

# Prevalence of Malnutrition and Associated Factors Among Children Aged 6-59 Months at Hidabu Abote District, North Shewa, Oromia Regional State

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## Abstract

**Introduction:** Malnutrition continues to be a major public health problem in developing countries. It is the most important risk factor for the burden of diseases. In Ethiopia, child malnutrition rate is one of the most serious public health problem and the highest in the world. High malnutrition rates in the country pose a significant obstacle to achieving better child health outcomes.

**Objective:** To assess prevalence of malnutrition and associated factors among children aged 6-59 months at Hidabu Abote district, North shewa, Oromia.

**Methods:** A community based cross sectional study was conducted on 820 children aged 6-59 months from September 8-23, 2012 at Hidabu Abote district. Multistage sampling method was used to select households. Children were selected from each kebeles by simple random sampling. Anthropometric measurements and structured questioners were used. Data were processed using Epi-info soft ware and exported to SPSS for analysis. Then after, sex, age, height and weight transferred with HHs number to ENA for SMART 2007 software to convert nutritional data into Z-scores of the indices; Height-for-age, weight-for-height and weight-for-age. Bivariate and multivariate logistic regressions were used to identify associated factors of malnutrition.

**Results:** The analysis this study revealed that, 47.6%, 30.9% and 16.7% of children were stunted, underweight and wasted, respectively. The main associated factors of stunting were found to be child age, family monthly income, children were received butter as pre-lacteal feeding and family planning. Underweight was associated with number of children HHs and children were received butter as per-lacteal feeding. Treatment of water in HHs the only variable associated with wasting.

**Conclusion and recommendation:** From the findings of this study, it is concluded that malnutrition is still an important problem among children aged 6-59 months. Therefore, especial attention should be given on intervention of malnutrition.

**Keywords:** Malnutrition, Children, Hidabu abote district

## Introduction

### Statement of the Problem

Malnutrition refers to a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. It is a state of nutrition where the weight for age, height for age and weight for height indices are below -2 Z-score of the NCHS reference. Malnutrition continues to be a major public health problem in developing countries. It is the most important risk factor for the burden of disease causing about 300, 000 deaths per year directly and indirectly responsible for more than half of all deaths in children [1]. Health and physical consequences of prolonged states of malnourishment among children are: delay in their physical growth and motor development; lower intellectual quotient (IQ), greater behavioral problems and deficient social skills; susceptibility to contracting diseases [2].

Much of the burden of deaths resulting from malnutrition, estimated to be over half of childhood deaths in developing countries, can be attributed to just mild and moderate malnutrition, varying from 45% for deaths due to measles to 61% for deaths due to diarrhea [3]. The majority of studies on child nutritional status have described prevalence of malnutrition among under-five children and analyzed socioeconomic, demographic and cultural factors associated with child malnutrition in SSA [4].

In Ethiopia, child malnutrition is one of the most serious public health problem and the highest in the world [5]. Nationally about 44%stunted, 29% underweight and 10% children were wasted [6]. In

Oromia region prevalence of child malnutrition indicated that 26% are underweight with 7.8% severe underweight, 9.7% of the children are wasted (2.8 % severe wasting) and 41.4 % of the children are stunted with 18% sever stunting [6]. However, the study of prevalence and associated factors of malnutrition among 6- 59 months age children has not been conducted at Hidabu Abote district yet. Therefore, this study designed to assess the prevalence of malnutrition and associated factors among children aged 6-59 months.

## Literature Review

**Magnitude of the problems:** Malnutrition remains one of the most common causes of morbidity and mortality among children under five children throughout the World [7]. Worldwide, over 10 million children under the age of 5 years die every year from preventable and treatable illnesses despite effective health interventions. At least half of these deaths are caused by malnutrition. Malnourished children

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have lowered resistance to infection; therefore, they are more likely to die from common childhood ailments such as diarrheal diseases and respiratory infections. In addition, malnourished children that survive are likely to suffer from frequent illness, which adversely affects their nutritional status and locks them into a vicious cycle of recurring sickness, faltering growth and diminished learning ability. In developing countries, malnutrition is a major health problem [8].

The burden of malnutrition is much higher in South Asia compared to that in Africa and other parts of the world. The prevalence of underweight and stunting in South Asia has been recorded as 46 and 44 percent, respectively [9]. Chronic malnutrition has been a persistent problem for young children in Sub-Saharan Africa. A high percentage of these children fail to reach the normal international standard height for their age; that is, they are “stunted” In contrast, the percentage of children stunted in Southeast Asia dropped from 52 percent to 42 percent between 1990 and 2006. The number of undernourished (low weight for age) people of all ages in sub-Saharan Africa increased from about 90 million in 1970 to 225 million in 2008, and was projected to add another 100 million by 2015, even before the current world food price hikes [10].

A study conducted on influence of socio-economic factors on nutritional status of children in a rural community of Osun state, Nigeria revealed that the prevalence rates of underweight, wasting and stunting were 23.1%, 9 % and 26.7% respectively and also prevalence and determinants of malnutrition among Under-five Children of Farming Households in Kwara State, Nigeria results indicate that 23.6%, 22.0% and 14.2% of the sample children were stunted, underweight and wasted, respectively [11,12].

Study done on malnutrition among under-five children in Bangladesh revealed that, the high prevalence of stunting and underweight, for instance 42% and 40% of under-five children were stunted and underweight, respectively [13]. Also study conducted nutritional status of under-five children in Mongolia also showed that, the prevalence of stunting, wasting and underweight were 15.6%, 1.7% and 4.7%, respectively [14].

A cross-sectional study conducted in Belahara VDC of Dhankuta district in Nepal located in South Asia, the prevalence of underweight, stunting and wasting were 27%, 37% and 11%, respectively [15]. The prevalence of children under five years with acute malnutrition in Southern Sudan is one of the highest in the world approximately one out of every five children (22%) suffers from moderate to severe acute malnutrition (wasting). The prevalence of acute malnutrition among this age population in Southern Sudan is almost twice as high as in other parts of Sudan and also study conducted in a decertified area of Sudan - Alrawakeeb valley revealed that the prevalence of malnutrition among these children is very high (27.5% were severely malnourished and 35% suffered from either mild or moderate malnutrition [16,17].

According to research conducted in pre-school children in a rural area of western Kenya revealed that, the prevalence of stunting, underweight and wasting were 30%, 20%, and 4%, respectively [18].

Although a cross-sectional survey conducted in a rural locality called Gumbrit, the overall prevalence of malnutrition in the community was high with 28.5% of the children being underweight, 24% stunted and 17.7% wasted. Similarly, study done at Beta-Israel community revealed that, the prevalence of stunting, Underweight and wasting were 37.2%, 14.6%, and 4.5%, respectively. Moreover, severe stunting, severe underweight and severe wasting were seen in 14.8%, 2.9%, and 0.5% of the Children respectively [19,20].

A community based cross-sectional survey conducted West Gojam zone revealed that 49.2 % children were found to be under-weight, 43.2 % of the children under age five were suffering from chronic malnutrition and 14.8 % acutely malnourished [21]. The cross sectional survey conducted rural communities of Tigray region also revealed that, the levels of stunting, under weight and wasting were 42.7%, 38.3% and 13.4%, respectively [22].

A cross sectional study conducted in Aynalem village in Tigray region, the overall prevalence of stunting, underweight and wasting were 45.7%, 43.1% and 7.1%, respectively [23]. According to research conducted in Gimbi district Oromia region indicated that, 32.4 % stunted, 23.5 % underweight and 15.9% of the children were wasted. Prevalence of severe stunting, severe underweight and severe wasting respectively were 15.7%, 8.0 % and 5.7% [24].

A community-based cross-sectional study conducted in rural kebeles of Haramaya district although revealed that, the prevalence of stunting, underweight, and wasting were 42.2%, 36.6%, and 14.1%, respectively. In addition, the proportion of the prevalence of malnutrition by its level of severity indicated that 19.9% were severely stunted, 16.6% were severely underweight and 3.9% were severely wasted [25].

**Associated factors:** The causes of malnutrition are numerous and multifaceted. These causes are intertwined with each other and are hierarchically related. The most immediate determinants are poor diet and disease which are themselves caused by a set of underlying factors; household food security, maternal/ child caring practices and access to health services and healthy environment. These underlying factors themselves are influenced by the basic socio-economic and political conditions [1].

Study conducted on malnutrition among under five children in Bangladesh revealed that household economic status, mother's education, father's education, mother's antenatal visit (s), mother's age at birth and mother's BMI are the most significant factor /determinants of child's malnutrition [13].

As study on influence of socio-economic factors on nutritional status of children in a rural community of Osun state, Nigeria, Children of mothers who were not educated beyond secondary school level had one and a half to two times the prevalence rate of stunting. On the other hand, children of mothers with post secondary education were apparently more often affected by wasting than those with less educated mothers but there was no consistent trend in the pattern of wasting or stunting with respect to paternal educational level. Low maternal income and overcrowding were associated with higher prevalence of wasting. However no association was found between the source of drinking water or social class and malnutrition [15]. Study conducted on prevalence and determinants of malnutrition among Under-five Children of Farming Households in Kwara State, Nigeria, malnutrition were significant associated gender and age of child, education and body mass index of mother, calorie intake of the households, access to clean water and presence of toilet in the households [16].

According research conducted in Belahara VDC of Dhankuta district in Nepal located in south Asia, poor socioeconomic status was found risk factors for both stunting and underweight, Children reared in the jointly family were found less like to be stunted than those in nuclear family. Also ethnic group and age of mothers at pregnancy seems to have significance association with stunting but maternal education not associated. Nevertheless, study conducted in a decertified area of Sudan - Alrawakeeb valley revealed that maternal education was

found to be the strongest factor associated with malnutrition among under five children [15,17].

Among the socio-economic variables included in the study rural locality of Gumbrit, the only family income was significantly associated with malnutrition [19]. Study conducted at Beta-Israel also show that the main contributing factors for under-five malnutrition were found to be sex of the child, child's age, diarrhea episode, deprivation of colostrums, duration of breastfeeding, pre-lacteal feeds, type of food, age of introduction of complementary feeding and method of feeding [20].

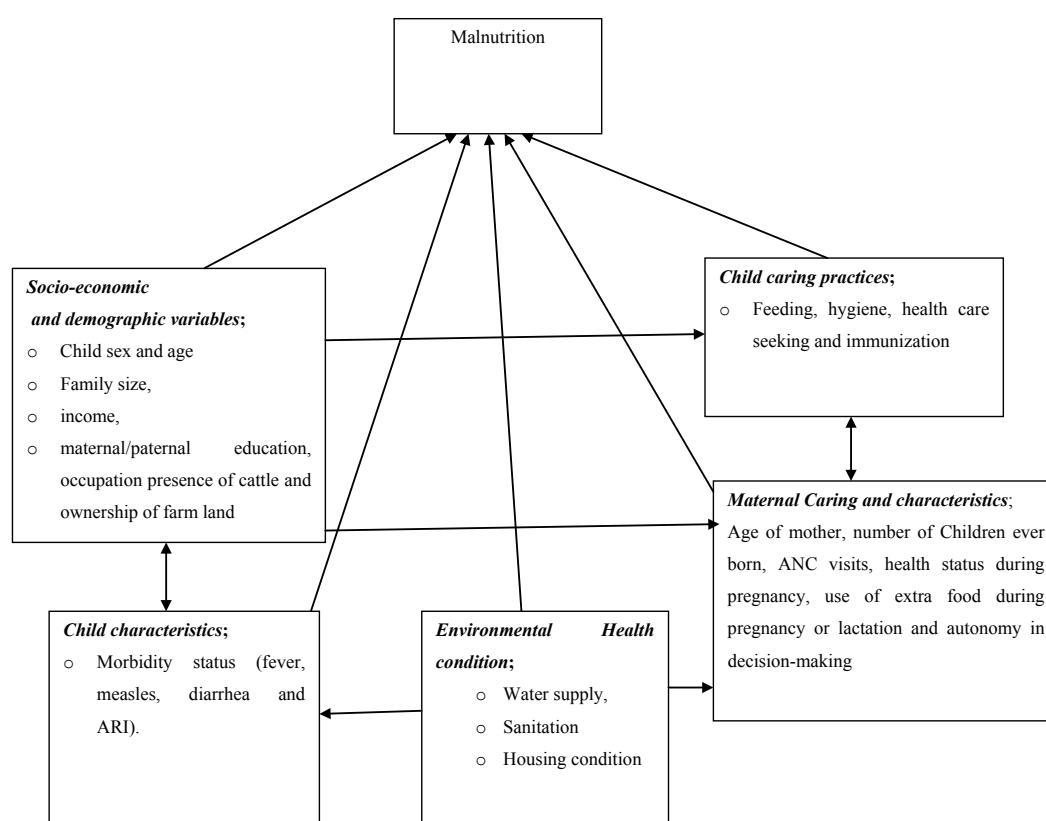
Malnutrition varies from country to country depending on economic, ecological, social, and other factors. In Ethiopia at present the most serious nutritional problems are mainly due to low intake of foods in general. The problem is more severe among children aged 1-3 years who suffer from Kwashiorkor and Marasmus (4%) and under weight (60%). Any change in income or income from influence of the nutritional status at the household and individual levels. The effect of income is measured by expenditure on food which reflects a household's income and resources [26]. Study conducted by Bayesian Approach to identify predictors of nutritional status in Ethiopia, the main predictors of children nutritional status were place of residence, maternal education, occupation of mother, Preceding birth interval, source of water drinking, age of child, sex of child, Mother's BMI and age of mothers [27].

Study conducted in rural Tigray region revealed that, a very high proportion of the mothers (80%) initiated feeding of newborns with pre-lacteal feeds primarily butter or water. Child age, maternal

anthropometric characteristics, inadequate complementary foods, and area of residence were the main contributing factors to child malnutrition [22]. The prevalence of stunting and underweight were significantly associated with the age group of children in Aynalem village in Tigray region. Both highest prevalence of stunting and underweight were observed among the age group of 12-24 months whereas the lowest prevalence of stunting, wasting, and underweight were observed among the age 0-6 months age group [23].

The main important associated factors of under nutrition include the education, income, and nutritional situation of the parents, access to clean water and sanitation, access to primary health care, sex and age of child. Factors that are contributing to malnutrition may differ among regions, communities and over time. Identifying the underlying causes of malnutrition in a particular locality is important to solve the nutritional problems. Various studies have been made and conclusions were reached by different scholars in the past regarding predictors of health and nutritional status. Survey of available literature indicated that factors like knowledge of health practices and caring level, educational level of parents, access to or interactions of age of the child have strong effect on household and community variables in which the child grows up [28].

Study conducted in Gimbi district show that the main associated factors of wasting were childhood illness indicated by fever, low household income and maternal lack of education. Low birth size of children, paternal lack of education, maternal lack of decision making on use of money and lack of animals were associated with chronic malnutrition (stunting). ARI in children and lack of windows of houses are the most important factors of underweight [25] (Figure 1).



**Figure 1:** Conceptual frame work of malnutrition.

## Justification

Malnutrition is one of the main health problems facing children in under five age group in developing countries.

The prevalence of malnutrition imposes significant costs on the Ethiopian economy as well as society. The high mortality due to malnutrition leads to the loss of the economic potential of the child. It affects children in many ways, predisposing them to different infectious diseases, psychosocial maldevelopment, and cognitive deficiencies.

The prevalence of malnutrition in Ethiopia is relatively well documented, but not specific to the regions, localities and residence so far. It is also vary among regions, localities and residence and limited data is available in study area. Study conduct in other districts is not address the main associated factors of malnutrition.

Therefore, this study was design to assess the prevalence of malnutrition and associated factors among children aged 6-59 months can be used as a reference in priority setting and designing effective nutritional programs at Hidabu Abote district.

## Objective

### General Objective

To assess prevalence of malnutrition and associated factors among children aged 6-59 months at Hidabu Abote district, North shewa, Oromia region, Ethiopia, 2012.

### Specific Objectives

- To determine prevalence of malnutrition among children aged 6-59 months at Hidabu Abote.
- To identify associated factors of malnutrition among children aged 6-59 months at Hidabu Abote.

## Methods

### Study Design

A community based cross-sectional study was conducted to assess the prevalence of malnutrition and associated factors among children aged 6- 59 months.

### Study Area and Period

The study was conducted from September 8-23, 2012 at Hidabu Abote district. Hidabu Abote woreda is one of the 14 woredas of North Shewa Zone of Oromia Regional State and located 34 kms from the zonal capital Fitcha, and 146 from Finfinne. The woreda is divided in to 20 kebeles of which 19 of them are peasant associations acting as rural administrative units and one urban administrative unit with 92,603 total populations, 20,406 HHs and 16,064 under five children [29]. Hidabu Abote woreda has proximity with Dera in north, Wero Jarso in the west, Kuyu in the south and south west and Degem in the north east, east and south east. The total area of the woreda is about 485.84 sq.kms, sharing about 4.05 % of the zonal area.

### Source and Study Population

Source populations were all children aged 6-59 months living in the district and the study populations were children of aged 6-59 months randomly selected and included in the study.

#### Inclusion and exclusion criteria

**Inclusion criteria:** The inclusion criteria of study participants were children aged 6-59 months who live in Hidabu Abote district.

**Exclusion criteria:** The study participants who were seriously ill were not included in the study.

### Sample Size Determination and Sampling Techniques

**Sample size determination:** The sample size was determine using a single proportion formula by using 41.4% of prevalence of stunting in Oromia region (6),95% confidence interval(CI), marginal of error 5 % and 10 % non response rate are added to the total sample size is computed.

A Z-value of 1.96 used at 95% CI and d of 5%. (n= sample size, p= prevalence, d= margin of error).

$$n = Z^2 p(1-p) = (1.96^2 \times 0.414)(1-0.414) = 373$$
$$d^2 0.05^2$$

So with adjustment for non-response (10% contingency) n= (373+37) =410, and again multiplied by design effect 2, the final sampling size was 820 children.

**The sampling technique and procedures:** Multistage sampling technique followed by simple random sampling was used to select children from households. From 19 rural kebeles, six kebeles were selected by simple random sampling (lottery method). Study participants/households/care takers were allocated to selected kebeles by proportionate allocation and from each selected kebeles study participants were selected by simple random sampling (table of random numbers) based on frame existing in health posts (Figure 2).

Formula used to calculate sample size of each selected kebeles:

$n_i = (n \cdot N_i) / N$  where  $n_i$  = sample size of each selected kebeles

$n$  = total sample size

$N_i$  = total number of household in each selected kebeles

$N$  = total number of household in all selected kebeles

### Study Variables

**Dependent variable:** Malnutrition indicated by stunting, wasting and underweight

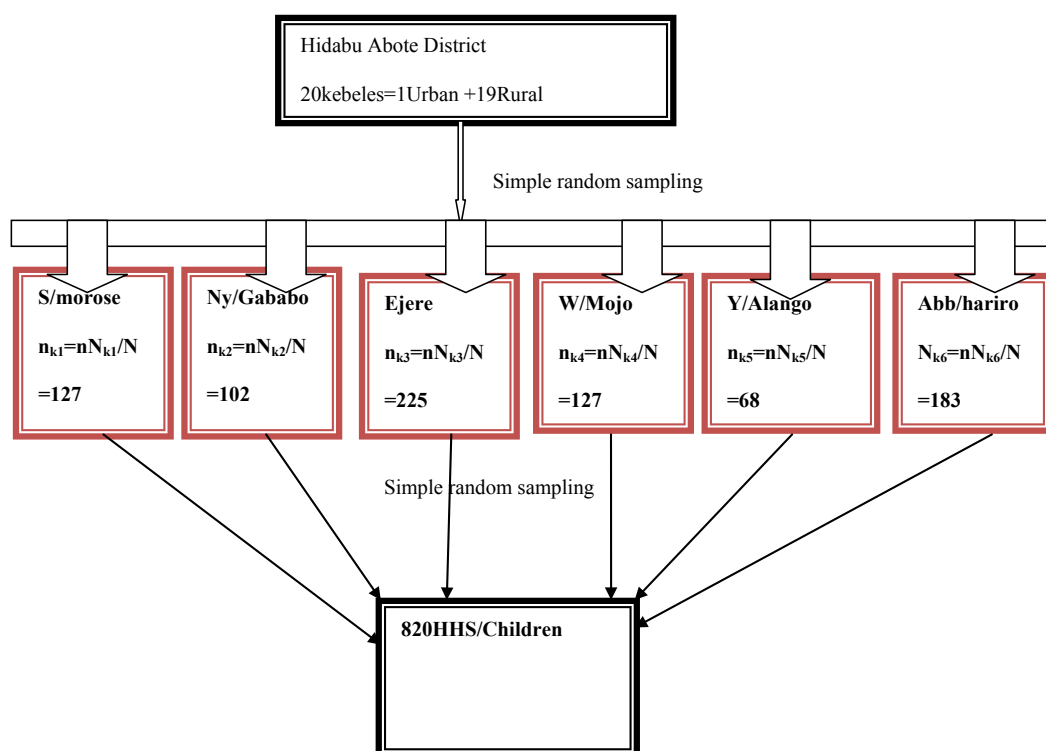
**Independent variables:** Five categories of factors were assessed as independent variables;

- **Socio-economic and demographic variables;** Head of HHs, marital status, ethnicity, religion, family size, income, education, occupation, ownership of livestock and farm land.
- **Child characteristics;** Age, Sex, birth order, place of delivery, gestational age, types of birth, breastfeeding status and morbidly status (fever, measles, diarrhea and ARI).
- **Child caring practices;** Feeding, hygiene, health care seeking and immunization
- **Maternal characteristics;** age, number of children ever born, ANC visits, extra food during pregnancy/lactation, health status during pregnancy, use of extra food during pregnancy or lactation and autonomy in decision-making on use of money.
- **Environmental Health condition;** Water supply, sanitation and housing condition.

### Operational Definitions

**Acute Respiratory Infection (ARI):** A child with cough, fast breathing or difficulty in breathing and fever.





#### Key notes

$n_k$  = number of sample for each kebeles by proportionate allocation

$n$  = Sample size of study/820/

$N_k$  = total number of Household/study participants in each selected kebeles

o (S/morose(828),Ny/gababo(736),Ejere(1616),W/Mojo(913),Y/alango(488),Abb/hariro(1318)).

$N$  = total number of Household/participants in all selected kebeles/5,899/

**Figure 2:** Schematic presentation of sampling procedure.

**Anthropometry:** Measurement of the variation of physical dimensions and the gross composition of the human body at different age levels and degrees of nutrition by weight-for-age, height-for-age and weight-for-height [30].

**Complementary food:** Foods which are required by the child, after six months of age, in addition to sustained breastfeeding.

**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.

**Fever:** A child with elevated body temperature than usual.

**Income:** It is periodical monthly earning from one's business, lands, work, investment etc.

**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 [30].

**Measles:** A child with more than three signs of the following is considered having measles: fever, and skin rash, runny nose or red eyes, and/or mouth infection, or chest infection.

**Stunting:** A child was defined as stunted if the height for age index was found to be below -2 SD of the median of the standard curve. Severe stunting was diagnosed if it was below -3 SD [30].

**Underweight:** Refers to a deficit and is defined as underweight below the -2 SD from the NCHS/WHO reference of the median of the standard curve. A severely underweight was diagnosed if it was below -3 SD [30].

**Wasting:** Nutritional deficient state of recent onset related to sudden food deprivation or mal-absorption utilization of nutrients which results weight loss, weight-for-height below-2SD from the NCHS/WHO median value. Severe wastage was diagnosed if it was below -3 SD [30].

#### Data Collection Procedures

Data were collected using structured questionnaire and anthropometric measurement. Eleven data collectors who were able to communicate in Oromiffa were recruited from health centers and health posts in the district. Training was provided for data collectors and supervisor for two days.

Interview was conducted with mothers/care takers of the children to fill the questionnaire. In HHs with more than one children of age between 6-59 months, one child was selected randomly by lottery method.

**Anthropometric data:** The anthropometric data were collected using the procedure stipulated by the WHO (2006) for taking anthropometric measurements. Before taking anthropometric data for children; their age should first determined in order to ensure the target population. A local event was used to establish the birth period. The

mothers were asked whether the child was born before or after certain major events until a fairly accurate age is pinpointed. If age cannot be determined accurately a height of 65-110 cm was considered as proxy indicators [30].

**Height/length measurement:** Body length of children age up to 23 months was measured without shoes and the height was read to the nearest 0.1cm by using a horizontal wooden length board with the infant in recumbent position. However, height of children 24 months and above was measured using a vertical wooden height board by placing the child on the measuring board, and child standing upright in the middle of board. The child's head, shoulders, buttocks, knees and heels touching the board.

**Weight measurement:** Weight was measured by electronic digital weight scale with minimum/lightly/clothing and no shoes. Calibration was done before weighing every child by setting it to zero. In case of children age below two years, the scale was allowed weighing of very young children through an automatic mother-child adjustment that was eliminated the mother's weight while she standing on the scale with her baby.

Oedema was checked and noted on data sheet because children with oedema were severely malnourished. In order to determine the presence of oedema, normal thumb pressure was applied to the two feet for three seconds whether a shallow print or pint remains on both feet when the thumb is lifted.

To identify retrospective morbidity of children, mothers were asked about any occurrence of illness during the past two weeks. Enumerators probe to confirm nature of illness based on operational case definition and also asked to identify occurrence of measles in the past one year.

Vaccination status of children were checked by observing immunization card and if not available mothers were asked to recall it. BCG vaccination was checked by observing scar on right (also left) arm.

## Data Quality Management

Structured questionnaire was prepared in English and translated into Oromiffa language and retranslated back to English by language experts to increase measurement accuracy and for field work purpose. Pre-test of the questionnaire was done on 5% of sample size in similar area, which was not include in study before the actual data collection to see for the accuracy of responses and to estimate time needed. The scales indicators were checked against zero reading after and before weighing every child. On daily basis collected information was reviewed and possible errors were returned to the collectors for correction.

## Data Processing and Analysis

First the data were checked for completeness and consistency. Then it was coded and entered in the computer using EPI-INFO3.5.1 software and then sex, age, height and weight transferred with HHs number to ENA for SMART 2007 software to convert nutritional data into Z-scores of the indices; H/A, W/H and (W/A) using NCHS reference population standard of WHO. Then, the data were exported to SPSS version 16 for analysis; descriptive summary using frequencies, proportions, graphs and cross tabs was used to present study results.

Analysis was carried out at two. Firstly, a bivariate analysis was performed to determine the association of malnutrition and associated factors. Statistical association was checked by 95% confidence interval and crude odd ratio. Secondly, the significant variables (p-value < 0.2) observed in bivariate analysis were subsequently included in

multivariate analysis. Finally, 95% confidence interval and adjusted odd ratio were checked and the significance variables were taken as associated factors of malnutrition. P-value less than 0.05, 95% CI and odd ratio were considered as statistically significant.

## Ethical Consideration

Ethical clearance was obtained from Ethical Review Board of University of Gondar, College of Medicine and Health sciences, Institute of Public Health and it was also got granted from Oromia Regional Health Bureau, North Shewa Zonal Health Department, Health office of Hidabu Abote district and kebele administration units. Verbal consent from parents/care taker of study subjects was obtained and the objective of the study was explained to them.

Privacy and confidentiality of collected information was ensured at all level. Two sick children and one severely malnourished with problems of shortage foods were referred to nearest health facilities and health/nutritional advice is also given to parents/care taker.

## Dissemination and Utilization of Results

The result of the study was presented to Institute of Public Health, College of Medicine and Health sciences, University of Gondar as part of Masters of Science in Applied Human Nutrition thesis. Although this finding will be shared to Oromia Regional Health Bureau, North Shewa Zonal Health Department, Hidabu Abote district health office and respective kebele administrations as well to all stakeholders working on nutritional interventions for appropriate nutritional intervention strategy. Efforts will be made to present the results on scientific conferences and peer reviewed journal publications will be considered.

## Results

### Demographic and Socio-Economic Characteristics

From the total planned study subjects, complete response was obtained for 820(100%). As indicated in Table 1, 727(88.7%) households were headed by male and 716(87.3%) respondent were married.

Majority of respondents were Oromo ethnic group 806 (98.3%) and 810 (98.8%) were Orthodox. Out of the respondents, 407(50.9%) had average and less than five family size while 403(49.1%) of households have more than five and 635(77.4%) of HHs were had one under five years children.

Concerning educational status 538(65.6%) of mothers and 438(53.4%) of fathers cannot read and write. About 572(69.8%) of mothers and 585(71.3%) fathers were farmer. Although, 618(75.4%) of households earn monthly income of less than 750birr and 709(86.1%) of them were decision making on use of money made both jointly (husband and wife).

Regarding livestock, 562(68.5%) of HHs were had livestock and out of them 40% were had 1-5 and 7.4% were had more than 10 livestock. On the other hand 499(60.9%) of households were had farm land and out of them 344(42%) were had more than 0.5 Hectare.

### Characteristics and Caring Practices of Children

**Child characteristics:** A total of 820 children aged 6-59 months within six kebeles (Sire Morose, Welu Mojo, Nya'a Gababo, Ejere, Yaya Alango and Hariro Abbadho) selected from Hidabu Abote district were included, from the total 410(50.0%) were males and 410(50.0%) were females (Table 2).

Among the total children aged 6-59 months, 77(9.4%),172(21%),184(22.4%), 185(22.6%) and 202(24.6%) children were found in the age groups of 6-11, 12-23, 24-35, 36-47 and 48-59 months, respectively. The mean age of children was 32.1 with SD of 14.9.

From the total children,652(79.5%) of children were delivered at home and 168(20.5%) children were delivered at health facilities. Out of the children were delivered at health facilities and home,33(4%) ,549(67%) and 238(29%) of children were born less than nine months,

at nine months and greater than nine months, respectively. Out of these 23(2.8%) of children were twin.

Regarding breastfeeding status,484(59%) of children were still breast feeding at the time of survey and others not breastfeeding due to refusal of children, maternal pregnancy, maternal health problems and lack of milk by mothers.

As indicated table 2 about the prevalence of common childhood illness, out of the 820 children,212(25.9%) of children had diarrhea in last two weeks before study conducted. Out of children who had

Characteristics		Frequency	Percent
Head of HHs	Male	727	88.7
	Female	93	11.3
Marital status	Married	716	87.3
	Divorced	65	7.9
	Others <sup>a</sup>	36	4.8
Ethnicity	Oromo	806	98.3
	Amhara	14	1.7
Religion	Orthodox	810	98.8
	Others <sup>b</sup>	10	1.2
Family size	≤5	417	50.9
	>5	403	49.1
HHs with under 5yrs children	1	635	77.4
	2-3	185	22.6
Maternal Education	Can't read and write	538	65.6
	Can read and write(Informal education)	16	2.0
	Primary education	215	26.2
	Secondary education	21	2.6
	Higher education	30	3.7
Paternal education	Can't read and write	438	53.4
	Can read and write	37	4.5
	Primary education	270	32.9
	Secondary education	26	3.2
	Higher education	49	6.0
Occupation of mother	Housewife only	59	7.2
	Farmer	572	69.8
	Merchant/Trade	111	13.5
	Others <sup>c</sup>	78	9.5
Occupation of husband	Farmer	585	71.3
	Gov't employee	60	7.3
	Merchant/Trade	101	12.3
	Others <sup>d</sup>	74	9.0
Monthly income(In Birr)	<750	618	75.4
	750-1500	163	19.9
	>1500	39	4.8
Decision making on use of money	Mainly spouse	91	11.1
	Mainly Husband	14	1.7
	Only husband	9	1.1
	Both jointly	709	86.1
Ownership of livestock	Yes	562	68.5
	No	258	31.5
Livestock per household	1-5	328	40.0
	6-10	173	21.1
	>10	61	7.4
Ownership of land	Yes	499	60.9
	No	321	39.1
Land by hectare per HH	≤0.5Hectare	155	18.9
	>0.5Hectare	344	42

<sup>a</sup>Widowed, Separated <sup>b</sup>Muslim, protestant <sup>c</sup>Private org.employee, gov't employee, student, <sup>d</sup>Private employee , Daily laborer, student

**Table 1:** Demographic and socio-economic characteristics of children families at Hidabu Abote district, North shewa zone, September 2012(N=820).

Characteristics	Frequency	Percent
<b>Child sex</b>		
Male	410	50.0
Female	410	50.0
<b>Child age(In months)</b>		
6-11	77	9.4
12-23	172	21.0
24-35	184	22.4
36-47	185	22.6
48-59	202	24.6
<b>Place of delivery</b>		
Home	652	79.5
Health facility	168	20.5
<b>Gestational Age at birth</b>		
Less than 9 months	33	4.0
At 9 months	549	67.0
Greater than 9 months	238	29.0
<b>Types of birth</b>		
Single	797	97.2
Twin	23	2.8
<b>Still breastfeed child</b>		
Yes	484	59.0
No	336	41.0
<b>Reason for not feed breast(n=336)</b>		
Maternal health problems	45	5.5
Refusal of child	212	25.9
Maternal pregnancy	79	9.6
<b>Diarrhea</b>		
Yes	212	25.9
No	608	74.1
<b>Frequency of diarrhea per year</b>		
1 episode	40	4.9
2 episode	50	6.1
3-4episode	102	12.4
≥5episode	20	2.4
<b>Fever</b>		
Yes	55	6.7
No	765	93.3
<b>ARI</b>		
Yes	48	5.9
No	772	94.1
<b>Measles</b>		
Yes	19	2.3
No	801	97.7

**Table 2:** Characteristics of children age 6-59 months at Hidabu Abote District, North shewa zone, Oromia, September 2012(n=820).

diarrhea, 102(12.4%) of children had 3 to 4 episode of diarrhea per year and 23(2.8%) had five or more than episodes per a year. Also, 55(6.5%), 48(5.9%) and 19(2.3%) of children had fever, ARI and measles, respectively.

**Characteristics of child caring practices:** As indicated in table 3, from the total of children, 546(66.6%) of children were initiated breastfeeding practice immediately after birth. In addition to initiation of breastfeeding practice, 372(45.4%) children were received pre-lactation of food or fluids like Butter 247 (30.1%) and sugar with water 125(15.2%). 770(93.9%) children were exclusively breastfeed until six months.

About 453(48.7%) of children started complementary feeding at the age of 6 months. However, 31(3.8%) of children not started complementary feeding in addition to breastfeeding last 48hrs before

survey but others were started additional food and out of them 227(27.7%) were feeding three times per day.

Regarding methods of feeding, majority of children who were started complementary feeding were used by cup 230(28%) and 95.6.0% of care giver/mothers were washed their feeding materials of children immediately after feeding.

Concerning immunization status and vitamin A supplementation, 785(95.7%) of children were immunized and 766(93.3%) of children were supplemented with vitamin A. However, only 35(4.3%) and 54(6.6%) children were neither immunized and nor supplemented with vitamin A.

### Maternal Characteristics

As showed Table 4, mean ( $\pm$  SD) age of mothers were 28.9( $\pm$  6SD) years and mean age of first and youngest children birth were 18.4( $\pm$  3.2SD) and 26.1( $\pm$  5.9SD), respectively. Majority 459 (56.0%) of mothers were in age group between 20-29 years. About 512(62.4%) of mothers gave first children birth below 18years of age.

Characteristics	Frequency	Percent
<b>Initiation of breastfeeding of child</b>		
Immediately	546	66.6
After 1 to 24 hrs	22	2.7
After a day	252	30.7
<b>Child received pre-lactation food/fluid</b>		
Yes	372	45.4
No	448	54.6
<b>Pre-lactation food/fluids kind</b>		
Water with sugar	102	12.4
Butter	270	32.9
<b>Age complementary feeding started(In months)</b>		
1-2	4	0.5
4-5	17	2.1
6	399	48.7
7-12	33	4.0
<b>Complementary food last 48hrs in addition to BF</b>		
Yes	453	55.2
No	31	3.8
<b>Frequency of feeding/day</b>		
<3times	74	9.0
3times	227	27.7
>3times	152	18.5
<b>Method of feeding</b>		
Bottle	8	1.0
Cup	230	28.0
Spoon	187	22.8
Hand	28	3.4
<b>EBF child( In months)</b>		
1-3	11	1.3
4-5	27	3.3
6	770	93.9
7-12	12	1.5
<b>Immunization</b>		
Yes	785	95.7
No	35	4.3
<b>Vitamin A supplementation</b>		
Yes	766	93.4
No	54	6.6

**Table 3:** Characteristics of caring practice of children age 6-59 months of Hidabu Abote district, North shewa zone, Oromia, September 2012(n=820).



Almost 630(77%) of mothers did not take extra food during pregnancy or lactation. About 685(84) %of mothers visited health facilities for ANC during pregnancy of study subjects. Regarding the use of family planning, 672(82%) mothers were used family planning and such Depo-Provera633 (77.2%) were used by majority of the mothers.

### Environmental Health Characteristics of Households

The main sources of drinking water used by households, 533(65%) public tap and unprotected spring water 232(28.3%). River and protected spring water also sources of drinking water (Figure 3).

Almost 722 (88%) of households require greater than 30 minutes fetching water from these sources (Table 5). Water used per house per day, 412(50.2%) HHs were used less than 40 liters and 352(42.9%) were used 40-60 liter per day (Table 5).

With regarding to treating drinking water in households, majority of HHs (594)72.4%were treat water to make it safe to drink. Concerning about toilet facilities, Majority of households 598(73%) had latrine. In this study district, wooden slap of latrine is the most commonly being utilized and almost all households were wash hand after toilet, especially by using soap 669(82%).Regarding waste disposal system, 305(37%) and 278(34%) households were dispose garbage in a pit and open field, respectively.

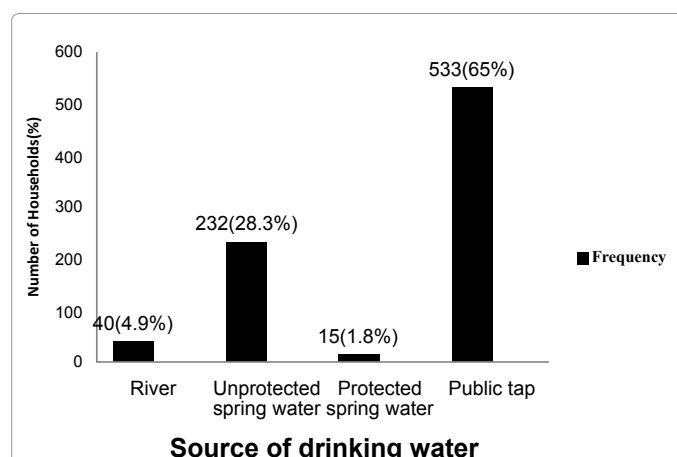
### Prevalence of Malnutrition Among Children Aged 6-59 Months

The overall prevalence of malnutrition of children among aged 6 -

Characteristics	Frequency	Percent
<b>Age of mother(years)</b>		
15-19	22	2.7
20-29	459	56.0
30-39	291	35.5
40-49	48	5.9
<b>Age at first birth(years)</b>		
<15	4	0.5
15-19.8	110	13.4
20-29.8	512	62.4
30-39.5	167	20.4
40-49	27	3.3
<b>Total child born before</b>		
No	151	18.4
1-3	419	51.1
4-6	214	26.1
>7	36	4.4
<b>Extra food during pregnancy/lactation</b>		
Yes	190	23.2
No	630	76.8
<b>Visit health facility for ANC</b>		
Yes	685	83.5
No	135	16.5
<b>Family planning used<sup>b</sup></b>		
Yes	685	82.0
No	71	8.7
<b>Types of family planning used</b>		
Pills	27	3.3
Depo-Provera	633	77.2
Others <sup>a</sup>	12	1.5

<sup>a</sup>=Norplant, condom and calendar methods

**Table 4:** Maternal characteristics of Hidabu Abote district, North shewa zone, Oromia, September 2012(n=820).



**Figure 3:** Main source of drinking water of households at Hidabu Abote district, North Shewa, Oromia, September 2012.

Characteristics	Frequency	Percent
<b>Water used in HH per day by liters</b>		
<40	412	50.2
40-80	352	42.9
>80	56	6.8
<b>Time to obtain drinking water (round trip)</b>		
<15minutes	587	71.6
15-30minutes	201	24.5
>30minutes	32	3.9
<b>HHs treat water by any means<sup>R</sup></b>		
Yes	594	72.4
No	226	27.6
<b>Availability of latrine</b>		
Yes	598	72.9
No	222	27.1
<b>Materials used to wash hands after toilet</b>		
Using water only	50	6.1
Using soap sometimes	669	81.6
Using soap always	101	12.3
<b>Method of disposal of HHs waste</b>		
Open field disposal	278	33.9
In a pit	305	37.7
Common pit	19	2.3
Composing	211	25.7
Burning	7	0.9

**Note:** <sup>R</sup> boiling, bleaching, straiting with cloth

**Table 5:** Environmental Health characteristics of household of Hidabu Abote district, North shewa zone, Oromia, September 2012(n=820).

59 months in study area were 47.6 % stunted, 30.9 % were underweight and 16.8 % were wasted. The highest prevalence of malnutrition children aged 6-59 months were seen in male (Figure 4).

Compared with age groups, the highest prevalence of stunting was children age 24-35 months followed by children aged 12-23 month. However, the lowest prevalence of stunting was seen in children aged 6-11 months as indicated below (Figure 5).

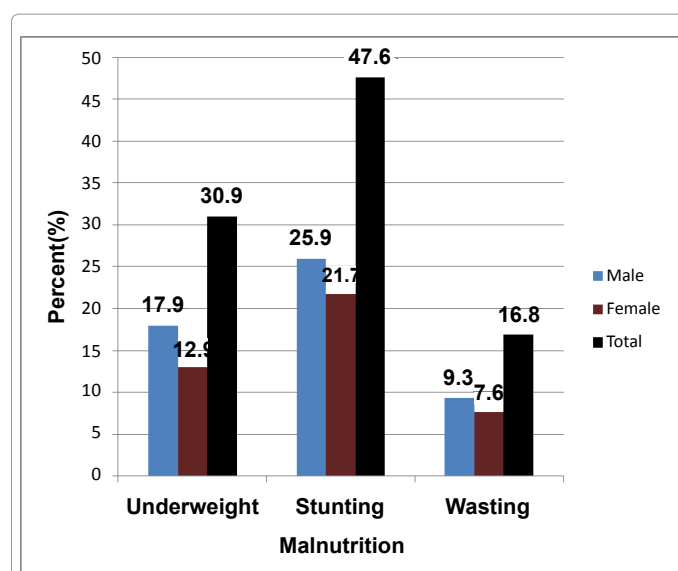
As indicated in figure 6, the highest prevalence of underweight was seen children aged 48-59months with prevalence of 8%.However, the lowest prevalence of underweight seen children aged 6-11 months with prevalence of 1.7%.

The highest prevalence of wasting was seen children aged 48-59 months at Hidabu Abote district with 5%prevalence.The lowest prevalence of wasting was seen in children aged 6-11 months (Figure 7).

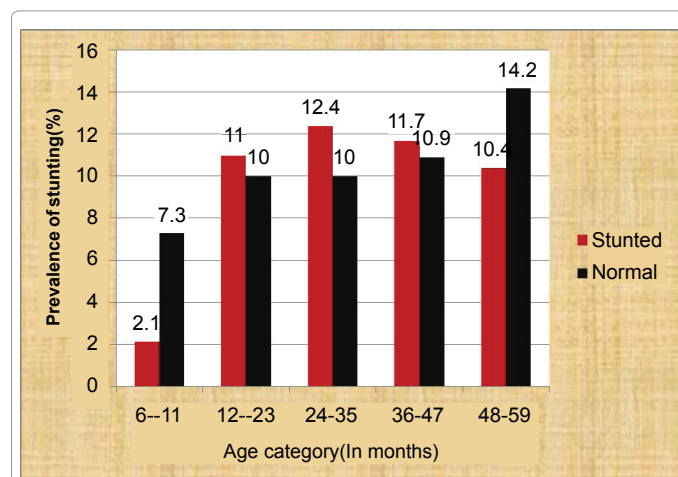
### Factors Associated with Malnutrition of Children

**Associated factors of stunting:** Based on the multivariate regression analysis of this study, child age, family monthly income, mothers those used family planning and children who were received butter pre-lacteal were significantly associated chronic malnutrition (stunting). Children age group 13-24 months were about 7 times more likely to be stunted than children age 6-11 months(AOR=7.15; 95%CI=2.33,21.90) (Table 6).

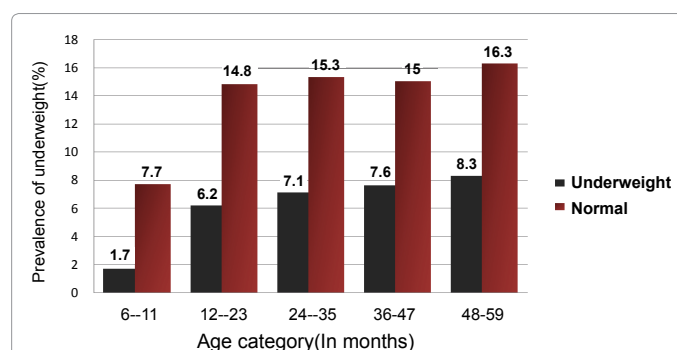
Another association found in this study result, children those family monthly income 750-1000birr were less likely to be stunted than children whose family monthly income were less than 750 birr (AOR=0.24; 95%CI=0.11, 0.51).



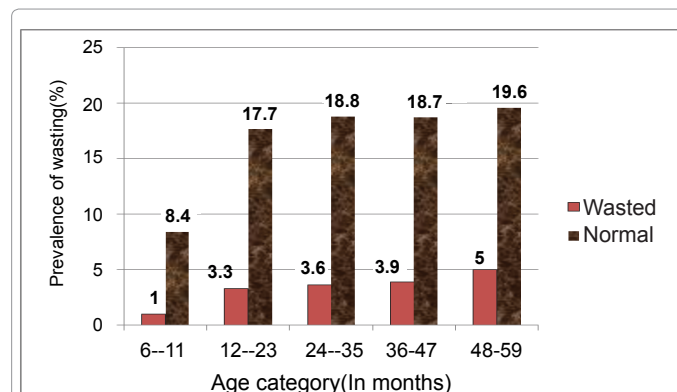
**Figure 4:** Distribution of malnutrition among children aged 6-59 months by sex at Hidabu Abote district, North Shewa, Oromia, September 2012.



**Figure 5:** Prevalence of stunting by age among children aged 6-59 months at Hidabu Abote District, North Shewa, Oromia, September 2012.



**Figure 6:** Prevalence of underweight by age among children aged 6-59 months at Hidabu Abote district, North Shewa, Oromia, September 2012.



**Figure 7:** Prevalence of wasting by age among children aged 6-59 months at Hidabu Abote, North Shewa, Oromia, September 2012.

This study result also revealed that, children whose mothers were not used family planning were found 2.54 times more likely to be stunted as compared to children whose mothers were used family planning at district(AOR=2.54; 95%CI=1.12,5.77).

Regarding the association of pre-lacteal feeding with stunting, children who were fed butter as pre-lacteal feeding were about 3 times more likely to be stunted compared to children who received water with sugar by their mothers/care taker (AOR=3.102;95%CI=1.82,5.31).

Unlike others study, this result showed that, sex of child, family size, and maternal education status, ownership of farm land, diarrhea and time to obtain drinking water (round trip) were not statically associated with stunting by multivariate analysis.

**Associated factors of underweight:** As indicated Table 7, total number of under five were living in HHs and Kind of floods/fluids children were received as pre-lacteal feeding were significantly associated with underweight in final multivariate analysis.

Analysis of this study showed that, children comes from those family had three under five children in HHs were about 4.5 times more likely underweight as compared to those children were come from family had one under five children (AOR=4.52;95%CI=1.01,20.23). Although this result reveled that, children who received butter as pre-lacteal feeding were about 2 times more likely underweight as compared to those were received water with sugar as per-lacteal feeding (AOR=1.94;95%CI=1.38,3.31) (Table 7).

**Associated factors of wasting:** Table 8 show that, treatment of water at HHs level was the only variable significantly associated with

malnutrition as measured by wasting. Children who were from those family not treat water by any means (boiling, straining, bleaching) 2.4 times more likely wasted as compared to children who were from those family treat drinking water obtained from river and unprotected spring water (AOR=2.42;95% CI=1.34,4.35).

## Discussion

The prevalence of stunting, underweight and wasting were about 47.6 %), 30.9% and 16.8 %, respectively. The result of this study revealed that, the prevalence of stunting and wasting were higher as compared with a community cross-sectional study conducted in rural kebeles of Haramaya district, 42.2% stunted and 14.1% were wasted [25].

Although present study result showed that the prevalence of malnutrition of children aged 6-59 months higher than a study conducted in Gimbi district, Oromia region on 490 children, 32.4%stunting, 23.5%underweight and 15.9%wasting [24].

Finding of this study also revealed that, the prevalence of stunting

very high as compared to study conducted on 446 pre-school children aged 0-59 months at Gumbrit, with 24% prevalence of stunting. However, the prevalence of underweight and wasting were relatively similar, 28.5% and 17.7% of children were underweight and wasted, respectively [19].The prevalence of wasting was higher in study district, indicating a serious health problem at the time of data collection as like study conducted on pre-school children of Gumbrit. This might be difference due to study period, study area, age difference of study subject and sample size. In this study, data was collected in September when most rural areas have shortage of food; this could probably one of the reasons for high prevalence of wasting in the area.

Even though the prevalence of underweight very high in this district but lower than study conducted on food Surplus region of Ethiopia in case of West Gojam zone with 49.2% of children under five were affected by underweight. However, present study showed that prevalence of stunting and wasting were higher as compared with study of west Gojam zone [21]. This may be varies due to socioeconomic, sample size, study subjects and periods as compared with present study.

Explanatory variables	Stunting		COR(95%CI)	AOR (95%CI)
	Yes	No		
Child sex				
Male	212	198	1	
Female	178	232	0.717 (0.544-0.943)*	
Child Age(In months)				
6-11	17	60	1	1
12-23	90	82	3.874 (2.092-7.173)***	7.151(2.335-21.902)**
24-35	102	82	4.390 (2.381-8.096)***	6.408(2.137-19.217)**
36-47	96	89	3.807 (2.067-7.013)***	3.144(1.081-9.146)*
48-59	85	117	2.564 (1.398-4.703)	2.803(0.998-7.877)*
Educational status of mother's				
Cannot read and write	275	263	1	
Can read and write	6	10	0.574(0.206-1.601)	
Primary education	92	123	0.715(0.520-0.984)	
secondary education	10	11	0.869 (0.363-2.081)	
Higher education	7	23	0.291 (0.123-0.690)**	
Family monthly income(In birr)				
<750	330	288	1	1
750-1000	42	72	0.509(0.337-0.769)**	0.236(0.110-0.506)***
>1000	18	70	0.224(0.131-0.386)***	0.133(0.033-0.543)**
Ownership of farm land				
Yes	222	274	1	
No	168	156	1.329 (1.004-1.760)*	
Gestational age				
less than 9 months	21	12	1	
At 9 months	274	275	0.569 (0.275-1.180)	
Greater than 9 months	95	143	0.380 (0.178-0.808)**	
Use of family planning				
Yes	311	361	1	1
No	39	32	1.415(0.865-2.2.313)	2.543(1.121-5.767)*
Pre-lactation Foods/fluids				
Water with sugar	45	80	1	1
Butter	139	108	2.288 (1.469-3.565)***	3.102 (1.815-5.305)***
Time to obtain drinking water (round trip)				
<15minutes	296	291	1	
15-30minutes	83	118	0.692(0.500-0.956)*	
>30minutes	11	21	0.515(0.244-1.087)	

Note \* = p<0.05, \*\* =P<0.01, \*\*\*=P<0.001  
Backward LR Used in multivariate analysis

**Table 6:** Bivariate and multivariate analysis showing impact of selected independent variables on stunting among children age 6-59 months at Hidabu Abote district, North Shewa, Oromia, September 2012(n=820).

Explanatory variables	Underweight		COR 95% CI	AOR 95% CI
	Yes	No		
Child sex				
Male	147	263	1	
Female	106	304	0.624(0.462-0.842)*	
Total under five children in HHs				
1	186	449	1	1
2	61	106	1.389(0.971-1.988)	1.871(1.048-3.39)
3	6	12	1.207(0.446-4.264)	4.517(1.008-20.233)*
Occupational status of father				
Farmer	176	409	1	
Gov't employee	12	48	0.581(0.301-1.120)	
Merchant/Trade	30	71	0.982(0.619-1.558)	
Others	35	39	2.086(1.278-3.402)*	
Ownership of livestock's				
Yes	159	403	1	
No	94	164	1.453(1.062-1.987)*	
Place of delivery				
Home	213	439	1	
Health facility	40	128	0.644(0.436-0.952)*	
Kinds of foods/fluids as pre-lacteal				
Water with sugar	24	101	1	1
Butter	84	163	2.169(1.23-3.637)**	1.941(1.138-3.310)*
Treat drinking water in home by any means				
Yes	168	426	1	
No	85	141	1.529(1.107-2.111)*	
Availability of latrine				
Yes	170	428	1	
No	83	139	1.503(1.086-2.080)*	

Note, \*\*\*p<0.001, \*\*p<0.01, \*p<0.05 Backward LR used in multivariate analysis

**Table 7:** Bivariate and multivariate analysis showing impact of selected independent variables on Underweight among children age 6-59 months at Hidabu Abote district, North Shewa, Oromia, September 2012(n=820).

Explanatory variables	Wasting		COR 95% CI	AOR 95% CI
	Yes	No		
Child sex				
Male	76	334	1	
Female	62	348	0.783(0.542-1.131)	
Ownership of livestock				
Yes	85	477	1	
No	53	205	1.451(0.992-2.122)	
Immunization				
Yes	129	656	1	
No	9	26	1.760(0.806-3.844)	
Presence of Fever				
Yes	14	41	1	
No	124	641	0.567(0.300-1.071)	
Initiation of breastfeeding				
Immediate after birth	81	465	1	
After 1 to 24 hrs	2	20	0.574(0.132-2.503)	
After a day	55	197	1.603(1.095-2.346)*	
Kinds of foods/fluids as pre-lacteal feeding				
Water with sugar	14	111	1	
Butter	51	196	2.063(1.093-3.3.895)*	
Treatment of drinking water by any means <sup>a</sup>				
Yes	81	513	1	1
No	57	169	2.136(1.460-3.126)***	2.416(1.343-4.347)**
Available of latrine				
Yes	91	507	1	
No	47	175	1.496(1.011-2.214)*	

Note \*\*\*p<0.001, \*\*p<0.01, \*p<0.05 <sup>a</sup> =boiling, bleaching, Straining with cloth  
Backward LR used in multivariate analysis

**Table 8:** Bivariate and multivariate analysis showing impact of selected independent variables on wasting among children age 6-59 months at Hidabu Abote district, North Shewa, Oromia, September 2012(n=820).

Prevalence of malnutrition also higher than cross-section study conducted on Beta-Israel children in Amhara region, 37.2%, 14.6% and 4.9% of children age 0-59 months were stunted, underweight and wasted, respectively [20]. The prevalence of malnutrition increased as age increases.

As showed in this study result, the prevalence of malnutrition among children age 6-59 months were also higher than EDHS 2011 National report, 44% stunted, 29% underweight and 10 % wasted. Also this study result revealed that, prevalence of malnutrition higher than that of Oromia regional state reported in the national, 41.4% stunting, 26% underweight and 9.7% wasting [6].

Prevalence of stunting higher but prevalence of underweight was low as compared to study done in Bangladesh, 42% and 40% of children were stunted and underweight, respectively [13]. Although the prevalence of malnutrition higher in this finding as compared to study conducted in Mongolia, the prevalence of stunting, wasting and underweight were 15.6%, 1.7% and 4.7%, respectively [14]. This might be difference also due to study period, socioeconomic characteristics, health service delivery, study area and age difference.

The prevalence wasting in this study was low as compared to study conducted in Southern Sudan; approximately one out of every five children (22%) suffers wasting. Study conducted in a decertified area of Sudan - Alrawakeeb valley, 27.5% were severely malnourished and 35% suffered from either mild or moderate malnutrition [16,17]. This may be difference also probable due study period, study area, socioeconomic characteristic, health service delivery, and geographical characteristics of study area.

Result also revealed that prevalence of malnutrition higher than a cross-sectional comparative study conducted in Belahara VDC of Dhankuta district in Nepal located in South Asia, the prevalence of underweight, stunting and wasting was 27%, 37% and 11, respectively [15].

Regarding associated factors of malnutrition, analysis of this study indicated child age, family monthly income, use of family planning were found to be significantly associated with Stunting.

Present finding revealed that, family monthly income strongly negative association with stunting. This result was consistent with study conducted rural community in rural kebeles of Haramaya district [25]. As the family income was increased, the level of chronic malnutrition among children aged 6-59 months also decreased as like other studies in developing countries and here in Ethiopia [15,17,25]. Present study indicate that children from whose family monthly income 750-1000birr were less likely affected by stunting as compared to children those family monthly income less than 750birr (AOR=0.24; 95%CI=0.11, 0.51).

Family/household income was significantly associated with nutritional status of the under five children. Children belonging to the low-income group were at a higher risk of being wasted, underweight and stunted than children of better income families. Although the economic differentials seem to be silent in rural society it appears to be an important predictor of childhood nutritional status. Low income levels of developing nation limits the kinds and the amounts of food available for consumption. Low income also increases the likelihood of infection through such mechanisms as inadequate personal and environmental hygiene [19].

The present findings also showed that, children aged 12-23 months were 7 times more likely affected by stunting as compared

to children were aged 6-11 months. This result consistent with other studies conducted in Ethiopia and other developing countries, which showed the prevalence of stunting positively associated with child age [14,20,21,22]. As result indicated on descriptive, the prevalence of Child malnutrition increased with age. It appears that both chronic and acute child malnutrition, develop during the weaning period and rise sharply thereafter. The national EDH 2011 national also indicated that, the prevalence of stunting increases as the age of child increases consistent [6]. The prevalence of diseases and stunting rises with age [31].

Although this study showed that, children were received butter as pre-lacteal feeding was positively associated with the occurrences of stunting and underweight. Children who were received butter as pre-lacteal feeding 3 times more likely affected by stunting as compared to those who were received water with sugar [AOR=3.102; 95%CI=1.815, 5.305]. Children who were received butter were about 2 times more likely to be underweight as compared to children who were received sugar with water [AOR=1.94; 95%CI=1.14, 3.31]. Study conducted at western Gojam Zone revealed that, higher proportion of children who were received pre-lacteal feeding (48.3%) were stunted as compared to children who were not given fed pre-lacteal feeding by their mothers or care takers [21]. Another study conducted in Northern part of Tigray region revealed that, the commonly used pre-lacteal foods were butter (46.7%), sugar dissolved in water (15.1%) and plain water (14.5%) [22]. However, in present study indicated on descriptive parts, 372(45.4%) children were received pre-lacteal feeding. According to EDHS 2011 national report, nearly three children in every ten (27 percent) are given pre-lacteal feeds within the first three days of life. The practice of giving pre-lacteal feeds is discouraged because it limits the infant's frequency of suckling and exposes the baby to the risk of infection and malnutrition [6].

The present study also showed that, children whose mother were not using family planning were about 2.5 times more likely to be stunted as compared to those who were used family planning (AOR=2.54 95%CI=1.121, 5.767). Even though birth interval was not included in study as independent variables, family planning was used for birth spacing. This indicated that children born from mother who had been using birth spacing were less likely affected by stunting.

According to this study finding, having more under five children in households and children were received butter as pre-lacteal feeding immediately after birth were significantly associated with underweight.

As indicated in this study result, children were from those family had three under five children were about 4.5 times more likely affected by underweight as compared to those from family had one under five children [AOR=4.52; 95%CI=1.01, 20.33]. This study similar with study conducted in an urban slum of Ludhiana showed that, the prevalence of underweight was found to be significantly higher in those with more siblings. Those with no siblings, had the lowest proportion of underweight children (12.8%), higher in those with 1-2 siblings (30.6%) and highest (51.7%) in those with more than three siblings [31]. The prevalence of underweight found to be increasing as the number of sibling increasing because of having more children below five years of age might be more difficulty in caring for children.

Present study showed that, children from family not treat their drinking water by boiling, straining through cloth and bleaching/ chlorine were more likely affected by wasting as compared to children were from family treat their drinking water. This finding similar to study conducted western Kenya showed that, more children who drank water that was not consistently treated in households were



wasted [32]. An overwhelming majority, nine households in every ten, do not treat their drinking water. Rural households are not use an appropriate treatment method to ensure that water is safe for drinking as compared to urban [6]. Therefore, diarrhea and water born diseases caused by unsafe drinking water at households' level might be increase the prevalence of malnutrition directly or indirectly.

Education is one of the most important resources that enable women to provide appropriate care for their children. Education of women is believed to exert an impact on health and nutritional status of children since it provides the mother with the necessary skills for child care, increase awareness of nutritional needs and preference of modern health facilities as well as change of traditional beliefs about diseases causation, and use of contraceptives for birth spacing [27]. In this study result, majority of mothers or care takers were can't read and write but significance association was not found with prevalence of malnutrition.

### Limitation of Study

- The prevalence of wasting during the present study was very high as compared to others study. This might be due to difficulty of entertaining the seasonal variation, because study was conducted during summer season when the shortages of foods happen at community level.
- Others significant independent variables did not included like birth interval, weight at birth, MBI.
- Recall bias

### Conclusions and Recommendations

#### Conclusions

This study revealed that, prevalence of malnutrition was high and it was the top list among the health problems in Hidabu Abote district. The prevalence statistics in this study area were higher than the regional and national figures found from Ethiopian Demographic Health Survey 2011 national reports.

According to investigation of independent variables with dependent variables in multivariate analysis, child age, family monthly income, kinds of pre-lacteal feeding and family planning were significance association with chronic malnutrition. However, having more under five children in household and children were received butter as per-lacteal feeding were associated with underweight. Households not treat their drinking water was the only variables associated with wasting among children were aged 6-59 months in district.

#### Recommendations

- Community based nutrition program should be established to tackle the problem of malnutrition at community level depending on the severity of malnutrition identified in this study.
- Nutrition education by health extension works should be strengthening to improving the feeding practice of parents on appropriate children feeding.
- Continued attention should mandatory to infant exclusive breast feeding practices till 6 months is important to avoid traditionally giving butter as pre-lacteal feeding by rural community.
- Woreda health office should be collaborated with others sectors and stake holders to improve access of water supply.

- Households should be treat drinking water which obtained from unprotected spring water and river by boiling, bleaching and strained through cloth
- Woreda administration should strengthen and established income generation active and saving at households like credit and saving process with collaborate of stake holders to improve family income.
- Use of family planning should be encourage at community level
- Further study should be done to see other an explored associated factors that were not included in the present study.
- Nutrition surveillance needs to be done continuously and special attention should be given to vulnerable groups such as poorest and the most severely malnourished children.

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