



ASRAT WELDEYES MEDICINE AND HEALTH SCIENCE CAMPUS

SCHOOL OF PUBLIC HEALTH

**ACUTE MALNUTRITION AND ASSOCIATED FACTORS AMONG
UNDER-TWO CHILDREN IN INTERNAL DISPLACEMENT
POPULATION IN DEBRE BERHAN TOWN, AMHARA REGIONAL
STATE, ETHIOPIA**

BY: MEKIDES G/TSA DIK

**A THESIS TO BE SUBMITTED TO DEBRE BERHAN UNIVERSITY,
ASRAT WOLDEYES HEALTH SCIENCE CAMPUS, SCHOOL OF
PUBLIC HEALTH IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR MASTER OF PUBLIC HEALTHI NUTRITION**

JUNE, 2023

DEBRE BERHAN, ETHIOPIA

DEBRE BERHAN UNIVERSITY
ASRAT WOLDEYES HEALTH CAMPUS
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JUNE, 2023

APPROVAL SHEET

It is to certify that the thesis prepared by Mekides G/Tsadik en titled to assess the prevalence and factors associated with acute under mal nutrition among under-two year children living in internal displacement population centers at DebreBerhan town in Amhara region, Ethiopia, 2023., In partial fulfillment of the requirements for the degree of master in Nutrition in complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

ADVISORS: Dr Abera lambebo (MPH, PHD, Asst.prof.of human nutrition)

To Be Approved by the Examining board of Asrat woldeyes Health science campus ,school of public health debre berhan university

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ABBREVIATIONS AND ACRONYMS

EDHS	Ethiopia Demographic Health Survey
HAZ	Height for Age Z Score
IDP	Internally Displaced Population
LBW	Low Birth Weight
PEM	Protein Energy Malnutrition
WHZ	Weight for Height Z score
WAZ	Weight for Age Z score
WHO	World Health Organization

ABSTRACT

Introduction: Malnourishment is recognized as a major global public health problem and is a leading cause of infant mortality and morbidity. Additionally, displacement due to natural or man-made disasters can further increase the vulnerability of children to acute malnutrition.

Objectives: to assess the prevalence and factors associated with acute malnutrition among under-two year children living in internal displacement population centers at Debre Berhan town in Amhara region, Ethiopia, 2023.

Method and materials: An institutional based cross sectional study design conducted at internally displaced population (IDP) site in Debre Berhan town, North Shoa zone, Ethiopia. The study period was from May 1 to 30, 2023. The source populations are all children below 24 months of ages. The total sample size estimated for this study was 308. Anthropometric measurement (including MUAC, Weight) and questionnaires administered by interviewers used to collect data. Data entered on Epidata and exported to SPSS for statistical analysis. Bivariate and multivariate logistic regression analysis performed with p-value less than 0/05 considered statistically significant.

Result: In this study, the prevalence of under-nutrition was 134 (43.5%) and the prevalence of wasting was 86 (27.9%). Care taker Marital status (AOR= 1.85; 95% CI=1.01, 6.75), care taker educational level (AOR= 1.67; 95% CI=1.12, 5.29), children place of delivery (AOR= 1.26; 95% CI=1.15, 2.06) were significant predictors of children malnutrition.

Conclusion and recommendations: Under-nutrition and wasting, is high among children in the study area. Marital status of care giver, educational level of care giver, place of delivery and history of children diarrhea were significantly associated with malnutrition. These findings suggest healthcare access which may have a positive impact on child nutrition status.

1 INTRODUCTION

1.1 Background

Acute malnutrition is nutritional deficiency resulting from either inadequate protein or energy intake.(27) defined protein energy malnutrition as nutritional deprivation amongst children in developing countries. protein and other nutrients leads to measurable adverse effects on tissue and body functions, and a clinical outcome of growth deviation.(28)

Primary acute malnutrition in children is the result of inadequate food supply caused by socioeconomic, political, and environmental factors, and it is most commonly seen in low- and middle-income countries . Responsible factors include household food insecurity, poverty, poor nutrition of pregnant women, intrauterine growth restriction, low birth weight, poor breastfeeding and inadequate complementary feeding, frequent infectious illnesses, poor quality of water, hygiene, etc. Therefore, primary acute malnutrition is mostly social rather than biomedical in origin, but it is also multi factorial. For example, poor water quality, sanitation and hygiene practices are increasingly believed to be the cause of the condition called “environmental entero pathy” that contributes to acute malnutrition in childhood.(29,30)

Secondary acute malnutrition is usually due to abnormal nutrient loss, increased energy expenditure, or decreased food intake, frequently in the context of underlying, mostly chronic, diseases like cystic fibrosis, chronic renal failure, chronic liver diseases, childhood malignancies, congenital heart disease, and neuromuscular diseases.(29,30)

Children living in IDP settlements are particularly vulnerable to malnutrition due to higher levels poverty compared to non-displacement areas.(8) IDPs are individuals who have been compelled to move within their own country due political unrest or conflict resulting from natural disasters or human rights violations(8). Additionally there is an increase proportionately more than double prevalence of poor feeding practices such as lower rate exclusive breast feeding,less complimentary feeding meals, infrequent feeding snacks and less nutritious foods consumed among infants that live with IDP mother which may also contribute toward increasing malnutrition rates among vulnerable infants in this region situations (9).

The most significant factor in children malnutrition after a lack of protein, carbohydrates, and fat is severe and ongoing infections and also other medical conditions like helminthic infections. The underlying processes for malnutrition include direct nutrient losses, decreased nutrient absorption, increased metabolic requirements, and decreased food intake. In the present time, malnutrition remains a serious public health issue in the world(2).

Nutritionists are increasingly being explored that malnutrition has many facets and is not just a matter of a lack of food. Malnutrition is now more widely understood to be a result of larger, more complex social and behavioral determinants that impact child growth and development. In most of the developing nations of the world, malnutrition will continue to be a serious issue due to several predisposing factors which aggravate the condition(3, 7).

Among all the population groups, internally displaced people (IDP) are particularly vulnerable to malnutrition and health conditions. Each year many thousands of people flee their homes due to conflict, natural disasters, or civil unrest and face a range of significant food insecurity, health and nutrition problems. Malnutrition will be double barreled problem worldwide, including in Ethiopia's internally displaced population(5).

In Ethiopia recent studies noted that IDPs have been more exposed than host community labor market inequalities which may result lack affordability for healthy diet options. To date little information exists on malnutrition among IDPs in Ethiopia leaving a critical gap in assessing their risk. Debre Berhan town is one of the host communities for IDPs in Amhara regional state which was selected as the study site for this study. Therefore, this current research aims to investigate the prevalence and factors associated with under nutrition among under-two year children residing within Debre Berhan town IDP (9).

1.2 Statement of the problem

Malnutrition is recognized as a major global public health problem and is a leading cause of infant mortality and morbidity. Approximately 25 percent of all under-two year children suffer from malnutrition in developing countries, which accounts for more than 3 million deaths each year (6).

Previous studies have shown that malnutrition among under-two year old children contributes a range of long-term physical and cognitive developmental impairments as well as death in extreme cases. This is especially concerning in Ethiopia, where malnutrition still affects almost half of all children under two years old. Malnutrition is often caused by a combination of factors such as poverty and food insecurity, inadequate feeding practices and poor healthcare access (10).

Additionally, displacement due to natural or man-made disasters can further increase the vulnerability of these populations by leading to substandard housing, inadequate access to food and increasing transmission risks. Malnutrition among under-two years children are two times higher within internal displacement population center compared to outside or host communities (11). Having displaced or refugee status may increase vulnerability to acute or chronic malnutrition due to increased economic strain and reduced access to health care services (5). Several structural factors such as food insecurity, poverty, poor nutrition knowledge and limited access to health services can contribute significantly towards malnutrition in IDP centers (12, 13).

One such area is Debre Berhan town located in the Amhara region of Ethiopia, where internal displacement population centers have been set up in recent years. Though there have been several studies focused on nutrition among different populations in Ethiopia, few have looked into specifically at these internally displaced persons. Therefore this study aims to assess the prevalence and factors associated with malnutrition among under-two years children living in internal displacement population centers at Debre Berhan town in Amhara region, Ethiopia.

1.3 Significance of the study:

The proposed study aims to understand the prevalence and factors associated with malnutrition among under-two children in internal displacement population center at DebreBerhan town, Amhara region, Ethiopia. It is important to address this issue because insecurity, armed conflicts and disasters resulting from human activities are the leading causes of internal displacement in recent years which force individuals and families to leave their homes and move to new places with limited resources(7).

This poses a serious threat to nutritional status of these individuals especially the vulnerable populations including young children who are more prone to malnutrition due to their specific nutrient requirements for growth. As a result, it is essential to assess the prevalence of malnutrition and its associated risk factors among internally displaced children between aged under two years in DebreBirhan town so that interventions can be effectively made aimed at improving nutrition outcomes in this highly vulnerable population and will produce data for decision-makers and public health professionals that will be useful in establishing public health priorities and allocating resources to prevent and control children malnutrition. It will also serve as a baseline for further studies in the future in the study topic.

2 LITERATURE REVIEW

2.1 Prevalence of malnutrition

Malnutrition remains one of the leading causes for child mortality under five years old in Ethiopia according to a government report issued on 2020. Estimates suggest that 38 percent of children under five are stunted and 20 percent are underweight while 7 percent are wasted. Low access to quality care services remains a major contributor where only 6 out of 10 neonates receive help within the first hour after birth. Even more concerning is that at least one third do not receive early initiation breastfeeding causing them even more vulnerability(15). Malnutrition is a serious worldwide health issue, particularly in developing nations. It has been connected to higher mortality rates and can result in stunted growth and other behavioral problems in children. According to estimates from the World Health Organization for 2022, malnutrition affects 149 million children under the age of five globally (1, 13).

2.2 Factors associated with children malnutrition

2.2.1 2.2.1 socio economic factors

Previous studies conducted in low-income countries found an association between parents' educational level and their ability to address nutritional needs for their children adequately, which can result in malnutrition if not addressed (16). For example, study conducted in Chad explored correlations between educational attainment of mothers as well as other socio economic indicators with prevalence levels of moderate or severe stunting amongst infants aged below 24 months old in chad. The results showed a negative correlation between both parents' education level and prevalence levels of stunting, meaning that mothers and fathers who had more education were less likely to have children who suffered from stunting due to nutrition-related causes. Thus, increasing access to education is another effective intervention strategy for reducing instances of childhood malnutrition globally (17).

Studies have also shown links between inaccessible food supplies or inadequate food supplies due environmental disasters or poor harvests with higher rates of malnourishment. Additionally

lack access clean water supply, inadequate sanitation facilities, violent conflict all play key causal roles adding onto existing dilemma (18)

The findings of the research on Guatemala, Mothers' monthly income, her share of the family's income, and the total number of hours she worked in the preceding year are all factors in her income that may be related to anthropometric status. Weight for age and height for age were both correlated with the woman's monthly income, but the mother's percentage of family income received was not (19).

Education of the mother appeared to be a safeguard against starvation in children. Overall, 93% of the mothers are literate, albeit at varying degrees. The prevalence was greatest in areas with illiterate mothers (52.94%), compared to a value of 38.46% in areas with mothers who had completed at least secondary school. Stunting rates were also 17.65% in cases of mother illiteracy and 7.69% in cases of education above high school. For both instances, differences were statistically significant. The nutritional status of children under five was greatly affected by the educational level of mothers, as the prevalence of under nutrition was 52.94% among mothers who were illiterate and 38.46% among mothers with a higher education level than secondary school. (20).

According to research conducted in Shingle Woreda, Somali regional state Ethiopian several factors significantly associated with children malnutrition. In this study, family size, immunization status, maternal education, monthly income, extra feeding during pregnancy and lactation, ANC follow-up, child breastfeeding, birth order, how soon after birth you first started breastfeeding child, and the availability of latrines all have a significant correlation with child wasting. In this study children from large families were 2.0 times more likely to be wasted than children from small families, children from households with monthly incomes of less than 750 birr were 1.8 times more likely to be wasted than children from households with monthly incomes of less than 750 birr, non-immunized children were 7.6 times more likely to be wasted than their counterparts, and girls were 1.5 times more wasted than boys (21).

According to previous study in Northern part of Ethiopia, there is a direct correlation between stunting and a child's age, family number, and birth spacing. Children are more susceptible to malnutrition in communities with limited access to and interaction with health care as a result of

subpar care for common illnesses, low immunization rates, and subpar antenatal care. However, the contributing reasons to the issue of malnutrition may vary over time and across regions, zones, and communities (22).

2.3 Displacement and malnutrition

IDPs had higher rates of global acute malnutrition (15.1%) than refugees (12.0%, $p < 0.05$) according to a survey on child acute malnutrition and mortality in populations affected by displacement from Ethiopia, Kenya, Sudan, and Uganda that was performed in the Horn of Africa between 1997 and 2009. GAM prevalence was 16.5% in pastoralists compared with 7.2% in agriculturalists, and the difference is comparable to the local populations (18.3% pastoralists vs. 9.0% agriculturalist), when IDPs and refugees are combined as displaced populations (12). Acute malnutrition rates among children aged 6 to 59 months who were either internally displaced (904 cases), living in a hamlet (956 cases), or living in a town (901 cases), and 10% correspondingly. High rate of IDP mortality and increased prevalence of wasting not only in IDP camps but also in nearby communities (23, 24).

Due to gender inequality in our male-dominated society, it has been discovered that malnutrition affects female children more frequently than male children. While 24 male (60%) and 35 female (58%) malnourished children had no recent experience of deworming, 16 male (40%) and 25 female (42%) malnourished children had previously undergone deworming. Using univariate and multivariate analysis, there was no discernible relationship between malnutrition and the anticipated risk variables (last month's diarrhea, last month's fever, artificial bottle feeding, parents' absenteeism, parents' educational levels, and vaccination) (25). All Pakistani flood-displaced children who were examined for hunger fell below the third centile of the WHO growth standards. Several risk factors could lead to a rise in measles transmission among displaced population (13).

According to a research done in Uganda, there is a significant prevalence of stunting (52.4%) and acute malnutrition (6.0%) in IDP settings. In comparison to the other age groups, the prevalence of both global acute malnutrition and stunting was higher in the age categories 6–12 months and 13–24 months. Chronic malnutrition was strongly associated with the gender of the child (26).

Conceptual framework

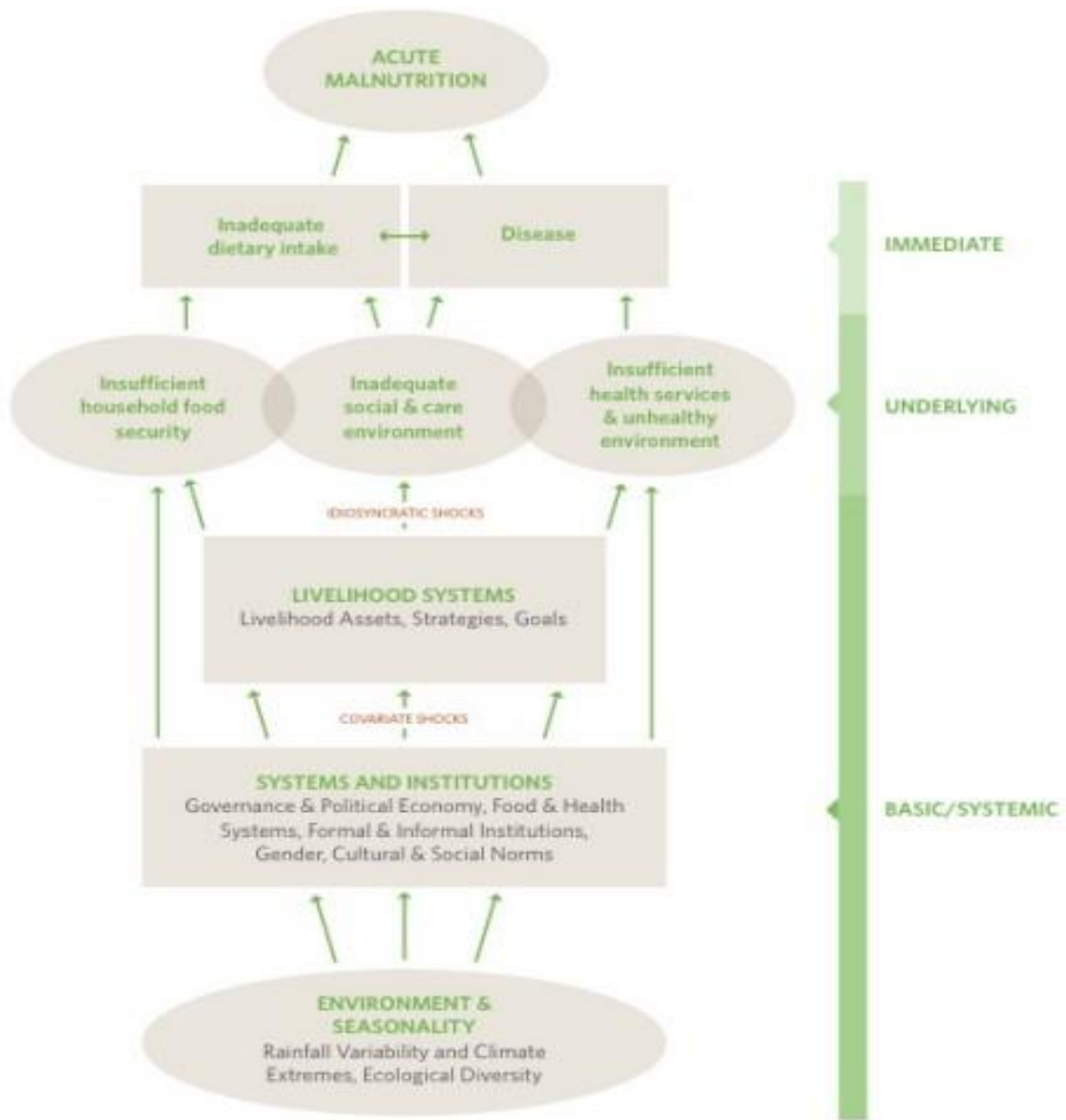


Figure 1: Conceptual framework on factors associated with malnutrition (Adopted from UNICEF, Acute malnutrition determinates framework).

3 OBJECTIVES OF THE STUDY

General objective:

To assess the prevalence and factor associated with acute malnutrition among under-two years children in internal displacement population center at Debre Berhan town, amhara regional state,Ethiopia 2023.

Specific objectives:

To identify the prevalence of acute malnutrition among under-two years children in internal displacement population center at Debre Berhan town, amhara regional state,Ethiopia 2023.

To identify factor associated with acute malnutrition among under-two years children in internal displacement population center at Debre Berhan town, amhara regional state,Ethiopia 2023.

4 METHOD AND MATERIALS

4.1 Study area and period

The study conducted in Amhara Regional State, North Shoa Zone Debre Berhan town. The town is the capital of the North Shoa Zone and it is located in 130 kms away in North from Addis Ababa, the capital city of Ethiopia. The total population of the town is 202,226 and the town comprised of a total of 4 sub city and 39 kebeles. The town has 2 public hospitals, 8 health centres, 39 health posts and 6 IDP center. The study conducted from April 1 to 30, 2023.

4.2 Study design

An institutional based cross-sectional study design was conducted.

4.3 Population

Source population

All children in the age group of under 24 months in the IDP selected for the study.

Study population

The study population for this study was all randomly selected children of age under 24 months in the IDP.

4.4 Inclusion and exclusion criteria

4.4.1 Inclusion criteria

Children under 24 months who are living in the IDP newly transfer during the study were included in the study.

4.4.2 Exclusion criteria

Children above 24 months who are living outside the IDP center and Children who are severely sick during the study period will be excluded other than acute malnutrition

4.5 Sample size determination

The sample size for this study determined using single population proportion formula with assumption of 0.05 margins of error, 95% confidence level, 24% of proportion of malnutrition among children in IDP taken from previous study (11) and 10% of non-response rate.

$$N = (Z_{\alpha/2})^2 \times P(1-P)/d^2$$

Where:

n: the total sample size

z: is the critical value for given interval (1.96)

d: is the margin of error which is 5%

p: is the proportion of malnutrition among children.

Based on the calculation, the total sample size required for this study was 280. By considering a 10% non-response rate, the total sample size becomes 308.

4.6 Data collection procedure

Anthropometric measurement (including MUAC, Weight) and interview administered by questionnaire was used to collect data. The questionnaire developed from previous research conducted in the topic. Two experts who were fluent in both languages translate the questionnaire into Amharic, the language spoken in the study area, and then translate it back into English. To check for uniformity, the Amharic questionnaire was back translated. The questions were grouped and put in order based on the particular goals they were meant to address. The surveys included anthropometric measurements as well as socio-demographic, maternal, child, economic, and environmental health aspects.

The data was collected by 4 health extension workers and one BSC nurse and the principal investigator was supervisor for the overall data collection process. A two days training was given to the data collectors and supervisor regarding the study objectives, content of the questionnaire, interview techniques and anthropometric measurements.

Mothers or other caregivers of the children asked about illness that occurred in the two weeks prior to the survey as well as their history of taking vitamin A supplements and deworming medications in the six months prior to the study. Children's immunization records examined to determine their vaccination status. By looking at the scar on the child's arm, the BCG vaccination was verify.

4.7 Study variables

4.7.1 Dependent variable:

- ✓ Wasting
- ✓ Underweight
- ✓ Acute malnutrition

4.7.2 Independent variables:

✓ **Socio-demographic characteristics:**

- Age
- Sex
- Marital status
- Educational status

✓ **Child factors**

- Morbidity status
- Immunization status

✓ **Behavioral factors**

- Bottle feeding
- Breast feeding

4.8 Operational definition and definition of terms

Internally displaced: Someone who moved away from their original residence due to land loss, drought, or climate change; they have since made a home there and have stayed there for more than six months.

Malnutrition: refers to under-nutrition or deficiency in protein-energy nutrition.(4)

Acute malnutrition is nutritional deficiency resulting from either inadequate energy or protein intake(4)

Under-weight: Weight for age less than 2 Standard Deviation below the NCHS median value.(3)

Wasting: Weight for height less than 2 Standard Deviation below the NCHS median value

4.9 Data processing and analysis

After the completion of data collection, editing, coding and cleaning carried out. Data entered using Epi-data version 3.1 and exported into SPSS version 20.0 statistical software for analysis. Different frequency tables, graphs and descriptive summaries used to describe the study variables. Binary logistic regression analysis used to see the association between the dependent and independent variables. In the bivariate analysis if the p-value < 0.20 it was transferred to the multivariate logistic regression analysis which helps to control confounders. Adjusted odds ratio and 95% CI computed to measure the strength of the association between the outcome and the explanatory variables. P-value < 0.05 was considered as a statistical significant.

4.10 Ethical considerations

The ethical approval and clearance was obtained from the research ethical review board of DebreBerhan University, College of Health Science, Department of public health. Permission to conduct this study secured from DebreBerhan University, College of Health Science. A formal support letter prepared and submitted for the IDP administrator. Then after permission, individual written consent care giver obtained from each study participants and names of participants not included in the questionnaire.

4.11 Dissemination of result

At the end of the study the result will be presented and submitted to Debre Berhan University, College of Health Sciences, Department of Public Health. The findings will also be distributed to North Showa zone health department and Debre Berhan town Mayor Office. It will be also distributed to other concerned health planners and stakeholders. There will be also an attempt to publish the study in scientific journal at national and international level.

5 RESULT

5.1 Socio-demographic characteristics of respondents

All 308 study respondents participated in the study making the response rate 100%. 209 (67.9%) of respondents were less than 30 years old and 219 (70.6%) of them were married. Most of the respondents, 187 (60.7%), were illiterate and 213 (69.2%) respondents live in family members less than 5. Majority, 235 (76.3%) of this study respondents displaced year was less than 1 year (Table 1).

Table 1: Socio-demographic characteristics of study respondents in Debre Berhan town, Amhara Regional State, Ethiopia, 2023

Characteristics	Frequency (n)	Percent (%)
Age of the respondent		
Less than 30 years	209	67.9
30 to 39 years	75	24.4
40 and above years	24	7.8
What is your marital status?		
Single	70	22.6
Married	219	70.6
Separated	12	3.9
Divorced	7	2.3
Highest level of education level		
Illiterate	187	60.7
Primary	65	21.1
Secondary	26	8.4
College diploma and above	30	9.7
How many persons live in the family member?		

Less than 5	213	69.2
5 and above	95	30.8
What is your displaced year from original place?		
Less than 1 year	235	76.3
1 year and above	73	23.7

5.2 Child characteristics

More than half, 187 (60.7%) of the child were female and 161 (52.3%) of them had birth order 3 and above. Majority, 193 (62.7%) of the study respondents reported as the child place of delivery was health facility. Most of the study respondents, 298 (96.8%) type of birth was single. Almost all, 303 (98.4%) of child fully immunized, 284 (92.2%) of child received Vitamin A supplementation in the past six months and 181 (58.8%) of child got de worming tablet in the last six months. More than half of the child, 183 (59.4%) had diarrhea in the last two weeks and 206 (66.9%) of them had fever in the last two weeks. Only, 10 (3.2%) of child got measles in the last one year (Table 2)

Table 2: Child characteristics in IDP study respondents in Debre Berhan town, Amhara Regional State, Ethiopia, 2023

Child characteristics	Frequency	Percent
Child sex		
Male	121	39.3
Female	187	60.7
Child birth order		
1	83	26.9
2	64	20.8
3 and above	161	52.3
Place of delivery		

Home	115	37.3
Health facility	193	62.7
Type of birth		
Single	298	96.8
Twins	10	3.2
Does the child fully immunized?		
Yes	303	98.4
No	5	1.6
Vitamin A supplementation in the past six months?		
Yes	284	92.2
No	24	7.8
Has the child had diarrhea in the last two Weeks?		
Yes	125	40.6
No	183	59.4
Has the child been ill with fever at any time in the last two weeks?		
Yes	102	33.1
No	206	66.9
Don't know		
Has the child get sick with measles in the last Year?		
Yes	10	3.2
No	298	96.8
Did you ever breast fed your child?		
Yes	288	93.5
No	20	6.5

Do you still breast feed the child?

Yes	286	92.9
No	22	7.1

Does the child start complementary food?

Yes	296	96.1
No	12	3.9

5.3 Maternal characteristics and health service utilization related factors

Majority, 182 (59.1%) of the study respondents age at child birth were less than 20 years. About half, 155 (50.3%) of the study respondents gave birth to total of 4 and above children. Most of them, 241 (78.1%) visited health facility for ANC and 182 (59.1%) of the study respondents ever used family planning methods (Table 3).

Table 3: Maternal characteristics and health service utilization related factors among study respondents in Debre Berhan town, Amhara Regional State, Ethiopia, 2023

Questions	Frequency	Percent
Age at child birth		
Less than 20 years	182	59.1
20 years and above	126	40.9
Total number of children ever born?		
Less than 4	153	49.7
4 and above	155	50.3
Did you visit health facility for ANC?		
Yes	241	78.2
No	67	21.8
Have you ever used family planning methods		

Yes	182	59.1
No	126	40.9

5.4 Nutritional status of the children

In this study, 134 (43.5%) of children found to have under-nutrition and 86 (27.9%) of children had wasting. (Figure 3).

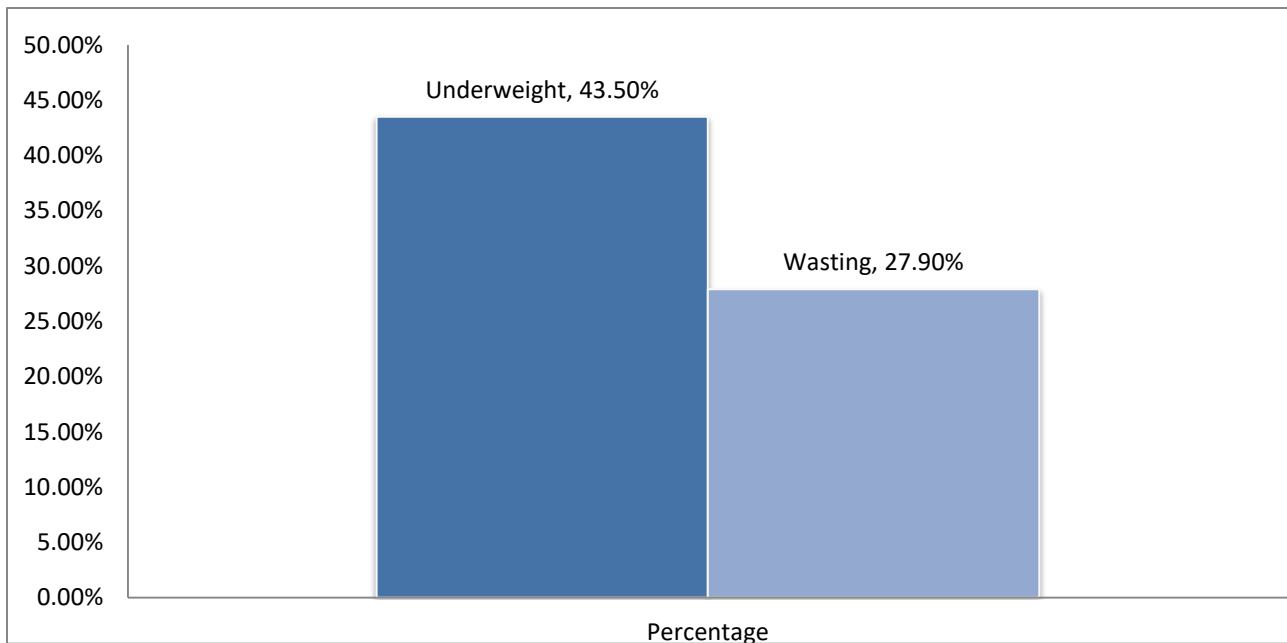


Figure 3: Nutritional status of children in Debre Berhan town, Amhara Regional State, Ethiopia, 2023

5.5 Factors associated with nutritional status of the children

5.5.1 Factors associated with under-nutrition

Factors which significantly associated with children under-nutrition during the multivariate binary logistic regression analysis were marital status of care giver, educational level and place of delivery. Children from divorced study respondents were 1.85 times (AOR= 1.85; 95% CI=:1.01, 6.75) more likely to had under-nutrition than married study respondents. In addition, children from study respondents who were unable to read and write were 1.67 times (AOR=

1.67; 95% CI=:1.12, 5.29) more likely to had under-nutrition compared to those who had diploma and above educational level. Place of delivery was one of the factor who had significant association with children under-nutrition, children who were delivered at home were 1.26 times (AOR= 1.26; 95% CI=:1.15, 2.06) more likely to develop under-nutrition compared to those who were delivered at health facilities (Table 4).

Table 4: Factors associated with children under-nutrition among study respondents in Debre Berhan town, Amhara Regional State, Ethiopia, 2023

Variable	Under-nutrition		AOR with 95% CI	P-value
	Yes n (%)	No n (%)		
Marital status				
Married	98 (73.1)	120 (69.8)	1	
Single	25 (18.7)	44 (25.6)	1.33 (0.91, 8.35)	0.07
Separated	5 (3.7)	7 (4.1)	8.15 (0.88, 11.86)	0.06
Divorced	6 (4.5)	1 (0.6)	1.85 (1.01, 6.75)	0.03
Education level				
Unable to read and write	83 (61.9)	103 (59.9)	1.67 (1.12, 5.29)	0.01
Primary	33 (24.6)	32 (18.6)	1.5 (0.43, 3.66)	0.23
Secondary	7 (5.2)	18 (10.5)	0.56 (0.01, 3.12)	0.08
Diploma and above	11 (8.2)	19 (11.0)	1	
Breast feeding				
Yes	125 (93.3)	161 (92.5)	1	
No	9 (6.7)	13 (7.5)	1.27 (0.47, 3.47)	0.63
Child sex				
Male	61 (45.5)	60 (34.5)	1	
Female	73 (54.5)	114 (37.0)	0.78 (0.47, 1.31)	0.08

Place of delivery

Healthcare facilities	81 (60.4)	112 (64.4)	1	
Home	53 (39.6)	62 (35.6)	1.26 (1.15, 2.06)	0.01

5.5.2 Factors associated with wasting

Study respondents educational level and history of children diarrhea in the last two weeks were the factors which show statistically significant association with children wasting. Children of study respondents who had primary educational level were 3.59 times (AOR= 3.59; 95% CI=:1.31, 9.88) more likely to had wasting than those with diploma and above educational level. Furthermore, children who had history of diarrhea in the last two weeks were 1.34 times (AOR= 1.80; 95% CI=:1.02, 3.16) more likely to had wasting than children who hadn't history of diarrhea (Table 5).

Table 5: Factors associated with children wasting among study respondents in Debre Berhan town, Amhara Regional State, Ethiopia, 2023

Variable	Wasting		AOR with 95% CI	P-value
	Yes n (%)	No n (%)		
Educational status				
Illiterate	55 (64.0)	131 (59.5)	1.80 (0.78, 4.17)	0.16
Primary school	10 (11.6)	55 (25.0)	3.59 (1.31, 9.88)	0.01
Secondary school	8 (9.3)	17 (7.7)	1.32 (0.42, 4.18)	0.62
Diploma and above	13 (15.1)	17 (7.7)	1	
Birth order				
One	25 (29.1)	58 (26.2)	1	
Two	11 (12.8)	53 (23.9)	0.84 (0.43, 2.62)	0.60
Three and above	50 (58.1)	111 (50.0)	1.74 (0.80, 3.75)	0.15
Place of delivery				

Healthcare facilities	40 (46.5)	85 (38.3)	1.34 (0.79, 2.27)	0.26
Home	46 (53.5)	137 (61.7)	1	
Diarrhea in the last 2 weeks				
Yes	47 (54.7)	146 (65.8)	1	
No	39 (45.3)	76 (34.2)	1.8 (1.02, 3.16)	0.04

6 DISCUSSION

The main purpose of this study was to assess the prevalence and factor associated with acute malnutrition among under-two years children in internal displacement population center at Debre Berhan town.

This study finding shows that the prevalence of under-nutrition and wasting was 43.5% and 27.9%, respectively. This result is alarming as it indicates that almost half of the under-two years children in this population center are suffering from under-nutrition, which can have long-lasting effects on their physical and mental development. Moreover, the high prevalence of wasting indicates that many children in this population center are not receiving adequate nutrition. The study findings are comparable to cross-sectional study conducted in Tigray region, Ethiopia which reported prevalence of 43.2% under nutrition and 24.6% stunting among under-two year's children in similar settings (20). Nevertheless, these rates are significantly higher than the WHO global estimates of under-nutrition and wasting in children aged 0-59 months, which were 22% and 7.7%, respectively (15).

This study finding revealed that that children from divorced study respondents were 1.85 more likely to have under-nutrition than married study respondents. This finding is consistent with previous research literature that showed a significant correlation between maternal marital status and child malnutrition. A study conducted in India found that children born to unmarried mothers had a higher prevalence of stunting compared to those born to married mothers (17). Additionally, a study cross-sectional study in Nigeria showed that children whose mothers were separated or divorced had a higher risk of under nutrition, indicating that marital status can be a critical determinant of child nutrition (19). The possible explanation for the correlation between maternal marital status and child nutrition can be attributed to the single mothers may have limited financial resources, which can negatively impact their ability to provide nutritious food for their children (8, 12).

In line with this study finding, previous literatures have also identified parental education level as a key factor in determining a child's nutritional status. For example, a study conducted in Shinille Woreda, Somali regional state, Ethiopian found that education level was inversely related to malnutrition; children whose parents had higher levels of education were less likely to

be malnourished (21). Similarly, a study conducted in Nigeria found that mothers who had higher levels of education were less likely to have malnourished children (19). Overall, the findings of the present study emphasize the need for targeted interventions that address the unique needs of children living in internal displacement centers. These interventions should focus on improving access to education and other resources that can help parents provide their children with adequate nutrition.

This study found that home delivery is a significant factor associated with under-nutrition among children. Infants delivered at home were 1.26 times more likely to develop under-nutrition compared to those who were delivered at health facilities. In contrast, some studies have reported no association between place of delivery and child malnutrition. A study in Uganda did not find any significant association between place of delivery and child malnutrition (26). A prospective longitudinal cohort study in Kenya also reported no association between place of delivery and malnutrition among children (16). The conflicting results of these studies may be due to differences in study design, sample size, and cultural practices around home births.

Furthermore, children who had history of diarrhea in the last two weeks were 1.34 times more likely to had wasting than children who hadn't history of diarrhea. Similarly, a study in Northern part of Ethiopia found that children with diarrhea had a higher risk of malnutrition. This finding highlights the importance of hygiene and sanitation in preventing malnutrition in this population.

7 CONCLUSION AND RECOMMENDATION

7.1 Conclusion

In summary, acute malnutrition, under-nutrition and wasting, is high among in the children in the IDP. Marital status of care giver, educational level and place of delivery were significantly associated with under-nutrition. And, factors including study respondents educational level and history of children diarrhea in the last two weeks were the factors which show statistically significant association with children wasting. These findings suggest that healthcare access for caregivers may have a positive impact on child nutrition outcomes.

7.2 Recommendations

For Amahara regional health bureau, program and projects:

- It is recommended for them to consider the specific needs and challenges faced by internally displaced populations in regards to their access to adequate and nutritious food.
- Incorporating interventions that address food insecurity and malnutrition within internal displacement settings can greatly benefit this vulnerable population.
- Implementing targeted nutrition intervention programs and conducting regular nutritional assessments to monitor progress and identify areas for improvement.
- It is crucial to undertake a quick assessment, identify the individuals who require enrollment in supplementary feeding or therapeutic feeding programs, and initiate such programs as soon as possible.
- Nutrition education should be initiated with an emphasis on enhancing the quality of nutrition.

For non-governmental organizations:

- To reduce the negative health effects, it's crucial to pay close attention to access to better sanitary facilities to improve national status of children in IDP.

Further research:

- Further study need to explore contextual and structure related factors that determine children malnutrition in IDP.

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ANNEX

ANNEX I: INFORMATION SHEET AND CONSENT FORM

Information sheet

Research title: Prevalence and factors associated with Acute malnutrition among under-two year children in IDP in DebreBerhan, North Shoa Zone Hospitals, Amahara Region, Ethiopia, 2023

Principal investigator: Mekides G/tsadik

Name of sponsor: Self-sponsor

Introduction: This information sheet is prepared to give you brief information about the study and to invite you to participate in the study. If you need more information about the study you can ask after you read the information sheet.

The general purpose of the study: The general purpose of this study is to assess acute malnutrition among under-two years children in IDP in DebreBerhantown. The findings and recommendations from this study may contribute to policy makers and concerned stakeholders to develop health policy and plan.

Procedures: This is a cross-sectional study and it involves data collection through face to face interview

with the guidance of data collectors.

Voluntary participation: Participation is completely voluntary, it is your choice to participate or not. Even after you decide to participate you have a right to leave whenever you are not comfortable. However, your genuine participation is extremely important to meet the objective of the study.

Risks: there is no any threat associated with participating in this study.

Benefits: There will be no direct benefit which will be obtained from participating in this study but the findings will provide information to policy makers and other stakeholders which may help to develop effective policy and plan.

Confidentiality: Your name will not be presented in any part of the study and identification numbers will be used for the purpose of the study. The questionnaire that you fill will be only accessible to principal investigators only and it will be stored in a secured area.

Person to contact: If you need any detailed information regarding the study and its process you can contact the principal investigator through:

Mobile-

E-mail-

Permission: Finally you are kindly requested to participate in this study.

Thank you for your time!

Consent form

Malnutrition among under-two year children in IDP in DebreBerhantown, North Shoa zone, Amahara Region, Ethiopia, 2023

Please put X mark on the appropriate boxes

- I have read and understand the study information sheet.
- I have had the chance to ask questions about the study and I get satisfactory answer
- I understand that my participation is voluntary.
- I understand that I am free to withdraw at any time without giving reasons.
- I agree to participate in the study

Name of participant Signature Date

Name of research assistant Signature Date

ANNEX II: ENGLISH VERSION QUESTIONNAIRE

Study respondent ID: _____

Facility type: _____ Part one: Child characteristics

No	Questions	Responses/options	Skip to
101	Child sex	1. Male 2. Female	
102	Child age in month	_____ Month	
103	Child birth order	_____ th	
104	Place of delivery	1. Health facility 2. Home 3. Other, specify _____	
105	Type of birth	1. Single 2. Twins	
106	Does the child ever been immunized?	1. Yes 2. No	
107	Vaccines received (See card, if no card available ask them to recall) (More than one answer is possible)	1. BCG only (see scar) 2. OPV 123 3. Penta 123 4. Measles 5. No card found	
108	Vitamin A supplementation in the past six months?	1. Yes 2. No 3. Don't know	
109	Did your child get a de worming tablet in last 6 months?	1. Yes 2. No 3. Don't know	
110	Has the child had diarrhea in the last two Weeks?	1. Yes 2. No 3. Don't know	
111	Has the child been ill with fever at any time in the last two weeks?	1. Yes 2. No 3. Don't know	
112	Has the child get sick with measles in the last Year?	1. Yes 2. No 3. Don't know	
113	Did you ever breast fed your child?	1. Yes 2. No	
114	After how long after delivery child	1. Within 1 hour of delivery	

	was put to breast feed?	2. Within the first 8 hours 3. After 2 to 3 days 4. Seven days later 5. Don't know	
115	Do you still breast feed the child?	1. Yes 2. No	
116	Does the child start complementary food?	1. Yes 2. No	

Part two: Socio-demographic characteristics of respondents

No	Questions	Responses/options	Skip to
201	age of the care taker	_____ in years	
202	Sex of the care taker	1. Male 2. Female	
203	What is your marital status?	1. Single 2. Married 3. Married 4. Divorced 5. Windowed	
204	What is the highest level of education level?	1. Illiterate 2. Read and write only 3. Grade 1 to 6 4. Grade 7 to 8 5. Grade 9 to 12 6. College diploma 7. Degree and above	
205	How many persons live in the family member?	_____	
206	How many under two children live in the family?	_____	
207	What is your displaced year from original place?	_____ Year	

Part three: Maternal characteristics and health service utilization related factors

No	Questions	Responses/options	Skip to
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301	Mother's age in years	_____ yrs	
302	Age at child birth	_____ yrs	
303	Total number of children ever born?	_____	
304	Did you visit health facility for ANC?	1. Yes 2. No	
305	Have you ever used family planning methods	1. Yes 2. No	

Part four: Anthropometric measurements

No	Questions	Responses/options	Skip to
401	Child weight?	_____ kg	
402	MUAC in cm	_____ cm	

This is the end of the questionnaire. Thank you very much!