

Research Article

# Prevalence and Associated Risk Factors of Acute Malnutrition Among Children Aged 6-59 Months in Harorays Woreda

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## Abstract

**Background:** Malnutrition continues to be a major public health problem in developing countries and in Ethiopia wasting is one of the most serious public health problems. High wasting rates in the country pose a significance obstacle to achieving better child health outcomes. **Methods:** A community based cross sectional study was conducted on 428 children aged 6-59 months from January to March 2023 in Harorays Woreda. Simple random sampling technique was used to select Kebeles and Children from each Kebeles. Anthropometric measurements and structured questioners were used. Data were processed using Epi-data version 3.1 software and exported to SPSS version 23 for analysis. Bi-variable analysis was carried out to see the association between each independent variable and the dependent variable. All variables with p-value <0.25 during bi-variate analysis was entered multivariate logistic regression analysis to control for all possible confounders and to identify factors associated with the outcome variable. Odds ratio along with 95% confidence interval was estimated to measure the strength of association. Level of statistical significance was declared at p-value less or equal to 0.05. **Result:** The analysis of the anthropometric indices revealed that the prevalence of wasting is 36.4% (95%CI: 31.7%, 41.0%). Regarding the associated factors of wasting, the multivariable regression analysis revealed that living in rural residence, being illiterate, poor income status, increased family size, late initiation of breast feeding, diarrhea in the last two weeks, poor dietary diversity, presence of diarrhea in the last two weeks, pre-lactal feeding and child immunization were independent predictors for wasting. **Conclusion and recommendation:** The prevalence of wasting in this study area was found to be very high according to WHO classification. Living in rural residence, being illiterate, poor income status, increased family size, late initiation of breast feeding, diarrhea in the last two weeks, poor dietary diversity, presence of diarrhea in the last two weeks, pre-lactal feeding and child immunization were independent predictors for wasting.

## Keywords

Wasting, Children, 6-59 Months, Harorays Woreda

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## 1. Introduction

Malnutrition remains among the most devastating problem worldwide, particularly facing the world under privileged and poor. It covers a broad spectrum of illness, including nutrition, specific nutrient deficiencies and under nutrition [1]. In developing world, this usually described as undernutrition whereby there exist varying degree of deficiencies is essential nutrients. The body of children respond to malnutrition/undernutrition by stunting (low height for age), wasting (low weight for height) and/or nutritional edema [2].

Wasting (Acute malnutrition) is a clinical term defined as weight for height with Z-score (WHZ) below minus two standard deviations from the median weight for height of the standard reference population [3]. Acutely malnourished children are categorized into severe acute malnutrition (SAM) and moderate acute malnutrition (MAM) on the basis of body measurements. SAM is defined WHZ  $<-3$  and MAM is defined as having WHZ  $<-2$  and  $>-3$ , accounting for 11% of under nourished children worldwide [4].

Under five years' children are the most susceptible age group for malnutrition which is mainly under nutrition especially acute malnutrition or wasting [5]. Wasting is a short-term response to inadequate nutritional intakes that often occur in combination with infection [2]. The burden of malnutrition commonly occurs within the African especially sub-Saharan countries and Asian countries of the world [6].

Ethiopia is one of sub-Saharan countries with very high burden of undernutrition. In the country, undernutrition contributes to the underlying cause of 57% of child deaths [7]. Children with wasting (Acute malnutrition) are three to nine times more likely to die than well-nourished [8]. Finding shows that about 0.4 million child's death can be prevented by adequate identification and proper management of acute malnutrition [4]. The last five national level of Ethiopian demographic and health survey (EDHS) showed a decreased trend of stunting and underweight in under five years' children's. Prevalence of stunting decreased from 58% to 38% and underweight from 41% to 24% between 2000 and 2016. Conversely, the prevalence of wasting has remained fairly static over the last 16 years [9].

Besides, no study has been conducted to address the Prevalence and Associated Risk Factors of Acute Malnutrition Among Children Aged 6-59 Months in Harorays Woreda. Therefore, this study was designed to assess the prevalence of wasting and the factors associated among children aged 6-59 months.

## 2. Materials and Methods

### 2.1. Study Area and Period

The study was conducted in Harorays Woreda, east part of Somali regional state. Harorays is one of the 93 Woredas in Somali region located 680 Km from the capital Addis Ababa.

According to the Woreda health office statistics of 2018 the estimated total population is 40,171 (19,684 males and 20484 females). From these number of under- five-year children's is estimated to be 3980. There are also 4850 households. The Woreda has 2 health centers and 15 health posts. majority of the populations are Agro-Pastoralist and the economic source of the Woreda is mainly dependent on livestock and livestock products. The study was conducted from March to May.

### 2.2. Study Design and Population

Community based cross-sectional study was applied among all mother/caregiver having children aged 6-59 months living in Harorays Woreda. However, the study population was Randomly selected children aged 6-59 months and living in the selected kebeles of Harorays Woreda.

### 2.3. Sample Size Determination and Sampling Procedure

Sample size was estimated based on single population proportion formula considering 95% confidence level, 5% margin of error. Finding from Magnitude and factors associated with malnutrition among children aged 6-59 months of age in Shinille Woreda, Somali region Ethiopia Shows prevalence of wasting was 20% [10].

Regarding the procedure, the study used simple random sampling technique of the total 17 Kebeles, 1 urban and 7 rural Kebeles that will represent the rest 9 Kebeles in socio-economic status was purposefully selected. All children aged 6-59 months from health extension registration in each Kebele will enumerate, then the study subject was selected in proportion to the size of the study population of each Kebele using systematic sampling. To apply this sampling technique a sampling fraction ( $K^{\text{th}}$ ) was calculated using total number of under-five years' children divided by estimated sample size. The first sample was selected using lottery method, every  $k^{\text{th}}$  the first sample included until the required sample size is attained.

### 2.4. Data Collection Methods

Data were collected by using structured questionnaire adapted from EDHS and other literatures with minor modification to fit the study subjects and anthropometric measurements were done through house to house visit and wasting was measured by using MUAC and Wasting was considered MUAC less 11.5 cm. The questionnaire was designed to capture sociodemographic and economic characteristics, health and environmental related information. Five data collectors (diploma nurses) and one field supervisor of BSc holder were recruited for the study. In households who have more than one under five-year children, the youngest child

was selected.

Weights of the child was measured using united Nation's International Children's Fund (UNICEF) SECA portable, digital scale with a capacity of 150 kg to the nearest 0.1 kg. Weight was taken with light clothing and no shoes. Instrument calibration was done before weighing each child. Furthermore, the weighing scale was checked daily against the standard weight for accuracy. The length of a child (aged 6-23 months) was measured using a horizontal wooden length board in recumbent position and children above two years was measured in a standing position with centimeters to the nearest of 0.1 cm.

Data on household food security status was determined based on nine standard Household Food Insecurity Access Scale (HFIAS) questions adapted for this purpose from Food and Nutrition Technical Assistance (FANTA), 2007 which has four-week recall period. More ever, data on dietary diversity were adapted from WHO standardized questionnaire for infant and young children feeding practices based on mother's recall of food given to her child for the last 24 hours. Edema was checked and noted on data sheet because children with edema is severely undernourished. To check edema, normal thumb pressure was applied on both feet the child for 3 seconds. The data collectors checked whether a shallow print remained or not on both feet when the thumb lift.

## 2.5. Operational Definitions

*Wasting*: - is computed when the weight-for-height z-score (WHZ) is below  $-2$  SD (Standard Deviation) using the new WHO child growth standards [4-11].

*Malnourished*: A child was labeled as malnourished if any of the nutritional assessment indices weight for height, weight for age, or height for age is abnormal [4-11].

*Diarrhea*: Diarrhea is defined for a child having three or more loose or watery stools per day. Family size: refers total number of people living in a house during the study period [4-11].

*Fever*: A child with elevated body temperature than usual [4-11].

*Food secure households*: households who experience none of the food insecurity (access) conditions, or just experience worry, but (one or two times in the last 4 weeks) are labeled as "Food secured [4-11].

*Food insecure households*: in ability of households to access sufficient food at all time to lead to active healthy life (includes all stage of food insecurity; mild, moderate and severe) without eating), even as infrequently as rarely (one or two times in the last 4 weeks) [4-11].

## 2.6. Data Quality Control

The quality of data was ensured by pre-testing the data collection tools on 5% of the participants in Jigjiga town which was not included in the study to check for the validity of the

instruments and necessary adjustments was made before the actual data collection. The collected data was checked for completeness and clarity by assigned supervisor and the principal investigator.

## 2.7. Data Processing and Analysis

Data was coded and entered to Epi Data version 3.1, then transferred to Statistical Package for Social Science (SPSS) Version 23 software for analysis. World health organization (WHO) Anthro V3.2.2 software was used to convert nutritional data into Z-scores of the indices weight-for-height/length taking age and sex into consideration using WHO standards. Logistic regression model was used to identify the magnitude of the association between the variables. The independent variables were selected based on prior evidence in the literature. All independent variables that have a p value of 0.25 in the bi-variable analysis fitted to the multivariate logistic regression analysis to control for possible confounding effects of variables. Variables which were found at 95% CI and p-value of  $<0.05$  were statistically significant.

## 3. Results

### 3.1. Socio Demographic Characteristics

In this study, the final analysis included 420 mothers with their children aged 6-59 months, making the response rate of 98.1%. of the total respondents, 188 (44.8%) of them fall between the age of 25-34 years followed by 15-24 years which accounts about 123 (29.3%). Concerning place of residence around 279 (66.4%) was from rural residences. Regarding ethnicity and religion, all respondents were Somali and Muslim respectively. Besides, most 367 (87.4%) study respondents were married. Nearly three forth, 308 (73.3%) of the respondents were not employed. Large proportion of respondents 184 (43.8%) have medium income. Regarding family size, 310 (73.8%) respondents have less five family members. About 304 (72.4%) respondents have  $>2$  under five-year children in their household.

### 3.2. Child Feeding Practice

Regarding characteristics of children among the children participated in this study, more than half 247 (58.8%) were females, where 179 (42.6%) fell in the age group of 12-23 months. Of the studied children, just above half, 222 (52.9%) respondents did not feed their children exclusively. About 267 (63.6%) respondents started breastfeeding after one hour after birth. Just above half of the respondents 215 (51.2%) started complimentary feeding timely at 6 months. Bottle feeding was practiced by 257 (61.2%) respondents. Regarding Minimal Dietary Diversity (MDD) and Minimal Meal Frequency (MMF) only 198 (47.1%) and 225 (53.6%) have received MDD and MMF respectively.

### 3.3. Maternal and Child Healthcare

Sixty respondents (14.3%) had been sick in the last two weeks before the survey, while seventy (16.7%), and 36 (8.6%) respondents had history of diarrhea and fever two weeks before the survey. Concerning vaccination, 128 (30.5%) of the children received full vaccine. Respiratory disease and edema were present in 56 (13.3%) and 18 (4.3%) of children. Regarding health service utilization, 302 (71.9%) respondents had ANC follow more than 2 times while only 91 (21.7%) utilized family planning.

### 3.4. Anthropometric Measurement

Regarding anthropometric measurement of children *from 6 to 59 months in the study area* 63.3% (266) children weighted from 5-10 kg followed by 28.1% (118) from 11-15. Turning to the height of children, 46.9% (197) have height of 75-100 cm followed by 45.2% (190) from 50-75 cm. Meanwhile, just above half, 51.7% (217) of children have a MUAC of  $\geq$  12.5, while 45.2% (190) children have a MUAC of from 11.5 to 12.4 cm.

### 3.5. Factors Associated with Wasting

In the bivariate logistic regression model, living in rural residence, being illiterate, poor income status, increased family size, late initiation of breast feeding, poor dietary diversity, presence of diarrhea in the last two weeks, pre-lactal feeding and child immunization were associated with wasting. In the final multivariable logistic regression analysis, living in rural residence, being illiterate, poor income status, increased family size, late initiation of breast feeding, diarrhea in the last two weeks, poor dietary diversity, presence of diarrhea in the last two weeks, pre-lacteal feeding, and child immunization were independent predictors for wasting. Accordingly, the odds of child wasting among mothers from a rural residence (AOR=4.2; 95% CI: 1.51, 8.90) was higher compared with those from urban residence. Similarly, the odds of child wasting among children who belongs to a family with low-income status ((AOR=2.02; 95% CI: 1.39, 9.90) was higher compared with those children from a family with high income status. The odds of child wasting among children from increased family size,  $\geq 5$  (AOR=6.81; 95% CI: (3.59, 12.92) was higher compared to those who are from a family size less than five-year-old. Children who had history of diarrhea in the last two weeks were 2.45 times more likely to develop wasting compared to those children who had no history of diarrhea in the last two weeks before the survey (AOR= 2.45; 95% CI: 1.16, 7.42). Children who had poor dietary diversity were nearly 3.4 more likely to develop wasting compared to those children who had good dietary diversity (AOR= 3.4; 95% CI: 1.16, 8.42). Moreover, the odds of child wasting among children with incomplete vaccination (AOR=2.16; 95% CI: 1.16, 10.42) was higher compared with those who have completed

vaccination.

## 4. Discussion

Child malnutrition continues to be a major public health problem in developing countries including Ethiopia. This study aimed to assess the prevalence of wasting and its associated factors among children aged 6-59 months in Harorays Woreda, Somali Region, Eastern Ethiopia 2023. The analysis of the anthropometric indices revealed that the prevalence of wasting was 36.4% (95%CI: 31.7%, 41.0%) which is found to be very high according to WHO classification [12].

Regarding the associated factors of wasting, the multivariable regression analysis revealed that living in rural residence, being illiterate, poor income status, increased family size, late initiation of breast feeding, diarrhea in the last two weeks, poor dietary diversity, presence of diarrhea in the last two weeks, pre-lactal feeding and child immunization were independent predictors for wasting.

In the current study, the prevalence of wasting (36.4%) was much higher than findings in Afar region, 19.5% [13] and Hidabu Abote district, 16.7% [14], than the national figure, 9.7% [13], Damot district, 9% [15], Metekele zone, 10.2% [16], Haramaya district, 10.7% [17], and other countries including Kenya, 2.6% [18], and Nigeria, 8.8% [19], which is an alarming case to increase risk of deaths among children. The possible explanation for this higher magnitude of wasting in the current study could be due to a difference in the socioeconomic, food insecurity at household level, and nomadic nature of the population. Besides, this could also be due to a difference in cultural and child feeding habits, study setting, and periods of the study. However, it is lower than the study done in the pastoral communities of Dollo Ado district, Eastern Ethiopia, 42.3% [20]. This higher magnitude in Dollo Ado district could be due to the discrepancy in study participants as study subjects in that study involved only pastoral communities. Wasting is an indicator of acute malnutrition that can occur due to recent infection or weight loss due to periodical variation of food supply. The current magnitude of wasting indicates as it is still a public health problem. These alert the need for improved efforts of the health institutions to promote health education through health extension workers at the community level. Moreover, the health extension program in this area has to include wasting as indicator for child growth monitoring and promotion indicator.

Regarding factors associated with wasting, in the current study, the odds of child wasting among illiterate mothers was higher compared with those mothers who attend secondary and above education. Similar finding was reported in other studies conducted in Hawassa Zuria, Ethiopia [21], Dollo Ado district, Ethiopia [20], Rwanda [22], and Iran [23]. This might be due to the fact that educated mothers would have proper management of resources, practice better health promoting behaviors, and might develop better children centered caring practices.

This study revealed that children from family with poor wealth quintile had higher odds of being wasted compared to their counterparts. This finding is in line with other studies across the literature in Ethiopia [21] and in Bangladesh [24]. This could be because adolescents from rich households can easily access balanced nutrition and they can afford and access nutrition-related information from media and other services [25, 26].

The result also showed that residence was positively associated with stunting which is consistent with results from studies in Ethiopia and Sub-Saharan Africa in which stunting was higher among rural area dwellers [27, 28]. This urban-rural discrepancy might be because people living in urban areas have better access to health care services. They are also more easily reached by immunization and educational campaigns. Besides, people living in urban areas are more exposed to different nutrition-related information through mass media like television, magazines and the internet. Moreover, urban dwellers have a better socio-economic status [29].

In the current study, household family size was significantly associated with wasting among study children. This finding is in line with finding of other studies done in Ethiopia, Libo-Kemekem district [30] and Benna Tsema district [31], and other countries like Bangladesh [34]. The possible explanation for this might be due to fact that families with more children might be challenged with more economic burden for food consumption; hence, they might be more likely to suffer from poor nutritional status due to household food insecurity.

In the current study, immunization status of children had a significant association with increased risk underweight. This finding was in line with other studies conducted in Ethiopia, Metekele Zone [36], Shinille district [32], EDHS report [33], and other countries such as Zambia [34]. This might be due to the fact that children who were not fully vaccinated could be at risk of many vaccines preventable diseases such as diarrheal disease and respiratory infections, which might result in depleting nutrients from the body.

In the current study, presence of diarrheal in the last two weeks before the survey was significantly associated with increasing prevalence of wasting. This finding was in agreement with other findings conducted in Damot district, Ethiopia [35], and Vadodara, India [36]. This could be due to the fact that diarrhea may result in lower appetite, poor digestion, and mala-absorption which leads to malnutrition. The other possible explanation also might be that malnourished children would have more diarrheal episodes and a child with diarrhea losses electrolyte and nutrients which in turn leads to loss of weight and they can quickly become malnourished.

## 5. Limitation of the Study

Due to the cross-sectional nature of the design, causal inference might not be possible between the dependent and

independent variables. There might also be the possibility of recall bias in some infant and young child feeding (IYCF) indicators happened in the past.

## 6. Conclusion and Recommendations

The current study revealed that wasting is still an important public health problem among children in the study area. Being from rural residence, poor income status, increased family size, late initiation of breast feeding, diarrhea in the last two weeks, poor dietary diversity, presence of diarrhea in the last two weeks, pre-lacteal feeding, and child immunization were independent predictors for wasting.

Promoting childhood vaccination, preventing diarrheal diseases, enhancing the access of nutrition education programs emphasizing on the rural and uneducated resident are vital interventions to improve nutritional status of the children. A due emphasis should also be given to strengthen the health extension program to improve and provide participatory nutrition education to create awareness and to develop behavior change communication for better child feeding practices especially for uneducated mothers.

## Abbreviations

CF	Complementary Feeding
DALYs	Disability Adjusted Life Years
EDHS	Ethiopian Demographic and Health Survey
ETB	Ethiopian Birr
FANTA	Food and Nutrition Technical Assistance
GDP	Gross Domestic Product
HFIAS	Household Food Insecurity access scale
MAM	Moderate Acute Malnutrition
NGOs	Non-Governmental Organizations
PI	Principal Investigators
SAM	Severe Acute Malnutrition
SPSS	Statistical Package for Social Science
UNICEF	United Nation International Children Fund
WHO	World Health Organization
WHZ	Weight for Height Z-score

## Declarations

The study was conducted in accordance with the declaration of Helsinki. Before starting of the data collection process, ethical clearance was secured from Jigjiga University Institutional Health Research Ethics Review Committee. In addition, Jigjiga University wrote Official support letter to Harorays Woreda Health Office. Data collection was carried out after receiving letter of support from the administration of the Woreda. All Participants in the selected households got clear information about the study. After obtaining full information about the research the respondents signed a written consent agreement. They had been informed of their rights to

withdraw from the study at any stage. Moreover, the confidentiality of information was guaranteed by using code numbers rather than personal identifiers and by keeping the data securely locked up. Health education on risk factors, consequences and compilation was provided to all the participants after the compilation of data collection.

## Conflicts of Interest

The authors declared no competing of interest.

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