	0	17(100.0)	301(90.7)
	Amhara	13(5.1)	2(3.4)	0	0	15(4.5)
	others	14(5.5)	0	2	0	16(4.8)
	Total	255	58	2	17	332
Marital status	married	222(87.1)	45(77.6)	0	11(64.7)	278(83.7)
	Others,widowed /divorced…	33(12.9)	13(22.4)	2	6(35.3)	54(16.3)
	Total	255	58	2	17	332
Religion	Orthodox	237(92.9)	56(96.6)	0	15(88.2)	308(92.8)
	Muslim	14(5.5)	2(3.4)	2	0	18(5.4)
	Others	4(1.6)	0	0	2(11.8)	6(1.8)
	Total	255	58	2	17	332
Occupation of the mothers	house wife	155(60.8)	22(37.9)	2	8(47.1)	187(56.3)
	Farmer	88(34.5)	34(58.6)	0	7(41.2)	129(38.9)
	Others	12(4.80)	2(3.4)	0	2(11.8)	16(4.8)
	Total	255	58	2	17	332
Occupation of the husbands	Farmer	193(75.7)	44(75.9)	1	11(64.7)	249(75.0)
	daily laborer	47(18.4)	10(17.2)	1	6(35.3)	64(19.3)
	Others	15(5.9)	4(6.9)	0	0	19(5.7)
	Total	255	58	2	17	332
Family size	1-5	142(55.7)	31(53.4)	0	6(35.3)	179(53.9)
	>=6	113(44.3)	27(46.6)	2	11(64.7)	153(46.1)
	Total	255	58	2	17	332
Distance of HI from residence	≤2 hours	196(76.9)	35(60.3)	0	11(64.7)	242(72.9)
	>2 hour	59(23.1)	23(39.7)	2	6(35.3)	90(27.1)
	Total	255	58	2	17	332

The median monthly income of the families was 800.00 ETB. Out of the 332 participants, 196(89.2%) have agricultural harvests/productions, out of which 226(76.4%) produce subsistent/food crops. The median amounts of harvests/crops for the participant's families were found to be 6 quintals (table 4).

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Table 4: Socio-economic characteristics of the participants of outpatient therapeutic feeding program in Enderta woreda, Tigray regional state, 2004 EC

Variables		Cured No (%)	Defaulted No (%)	Died No (%)	Non-response No (%)	Overall No (%)
Type of agricultural production	Subsistent	185(72.5)	37(63.8)	0	4(23.5)	226(68.1)
	Commercial	44(17.3)	17(29.3)	0	9(52.9)	70(21.1)
	none	26(10.2)	4(6.9)	2	4(23.5)	36(10.8)
	Total	255	58	2	17	332
any form of financial subvention	none	156(61.2)	30(51.7)	2	15(88.2)	203(61.1)
	regular	41(16.1)	9(15.5)	0	2(11.8)	52(15.7)
	Casual	58(22.7)	19(32.8)	0	0	77(23.2)
	Total	255	58	2	17	332
Are there livestock in HH	yes	211(82.7)	46(79.3)	0	13(76.5)	270(81.3)
	no	44(17.3)	12(20.7)	2	4(23.5)	62(18.7)
	Total	255	58	2	17	332

Out of the participant's families 270 (81.3 %) of them possessed livestock. The different types of livestock found were cattle, sheep, goats, chickens and draft animals (figure 3).
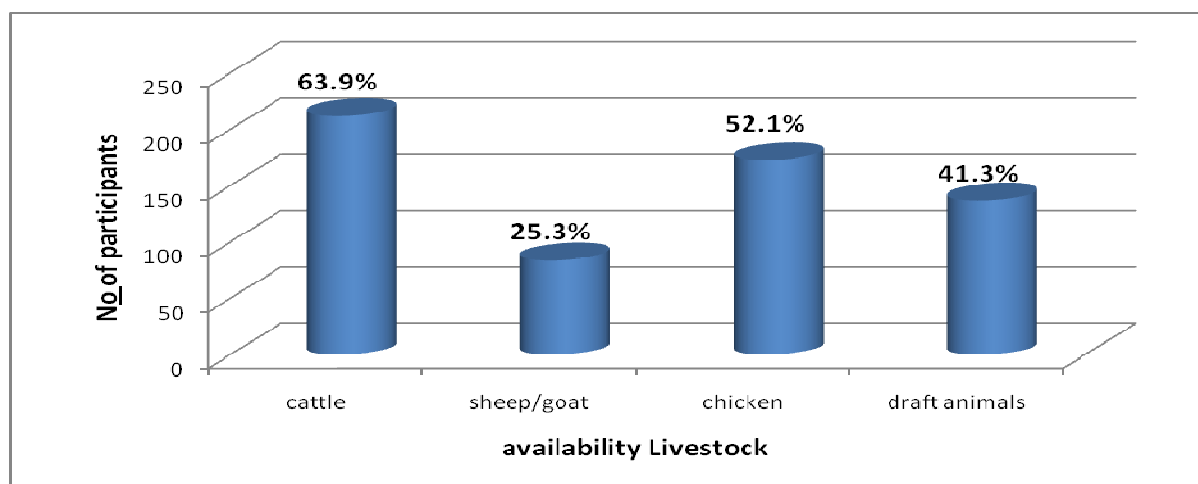
Figure 3: Distribution of livestock in the households of the study subjects in enderta woreda, tigray regional state, 2004 EC

5.2. Environmental factors

Concerning the housing condition, the majority, 316(95.2%) of the floor of the dwellings were made of earth. Regarding the kitchen of the respondents, 282(84.9%) was separated from the dwelling. From the respondents 228(68.7%) of them store drinking water in 'jerican' and the rest store in pot (Table 5).

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Table 5: Environmental characteristics of the participants of outpatient therapeutic feeding program in Enderta woreda, Tigray regional state, 2004 EC

Variables		Cured No (%)	Defaulted No (%)	Died No (%)	Non response No (%)	Overall No (%)
Type of the roof	Corrugated	157(61.6)	44(75.9)	0	8(47.1)	209(63.0)
	Thatched	98(38.4)	14(24.1)	2	9(52.9)	123(37.0)
	Total	255	58	2	17	332
Status of the kitchen with the dwelling	Separated	224(87.8)	47(81.0)	0	11(64.7)	282(84.9)
	attached	31(12.2)	11(19.0)	2	6(35.3)	50(15.1)
	Total	255	58	2	17	332
Water storage	'Jerican'	193(75.7)	30(51.7)	0	5(29.4)	228(68.7)
	Pot	62(24.3)	28(48.3)	2	12(70.6)	104(31.3)
	Total	255	58	2	17	332
Is there Latrine in the household	Yes	213(83.5)	32(55.2)	0	12(70.6)	257(77.4)
	No	42(16.)5	26(44.8)	2	5(29.4)	75(22.6)
	Total	255	58	2	17	332
Hand washing with the latrine	Yes	49(19.2)	14(24.1)	0	6(35.3)	69(20.8)
	No	164(64.3)	18(31.0)	0	6(35.3)	188(56.6)
	No latrine	42(16.5)	26(44.8)	2	5(29.4)	75(22.6)
	Total	255	58	2	17	332
Solid waste disposal means of the household	disposal pit	178(69.8)	32(55.2)	0	11(64.7)	221(66.6)
	open field	73(28.6)	26(44.8)	2	6(35.3)	107(32.2)
	Others	4(1.6)	0	0	0	4(1.2)
	Total	255	58	2	17	332

Out of the 332 respondents 217(65.5%) of them use drinking water from hand pump/tap (figure 4)
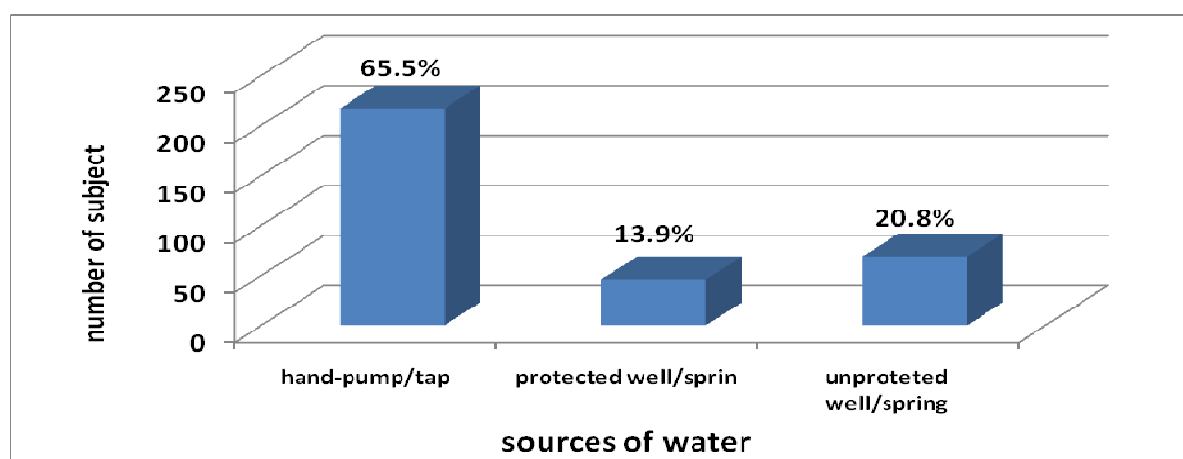
Figure 4: Distribution of sources of drinking water of participants of Enderta woreda, Tigray regional state, 2004EC

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5.3. Maternal and child related factors

5.3.1. Maternal factors

Out of the 332 mothers 209(63.0%) usually work out side home. Concerning the way of food preparation for children of under five by the mothers, 206(62.0%) of them prepare the children's food separately from that of adults. The mean number of births of the mothers was 3.84(±2.0). Majority 227(68.4%) of the mothers' age at their first marriage was less than or equal to 18 year, with a mean age of 17.4(±2.5) years (table 6).

Table 6: Maternal characteristics of the participants of outpatient therapeutic feeding program in Enderta woreda, Tigray regional state, 2004 E.C

Variables		Cured No (%)	Defaulted No (%)	Died No (%)	Non response No (%)	Overall No (%)
Does the mother usually work out-side home	Yes	83(32.5)	33(56.9)	0	7(41.2)	123(37.0)
	No	172(67.5)	25(43.1)	2	10(58.8)	209(63.0)
	Total	255	58	2	17	332
Have you got enough time to prepare food?	Yes	229(89.8)	54(93.1)	2	15(88.2)	300(90.4)
	No	26(10.2)	4(6.9)	0	2(11.8)	32(9.6)
	Total	255	58	2	17	332
How do you usually prepare food for <5 children	Separately	178(69.8)	22(37.9)	0	6(35.3)	206(62.0)
	Not separate	77(30.2)	36(62.1)	2	11(64.7)	126(38.0)
	Total	255	58	2	17	332
Total number of births given by the mother	1-3	132(51.8)	29(50.0)	0	6(35.3)	167(50.3)
	4-5	67(26.3)	10(17.2)	2	6(35.3)	85(25.6)
	≥7	56(22.0)	19(32.8)	0	5(29.4)	80(24.1)
	total	255	58	2	17	332
Maternal age at 1st marriage	<18	176(69.0)	38(65.5)	2	11(64.7)	227(68.4)
	≥18	79(31.0)	20(34.5)	0	6(35.3)	105(31.6)
	Total	255	58	2	17	332

Majority, 32.2% of the mothers have 4 children of under-five years of age. Whereas 12% of them have only one child.
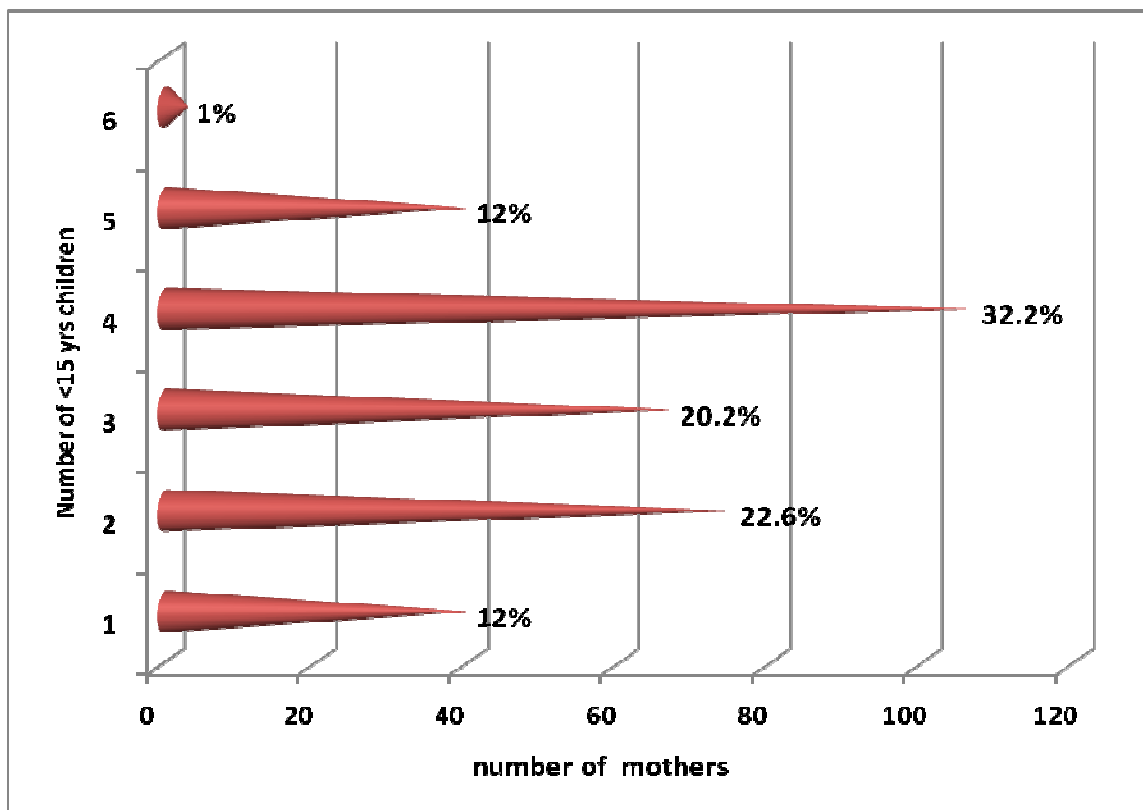
Figure 5: Distribution of number of mothers and corresponding number of < 15 years children in Enderta worada, Tigray regional state, 2004EC

5.3.2. Child related factors

Majority 274(82.5%) of the children were fully vaccinated for their age. Concerning breast feeding 288(86.7) of the children were on breast feeding during the study. Regarding the nutritional diagnosis 274(82.5%) had been diagnosed with marasmus. From the 25 children who have diarrhea, 6(24%) had dehydration (Table 7).

Table 7: Child characteristics of the participants of outpatient therapeutic feeding program in Enderta woreda, Tigray Regional State, 2004 EC

Variables		Cured No (%)	Defaulted No (%)	Died No (%)	Non-response No (%)	Overall No (%)
Sex of the child	Male	124(48.6)	24(41.4)	2	8(41.1)	158(47.5)
	Female	131(51.4)	34(58.6)	0	9(58.9)	174(52.2)
	Total	255	58	2	17	332
Immunization status of the child	fully vaccinated	233(91.4)	31(53.4)	0	10(58.8)	274(82.5)
	Not fully vaccinated	22(8.6)	27(46.6)	2	7(41.2)	58(17.5)
	Total	255	58	2	17	332
Up to date Vit- A supplementation	Yes	243(95.3)	33(56.9)	0	17(100.0)	293(88.3)
	No	12(4.7)	25(43.1)	2	0	39(11.7)
	Total	255	58	2	17	332
Currently on breastfeeding	Yes	221(86.7)	48(82.8)	2	17(100.0)	288(86.7)
	No	34(13.3)	10(17.2)	0	0	44(13.3)
	Total	255	58	2	17	332
Type of nutritional diagnosis	Marasmic Kwashiorkor	35(13.7)	17(29.3)	0	6(35.3)	58(17.5)
	Marasmus	220(86.3)	41(70.7)	2	11(64.7)	274(82.5)
	Total	255	58	2	17	332
WFH at admission	<60 %	37(14.5)	6(10.3)	2	9(52.9)	54(16.3)
	≥60%	218(85.5)	52(89.7)	0	8(47.1)	278(83.7)
	Total	255	58	2	17	332
Diarrhea at admission	Yes	240(94.1)	52(89.7)	2	13(76.5)	307(92.5)
	No	15(5.9)	6(10.3)	0	4(23.5)	25(7.5)
	Total	255	58	2	17	332

5.4. Treatment outcome of OTP

Concerning the outcomes of treatment, 255 patients (76.8%) have recovered with a median time to recovery of 49(28–56) days and mean rate of weight gain was 8.3 ($\pm$3.7) g/ kg/ day. Fifty eight patients (17.5%) defaulted and their median stay in the programme was 28 (14–49) days. This study showed that, the mean weight for height and mid upper arm circumference while defaulting were 73.3($\pm$6.5) % and 11.3($\pm$0.7) cm respectively. Overall Mean time to clinical resolution of edema was 17.4($\pm$4.4) days. Overall, mean rate of weight gain was 7.3($\pm$3.8) g/ kg/ day. The overall mean length of stay was 44.1($\pm$11.6) days (figure 6).
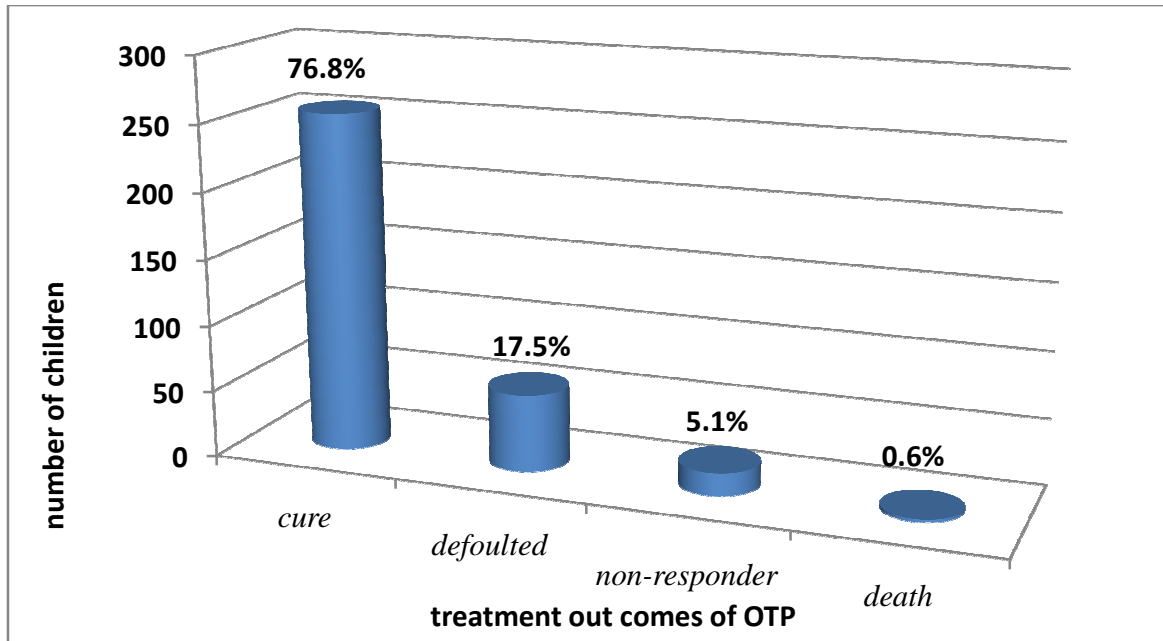
Figure 6: Treatment outcomes of OTP among malnourished children in Enderta woreda, Tigray regional state, 2004EC

5.5. Comparison of time to recovery among the different groups of children

The Kaplan-Meier curve for children of families, who store drinking water in ' jerican' at home have better treatment outcome of OTP with 84.6%, 42 days and 7.7 g/kg/d of cure rate, mean length of stay and mean weight gain per kg per day respectively as compared to those who store in pot. Whereas, for those who use pot the cure rate, mean length of stay and mean weight gain per kg per day were 59.6%, 49 days and 6.5 g/kg/day respectively (figure 7).
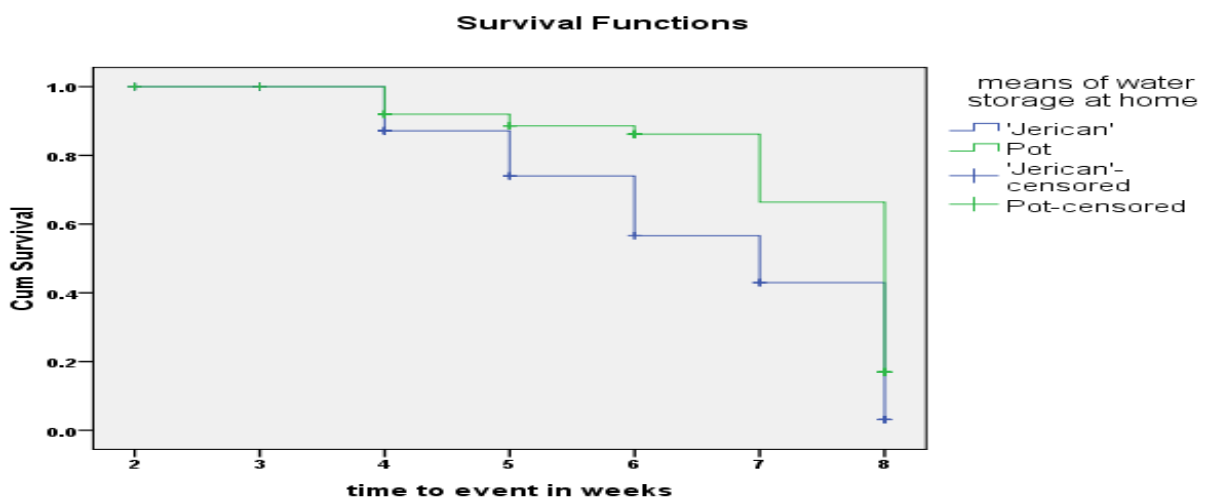
Figure 7: Kaplan-Meier survival curve among participants by water storage means at household level in Enderta woreda, Tigray regional state, 2004 EC.

The KM survival curve of distance of health institution from the residence of participants in relation to time to event illustrates that those who travel for less or equal to 2hrs have better treatment outcomes of OTP (cure rate of 81.0%, median length of stay of 42 days and mean weight gain of 8.4 g/kg/day) as compared to those who travel more than 2 hrs (cure rate of 65.6%, median length of stay of 52 days and mean weight gain of 7.6 g/kg/day) (Figure 8).
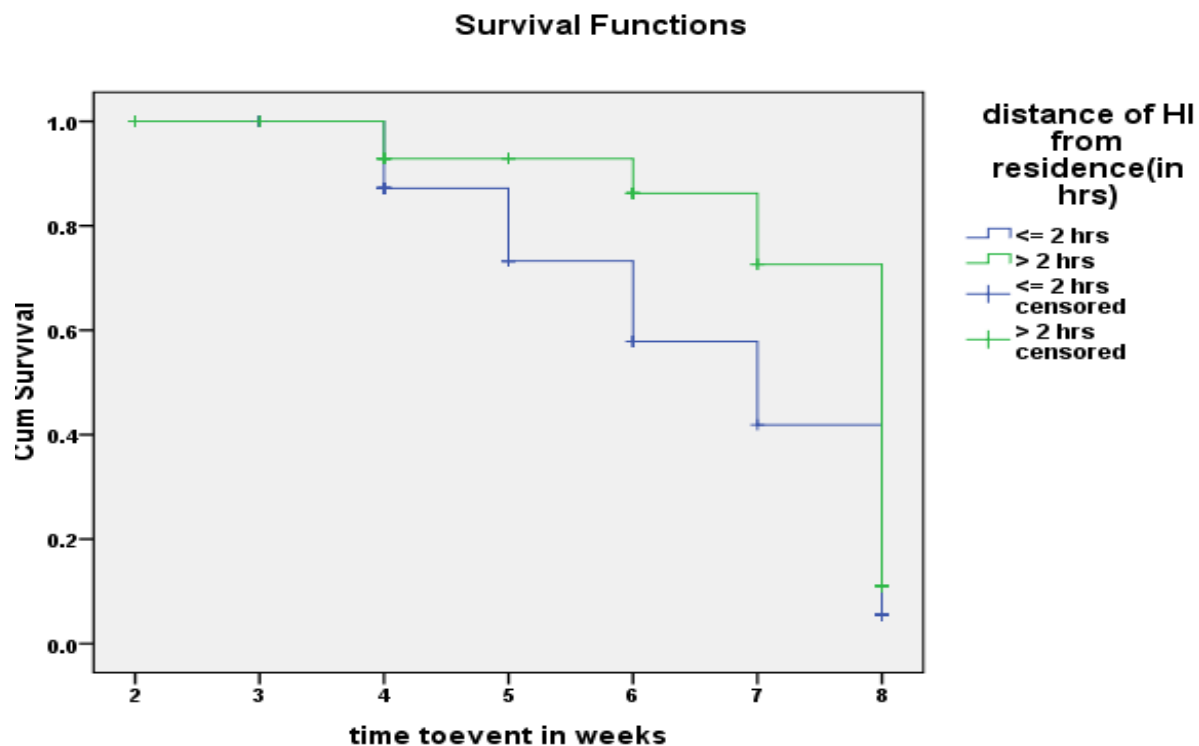
Figure 8: Kaplan-Meier survival curves among participants by distance of health institution in Enderta woreda, Tigray regional state, 2004EC

Children who were born from mothers whose age at first marriage was greater than or equal to 18 yrs have better response to OTP with higher cure rate (77.5%), lesser median length of stay (42 days) and higher mean weight gain (9.4 g/kg/day) as compared to those who were born from mothers whose age at first marriage is less than or equal to 18 yrs that had 74.3%, 49 days and 7.7 g/kg/day of cure rate, median length of stay and mean weight gain per kg per day respectively (figure 9).

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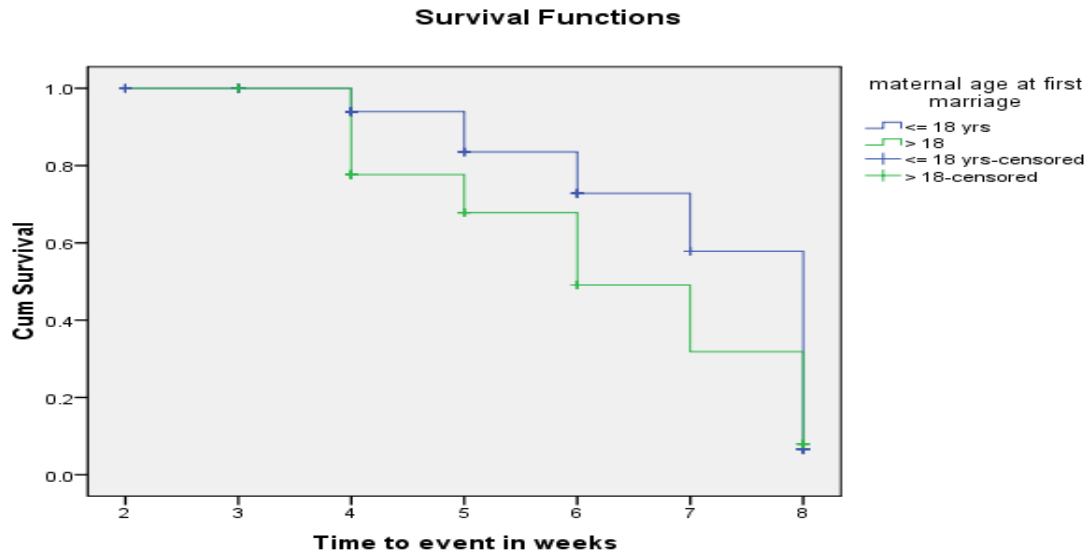
Figure 9: Kaplan-Meier survival curve among children by their mother's age at first marriage in Enderta woreda, Tigray regional state, 2004 EC

The KM survival curve for sex illustrates that the treatment outcome of males was better than that of females. The cure rate, median length of stay and mean weight gain per kg per day was 78.5%, 42 days and 8.6 g/kg/day for males respectively. For females cure rate, median length of stay and mean weight gain per kg per day was 75.3%, 50 days and 7.9 g/kg/day respectively (figure 10).
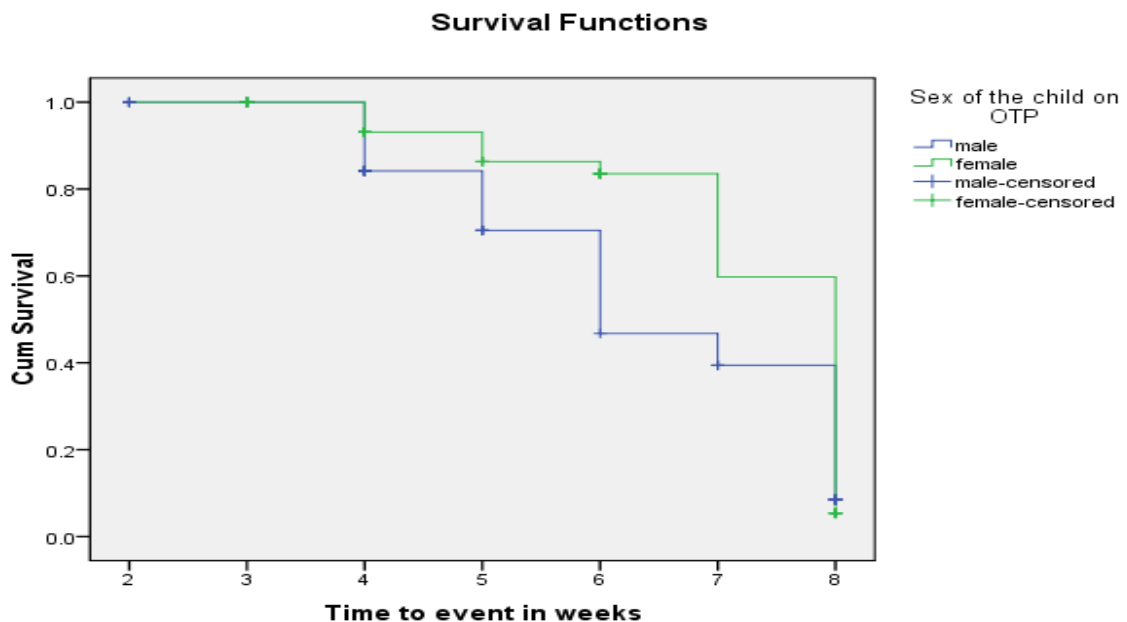
Figure 10: Kaplan-Meier survival curve of children on OTP by their sex in Enderta woreda, Tigray regional state, 2004 EC

The time to recovery of OTP was shorter for children of age 18 months and below as compared to children above 18 months (Figure 11).
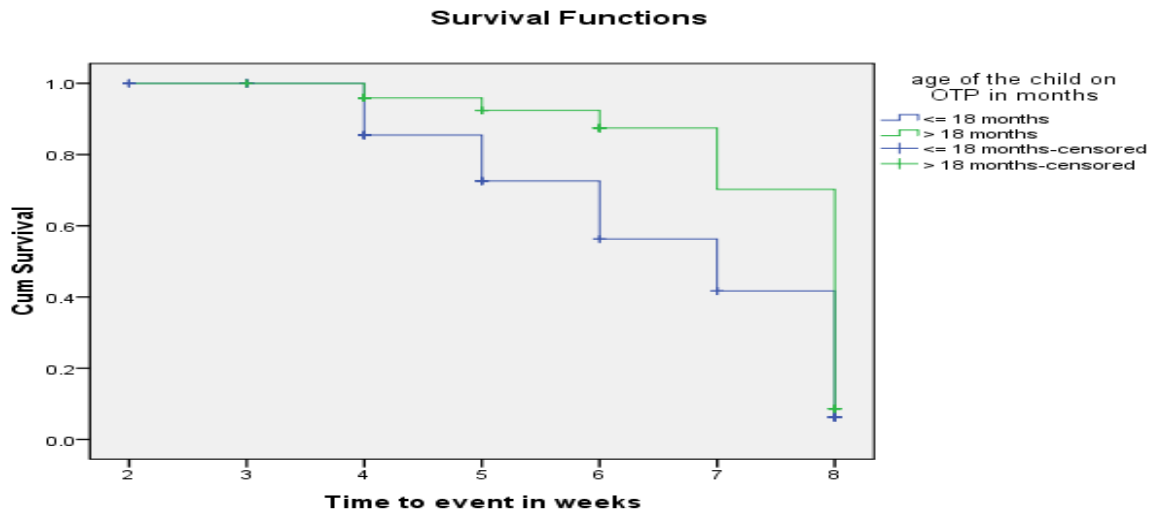
Figure 11: Figure 10 Kaplan-Meier survival curve of children on OTP by age in Enderta woreda, Tigray regional state, 2004 EC

Treatment outcome of children with baseline WFH greater than or equal to 60% have better time to recovery as compared to children with baseline WFH less than 60% (figure 12).
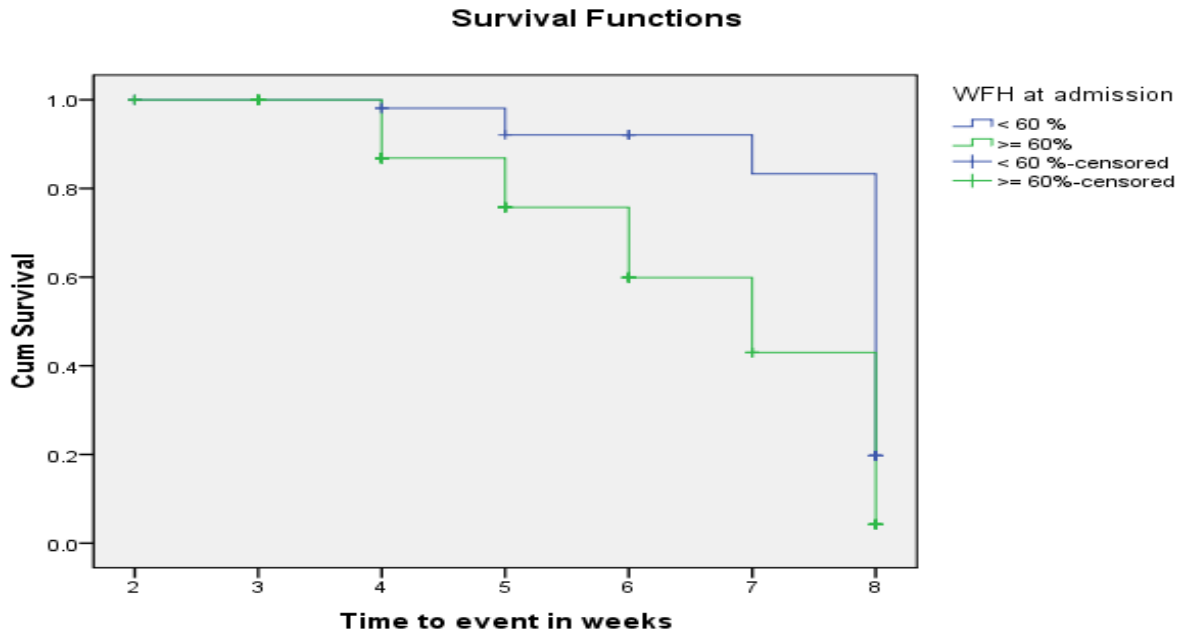
Figure 12:   Kaplan-Meier survival curve of children on OTP by WFH at admission in Enderta woreda, Tigray regional state, 2004 EC.

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5.6. Factors associated with survival time of children on OTP

The significance of the observed differences of the Kaplan Meier survival curves (times) among different groups of children was assessed using log rank test. As a result, distance of the health facility from the family's residence, means of drinking water storage at household level, sex of the child on OTP, age of the child on OTP, weight for height of the child at admission, maternal age at first marriage and way of food preparation for under five children by the mothers were found to have statistically significant association and the assumption for Kaplan Meier was met. But for the rest variables which are statistically significant by Log rank test; the Kaplan Meier assumption was not met. For this reason these variables were not included in multiple variable analysis of proportional hazards Cox model (Table 8).

Table 8: Log Rank test of significance for the predictors of treatment outcomes of OTP in Enderta woreda, Tigray regional state, 2004 EC (Univariate analysis)

Variables		cured	censored	Log rank	p-value
Distance of HI from residence	$\leq$ 2 hrs	196	46	19.3	< 0.001**
	>2 hrs	59	31		
Storage of drinking water at home	'Jerican'	193	35	21.8	< 0.001**
	Pot	62	42		
Sex of the child	Male	124	34	12.6	<0.001**
	Female	131	43		
Age of the child on OTP	< 18 months	176	39	18.3	<0.001**
	$\leq$ 18 months	79	38		
WFH at admission	< 60%	37	17	27.1	<0.001**
	$\geq$ 60 %	218	60		
Maternal age at 1st marriage	< 18 yrs	176	51	15.5	0.001**
	$\geq$ 18 yrs	79	26		
Way food preparing for <5 children	Separately for them	178	28	5.9	.015**
	Together with adult	77	49		
Source of drinking water	hand pump & Protected spring/well	218	45	4.614	0.032*
	un Protected spring/well	37	32		
Educational status of the mother	Illiterate	153	57	6.321	.042*
	Able read & write only	85	18		
	Educated(formal education)	17	2		
Maternal occupation	Housewife	155	32	13.60	.0001*
	Farmer	88	41		
	Others	12	4		

** Are variables with significant association on Log rank and the assumption for Kaplan Meier was met.

*Are variables with significant association on Log rank but the assumption for Kaplan Meier was not met.

Table 9: Proportional hazards Cox model multiple variable analysis of determinants of survival/treatment outcomes of OTP in Enderta woreda, Tigray regional state, 2004 EC

Variables		cured	censored	AHR	p-value	95%CI
Distance of HI from residence	$\leq$ 2 hrs	196	46	1.48	.013*	1.08,2.01
	>2 hrs	59	31	1		
Means drinking water storage	'Jerican'	193	35	1.51	.008*	1.11, 2.05
	Pot	62	42	1		
Sex of the child	Male	124	34	1.30	.043*	1.01, 1.68
	Female	131	43	1		
Age of the child on OTP	< 18 months	176	39	1.20	.259	.87, 1.64
	$\leq$ 18 months	79	38	1		
WFH at admission	< 60%	37	17	1	.001*	1.31, 2.66
	$\geq$ 60 %	218	60	1.87		
Maternal age at 1st marriage	< 18 yrs	176	51	1	.007*	1.10, 1.91
	$\geq$ 18 yrs	79	26	1.46		
Way of food preparing for <5 children	Separately for them	178	28	1.24	.117	.94,1.63
	Together with adult	77	49	1		

*P-value less than 0.05which are statistically significant.

AHR- adjusted hazard ratio

The rate of recovery from OTP among children whose mothers travel below 2 hours to the health facility was 1.48 times higher than that of children whose mothers travel 2 hours and above at any time during the study [AHR 1.48(95% CI: 1.08, 2.01)]. At any time during the study the rate of recovery from OTP among male children were 1.30 times higher than that of females [AHR 1.30(95% CI: 1.01, 1.68)]. The rate of recovery from OTP among children with baseline WFH of $\geq$ 60% was 1.87 times higher than that of children with baseline WFH of $\leq$ 60% at any time during the study [AHR 1.87(95% CI: 1.31, 2.66)]. The rate of recovery from OTP among children born from mothers, whose age at first marriage is 18 yrs and above, was 1.46 times higher than that of children born from mothers, whose age at first marriage is below 18 yrs at any time during the study [AHR 1.46(95% CI: 1.10, 1.91)]. At any time during the study, rate of recovery from OTP among children whose families store drinking water by 'Jerican' was 1.51 times higher than those children who belong to families that store drinking water by pot. [AHR 1.51(95% CI: 1.11, 2.05)] (Table 9).

CHAPTER SIX: DISCUSSIONS

The study assessed treatment outcomes of outpatient therapeutic feeding program and predictors of time to recovery of malnourished children in Enderta woreda of Tigray Regional State and 332 malnourished children and their mothers/care givers were involved in the study.

In this study 76.8% children were cured from malnutrition and this finding is above the sphere standard which states recovery rate should be greater than 75% [35]. When this result is compared with a study conducted in four regions of Ethiopia since 21st November 2010; it is below the recent total average of the four regions (79%), Amhara regional average (87%) and SNNPR regional average (90%) but still it is higher than that of Tigray regional average (72%) [11].

 The median length of stay (49(28-56) days) for recovered/cured children in this study was found to be higher than 42 (28–56) days reported by a retrospective cohort study conducted in Ethiopia since 2000/01(21). The mean, standard deviation of weight gained (8.3, ±3.7 g/kg/day) for recovered/cured of this study was consistent with that of the required sphere standard (> 8g/kg/day) [35].

Regarding defaulters, out of the 332 children included in the study 17.5% had defaulted from the program and this finding is higher than the sphere standard which is required to be less than 15 % [37] and reports from Tigray (8.8%), Amhara (4%), Oromia (9%) and SNNPR (4.6%) [11]. This difference might be due to their high proportion of unknown (9.5% ranging from 1.9% in SNNPR regional state and 18.9% in Oromia regional state) cases which underestimates the defaulter rate [11]. However, in this study home visit had been made to know the real status of lost cases from the program. Nevertheless it is far below 47% reported in a study conducted in Jimma since December 2005 to April 2007 [19].

The mean weight for height and MUAC of defaulters were 73.3% (±6.5) % and 11.3(±0.7) cm respectively. This was relatively higher as compared to the result of the evaluative study conducted in the four regions of Ethiopia i.e 10.2 cm and 10.9 cm in Tigray and Oromia respectively [11]. Out of the 58 defaulted malnourished children from OTP 28 (48.3%) had MUAC less than 11.0 cm. This finding showed that the children had defaulted while they were at higher risk of Mortality. The mean distance (minutes) traveled by the mothers/caregivers to the health institution

was 150(±30) minutes walking. This is consistent with the evaluative study [11] which found the mean distance (minutes) was 140.9 minutes for Tigray.

This study also showed that the non response rate and deaths rate were 5.1% and 0.6% respectively which are much lower than that of the sphere standard [37] (death rate is considered as good indicator of performance if it is <10%). The death rate in this study is similar with 0.7% reported in the study conducted in four regions of Ethiopia since 2008-2010 [36].

The overall mean length of stay (in days) of the malnourished children on the outpatient therapeutic feeding program was 44.1(±11.6) days which is higher than the maximum recommended standard of sphere project (40 days) [37]. The difference between this finding and the sphere standard was statistically significant (t = 6.5, df = 331, p-value < 0.001). This is in disagreement with the null hypothesis of no difference.

The overall weight gain of the malnourished children on OTP was found to be 7.3(± 3.8)g/kg/day. In comparison with sphere standard, it was smaller than the standard and the difference was statistically significant (t = -3.19, df = 331, p-value < 0.02).

Concerning occupational status of the mothers/caregivers of the children the majority 187(56.3%) were housewives, of which 155(82.9%) children were recovered. One hundred twenty nine (38.7%) were farmers with recovery rate of 68.2%. The rest 12(4.8%) were others (merchant, employee and daily laborer). The recovery rate of children of mothers with occupation of housewife was higher as compared to a study conducted in Senegal [26]. This might be due to the care given to the child that may be better among house wives than the farmers.

Majority (86.7%) of the children were on breast feeding during the study period. This finding was almost similar with a study conducted in Bangladesh since 2010 that had 80% of children on breast feeding [20].

Out of the 332 children included in this study 274(82.5%) were fully vaccinated to their age at the time of the study. From these children 233(85.0%) were recovered. Whereas from 58 (17.5%) who were not fully vaccinated to their age only 22(37.9%) had recovered. This finding is consistent with the study conducted in Senegal. According to this study the proportion of fully vaccinated was 81.3% [26].

The treatment outcome/response of this study showed that males had better outcome as compared to females. The cure rate, median length of stay and mean weight gain was 78.5%, 42 days and 8.6 g/kg/day for males respectively. For females cure rate, median length of stay and mean weight gain per kg per day was 75.3%, 50 days and 7.9 g/kg/day respectively. This difference was statistically significant and the rate of recovery from OTP among male children was 1.30 times higher than that of females at any time during the study. This was consistent with a similar study conducted in Senegal which showed that the recovery from underweight of boys was 1.09 times higher than that of girls [26]. The possible explanation could be due to the reason that, in Ethiopia more families prefer to have son (20%) than daughter (7.6%) [37]. This might affect equality of care and health seeking between the male and female child which in turn may affect the treatment outcome of OTP among < 5 children.

The recovery rate among the study subjects also varies with the weight for height of the children during admission to the program. The recovery rate among children admitted to OTP with WFH of < 60% was 68.4%; whereas among those who had been admitted with WFH of $\geq$ 60% was 78.5%. This difference was statistically significant with hazard ratio of 1.87, (95% CI: 1.31, 2.66). This finding is also similar with the study conducted in Senegal [26].

Children from mothers whose age at first marriage was 18 yrs and above have better response to OTP with higher cure rate (77.5%), lesser median length of stay (42 days) and higher mean weight gain (9.4 g/kg/day) as compared to those who were from mothers whose age at first marriage was below 18 yrs that had 74.3%, 49 days and 7.7 g/kg/day of cure rate, median length of stay and mean weight gain per kg per day respectively. The rate of recovery from OTP among children born from mothers whose age at first marriage was 18 yrs and above was 1.46 times higher than that of children born from mothers whose age at first marriage was below 18 yrs at any time during the study. The explanation for this difference could be that early marriage is linked to poor maternal health outcomes. These risks increase the likelihood of poor infant and child health outcomes [38] and this might in turn affect the treatment out-come of malnutrition among < 5 children.

Children of families who store drinking water in 'jerican' at home have better treatment outcome of OTP with 84.6%, 42 days and 7.7 g/kg/d of cure rate, mean length of stay and mean weight gain per kg per day respectively as compared to those who store in pot. Whereas, for those who use pot the cure rate, mean length of stay and mean weight gain per kg per day were 59.6%, 49

days and 6.5 g/kg/day respectively. The difference in treatment outcome between these groups of children was statistically significant on both Log rank and multiple variable proportional hazard Cox model. This might be due to that storing drinking water in pot is usually prone to contamination which could affect the health of the children. Then the treatment outcome of OTP may be poor among these children.

The KM survival curve of distance of health institution from the residence of participants in relation to time to event illustrates participants who travel for less or equal to 2hrs have better treatment outcomes of OTP (cure rate of 81.0%, median length of stay of 42 days and mean weight gain of 8.4 g/kg/day) as compared to those who travel more than 2 hrs (cure rate of 65.6%, median length of stay of 52 days and mean weight gain of 7.6 g/kg/day). This difference of treatment outcome by distance was statistically significant on log rank test and in the multiple variable proportional hazards Cox model. The rate of recovery from OTP among children whose mothers travel below 2 hours to the health facility was 1.48 times higher than that of children whose mothers travel 2 hours and above at any time during the study. Distance might affect the health seeking practice of the families that in turn could affects the treatment outcome of OTP among the children.

Concerning the independent predictors of treatment outcomes of outpatient therapeutic feeding program; distance of health institution, sex of the child, weight for height of the child at admission, maternal age at first marriage and means of drinking water storage at household level were found to have statistically significant association.

Strength of the study

> ✎ Since the study design was prospective longitudinal study:
>   - ✓ Cause and effect relationship was possible to establish for the factors dealt in the study
>   - ✓ The treatment outcome indicators have been appropriately described. This is because; maximum efforts had been made to know the right treatment outcome of children who lost from follow up through home visit rather than classifying as unknown.

Limitation of the study

> ✎ Treatment outcome of OTP might be affected by seasonal variation. This study was conducted on the winter/dry season for the study area.

CHAPTER SEVEN: CONCLUSIONS AND RECOMMONDATIONS

7.1.   Conclusions

Among the treatment outcome standards/indicators of OTP, the overall recovery rate, death rate and non response rate were within the recommended standards of sphere project. But regarding the overall defaulter rate, mean length of stay of the children in the program and mean weight gain in gram per kilogram of body weight per person was out of the sphere standards.

The Mid Upper Arm Circumference of the children when they default from outpatient feeding program indicated that the children defaulted while they were at higher risk of mortality.

Out of the variables which are statistically significant by Log rank test, sex of the child, distance of health institution, weight for height of the child at admission, age of the mother at first marriage and means of drinking water storage at home were the independent predictors of time to recovery of children on outpatient therapeutic feeding program. However; age of the child and way of food preparation for children < 5 years of age were statistically significant on the log rank test only.

7.2. Recommendations

Ministry Of Health

- Achieving the fourth millennium development goal of a two third reduction in childhood mortality will not be possible if SAM is not addressed effectively. In order for these to reach their potential, the treatment of SAM must become more central to the health care agenda

- The importance of SAM as a major cause of avoidable mortality must be better communicated and the child survival agenda must give greater priority to treating the condition.

Regional Health Bureau

- To improve the child morbidity and mortality, it is better to address the high rate of defaulter, low rate of weight gain and long length of stay in the program.

The Woreda Health Office and health care providers

- Efforts to trace defaulters from OTP should be emphasized and strengthened

- To overcome the high length of stay and low weight gain among patients in the OTP, they need to consider and give emphasis to the identified determinants of the treatment outcomes.

For Researchers

- Further research might be necessary in order to assess the determinants of gender differences on treatment outcomes of outpatient therapeutic feeding program among children < 5 years of age.

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ANNEXES

Annex I Questionnaire

I. STRUCTURED QUESTIONNAIRE FOR MOTHERS AND CARE GIVERS

Greeting

Hello! There is a study to be conducted here in Enderta worada and if you are willing, you may participate. You will not have any risk in participating except losing part of your time. Moreover, you can get the chance to know more on treatment of malnutrition and contribute your part in future improvement of the service in your area. I would like to ask you some questions about malnutrition; specifically we will discuss more on treatment of malnutrition on children. The main aim of this study is to assess the treatment outcomes of outpatient therapeutic feeding program and it's determinants in Enderta woreda. It would help in improving the quality of the service in the future. All the information you give will be kept confidential and we won't use your names. Moreover, you are not forced to answer to all questions and you can have some break time during the interview if you want. Is there something not clear that I should clarify? Can we proceed to the question?

Yes   No

Data Collection Sheet

Date: - Day ------ Month ------ Year --------

Name of head of house hold: - ------------------House No. ---------

Peasant association -------------------- Registered by: - --------------------

A. SOCIO DEMOGRAPHIC DATA

1. Number of children 6 to 59 months of age within the family ------------------------

2. Name of father --- age --------

3. Name of mother --- age --------

4. Education level:-

	Illiterate	Read and write	Formal education
4.1.Father	-----------------	--------------------	------------------
4.2.Mother	-----------------	--------------------	------------------

5. Place of residence

    i.   Rural   ii.   urban

6. Ethnicity:-

   i.   Tigray   iv.   Oromo

   ii.   Erob   v.   Amhara

   iii.   Gurage   vi.   Others(specify)-----------

7. Marital status:-

   i.   Married   iv.   divorced

   ii.   Single   v.   Separated

   iii.   Widow   vi.   Others(specify)-----------

8. Religion:-

   i.   Orthodox   iv.   Muslim

   ii.   Protestant   v.   Others(specify)-----------

   iii.   Catholic

9. Family size:

        Male-----------------   Female----------------   Total------------------

B. SOCIO-ECONOMIC DATA

10. What is the occupation of the mother?

   i.   Farming   iv.   housewife

   ii.   Trading   v.   Others   (specify)………………

   iii.   Public/ Civil Servant

11. If Farmer, state

   i.   Subsistent   ii.   Semi-Commercial   iii.   Commercial

12. Do you receive any form of financial subvention/ grant of money?

   i.   Yes   ii.   No

     12.1.If yes, in what form?

          i.   Regular   ii.   Casual

13. What is the Occupation of the father?

   i.   Farmer   iv.   Governmental employee

   ii.   Merchant   v.   NGO employee

   iii.   Daily laborer   vi.   Others(specify)-----------

14. Does he earn enough to buy food and essentials for all the family?

   i.   Yes   ii.   No

15. Do you have domestic animal?

    i.   Yes   ii.   No

16. If yes, how many of the following do you have?

    i.   Cattle --------------------   v.   Donkey -------------

    ii.   Sheep ------------------   vi.   Poultry -----------------

    iii.   Goat --------------------   vii.   Others(specify --------------

    iv.   Horse -------------------

17. How many quintals do you harvest in a year? -----------------------

18. What are your cash crops?

i.   Vegetables -----   iv.   pepper-------

ii.   Tef-------   v.   Others(specify)-----------

iii.   Boloke --------

19. Estimated monthly income in Birr -------------------------------

20. What is your staple food?

i.	Teff	iv.	Sorghum	vii.	Others(specify)---
ii.	Maize	v.	Wheat		
iii.	Barley	vi.	Boloke		

21. Do you grow vegetables around the house?

i.   yes   ii.   No

22. If not, how often do you buy?

i.   Daily   ii.   Weekly   iii.   Occasionally

23. How accessible is the market?

i. Half hour walk   iii.Two hours walk

ii. One hour walk   iv. Greater than two hours walk

C. **Environmental health data**

24. Roof:-

    i.   corrugated   iii.   Others   (specify)------------------

    ii.   thatched

25. Floor:-

    i.   muddy   ii.   cemented   iii.   Other(specify)-

26. Kitchen:-

  i. Separate   iii. Other(specify)---------------------

  ii. In the living room

27. Water supply for drinking :

    i. Protected well   iv. unprotected spring

    ii. Protected spring   v. River

    iii. Unprotected well   vi. Other(specify)----------------------

28. Water supply for food preparation :

    i. Protected well   iv. unprotected spring

    ii. Protected spring   v. River

    iii. Unprotected well   vi. Other(specify)----------------------

29. Water supply for washing :

  i. Protected well   iv. unprotected spring

  ii. Protected spring   v. River

  iii. Unprotected well   iv. Other(specify)--------------------

30. How do you store drinking water at home?

  i. Jerkan   iv. Bermil

  ii. Pot   v. Others, specify-----------------

  iii. Baldi

31. Do you have a latrine?

    i. yes   ii. No

If yes for Q # 30,

    30.1.Which type of latrine do you have?

    i. Pit   iii. Flash latrine

    ii. VIP   iv. Others (specify)--------------------

    30.2.Does the latrine have hand washing facility

                 i. Yes   ii. No

32. If no for Q # 30, do you use open field?

    i. yes   ii. No

33. What do you use for refuse disposal?

  i. Pit   ii. Open field   iii. Others, specify-

D. Questions directed to mother:-

34. Age at first marriage --------

35. Age at first delivery --------

36. Number of pregnancies --------

37. Number of children alive:-Male ------------ Female -----------

38. Do you usually work out-side home?

   i. Yes   ii. No

39. Have you got enough time to prepare food?

   i. Yes   ii. No

40. How do you usually prepare food for children under five year of age?

   i. Together with adult food   ii. Separately for them

41. Where do you usually take your child when get sick?

   i. Health institution   iii. Religious place

   ii. Traditional healer   iv. Other   specify--------------

42. How far is the health institution from the household in km? ------------------------

E. For child of 6 to 59 months of age(individual factors)

43. Age of the child on OTP(in months)--------------------------

44. Sex of the child on OTP

   i. Male   ii. Female

45. This child is the(birth order):

   i. 1st child   iv. 4th child

   ii. 2nd child   v. Other, specify _____

   iii. 3rd child

46. Immunization status:-

   i. Not vaccinated   iii. Fully vaccinated

   ii. Partially vaccinated   iv. Not known

47. What is the nutritional diagnosis of the child (as indicated in patient file)?

   i. Kwashiorkor   iii. Marasmic Kwashiorkor

   ii. Marasmus

48. Is the child's Vitamin A supplementation up to date?

   i. Yes   ii. No

49. Was/ is the child breastfed?

   i.   Yes   ii.   No

  If yes for Q # 49:

  49.1. To what age? _____months

  49.2.How long was the child exclusively breastfed? _____months

50. Is the child HIV+?

   i.   Yes   ii.   No   iii.   Un known

51. Does the child have TB?

   i.   Yes   ii.   No   iii.   Unknown

II. Data extraction form

variables	visits								
	admission	1st	2nd	3rd	4th	5th	6th	7th	8th
date									
Weight(kg)									
Weight change (+,0,-)	■								
Height/length (cm)		■	■	■		■	■	■	■
W/H %									
MUAC									
Eodema(0,+,++,+++)									
Diarrhea									
dehydration									
Vomiting									
Cough									
fever									
Respiratory rate									
Chest retraction		■	■	■	■	■	■	■	■
Temperature									
Eyes		■	■	■	■	■	■	■	■
Conjunctiva		■	■	■	■	■	■	■	■
Ears		■	■	■	■	■	■	■	■
Lymph nodes		■	■	■	■	■	■	■	■
Skin change									
Mouth		■	■	■	■	■	■	■	■
disability		■	■	■	■	■	■	■	■
Extremities		■	■	■	■	■	■	■	■
Amoxicillin									
Vitamin A									
Folic-acid									
De-worming									
outcome									

The outcomes are:
C=Cured; **D**=Dead; **UK**=Unknown (patient that has left the programme but his outcome (actual defaulting or death) is not confirmed/ verified by a home visit); **DF**=Defaulter (patient that is absent for 2

consecutive weighing and confirmed by a home visit); **NR**=Non-responder (patient that has not reached the discharge criteria after 8 weeks in the programme); **MT**=Medical transfer; **TT**=Transfer to TFU**.**

III.   HOME VISIT RECORD FORM

DATE VISITED_____

CHILDS NAME _____ Age _____ Sex _____

FAMILY NAME _____NAME OF THE CARER_____

OTP SITE _____ Kebele _____Woreda _____Unique SAM #_____

Findings:

i.   Defaulter,   *ii.   dead,*   *iii.   other   (specify)-----*

Outreach   worker   name_____   Signature_____

ኣብ ወረዳ እንደርታ ብዛዕባ ናይ ሕክምና ሕጽረት ምግቢ ኣብ ህጻናት መፅናዕቲ ሰለ ዝካየድ ብመጀመርታ ድሌትክን ይሓትት፡፡ኣብዚ ፅንዓት ብምስታፍክን ብዘይካ ጊዜ ምጥፋእ ትጉድኣ ነገር የለን፡ብተወሳኪ ድማ ኣብዚ ፅንዓት ብምስታፍክን ብዛዕባ ሕጽረት ምግቢ ንክትፈልጣ ይሕግዘክን፡፡ካብዚ ብምቅፃል ብዛዕባ ሕክምና ሕጽረት ምግቢ ኣብ ህጻናት ምዝታይ እዩ፡፡ እዚ ድማ ንቅፃሊ ናይ ሕክምና ሕጽረት ምግቢ ኣብ ህጻናት ኣቅርቦትን ፀርየትን ከም ዝፈትሕ እምነት ይግበረሉ፡ብተወሳኪ ድማ ተሳተፍቲ እትሀብል ሓበሬታ ብሚስጥር ተሓልዮ ናይ ተሳተፍቲ ስም ምግላፅ ድማ ኣድላዪ ኣይኮነን፡ ብተወሳኪ ድማ ኩሉ ሕቶ ናይ ምምላስ ግዴታ የብለልንን፣ እንተደልይን ካዓ ኣብ ማእከል ቃለመጠየቅ ዕረፍቲ ከወስዳ ይኸእላ እየን፡፡ እሞ ከዚ ናብ ሕቶ ክንዃዕል ዶ? ከበርሀልክን ትደልይአ ነገር ትሃሉዶ ድማ ምሕታት ይኸአል እዩ፡፡

ይስማዕማዕ እየ ☐   ኣይስማዕማዕን ☐

ሓበሬታ መኣከቢ መሕትት

ዕለት --------------------------------

ስም ምራሒ ስድራ-------------------------------------- ጣብያ---------------------- ጎጥ-----------------

ቁ. ገዛ----------------------------

ሓበሬታ ዝተቀበለ ስም---------------------------------

ሀ. ሓፈሻዊ ሓበሬታ

1. ካብ 6-59 ወርሒ ዝዕድመኦም በዝሒ ህጻናት ኣብ ስድራኹም ክንደይ ኣለዉ

    i.   ተባዕትዮ---------------

    ii. ኣነስትዮ---------------

2. ኣቦ ህጻን ስም--ዕድመ----------------------

3. ኣዶ ህጻን ስም--ዕድመ----------------------

4. ትምህርቲ ደረጃ

4.1. ኣቦ

    i.   መሃየምነት ዘየጥፈአ   iii. ስሩዕ ት/ቲ እንተወሲዱ ይጠቐስ---------

    ii. ምጽሓፍን ምንባብን ዘክእል

4.2. ኣዶ

    i.   መሃየምነት ዘየጥፈአ   iii. ስሩዕ ት/ቲ እንተወሲዱ ይጠቐስ---------

    ii. ምጽሓፍን ምንባብን ዘክእል

5. ኣበይ ከባቢ እየን ዝነብራ

    i.   ገጠር   ii.   ከተማ

6. ናይ ኣየናይ ቢሄረ ኣባል እየን

    i.   ትግራይ

    ii. ኢሮብ

53

iii. ጉራጌ

iv. ኦሮሞ

v. ኣምሓራ

vi. ካሊእ እንተኮይኑ ይጠቐስ-----

7. ኩነታት ሓዳረን እንታይ ይመስል

    i. ብሕታዊት

    ii. ብጓልቲ ሓዳር

    iii. ዝተፋተሐት

    iv. ብዓል ገዛኣ ዝሞታ

    v. ካሊእ እንተኮይኑ ይጠቐስ----------

8. ናይ ኣየናይ ሃይማኖት ተኸታሊ እዮም

    i. ኦርቶዶክስ

    ii. እስልምና

    iii. ካቶሊክ

    iv. ፕሮቲስታንት

    v. ካሊእ እንተኮይኑ ይጠቐስ------

9. በዝሒ ስድራኹም ክንደይ እዩ

9.1. ተባዕትዮ-------------

9.2. ኣንስትዮ--------------

10. ኩነታት ስራሕ ኣዶ እንታይ ይመስል

    i. ናይ ገዛ ኢምቤት

    ii. ሓረስታይ

    iii. ነጋዲት

    iv. መንግስታዊ/ዘይ-መንግስታዊ ስራሕ

    v. ካሊእ እንተኮይኑ ይጠቐስ------

10.1. ሓረስታይ እንተኮይነን ኩነታት ምህርተን እንታይ ይመስል

    i. ንስድራ ምግቢ ጥራሕ ዝውዕል

    ii. ንዕዳጋ ጥራሕ ዝውዕል

    iii. ንስድራ ምግብን ንዕዳጋን ዝውዕል

    iv. ካሊእ እንተኮይኑ ይጠቐስ------

11. ገንዘባዊ ሓገዝ እትረክብዎ ኣሎ ዶ

    i. እወ

    ii. ኣይፋሉን

11.1. እንተሃልዩ ኩነታቱ እንታይ ይመስል

    i. በቢእዋኑ

    ii. ሓልሓሊፉ

12. ናይ ኣቦ ስራሕ ኩነታት እንታይ ይመስል

    i. ዕልታዊ ስራሕ

    ii. ሓረስታይ

    iii. ነጋዲት

    iv. መንግስታዊ/ዘይ-መንግስታዊ ስራሕ

    v. ካሊእ እንተኮይኑ ይጠቐስ------

13. እቶትኩም ንስድራኹም ዝኣክል ምግቢ መዐደጊ እኩል ድዩ

    i. እወ

    ii. ኣይፋሉን

14. ካብ እዞም ዝስዕቡ ናይ ገዛ እንስሳ ኣየነኣም ኣለዉዎም

i. የብሎምን   v. ደረሁ

ii. ከፍቲ   vi. ካሊእ እንተሃልዩ ይጠቐስ-----------

iii. ጤለ-ብጊዕ

iv. ኣድጊ-ብቕሊ.

15. ኣብ ዓመት ብማእከላይ ክንደይ ኩንታል እክሊ ይሃፍሱ/የእትዉ---------------------------------------

16. ብማእከላይ ወርሓዊ ኣታዊኩም ክንደይ እዩ(ብግንዘብ)---------------------------

17. ስድራኹም ብበዝሒ ዝትቀምዎ ምግቢ እንታይ እዩ

i. ጣፍ   iv. ስገም

ii. ዕፉን   v. ቦሌቄ

iii. ስርናይ   vi. ካሊእ እነትሃልዩ ይጠቐስ----------------

18. ኣብ ገደናኩም ኣሕምልቲ ተብቁሉ ዶ

i. እወ   ii. ኣይፋሉን

18.1.ኣይፋሉን እንተኮይኑ ኣሕምልቲ መዓዝ መዓዝ ትዕድጉ

i. በቢማዕልቱ   iii. ሓልሓሊፉ

ii. በቢሰሙኑ   iv. ኣይንጥቀምን

19. ዕዳጋኩም ከሳብ ክንደይናይ ርሑቕ እዩ(ብእግሪ ጉዕዞ ዝዋስዶ ስዓት)-----------------------

ለ. ሓበሬታ ከባብያዊ ጥዕና

20. ናይ ገዛኩም ጣርያ ካብ ምንታይ ዝተሰርሐ እዩ

i. ቆርቆሮ   iii. ናሕሲ

ii. ሳዕሪ   iv. ካሊእ እንተኮይኑ ይጠቐስ----------------

21. ናይ ገዛኩም ምድር-ቤት ካብ ምንታይ ዝተሰርሐ እዩ

i. ሲሚንቶ   iii. ካሊእ እንተኮይኑ ይጠቐስ----------------

ii. መሬት

22. ኩነታት ኩሽናኩም እንታይ ይመስል

i. ኣብ ውሽጢ መንበሪ ገዛ   iii. ካሊእ እንተኮይኑ ይጠቐስ----------------

ii. ዝተፈለየ

23. ዝስተ ማይ ካብ ምንታይ ትጥቀሙ

i. ዝተከለለ ማይ ጉድጓድ/ዒላ   iv. ዘይተከለለ ማይ ጉድጓድ/ዒላ

ii. ዝተከለለ ሚንጪ ማይ   v. ማይ ቡንባ

iii. ዘይተከለለ ሚንጪ ማይ   vi. ካሊእ እንተኮይኑ ይጠቐስ----------------

24. ምግቢ ንምድላው ማይ ካብ ምንታይ ትጥቀሙ

i. ዝተከለለ ማይ ጉድጓድ/ዒላ   iii. ዘይተከለለ ሚንጪ ማይ

ii. ዝተከለለ ሚንጪ ማይ   iv. ዘይተከለለ ማይ ጉድጓድ/ዒላ

55

vi. ካሊእ እንተኮይኑ ይጠቐስ--------------

v. ማይ ቡንባ

25. ንሕብ ዝከውን ማይ ካብ ምንታይ ትጥቀሙ

    i. ዝተከለለ ማይ ጉድጓድ/ዒላ   iv. ዘይተከለለ ማይ ጉድጓድ/ዒላ

    ii. ዝተከለለ ሚንጪ ማይ   v. ማይ ቡንባ

                                     vi. ካሊእ እንተኮይኑ ይጠቐስ--------------

    iii. ዘይተከለለ ሚንጪ ማይ

26. ንመስተ እትጥቀሙሉ ማይ ኣብ ምንታይ ይቐመጥ

    i. ጀሪካን   iv. ባለዲ

    ii. ዕትሮ   v. ካሊእ እንተኮይኑ ይጠቐስ--------------

    iii. ብረሚል

27. ኣብ ግቢኩም ሽቓቕ ኣለኩም ዶ

    i. እወ   ii. ኣይፋሉን

27.1.   እንትሃልዩ ዓይነቱ እንታይ እዩ

    i. ፒት   iii. ፍለ i

    ii. ቪ.ኣይ.ፒ   iv. ካሊእ እንተኮይኑ ይጠቐስ--------------

27.2.   እንትሃልዩ ኢድ መሕጸቢ ኣለዎ ዶ

    i. እወ   ii.   ኣይፋሉን

27.3.   እንተዘይሃልዩ ኣበይ ይጥቀሙ

    i. ግዳም   iii. ካሊእ እንተኮይኑ ይጠቐስ--------------

    ii. ኣብ ናይ ህዝቢ

28. ጎሓፍ ኣበይ የዋግድዎ

    i. ጉዲጋድ   iii. ካሊእ እንተኮይኑ ይጠቐስ--------------

    ii. ግዳም

ሐ. ምስ ኣዶ ዝተተሓሓዙ ሕቶታት

29. ኣዶ ኣብ መበል ክንደይ ዕድመአን ትመርዕየን ----------------------------

30. ኣዶ ኣብ መበል ክንደይ ዕድመአን ቀዳማይ ውላደን ወሊደን --------------------------

31. ኣዶ ብጠቕላላ ክንደይ ቆለዑ ወሊደን(ዝሞቱ እንተሃልዩ ሓዊሱ)--------------------------

32. ብህይወት ዘለዉ በዝሒ ህጻናት(ትሕቲ 15 ዓመት) ተባዕትዮ------------------------ኣንስትዮ----------------

33. መብዛሕቲኡ ግዜ ርሕቅ ኣብ ዝበለ ቦታ ይሰርሓ ድየን

    i. እወ   ii.   ኣይፋሉን

34. ንስድራኩም ምግቢ ንምድላው እኹል ግዜ ኣለክን ዶ

    i. እወ

    ii.   ኣይፋሉን

35. ናይ ትሕቲ 5 ዓመት ህጻናት ምግቢ ብከመይ የዳሎ

      i.   ምስ ናይ ዓብይቲ ብሓባር

      ii.   ብፉሉይ ንበይኑ

      iii. ካሊእ እንተኮይኑ ይጠቐስ----------------

36. ውናድኽን እንትሓምም መብዛሕቲኡ ግዜ መጀመርታ ናበይ ትወስዳእ

      i.   ናብ ጥዕና ትካል

      ii.   ናብ ባህላዊ ሕክምና

      iii. ማይ ጸሎት/ጸበል

      iv. ካሊእ እንተኮይኑ ይጠቐስ----------------

37. እዚ ጥዕና ትካል እዚ ካብ መንብሪ ገዛኹም ክንደይ ዝኣክል ርሑቕ እዩ(ብ km)----------------------

መ. ምስ ህጻናት ዝተተሓሓዙ ሕቶታት

38. ናይዚ ተሓካማይ ህጻን ዕድመ ክንደይ እዩ(ብኣዋርሕ)------------------------

39. ናይዚ ተሓካማይ ህጻን ጾታ እንታይ እዩ

      i.   ተባዕታይ

      ii.   ኣነስታይ

40. እዚ ተሓካማይ ህጻን ካብ ውላድኩን መበል ክንደይ እዩ--------------------

41. እዚ ተሓካማይ ህጻን ሕክምና እንትጅምር ኩነታት ከትባት እንታይ ይመስል

      i.   ምንም ዓይነት ከትባት ኣይወሰደን

      ii.   ውሱን ከትባት ጥራሕ ወሱዱ

      iii. ንዕድመኡ/ኣ ሙሉእ ከትባት ወሲዱ

      iv. ኣይፍለጥን

42. እዚ ተሓካማይ ህጻን ሕክምና ቅድሚ ምጅማሩ Vitamin A ብቢእዋኑ ውሲዱ ዶ

      i.   እወ

      ii.   ኣይፋሉን

43. እዚ ተሓካማይ ህጻን ኣብዚ ሓዚ እዋን ጡብ ይወስድ ዶ

      i.   እወ

      ii.   ኣይፋሉን

44. እዚ ተሓካማይ ህጻን ረከሲ ኤች.ኣይ.ቪ ኩነታት እንታይ ይመስል

      i.   ፖዘቲቭ

      ii.   ነዜቲቭ

      iii. ኣይፍልጥን

45. እዚ ተሓካማይ ህጹን ረክሲ TB ኩነታት እንታይ ይመስል
    i.   ፖዘቲቭ
    ii.   ነዜቲቭ
    iii.   ኣይፍልጥን

46. እዚ ተሓካማይ ህጹን ዓይነት ሕጽረት ምግቢ እንታይ እዩ
    i.   ማራስምስ
    ii.   ክዋሽዮርክC
    iii.   ማራስሚክ-ክዋሽዮርክC

Annex II outpatient record card

5 OUT-PATIENT RECORD CARD

FRONT OF CARD

ADMISSION DETAILS: OUTPATIENT THERAPEUTIC PROGRAMME

BACK OF CARD

	NAME					Unique SAM No		Target Weight				
Week	ADM	2	3	4	5	6	7	8	9	10	11	12
Date												
Anthropometry												
Weight (kg)												
Weight change* (+ / 0 / -)		+	+									
Height (cm)												
W / H %												
MUAC (cm)												
Oedema (0 / + / ++ / +++)												

*Check for failure to respond (weight loss or no advance for treated children, failure to start to lose oedema on day 10, failure to gain any weight, oedema still present on day 21.)

	ADM	2	3	4	5	6	7	8	9	10	11	12
History												
Diarrhoea (# days)												
Vomiting (# days)												
Fever (# days)												
Cough (# days)												
Physical examination												
Appetite test (Pass/Fail)												
Temperature (°C)												
Respiratory rate (# / min)												
Dehydrated (Y/N)												
Anaemia (palmar pallor) (Y/N)												
Skin infection (Y/N)												
ACTION NEEDED** (Y/N)												
Routine Medication												
Amoxil dose												
Malaria trt dose												
Vitamin A												
Deworming												
Measles												
Folic acid												
Other medication (see front of card)												
RUTF (# packets/ cups)												
Name examiner												
OUTCOME ***												

C=Cured; D=Dead (confirmed by home visit); UN=Unknown (patient that has left the programme but his outcome (actual defaulting or death) is not confirmed/ verified by a home visit); DF=Defaulter (patient that is absent for 2 consecutive weighing and confirmed by a home visit); NR=Non-responder (patient that has not reached the discharge criteria after 6 weeks in the programme); MT=Medical transfer; TT=Transfer to TFU

** Action taken during follow-up (include date)

60

Annex III Target weight for discharge when no Ht is available

6 TARGET WEIGHT FOR DISCHARGE

This table gives the target weight for discharge for patients admitted with various admission weights[27] when no height is available- used for patients admitted on MUAC alone.

Admission weight	Discharge weight	Admission weight	Discharge weight	Admission weight	Discharge weight
3.0	3.6	8.1	9.8	18.5	22.5
3.1	3.8	8.2	10.0	19	23
3.2	3.9	8.3	10.1	19.5	23.5
3.3	4.0	8.4	10.2	20	24
3.4	4.1	8.5	10.3	21	26
3.5	4.3	8.6	10.4	22	27
3.6	4.4	8.7	10.6	23	28
3.7	4.5	8.8	10.7	24	29
3.8	4.6	8.9	10.8	25	30
3.9	4.7	9.0	10.9	26	32
4.0	4.9	9.1	11.1	27	33
4.1	5.0	9.2	11.2	28	34
4.2	5.1	9.3	11.3	29	35
4.3	5.2	9.4	11.4	30	36
4.4	5.3	9.5	11.5	31	38
4.5	5.5	9.6	11.7	32	39
4.6	5.6	9.7	11.8	33	40
4.7	5.7	9.8	11.9	34	41
4.8	5.8	9.9	12.0	35	43
4.9	6.0	10.0	12.1	36	44
5.0	6.1	10.2	12.4	37	45
5.1	6.2	10.4	12.6	38	46
5.2	6.3	10.6	12.9	39	47
5.3	6.4	10.8	13.1	40	49
5.4	6.6	11.0	13.4	41	50
5.5	6.7	11.2	13.6	42	51
5.6	6.8	11.4	13.8	43	52

5.7	6.9	11.6	14.1	44	53
5.8	7.0	11.8	14.3	45	55
5.9	7.2	12.0	14.6	46	56
6.0	7.3	12.2	14.8	47	57
6.1	7.4	12.4	15.1	48	58
6.2	7.5	12.6	15.3	49	60
6.3	7.7	12.8	15.5	50	61
6.4	7.8	13.0	15.8	51	62
6.5	7.9	13.2	16.0	52	63
6.6	8.0	13.4	16.3	53	64
6.7	8.1	13.6	16.5	54	66
6.8	8.3	13.8	16.8	55	67
6.9	8.4	14.0	17.0	56	68
7.0	8.5	14.2	17.2	57	69
7.1	8.6	14.4	17.5	58	70
7.2	8.7	14.6	17.7	59	72
7.3	8.9	14.8	18.0	60	73
7.4	9.0	15.0	18.2		
7.5	9.1	15.5	19.0		
7.6	9.2	16.0	19.5		
7.7	9.4	16.5	20.0		
7.8	9.5	17.0	20.5		
7.9	9.6	17.5	21.5		
8.0	9.7	18.0	22.0		

Annex IV. Summary of Criteria for admission:

To in-patient (SAM with complication) or out-patient care (SAM without complication)

Factor	In-patient care	Out-patient care
Anthropometry	6 months to 59 months W/H or W/L < 70% **or** MUAC < 110 mm with a Length > 65 cm	
Bilateral pitting oedema	Bilateral pitting oedema Grade 3 (+++) Marasmus-Kwashiorkor	Bilateral pitting oedema Grade 1 to 2 (+ and ++)
Appetite	Failed or equivocal Appetite test	Passes Appetite test
Choice of carer (at any stage of management – the carer is often the best judge of severity)	Carer chooses to start, continue or transfer to in-patient treatment. No suitable or willing carer.	Carer chooses to start, continue or transfer to out-patient treatment Reasonable home circumstances and a willing carer
Skin	Open skin lesions	No open skin lesions
Medical complications	- Severe vomiting/ intractable vomiting - Hypothermia: axillary temperature <35°C or rectal <35.5°C - Fever > 39°C - Number of breaths per minute: - 60 resps/ min for under 2 months - 50 resps/ minute from 2 to 12 months - >40 resps/minute from 1 to 5 years - 30 resps/minute for over 5 year-olds or - Any chest in-drawing - Extensive skin lesions/ infection - Very weak, lethargic, unconscious - Fitting/convulsions - Severe dehydration based on history & clinical signs - Any condition that requires an infusion or NG tube feeding. - Very pale (severe anemia), jaundice , bleeding tendencies	Alert with no medical complications