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Under-nutrition and Related Factors among Children Aged 6-59 Months in Gida Ayana District, Oromiya Region, West Ethiopia: a Community Based Quantitative Study

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Abstract

Background: Under-nutrition is the most known significant public health problems in developing countries of the world including Ethiopia that cause a shocking effect on children under five years of age. However, the extent of the problem and its several risk factors were not uniformly addressed enough across the various corner of the country. Thus, the objective of this study was to estimate the extent of under-nutritional status and to identify factors related to under-nutrition among children aged 6-59 months in Gida Ayana district, West Ethiopia.

Method: A community based cross sectional study was conducted in August/September, 2015. A total of 588 children aged 6-59 months with their respective mothers/caregivers/were used for this study. Weight, height and Mid-upper Arm Circumference (MUAC) were measured using instruments that are recommended by UNICEF (United Nations Children's Fund) and data regarding socioeconomic, demographic, child and maternal characteristics were collected using a pretested structured questionnaire through interview. Statistical Package for Social Sciences (SPSS) software version 20.0 was used to perform descriptive statistics as well as to perform bivariate and multivariate logistic regression analysis to identify factors related to under-nutritional status of children. World Health Organization (WHO) Anthro 2007 software version 1.0.4 was used to analyze anthropometric indices.

Results: The overall prevalence of stunting, wasting, and underweight were 40.5%, 10.9% and 19.2% respectively. In addition, prevalence of severe stunting; wasting and underweight were 13.4%, 2.9% and 4.6% respectively. Wasting was significantly higher in male children, 24-35 months aged children, House Holds (HHs) of illiterate fathers and HHs with lack of access to safe drinking water. Stunting were significantly higher in male children, children aged 36-59 months, HHs with lack of ownership of farm animals, children with diarrhea, children with fever and HHs with low monthly income. In addition, male children, urban children, children aged 24 months and above, HHs having more than one under five children and diarrhea were the factors that showed significant association with underweight.

Conclusion: The prevalence of wasting and stunting among under five children were high confirming nutritional situation in the study area is serious. Wasting, stunting and underweight were significantly higher among boys than girls. In addition; child age, residence, parent's formal education status, visiting antenatal clinic, and diarrhea becomes the main risk factors that contribute for the occurrence of at least two forms of under-nutritional status of children in the study area. Thus, efforts should be made to improve sources of drinking water and parental education, to prevent and control childhood illness, to implement child's age, residence and sex specific interventions as well as to establish therapeutic and supplementary feeding programs.

Keywords: Ethiopia; Gida Ayana; Under five children; Under-nutritional status; Underweight; Wasting; Stunting

Introduction

Under-nutrition is a pathological condition brought about by the inadequate intake of one or more of the essential nutrients necessary for survival, growth and reproduction [1]. It is the most known significant public health problems worldwide which becomes the underlying cause of 45% of deaths in children below 5 years of age [2,3]. In Sub-Saharan Africa, it is estimated that 4.8 million children die each year before reaching age of 5 years due to underling potentiating effect of under-nutrition on common infectious diseases, such as pneumonia and diarrhea [4]. Similarly in Ethiopia about 17% will die each year before reaching their fifth birthday due to underlying effect on common infectious diseases [5]. Other impacts of under-nutrition on children includes: retarding growth, diminish the immune system and enhancing susceptibility to infections, impaired mental development, and further enhancing the chance of under-nutrition [6]. It has also an impact on learning ability and productivity, thereby affecting the economic growth of the country.

There are various epidemiological studies done in different regions that showed the extent of the problem and associated risk factors. Reports from 2011 joint UNICEF-WHO-World Bank malnutrition estimation rate showed the prevalence of stunting and underweight in least developed countries (LDCs) was 38% and 23% respectively [7]. Contemporaneously other study found the prevalence of stunting and underweight among under five children in sub-Saharan Africa were 38% and 28% respectively [8]. In Ethiopia, according to Ethiopia Mini

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Demographic and Health Survey (EMDHS), 2014 40% of under five children were stunted, 10% wasted and 25% underweight. Similarly in Oromia regional state, 38.2% of under five children are stunted, and 18.6% severely stunted, 22.7% of them underweight with 7% severe underweight and 7.1% of the under five children are wasted, and 1.7% severely wasted [9]. A study done in Kombolcha District of Eastern Hararghe, Ethiopia found that 45.8%, 28.9% and 11.2% of under five children were stunted, underweight and wasted respectively [10]. A study conducted in Dollo Ado district, Somali region, Ethiopia among children aged 6-59 months found that 42.3%, 34.4% and 47.7% of the children were wasted, stunted and underweight respectively [11]. A study conducted in Gumbrit, North West Ethiopia among preschool children found that 28.5%, 24% and 17.7% of the children were underweight, stunted and wasted respectively [12]. A cross sectional study conducted in Mecha and Wenberma Woreda of West Gojjam, Northern Ethiopia found that 43.2%, 14.8% and 49.2 of the children under age five were suffering from stunting, wasting and underweight respectively [13]. Up to the researchers knowledge there is no previous study conducted on under-nutrition and related factors among under five children in the selected study area that reveal the magnitude of the problem and factors leading to the problem. Thus, the objective of this study was to determine the prevalence of under-nutrition and related factors among children aged 6-59 months in Gida Ayana district, Oromiya region, West Ethiopia from August 11 to September 11, 2015. Hence, the results of this study will help to know the magnitude and related contributing factors of the problem. This will provide baseline data about nutritional status and health condition of the study target groups, where other related issue will relay on. Moreover, it could add knowledge to the existing evidences about these problems. Lastly, knowing the extent of the problem and identifying the risk factors related with nutritional status of under five children in the study area will enable to guide public health planners and policy makers in determining priorities, in designing appropriate and effective nutritional intervention programs to address the problem and its associated consequences.

Methods and Materials

Study design, study area and study period

A community based cross sectional study was conducted in Gida Ayana district, East Wollega zone, west Ethiopia from August 11 to September 11, 2015. Gida Ayana district has 28 Administrative Kebeles (AKs); 21 rural and 7 of the Kebeles are urban. The total population of the district is 131,982 of which 66,291 were male and 65,691 were female as of 2007 census [14]. The total number of under five children in the district can be estimated from the total population. In Ethiopia the estimated proportion of under five population is nearly 15.4% [14] and the estimated number of under five children becomes approximately 20,325. In addition the total number of households in the district was 27,496. The district has three climatic zones; low land, midland and highland. In the district, there is one district hospital with ambulance service, four health centers and 22 health posts. Each health post had at least one health extension workers who provide basic primary health care services. Except for few, the livelihood of the people residing in the district depends directly or indirectly on agriculture. Most of the farmers in the area cultivate crop mainly maize, sorghum, sesame, bolekie, gobe, groundnut and akuri ater.

Study variables

Dependent variables: Indicators of under-nutritional status which includes: Stunting, wasting and underweight among children aged 6-59 months.

Independent variables: The following categories of factors were studied

- Demographic and socio-economic variables; marital status of the mother, family size (total household members), total number of children under five years old, maternal/paternal education and occupation, income, number of livestock owned, farm land ownership and size.
- Child characteristics; age of child, child sex, height, weight, birth order, birth weight, birth interval and manifestations of childhood morbidity (diarrhea, fever and cough).
- Child caring practices; IYCF (infant and young child feeding) practices, hygiene, health care seeking behavior, immunization.
- Maternal characteristics and caring practices; age of mother, nutrition awareness, number of children ever born, ANC (antenatal clinic) visits, health status during pregnancy, use of extra food during pregnancy and autonomy in decision-making.
- Environmental Health condition; water supply, sanitation and housing conditions.

Operational definitions:

- ***Under-nutrition*** in this study refers to state resulting from a relative or absolute deficiency of one or more essential nutrients and manifested by stunting, wasting and underweight.
- ***Stunting*** refers height for age less than the international median WHO reference value by more than two standard deviations
- ***Sever stunting*** refers height for age below-3SD (Standard Deviation) of the median WHO reference values.
- ***Wasting refers*** weight for height less than the international median WHO reference value by more than two SD.
- ***Sever wasting*** refers weight for height below-3SD of the median WHO reference values.
- ***Underweight*** refers weight for age less than two SD below the international median WHO reference value.
- ***Severe underweight*** refers weight for age below-3SD of the median WHO reference values.
- ***Access to health facility*** refers to the availability of health care facilities for the clients within 10 km radius.
- ***Household*** is defined as those people living together under 1 roof and sharing a common kitchen.
- ***IYCF practices*** which includes pre-lacteal feeding, time of initiation of breast feeding, feeding of colostrum, duration of exclusive breast feeding, duration of breast feeding, age at complementary feeding, the type and frequency of complementary foods and methods of complementary feeding.
- ***Pre-lacteals*** is defined as any feeding given to babies before initiating breast-feeding for the first time after birth.
- ***Exclusive breast feeding*** refers feeding only breast milk without anything else for the first six months of life, with the exception of medicines for therapeutic purpose.

- ***Complementary foods*** are foods which are required by the child, at and above six months of age, in addition to sustained breastfeeding.
- ***Low birth weight*** has been defined by as weight at birth of <2500 grams.
- ***Diarrhea*** refers passage of loose stools for three or more times in a day.
- ***Fever*** refers elevated body temperature than usual.

Source population: The source population was all children aged 6-59 months and their mothers/care givers/living in Gida Ayana district during the study.

Study population: The study population was all children aged 6-59 months and their mothers/care givers/in the selected HHs who fulfill inclusion criteria.

Inclusion criteria

- Children aged 6-59 months and their mother/care giver/living in the area for at least 6 months prior to the study was included in the study.

Exclusion criteria

- Children and their mothers/care givers/who had serious illness and/or hospitalized for diseases was not included in the study.
- Children and their mothers/care givers/having mental illness and physical deformity like deformity of upper limb, deformity of lower limb, deformity of thoracic region both anteriorly and posteriorly and making difficult for measurement was excluded from the study.

Sample size determination

The sample size was calculated using single population proportion determination formula; $n=Z^2\ (\alpha/2)\times p\times(1-p)/d^2$, by taking the prevalence of stunting, underweight and wasting among under five children respectively 41.78%, 39.6% and 11.84% from previous local study [15] and based on the assumption of 95% confidence interval and a margin of error of 5%. After considering design effect of 1.5 and adding 5% non response rate the final sample size respectively is becoming 588.7035~588, 578.8755~578 and 252.6237~252.

Sampling procedures

The sampling technique used to select appropriate and representative sample was two-stage by using simple random sampling method (lottery and Microsoft office excel generated random number). First the representative AKs in the district was selected by lottery. In the selected AKs of the district households having under five children were identified with the help of health extension workers (HEWs) and community leaders. The names of identified HHs having under five children were coded by number. Then this HHs was selected by random number (Microsoft office excel generated) in each study AKs of the district proportional to the estimated HH size having under five children and mother-child pairs was taken for the interview and measurements. In those households having more than one under five children, one child was selected by lottery method (Figure 1).

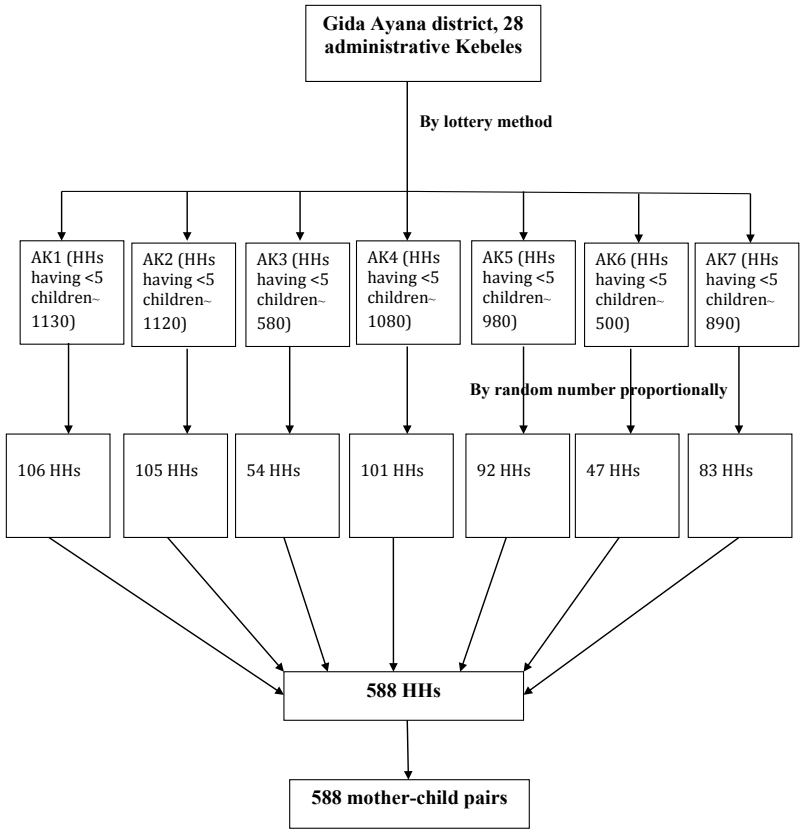

Figure 1: Schematic presentation of sampling procedures.

Data Collection Instruments and Procedures

The data was collected using pretested structured questionnaire and anthropometric measurements. The questionnaire was initially prepared in English and then translated into the local language, Afan Oromo, by fluent speakers of both languages and again it was translated back into English to check its consistency. Information regarding to socioeconomic and demographic factors, child factors, maternal factors and environmental health conditions was collected from mothers/caregivers by face to face interview using pretested structured questionnaire through house-to-house visit.

Anthropometric Measurements

Anthropometric data was obtained by measuring weight and height of children. Weight was measured without any footwear and with minimal clothing to the nearest 0.1 kg using recommended UNICEF weighing scale. In the time of refuse to be scaled, children's mothers were carrying and stand on the scale. Then, the child actual weight was obtained by subtracting mother's weight from mother and child weight. Standing height for those who is 24 months and older was measured without any footwear to the nearest 0.1 cm using a standard calibrated bar. The children were made to stand straight with heels, buttocks, shoulders and back of head touching the wall. Head hold comfortably erect with the lower border of orbit of the eye in the same horizontal plane as the external canal of the ear and the arms hanging loosely by the sides with palms facing the thigh. Measurement was read by placing the horizontally hold wooden board/scale touching the top of the head. The height was compared with the new WHO child growth standards, 2006 reference data for that particular age and sex to get height for age. Children below 24 months of age (below 85 cm) was measured in a recumbent position by using a length board with a headpiece to the nearest 0.1 cm. Heads touch the headpiece with their back, back of knees and heels touching the board and their hands be relaxed during measuring.

In addition the correct age of a child was elicited from the child's vaccination card or discharge delivery card and mother's recall. Mother's recall especially recall of illiterate mother was assisted by referring to local events like traditional festivals/ceremonies that took place around the period they gave birth to their children. In addition to strength the quality of data measurement MUAC was performed. Mid upper arm circumference (MUAC) was measured on left mid upper arm using flexible measuring tape to the nearest 0.1 cm.

Data Quality Management

To maintain data quality educated individuals completing 1st degree and graduating university students especially who do have previous experience of data collection and who speak local languages spoken in the study area was selected for data collection and supervision. Prior to the actual data collection, three day intensive training was given to interviewers and supervisors focusing on the rationale and objectives of the study, administration of the structured questionnaire, survey instruments, anthropometric measurements and ethical considerations.

Moreover, pre-test of questionnaires was done before the actual data collection work, by using 5% of the sample size on those people who was not included in the study to see for the accuracy of responses, to estimate time needed and some modifications was made on the basis of the findings. Weighing scales was calibrated with known weight object regularly. The scales indicators were checked against zero reading after weighing every child. On daily basis collected information was checked for completeness and consistency by the supervisors and by principal investigator to keep the quality of data and possible errors was returned to the data collectors for correction. Data validity and reliability was maintained through close supervision of the measurements by the principal investigator and trained supervisor. To minimize sampling error, weight and height of the children was taken two times by the same person and the average value was taken for final analysis.

Data Processing and Analysis

Data was coded and entered in to Epi Data version 3.1 statistical package software by one trained data clerk and by the principal investigator and it was exported to Statistical Package for Social Sciences (SPSS) software version 20.0 for analysis of descriptive statistics and statistical inferences. Data cleaning and editing was made before analysis.

Characteristics of the sample like socioeconomic and demographic factors, child factors, maternal factors and environmental health conditions was described in terms of frequencies and percentages through texts, tables and graph. Both bivariate and multivariate logistic regression analysis was performed to identify the factors that are associated with child under nutritional status. All the variables with p value ≤ 0.2 at the bivariate analysis were entered into the multivariable logistic regression model. In addition, repeatedly reported risk factors of poor nutritional status like perceived size of baby at birth, presence of diarrhea within 2 weeks of the survey, and pre-lacteal feeding practices were entered into the model regardless of the p-value. In multivariable logistic regression analysis OR (odds ratio) and 95% CI (confidence interval) was estimated to reveal the strength of association and a "p" value less than 0.05 was used to declare the statistical significance. Anthropometric indices H/A (Height-for-age), W/H (Weight-for-Height) and W/A (Weight-for-Age) taking age and sex into consideration was calculated using WHO Anthro 2007 software version 1.0.4.

Results

Demographic and socio-economic characteristics of the studied children, their mother and their households

All of the planned study subjects were participated in the study, making the response rate 100%. About 60% of respondents are living in rural area. Among the children studied, 293 (49.8%) were male and 295 (50.2%) were female, 145 (24.7%) fell in the age group 12-23 months. The median age of the children studied was 24 months. About 102 (17.3%) of the studied children were born to mothers aged less than 20 years. Mothers who gave first birth at their age 18 or less years were 56.5%. Average total number of children born to a mother was 2.9 with 2.2 SD, and 21.8% of the mothers gave birth of five and above children. Out of the total interviewed mothers 550 (93.5%) were married, 377 (64.1%) were illiterate and 512 (87.1%) were housewife. On the other hand 336 (59.1%) of mothers husband were literate and 354 (65%) of them were farmer in occupation. Almost half of (51.5%) of the study participants were Muslim and 61.7% were Oromo ethnic group.

About 41 HHs are headed by female and average household size is 4.8 persons with 1.73 SD and 31% of the HHs has more than five HH size. Sixteen % of the HHs had two under five year children and about 2 HHs had three under five year children. The detailed demographic and socioeconomic characteristics of the sample children, their mothers and their HHs are presented in Tables 1 and 2.

Health and health related characteristics of the studied children, their mothers and their households

The common childhood illnesses identified in the study were diarrhea, acute respiratory infections, malaria and typhoid fever. In about 211 (52.8%), 196 (49%) and 46 (11.5%) under five children respectively, complaints of diarrhea, complaints of fever and complaints of respiratory diseases were reported within 2 weeks preceding the study.

The mean amount of water used in a day per household was 60.2 liters with SD of 16.5 and almost all (95.7%) of HHs use more than 20 liters per day. Almost all (98%) of HHs have latrine and the commonest type (70.3%) utilized were traditional private pit latrine with wooden slab. The other detailed health and health related characteristics of the sample children, their mothers and their households are presented in Table 3.

Feeding practices of the studied children and their mothers

About 416 (70.7%) mothers started breastfeeding immediately after birth. Out of 342 (82.2%) mothers who have information about immediate breast feeding majority (63.4%) got from health extension workers. About 197 (33.5%) of respondents give pre-lacteal food/fluid for their child and the commonest ingredients given were water, cow milk and butter. Almost all of currently breast feed mothers provide the breast milk in both day and night time for more than 8 times per day. The other feeding practices of the sample children and their mothers are presented in Table 4.

Nutritional status of the studied children

Overall prevalence of stunting, wasting, underweight and overweight were 40.5%, 10.9%, 19.2% and 1.2% respectively and there were no cases of obesity. In addition prevalence of severe stunting; wasting and underweight were 13.4%, 2.9% and 4.6% respectively. Moreover, as measured by MUAC 13 (2.2%) studied children were severely wasted (in severe acute under nutritional status) (MUAC<11.5 cm) and 71 (12.1%) were moderately wasted (in moderate acute under nutritional status) (MUAC<12.5 cm) (Figure 2) (Tables 5 and 6).

Analysis result of factors associated to child nutritional status

The binary logistic regression analysis revealed selected demographic, socio-economic, health and health related factors as well as selected child feeding practices are associated to under nutritional status of children (stunting, wasting and underweight) and presented in Tables 7- 9 below. Sex, age and paternal education status were among the variables which showed a significant association with wasting, stunting and underweight ($p<0.05$).

Factors associated with wasting

This study revealed child sex, child age, residence, paternal education status, number of antenatal clinic visits and sources of drinking water were significantly associated with wasting.

The occurrence of wasting were 2.1 times higher in male children [AOR (adjusted odds ratio)=2.1, 95% CI=1.03, 4.12] as compared to female counterparts. Children in age group 24-35 months were 4.3 times at risk of being wasted (AOR=4.3, 95% CI=1.38, 13.39) than those older children. Children living in urban area were 1.96 times at risk of being wasted [COR (crude odds ratio)=1.96, 95% CI=1.16, 3.3] than those living in rural area. The risk of being wasted were 2.4 times higher in those children of illiterate fathers (AOR=2.4, 95% CI=1.22,

Variables	Characteristics	Frequency	Percent
Child's sex (n=588)	Male	293	49.8
	Female	295	50.2
Child's age (n=588)	6-11	97	16.5
	12-23	145	24.7
	24-35	109	18.5
	36-47	121	20.6
	48-59	116	19.7
Birth order (n=588)	1	175	29.8
	2-4	296	50.3
	>4	117	19.9
Birth interval (n=413)	<2 years	126	30.5
	Every 2 years	70	16.9
	>2 years	217	52.5
	Larger	86	14.6
Perceived size of baby at birth (n=588)	Average	308	52.4
	Small	194	33
Total number of children born to a mother (n=588)	<5 children born in a mother	460	78.2
	≥5 children born in a mother	128	21.8
Mothers age (n=588)	≤18 years	21	3.6
	>18 years	567	96.4
Mothers age at first birth (n=588)	≤18 years	332	56.5
	>18 years	256	43.5
Mother age during birth of index child (n=588)	<20years	102	17.3
	20-29years	351	59.7
	30-39years	130	22.1
	≥40years	5	0.9
Current marital status (n=588)	Single	13	2.2
	Married	550	93.5
	Divorced	21	3.5
	Widowed	4	0.7
Maternal formal education (n=588)	Yes	211	35.9
	No	377	64.1
Maternal formal education level (n=211)	Primary 1st cycle (1-4 grade)	93	44.1
	Primary 2nd cycle (5-8 grade)	80	37.9
	High school and above	38	18
Paternal formal education (n=569)	Yes	336	59.1
	No	233	40.9
Paternal formal education level (n=336)	Primary 1st cycle (1-4 grade)	136	40.5
	Primary 2nd cycle (5-8 grade)	129	38.4
	High school and above	71	21.1
Mother occupation (n=588)	Housewife only	512	87.10%
	Farmer	242	41.20%
	Merchant/trade	59	10.00%
	Private organization employee	3	0.50%
	Government employee	5	0.90%
	Daily laborer	19	3.20%
	Farmer	354	62.20%
	Merchant/trade	132	23.20%
Husband occupation (n=569)	Private organization employee	54	9.50%
	Daily laborer	27	4.80%
	Government employee	16	2.80%

Ethnicity (n=588)	Oromo	363	61.7
	Amhara	181	30.8
	Tigre	43	7.3
	Orthodox	220	37.4
Religion (n=588)	Muslim	303	51.5
	Protestant	65	11.1

Table 1: Demographic and Socio-economic characteristics of the sample children and their mothers in Gida Ayana district, East Wollega Ethiopia, August/September 2015.

Variables	Characteristics	Frequency	Percent
Residence (n=588)	Urban	235	40
	Rural	353	60
Household head (n=588)	Mother	41	7
	Father	547	93
HH size (n=588)	2-5	406	69
	>5	182	31
<5 years children in a HH (n=588)	1	492	83.7
	2	94	16
	3	2	0.3
Material of roof of the house (n=588)	Thatched	14	2.4
	Corrugated iron sheet	574	97.6
Material of floor of the house (n=588)	Earthen/soil	513	87.3
	Cemented	75	12.8
Presence of windows (n=588)	Yes	570	96.9
	No	18	3.1
Monthly HH income (in ETB, n=588)	≤1500	166	28.2
	1501-3001	264	44.9
	>3001	158	26.9
Decision making on utilization of money (n=588)	Mainly husband	245	41.7
	Both jointly	195	33.2
	Only husband	87	14.8
	Mainly wife	31	5.3
	Only wife	30	5.1
Ownership of farm animals/ livestock/ (n=588)	Yes	212	36.1
	No	376	63.9
Ownership of agricultural land (n=588)	Yes	360	61.2
	No	228	38.8
Ownership of agricultural land by hectare (n=360)	<5 hectare	261	72.5
	≥5 hectare	99	27.5
Currently cultivating crops on their farm land (n=360)	Yes	357	99.2
	No	3	0.8
Types of crops cultivated (n=357)	Maize	356	99.20%
	Akuri ater	331	92.20%
	Gobe	189	52.60%
	Selit	161	44.80%
	Groundnut	160	44.60%
	Bolekie	144	40.10%
	Coffee & khat	4	1.10%

Table 2: Demographic and socio-economic characteristics of the children's HHs in Gida Ayana district, East Wollega Ethiopia, August/September 2015.

Variables	Characteristics	Frequency	Percent
Ever faced any health problem of the child (n=588)	Yes	400	68
	No	188	32
Common childhood illnesses (n=400)	Malaria	100	25
	ARI (pneumonia)	140	35
	Diarrhea	290	72.5
	Typhoid	184	46
Diarrhea, preceding 2 wks (n=400)	Yes	211	52.8
	No	189	47.3
Frequency of diarrhea/ day (n=211)	1 episodes	12	5.69
	2 episodes	36	17.1
	3-4 episodes	123	58.3
	≥5 episodes	40	18.96
Fever, preceding 2 wks (n=400)	Yes	204	51
	No	196	49
Respiratory diseases, preceding 2wks (n=400)	Yes	46	11.5
	No	354	88.5
Ever taking to HF for sickness (n=400)	Yes	350	87.5
	No	50	12.5
Immunization status (n=588)	Immunized	557	94.7
	Not immunized	31	5.3
Source of drinking water (n=588)	protected sources[1]	384	65.3
	unprotected sources[2]	204	34.7
Time spent to fetch water (n=588)	<15 minutes	166	28.2
	15-30 minutes	355	60.4
	>30minutes	67	11.4
Presence of latrine (n=588)	Yes	576	98
	No	12	2
Methods of waste disposal (n=588)	open field disposal	270	45.9
	in a pit	44	7.5
	common pit	161	27.4
	Composting	15	2.6
	Burning	143	24.3
Perceived health status during pregnancy (n=588)	Good	450	76.5
	Not good/sick	138	23.5
Antenatal clinic visits (index child) (n=588)	None	113	19.2
	1-3 times visit	292	49.7
	≥4 times visit	183	31.1
Delivery place (index child) (n=588)	Home	386	65.6
	Health institution	202	34.4

1: Public tap, private pipe, protected spring; 2: River, pond, unprotected spring.

Table 3: Health and health related characteristics of the sample children, their mothers and their households in Gida Ayana district, East Wollega Ethiopia, August/September 2015.

Variables	Characteristics	Frequency	Percent
Child receive pre-lacteal foods/fluids (n=588)	Yes	197	33.5
	No	391	66.5
Commonest pre-lacteal foods used (n=197)	Water	16	8.1
	Butter	18	9.1
	Cow milk	162	82.2
	Other	1	0.5
Child feed 1st milk (n=588)	Yes	145	24.7
	No	443	75.3
Currently breastfeeding (n=588)	Yes	285	48.5
	No	303	51.5
Given additional foods preceding 24 h of the survey (n=285)	Yes	250	87.7
	No	35	12.3
Age initiated for CF (n=250)	<4 month	3	1.2
	4-6 month	201	80.4
	7-12 month	46	18.4
Types of CF initiated (n=250)	Cow's milk	156	62.4
	Butter	13	5.2
	Sugar solution	61	24.4
	Formula milk	32	12.8
	Attmit	188	75.2
	Injera and bread	145	58
Frequency of CF/day (n=250)	<3 times	10	4
	3 times	138	55.2
	>3 times	102	40.8
Methods of CF (n=250)	Bottle	113	45.2
	Cup	167	66.8
	Spoon	120	48
	Hand	121	48.4
Duration of BF (n=303)	<12 months	9	3
	12-24 months	219	72.3
	>24 months	75	24.8
Who cares, baby feeding (n=588)	Mother	548	93.2
	Grandmother	10	1.7
	Others	30	5.1
Change in feeding practice during illness (n=588)	Yes	373	63.4
	No	215	36.6
Feeding practices during illness (n=373)	preventing breast	16	4.3
	preventing food	157	42.1
	Providing additional food	200	53.6
Hand wash during preparation and feeding of child and herself (n=588)	Wash using water only	142	24.1
	Wash using soap some times	223	37.9
	Wash using soap always	189	32.1
	No wash	34	5.8
Extra food consumption during pregnancy/ lactation (n=588)	Yes	384	65.3
	No	204	34.7

Table 4: Feeding practices of the sample children and their mothers in Gida Ayana district, East Wollega Ethiopia, August/September 2015.

Nutritional status	Prevalence	95% CI
Stunting	40.5	(36.6, 44.6)
Wasting	10.9	(8.3, 13.8)
Underweight	19.2	(16.0, 22.8)
Overweight	1.2	(.3, 2.0)
Obesity	0	0

Table 5: Nutritional status of the studied children as measured by stunting, wasting, underweight , overweight and obesity**,** Gida Ayana district, East Wollega Ethiopia, August/September 2015 (n=588).

Nutritional status	Prevalence	95% CI
Severe acute under nutrition (MUAC<11.5)	2.2	(1.0, 3.4)
Moderate acute under nutrition (MUAC<12.5)	12.1	(9.5, 14.8)
Normal (MUAC ≥ 12.5)	85.7	(82.8, 88.4)

Table 6: Nutritional status of the studied children as measured by mid upper arm circumference (MUAC)**,** Gida Ayana district, East Wollega Ethiopia, August/ September 2015 (n=588).

Variables and characteristics	Wasting No (%)	COR (95% CI)	AOR (95% CI)
Residence			
Urban (n=235)	35 (14.9%)	1.955 (1.159, 3.298)*	1.407 (0.706, 2.804)
Rural (n=353)	29 (8.2%)	1	1
Child sex			
Male (n=293)	47 (16.0%)	3.124 (1.748, 5.584)**	2.059 (1.028, 4.122)*
Female (n=295)	17 (5.8%)	1	1
Child age			
6-11 (n=97)	12 (12.4%)	1.678 (0.676, 4.170)	2.894 (0.866, 9.669)
12-23 (n=145)	13 (9.0%)	1.171 (0.482, 2.844)	2.177 (0.681, 6.959)
24-35 (n=109)	23 (21.1%)	3.180 (1.399, 7.228)*	4.296 (1.378, 13.392)*
36-47 (n=121)	7 (5.8%)	0.730 (0.263, 2.029)	0.614 (0.128, 2.943)
48-59 (n=116)	9 (7.8%)	1	1
Paternal formal education			
Yes (n=336)	28 (8.3%)	1	1
No (n=233)	33 (14.2%)	1.815 (1.064, 3.096)*	2.404 (1.224, 4.722)*
Maternal education level			
Primary education (n=173)	22 (12.7%)	1.7 (0.482, 5.999)	1.137 (0.516, 2.504)
High school and above (n=38)	3 (7.9%)	1	1
Perceived size of baby at birth			
Large (n=86)	8 (9.3%)	1	1
Average (n=308)	42 (13.6%)	1.539 (0.694, 3.416)	2.824 (0.857, 9.303)
Small (n=194)	14 (7.2%)	0.758 (0.306, 1.881)	1.159 (0.306, 4.397)
Diarrhea, preceding 2wks			
Yes (n=211)	20 (9.5%)	1	1
No (n=189)	30 (15.9%)	1.802 (0.985, 3.295)	2.004 (0.996, 4.032)
No. of antenatal clinic (ANC) visit			
1-3 times (n=183)	28 (15.3%)	1	1
≥4 times (n=292)	27 (9.2%)	0.564 (0.321, 0.992)*	0.707 (0.329, 1.516)
Source of drinking water			
Unprotected (n=204)	34 (16.7%)	2.360 (1.398, 3.985)**	2.991 (1.485, 6.025)**
Protected (n=384)	30 (7.8%)	1	1
*p<0.05; **p<0.005; COR: Crude odds ratio; AOR: Adjusted odds ratio; CI: Confidence interval			

Table 7: Bivariate and multivariate binary logistic regression analyses results which show the effect of selected variables on nutritional status as measured by wasting, Gida Ayana district, East Wollega Ethiopia, August/ September 2015.

Variables and characteristics	Stunting No (%)	COR (95% CI)	AOR (95% CI)
Child sex			
Male (n=293)	124 (42.3%)	1.17(0.84, 1.62)	1.602 (1.014, 2.529)*
Female (n=295)	114 (38.6%)	1	1
Child age			
6-11 (n=97)	28 (28.9%)	1	1
12-23 (n=145)	60 (41.4%)	1.74 (1.004, 3.01)*	1.431 (0.690, 2.967)
24-35 (n=109)	42 (38.5%)	1.545 (0.861, 2.772)	1.330 (0.614, 2.884)
36-47 (n=121)	55 (45.5%)	2.054 (1.165, 3.619)*	3.055 (1.403, 6.650)**
48-59 (n=116)	53 (45.7%)	2.073 (1.171, 3.670)*	2.376 (1.083, 5.213)*
Maternal formal education			
Yes (211)	68 (32.2%)	1	1
No (377)	170 (45.1%)	1.73 (1.21, 2.46)**	1.533 (0.911, 2.579)
Ownership of animals			
Yes (n=212)	73 (34.4%)	1	1
No (n=376)	165 (43.9%)	1.49 (1.05, 2.11)*	1.765 (1.071, 2.909)*
Paternal formal education			
Yes (n=336)	122 (36.3%)	1	-
No (n=233)	106 (45.5%)	1.46 (1.04, 2.06)*	1.086 (0.676, 1.743)
Monthly HH income			
≤1500 (n=166)	83 (50.0%)	1.508 (.971, 2.342)	2.715 (1.397, 5.276)**
1501-3001 (n=264)	92 (34.8%)	0.807 (0.537, 1.211)	0.932 (0.537, 1.618)
>3001 (n=158)	63 (39.9%)	1	1
Child receive pre-lacteal foods/fluids			
Yes (n=197)	84 (42.6%)	1.144 (0.808, 1.620)	1.005 (0.617, 1.638)
No (n=391)	154 (39.4%)	1	1
Diarrhea, preceding 2wks			
Yes (n=211)	101 (47.9%)	1.597 (1.07, 2.384)*	2.377 (1.431, 3.946)**
No (n=189)	69 (36.5%)	1	1
Child had fever in last two weeks			
Yes (n=204)	93 (45.6%)	1.295 (0.870, 1.927)	1.754 (1.057, 2.909)*
No (n=196)	77 (39.3%)	1	1
Perceived size of baby at birth			
Large (n=86)	37 (43.0%)	1	1
Average (n=308)	112 (36.4%)	0.757 (0.466, 1.230)	0.570 (0.280, 1.161)
Small (n=194)	89 (45.9%)	1.123 (0.673, 1.873)	1.192 (0.563, 2.523)
Antenatal clinic visits			
Yes (n=475)	179 (37.7%)	1	1
No (n=113)	59 (52.2%)	1.807(1.195, 2.731)**	1.596 (0.909, 2.803)
*p<0.05; **p<0.005			

Variables and characteristics	Under-weight No (%)	COR (95% CI)	AOR (95% CI)
Residence			
Urban (n=235)	51 (21.7%)	1.301 (0.860, 1.968)	2.204 (1.081, 4.495)*
Rural (n=353)	62 (17.6%)	1	1
Child sex			
Male (n=293)	63 (21.5%)	1.342 (0.888, 2.028)	2.042 (1.138, 3.662)*
Female (n=295)	50 (16.9%)	1	1
Child age			
6-11 (n=97)	9 (9.3%)	1	1
12-23 (n=145)	19 (13.1%)	1.474 (0.637, 3.410)	2.012 (0.708, 5.716)
24-35 (n=109)	30 (27.5%)	3.713 (1.661, 8.301)**	3.601 (1.284, 10.098)*
36-47 (n=121)	26 (21.5%)	2.676 (1.189, 6.025)*	3.133 (1.068, 9.189)*
48-59 (n=116)	29 (25.0%)	3.259 (1.458, 7.286)**	3.968 (1.396, 11.275)*
Maternal formal education			
Yes (n=211)	31 (14.7%)	1	1
No (n=377)	82 (21.8%)	1.614 (1.026, 2.539)*	1.872 (0.921, 3.804)
Ownership of farm land			
Don't have (n=228)	38 (16.7%)	0.760 (0.494, 1.170)	0.614 (0.287, 1.310)
Have (n=360)	75 (20.8%)	1	1
Paternal formal education			
Yes (n=336)	53 (15.8%)	1	1
No (n=233)	57 (24.5%)	1.729 (1.138, 2.628)*	1.742 (0.985, 3.079)
Family size			
2-5 (n=406)	71 (17.5%)	1	1
≥6 (n=182)	42 (23.1%)	1.415 (0.921, 2.175)	1.457 (0.708, 3.000)
No of <5 children/HH			
1 (n=492)	89 (18.1%)	1	1
≥2 (n=96)	24 (25.0%)	1.509 (0.901, 2.528)	2.257 (1.126, 4.524)*
Birth order			
1 (n=175)	26 (14.9%)	1	1
2-4 (n=296)	69 (23.3%)	1.742 (1.061, 2.861)*	2.009 (0.941, 4.287)
>4 (n=117)	18 (15.4%)	1.042 (0.543, 2.001)	0.672 (0.225, 2.003)
Child receive pre-lacteal foods/fluids			
Yes (n=197)	45 (22.8%)	1.406 (0.921, 2.147)	1.623 (0.899, 2.931)
No (n=391)	68 (17.4%)	1	1
Diarrhea, preceding 2wks			
Yes (n=211)	52 (24.6%)	1.881 (1.130, 3.128)*	2.228 (1.166, 4.256)*
No (n=189)	28 (14.8%)	1	1
Child had fever in last two weeks			
Yes (n=204)	44 (22.4%)	1.351 (0.826, 2.210)	0.893 (0.481, 1.657)

Table 8: Bivariate and multivariate binary Logistic regression analyses results which show the effect of selected variables on nutritional status as measured by stunting, Gida Ayana district, East Wollega Ethiopia, August/September 2015.

No (n=196)	36 (17.6%)	1	1
Source of drinking water			
Protected (n=384)	82 (21.4%)	1.515 (0.963, 2.385)	1.812 (0.943, 3.483)
Unprotected (n=204)	31 (15.2%)	1	1
Immunization			
Immunized (n=557)	103 (18.5%)	1	1
Not immunized (n=31)	10 (32.3%)	2.099 (0.959, 4.592)	1.877 (0.661, 5.329)
*p<0.05; **p<0.005			

Table 9: Bivariate and multivariate binary Logistic regression analyses results which show the effect of selected variables on nutritional status as measured by underweight, Gida Ayana district, East Wollega Ethiopia, August/September 2015.

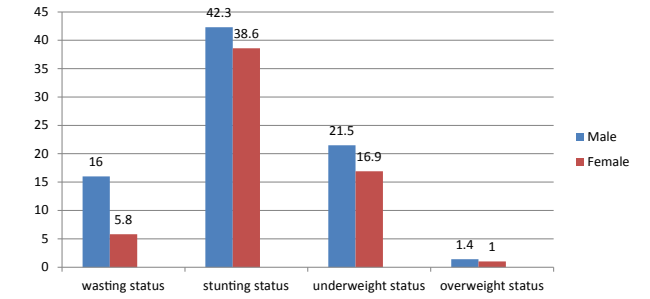

Figure 2: Percentage of wasting, stunting, underweight and overweight by child sex, Gida Ayana district, East Wollega Ethiopia, August/September 2015.

4.72) compared to those children of fathers attended formal education. Children of mothers who had greater number of antenatal clinic visit are 43.6% less likely to be wasted (COR=0.564, 95% CI=0.321, 0.992) as compared to those children of mothers who had less number of antenatal clinic visit, although this significance is marginal. Children who had no access to protected drinking water were 3 times at higher risk of being wasted (AOR=2.99, 95% CI=1.49, 6.03) than those who uses protected drinking water. Maternal education status, perceived size of baby at birth and diarrheal status within two weeks of the study were not significantly associated with wasting.

Factors associated with stunting

Analysis of this study showed child sex, child age, maternal and paternal education status, ownership of farm animals, monthly HHs income, diarrhea and fever preceding two weeks of data collection and antenatal clinic visits were significantly associated with stunting status.

The risk of being stunted were 1.6 times higher in male children (AOR=1.6, 95% CI=1.01, 2.53) than those female children. Children aged 12-23 months, 36-47 months and 48-59 months were 1.74 (COR=1.74, 95% CI=1.004, 3.01) times, 3.06 (AOR=3.06, 95% CI=1.40, 6.65) times, and 2.38 (AOR=2.38, 95% CI=1.08, 5.21) times at increased risk of being stunted respectively as compared to those aged 6-11 months. Children of illiterate mothers were 1.7 times at higher risk of being stunted (COR=1.73, 95% CI=1.21, 2.46) as compared to those children of mothers attended formal education. Similarly children of illiterate fathers were 1.5 times at higher risk of being stunted (COR=1.46, 95% CI=1.04, 2.06) as compared to those children of fathers attended formal education. Children of HHs which lack possession of farm animals were 1.8 times at increased risk of stunting (AOR=1.77, 95% CI=1.07, 2.91) compared to those children of HHs which possess farm animals. Children having complaint of diarrhea in the last two weeks preceding data collection were found to be 2.4 times at higher risk of stunting (AOR=2.377, 95% CI=1.431, 3.946). Similarly Children having complaint of fever in the last two weeks preceding data collection were found to be 1.75 times at higher risk of stunting (AOR=1.754, 95% CI=1.057, 2.909). Children of HHs having lower monthly income were 2.7 times at increased risk of stunting (AOR=2.72, 95% CI=1.397, 5.276). Children of mothers without antenatal clinic visit were 1.8 times at increased risk of stunting (COR=1.81, 95% CI=1.195, 2.731). Pre-lacteal feeding practice and perceived size of baby at birth were not significantly associated with stunting.

Factors associated with underweight

Analysis of this study showed child sex, child age, residence, maternal and paternal educational status, number of <5 children, birth order, diarrhea preceding 2 weeks of the study were found to be significant predictors of underweight.

The study showed, urban studied children were 2.2 times at higher risk of being underweight (AOR=2.20, 95% CI=1.08, 4.495) compared to those residing in rural area. Males are 2 times at increased risk of underweight (AOR=2.04, 95% CI=1.14, 3.66) compared to female counterparts. Children aged 24-35 months, 36-47 months and 48-59 months were 3.6 (AOR=3.6, 95% CI=1.28, 10.09) times, 3.1 (AOR=3.13, 95% CI=1.07, 9.19) times, and 4 (AOR=3.97, 95% CI=1.396, 11.28) times at increased risk of being underweight respectively as compared to those aged 6-11 months. Children with 2 up to 4 birth order were 1.7 times at increased risk of underweight (COR=1.742, 95% CI=1.061, 2.861) compared to those children born to mothers who had no previous birth. Children living in HHs having additional one or two under five children were 2.26 times at increased risk of underweight (AOR=2.257, 95% CI=1.126, 4.524) than those living in HHs without other under five children. Children having complaint of diarrhea in the last 2 weeks preceding data collection were found to be 2.2 times at higher risk of underweight (AOR=2.23, 95% CI=1.17, 4.26) compared to those children who didn't experience diarrhea 2 weeks preceding the study. In this study ownership of farm land, family size, pre-lacteal feeding practices, presence of fever within two weeks of the study, sources of drinking water and immunization status were not significantly associated with underweight.

Discussions

Stunting, wasting and underweight condition

Generally the prevalence of stunting, wasting and its severe forms are higher than 2014 EMDHS national as well as regional reports. But the figure of underweight and its severe form, sever stunting and overweight are lower than 2014 EMDHS national and regional reports. The high prevalence of wasting status may be attributed to unprotected drinking water sources that may lead to different infection and data collection period (August) when most of the households have shortage of food. Moreover, the prevalence of stunting, wasting, underweight and overweight were higher and lower than other studies conducted in different area of the world.

The prevalence of stunting, wasting and underweight is higher than compared to majority of the studies conducted abroad [16-22]. On the other hand, the prevalence of stunting, wasting and underweight is lower compared to reports of previous local studies conducted in eastern Hararghe, Somali region, west Gojjam, Guto Gida district [10,11,13,15]. Similarly the prevalence of wasting and underweight is lower compared to report of study done in Gumbrit, North west Ethiopia [12]. Even thought the extent of the problem is lower compared

to majority of previous local studies, stunting and wasting status in the study area was still serious condition during the study period.

Factors related to wasting, stunting and underweight

The result of this study showed, stunting was more prevalent in male children than female children which is consistent with previous many cross sectional studies conducted abroad and in Ethiopia [10,11,13,19,23-30]. This could be due to genetic deference and difference in energy requirement of boys and girls. In contrary, other studies reported that the occurrence of stunting among under five children was not significantly associated with child gender [12,21,31-33]. This study also showed, wasting and underweight were more prevalent in male children compared to female children which is consistent with other studies [23,34]. In contrary other studies report that wasting and underweight were more prevalent in female children than male children [10,22,35,36]. These discrepancies in findings could be attributed to differences in cultures, socioeconomic dynamics, parents' educational status and nutritional factors among the various communities. The discrepancies attributed to socioeconomic dynamics and educational status may be due to culture of the area in which the study is conducted may give priority for more care in any aspect for female children as well as the influence of sex preference of biological parents.

The finding of this study showed the prevalence as well as the risk of stunting and underweight increases with age. Children in age group 12-23 months and 36-59 months were at significantly higher risk of stunting compared to children in youngest age category. This finding is consistent with other studies [13,17,27]. In this study, significantly higher risk of underweight occurred in age group 24-35 months, 36-47 months and 48-59 months compared to youngest age group. This finding is consistent with previous studies [26,31,36]. The result of this study also showed the highest prevalence and significantly higher risk of wasting was occurred in age group 24-35 months compared to children in oldest age category. This finding is supported by previous study [15].

In this study maternal and paternal formal education status was significantly associated with stunting and underweight. Children of illiterate parents were at increased risk of stunting and underweight. This finding is consistent with the result of previous studies conducted elsewhere [19,22,26,37]. The result of this study also showed significant association between paternal formal education status and wasting. Children of illiterate fathers were at increased risk of wasting. This could be due to the fact that educated parents have the knowledge of improved child care, health services usage, hygiene and sanitation which have an impact on nutritional status of children. In contrary this study didn't find significant association between maternal education and wasting status. Contemporaneously, some of other previous studies didn't find significant association between maternal and paternal education and risk of stunting, wasting and underweight [12,18,33,38,39].

This study found children living in urban area were at significantly increased risk of wasting and underweight. The finding is consistent with previous studies conducted elsewhere [30]. This may be attributed to majority of HHs in urban area lack ownership of agricultural land and farm animals to cultivate different crops and lack of money to purchase the foods during time of data collection. This study also showed children of HHs which lacks ownership of farm animals are at significantly increased risk of stunting compared to those children of HHs which possess farm animals. This finding is consistent with previous study [11]. This probably attributed to HHs having farm animals can cultivate different crops and purchase/exchange/foods and other goods to be consumed by the children. On the other hand, this study found that farm land ownership had no significant association with any of the forms of under nutrition which is consistent with previous study [12].

Households' income level was significantly associated with chronic nutritional status. Children from households having low income are more likely to be stunted than those from households of high income. Previous studies conducted in different areas support this finding [11,18,19,24-26,30,40]. This could be due to high income households have greater purchasing power for food and other goods needed to ensure the health of children.

In this study children of mothers who hadn't antenatal clinic visit were at significantly increased risk of stunting compared to those children of mothers who had the visit. This finding is similar with those study conducted in Nepal [41] which showed children of mothers who hadn't antenatal clinic visit were at significantly increased risk of stunting compared to those who had the visits. These findings could be attributed to the health information given to mothers by health professionals during antenatal periods. Possible health information that health professionals could offer to mothers may include information on exclusive breastfeeding, initiation of complementary feeding as well as comprehensive care for the children.

Children with 2 up to 4 birth order were significantly at increased risk of underweight compared to those children born to mothers who had no previous birth. Another study conducted in Ethiopia [24] also showed children with birth order of 6 and above were at increased risk of underweight compared to those birth order of one. In contrast to this another study conducted in rural Bangalore [37] reported no significant association between underweight and birth order. This discrepancy may be due to difference in cultures, socioeconomic conditions, and parents' educational status of this various study area communities.

In this study, children living in HHs having additional one or two under five children were at significantly increased risk of underweight than those living in HHs without other under five children. This finding is supported by other study conducted in Butajira, Ethiopia [23] and trend analysis in Kenya [26] which reports HHs having other under five children was at increased risk of underweight. This probably attributed to food intake and accessibility of healthcare decrease with higher number of under five children especially in low income families.

Similar with the finding of other studies [13,18,24], in this study presence of diarrhea within two weeks preceding the data collection were significantly associated with the occurrence of stunting and underweight. The high prevalence and significant risk of stunting and underweight were observed among children who had experiencing diarrhea within two weeks preceding the study. Similarly consistent with other study [42], high prevalence and significant risk of stunting were observed among children who had experience fever within two weeks preceding the study. This may be attributed to vicious cycle relationship between infectious diseases and under nutritional status. Presence of diarrhea and fever causes loss of appetite and decreased intake of food which intern leads to weight loss and the children quickly become undernourished. On the other hand undernourished status further leads to the occurrence of diarrhea and other infectious diseases due to immune decline.

The finding of this study found that there is a significant association between sources of drinking water and acute nutritional status.

The higher prevalence and significant risk of wasting were occurred among children who utilized unprotected water sources. This finding is supported by previous studies [10,26,30]. The possible justification will be utilization of safe water decreases the probability of exposure of the child to water borne diseases that negatively affect the health and nutritional status of children in the study area.

In this study other commonly reported variables like pre-lacteal feeding practices as well as other IYCF practices (like deprivation of colostrum, EBF, duration of breast feeding, time of initiation of complementary feeding), family size and immunization status of children were not significantly associated with any of the indicators of under-nutritional status. This finding is consistent with other previous studies conducted elsewhere [18,33,38,39]. In contrary other previous studies reported the association of these factors with under-nutritional status indicators [10,11,13,24,30,37].

Conclusions

The result of this study found that indicators of under-nutritional status especially stunting and wasting were highly prevalent that confirms the nutritional condition in the study area is serious. The figure of wasting and stunting in the study area was higher than 2014 EMDHS national as well as regional figure.

This study found male children were at significantly increased risk of wasting, stunting and underweight. In addition the study revealed that among the risk factors; child age, residence, maternal and paternal formal education status, visiting antenatal clinic, and diarrhea becomes the main risk factors that contribute for the occurrence of at least two forms of under-nutritional status (wasting, stunting and underweight) of children in the study area. Thus, to tackle these problem efforts should be made to improve sources of drinking water and parental education, to prevent and control childhood illness, to implement child's age, residence and sex specific interventions as well as to establish therapeutic and supplementary feeding programs.

Declaration

Ethical consideration

Participants of the study were informed regarding the objectives of the study. Participation in the study was totally voluntary. Name and other personal identifiers were not recorded on data collection form and the information that they give us was kept confidential and was also used for this study purpose only. As the study was conducted through face to face interview and as well via measurement, it would not cause any harm as far as the confidentiality is kept. They were given full right to leave/to refuse to take part at any stage of the interview. But their participation in this study was essential to achieving the stated objectives that cannot be achieved without the participation of them. The response of the study participants enable to generate new knowledge that would produce benefits for themselves, for other persons or for society as a whole, or for the advancement of knowledge. Informed verbal consent was obtained from the participants as witnessed by data collectors name and signature. The proposal of this study was reviewed and approved by Ethical Review Committee of Wollega University. Permission was also obtained from the concerned bodies of East Wollega Zonal Health Department and the responsible administrative bodies of Gida Ayana district.

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