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Research Article

Nutritional Status and Associated Factors among Children Aged 6 - 59 Months in Mareka Woreda, Dawuro Zone, Southern Ethiopia

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Abstract

Background: Poor nutrition is among the leading causes of morbidity, mortality, and risk of exposure to diseases during childhood. The trends in under-nutrition need to be well understood in order to identify strategies to plan interventions. Hence, this study was to determine determinants of nutritional status and associated factors among under-five children.

Methods: A community-based cross-sectional study was conducted in Mareka Woreda from January 13 up to February 14, 2018. Study participants were selected using systematic sampling procedures. Data was collected using a face-to-face interview by asking mothers and child anthropometric measurements. World Health Organization (WHO) Anthro software was used to convert anthropometric measurements into Z-scores. A multivariate logistic regression model was used to determine the predictors of undernutrition. A variable of AOR with 95% C.I at p-value < 0.05 is considered as statistically significant.

Result: The prevalence of stunting, underweight, and wasting in the study area were 38.8%, 23.3% and 13.8% respectively. Child dietary diversity score and source of drinking water supply were significantly associated with stunting. Child immunization, ever use of family planning and child age were significantly associated with being underweight. Household dietary diversity score, family size and child sickness within the last two weeks were significantly associated with wasting. The sex of the child was associated with both stunting and being underweight.

Conclusion: The prevalence of undernutrition during childhood in the district was high. Household dietary diversity intake should be better and mothers should be encouraged to take extra meals during pregnancy. Intervention on child immunization, drinking water supply and controlling of diarrhea will be needed.

Keywords: *Nutritional Status; Children; Child Dietary Diversity Score; Child Immunization*

Introduction

Child under nutrition is malnutrition during fetal under nutrition; insufficient breast feeding; and complementary feeding of diets low in energy dense foods, essential fatty acids, and micronutrients in different patterns such as underweight, stunting, wasting, marasmus and kwashiorkor [1-3].

Globally, under nutrition is one of the most serious health problems estimated to be accountable for 2.2 million annual deaths of children under the age of five [3]. Worldwide about 27% (171 million) and16% (104 million) of children under the age of five years were stunted and underweight respectively [4]. Nearly 1/3rd of children are underweight or stunted in sub-Saharan Africa from these 40% were chronically undernourished and greater than half of all deaths are associated with under nutrition [5].

According to EDHS, 2014 children aged below five years who were stunted, underweight and wasted were 40%, 25% and 9% respectively. Furthermore, in Southern Nation Nationality peoples Region (SNNPR) stunting, underweight and wasting were 44.3%, 26.3% and 6.8% respectively [7].

Nutritional disorder leaves long lasting mark damage in early life, safer stunted physical and mental capability, lower work capacity and productivity in later life when the problem appear especially during the first two years. Besides it increases susceptibility to infectious diseases, micronutrient deficiencies and suboptimum breastfeeding [8]. Furthermore, babies born from undernourished mothers are at risk of fetal growth restriction and death. Mother also likely to remain stunted through childhood and adolescence transmit their poor nutritional status to the next generation [9].

Nutritional status is affected by several determinants, such as socio-economic and demographic condition, child feeding (caring) practice, maternal characteristic environmental and behavioral factors [5]. Interventions to improve breast feeding, complementary feeding and use of insecticide treated bed nets to protect against malaria are likely to be the most effective preventive interventions against child under nutrition [3]. In order to solve the problem of under nutrition, it is necessary to measure its burden and understand its risk factors.

Aim of the Study

This study was aimed to assess the prevalence of under nutrition and associated factors among children under age five years in Mareka Woreda Dawuro zone, Southern Ethiopia.

Methods

The study was conducted in Mareka Woreda which is located at 345 km from regional capital of Hawassa and 552 kms from Addis Ababa. The Woreda has two climatic zones, the highland and midland and agriculture is the main livelihood for the most population. A Community based cross-sectional study was conducted from November 3 up to November 24, 2014. All selected mothers having children aged 6 - 59 months in the selected Kebeles within the study area are assumed to be study population. Sample size determined by using a single population proportion formula using assumptions of 95% C.I, 0.05% margin of error, design effect of 1.5 and prevalence from study done in Tahtay Adiyabo Woreda, Tigray Regional State, Ethiopia by calculating for the three indicators (proportion of stunting = 57.1%, underweight = 37.4% and wasting = 17.8% [16] and the greatest sample size was taken, n = 574, added 10% of non-response rate, finally the calculated sample size was 632 study participants.

Structured questionnaire was used for data collection by face-to-face interview techniques and anthropometric measurements taken. The questionnaire was first prepared in English and translated in to Dawureghna and back translated to English by language expert to check for its equivalency. Before the actual study begun 10% of the calculated sample was pre-tested on the Kebele which was not included in the study for its consistence and to check difficult terms.

The collected data was cleaned and coded and entered into EPI DATA software version 3.1 and then exported to Statistical Package for Social Science (SPSS) version 20.0 windows program for further analysis. Anthropometric data was exported to WHO Anthro software version 2.0.2 to convert anthropometric measurement into Z-scores. The converted Z-score was exported back from the Anthro software to SPSS. The wealth index (indicator of living standard of household) was constructed through principal component analysis (PCA). Child

and household dietary diversity score was calculated by different food groups suggested by FANTA guideline, for household 12 food groups and for child 9 food groups were used. Frequencies and cross tabulations were used to check for missed values and variables. Errors was identified and corrected after revising the original questionnaires.

Descriptive statistics like frequencies or proportions was done and presented by tables. Then bivariate analysis was done for stunting, underweight and wasting separately. The independent variables with p-value ≤ 0.25 during bivariate analysis were entered in to multivariate analysis. Association between dependent and independent variables was assessed using OR and 95% Confidence Interval (CI). Statistical association was declared significant when p-value was less than 0.05.

Anthropometric measurements and standardization

For children less than two years, weight of mother and children taken then the weight of mothers alone measured and takes the difference of the two. Children aged two and older were measured on their own. Concerning the height measurement for children under two years length measured in a lying position and above two years measured in a standing position with vertical wooden board. Both weight and height was taken by two times by different data collectors; for a difference in reading the measurements of two readings, average of the two measurements were taken.

Operational definitions

- **Under nutrition**: z-score below -2 from the International median NCHS/WHO reference values.
- **Stunting**: H/A < -2SD from the International median NCHS/WHO reference values.
- **Underweight:** W/A < -2SD from the International median NCHS/WHO reference value.
- **Wasting:** W/H < -2SD from the International median NCHS/WHO reference value.
- **Dietary diversity (score):** Child take ≤ 3 aggregated food group (Low), 4 and 5 food group (Medium) and 6 and more food group (High) scores within 24 hours.

Data collection tools and procedures

Structured questionnaire was used for data collection by face-to-face interview techniques and anthropometric measurements taken.

Results

Socio demographic characteristics

Six hundred thirty respondents responded the interview successfully gave response rate of 99.1%. The mean and (± SD) of age of the respondents was 30.2 (± 5.67) years. About 245 (38.9%), 595 (94.4%) and 282 (44.8%) were illiterate, married and attended primary school respectively.

Variable	Frequency	Percent
Head of HH		
Male	616	97.8
Female	14	2.2
Ethnicity		
Dawuro	620	98.41
Others	10	1.59
Religion		
Protestant	368	58.4
Orthodox	255	40.5
Others	7	1.1

Paternal educational status		
Illiterate	245	38.9
Primary	282	44.8
Secondary	50	7.9
Diploma and certificate	43	6.8
Degree and above	10	1.6
Occupation of husband		
Farmer	373	59.2
Government employee	39	6.2
Merchant	142	22.5
Private employee	21	3.3
Daily laborer	55	8.7
Family size		
< 5	415	65.9
> 5	215	34,1

Table 1: *Socio-demographic characteristics of the households of sampled children, Mareka Woreda, 2018 (n = 630).*

Maternal characteristics

About 515 (86.6%) of mothers were visit health institution for ANC and 195 (32.8%) were delivered at health institution but the rest were delivered at home. From the total respondents of mothers 302 (49.7%) were take extra meal during pregnancy/lactation period.

Variables	Frequency	Percent
Age of mother in year		
15 - 24	112	17.8
25 - 34	426	67.6
> = 35	92	14.6
Maternal educational status		
Illiterate	276	43.8
Primary	303	48.1
Secondary	31	4.9
Diploma and above	20	3.2
Maternal occupational status		
Housewife	548	86.9
Merchant	35	5.5
Government employee	21	3.3
Others	26	4.1
Marital status		
Married	595	94.4
Divorced	15	2.4

Widowed	12	1.9
Single	8	1.3
ANC attended		
Yes	545	86.5
No	85	13.49
Delivery		
At health facility	345	54.76
Home	285	45.23
Additional meal		
Yes	302	47.9
No	328	52.1

Table 2: *Maternal characteristics, Mareka Woreda, Dawuro Zone, 2018 (n = 630).*

Child characteristics and caring practice

From the total sampled children the Mean (± SD) age of children was 28 (± 15.38) month. About 578 (91.7%) children's mother were give first milk (colostrums) for their child. Majority of children 482 (76.5%) were exclusively breast feed for six months. About 549 (87.1%) children had initiated for breast feed immediately after birth (within one hour). About 87 (13.8%) were give pre-lacteal food (Table 3).

Variable	Frequency
Sex of child	
Male	342 (54.3%)
Female	288 (45.7%)
Child age group in month	
6 - 11	78 (12.4%)
12 - 23	190 (30.2%)
24 - 35	162 (27.5%)
36 - 47	134 (21.3%)
48 - 59	68 (10.8%)
Child get first milk	
Yes	**578 (91.7%)**
No	52 (8.3%)
Breast feed in first hr	
Yes	**549 (87.1%)**
No	81 (12.9%)
Child birth order	

1	90 (14.3%)
2 - 4	392 (62.2%)
> = 5	148 (23.5%)
Exclusive BF	
Yes	482 (76.5%)
No	148 (23.5%)
Vaccination status	
Not full vaccinated	147 (23.3%)
Fully vaccinated	483 (76.7%)
Vitamin A supplementation	
Yes	480 (76.2%)
No	150 (723.8%)
Diarrhea in the last two weeks	
Yes	102 (16.9%)
No	528 (83.8%)

Table 3: *Child characteristics and caring practice of Mareka Woreda, Dawuro Zone, 2018 (n = 630).*

Environmental factors

Regarding to source of drinking water that the respondents had used majority of households use river 310 (49.21%) and public tap 210 (33.33). About 550 (96.6%) of respondents had latrine.

Variable	Frequency	Percent
Waste disposal method		
Proper	200	31.75
Improper	430	68.25
Drinking water source		
Public tap		
River	240	38.1
Tube well or bore hole	310	49.21
Pond	34	5.39
Protected dug well or spring	18	2.85
Unprotected dug well or spring	14	2.22
Water source		
Unimproved	450	25.8
Improved	180	74.2
Main source of water		
Protected	178	28.25
Not protected	452	71.75

Presence of hand washing facility		
Yes	80	12.69
No	550	87.31
Having toilet facility		
Yes	550	87.31
No	80	12.69
Method to dispose waste		
Open field disposal	450	71.43
In a pit	90	14.28
Common pit	30	4.76
Composting	52	8.25
Burning	18	2.85
Washing hands with soap		
Yes	520	82.54
No	110	17.46

Table 4: *Hygiene and sanitation, Mareka Woreda, Dawuro Zone, 2018 (n = 630).*

Prevalence of nutritional status

From the total study participant the prevalence of stunting, underweight and wasting were 38.1%, 20.30% and 13.49% respectively. The prevalence of severe stunting, underweight and wasting were 21.40%, 6.70% and 6.67 respectively (Table 5).

Indicators of under nutrition	Frequency	Percent (%)
Stunting		
Normal HAZ (> = -2SD	390	61.9
Moderate HAZ (> = -3< -2SD)	105	16.7
Sever HAZ (< -3SD)	135	21.4
Overall stunting	240	38.1
Underweight		
Normal WAZ (> = -2SD)	504	80.00
Moderate WAZ (> = -3< -2SD)	84	13.49
Sever WAZ (< -3SD)	42	6.70
Overall underweight	126	20.30
Wasting		
Normal WHZ (> = -2SD)	545	86.5
Moderate WHZ (> = -3< -2SD)	43	6.83
Severe WHZ (< -3SD)	42	6.67
Overall wasting	85	13.49

Table 5: *Proportion of under nutrition among children aged 6 - 59 months, Mareka Woreda, Dawuro Zone, 2018 (n = 630).*

Factors associated with stunting

Variables	Normal	Stunting	Crude OR (95% CI)	Adjusted OR (95% CI)
Child dietary intake				
Low	300	160	1.42 (0.99, 2.04) *	1.44 (1.01, 2.01)**
Middle and high	90	80	1	1
Family wealth index				
Poor	330	190	2.02 (1.39, 2.94)*	2.01 (1.05, 3.88)**
Middle	45	36	1.63 (1.04, 2.56)*	1.37 (0.66, 2.88)
Rich	15	14	1	1
Drinking water source				
Unimproved	61	45	2.13 (1.46, 3.10)*	2.11 (1.08, 4.11)**
Improved	38	26	1	1

Table 6: *Factors associated with stunting of child under nutrition, Mareka Woreda, Dawuro Zone, March 2018.*

Factors associated with underweight

Child age group were also had a significant association with underweight. Child age group 6 - 12 month were 79% reduce the risk of underweight as compared to child age group 49 - 59 month (AOR = 0.21; 95% CI = 0.09, 0.44).

Another association found in this study in underweight was child immunization, as compared to child who had been fully immunized, child who were not ever been immunized were 3.39 times more likely to be underweight (AOR = 3.39; 95%CI = 1.21, 9.48) (Table 7).

Variables	Normal	Underweight	Crude OR	Adjusted OR
Sex of child				
Male	249	72	2.25 (2.06, 2.85)*	2.64 (1.75, 2.97)**
Female	258	46	1	1
Immunization				
Not vaccinated	14	9	3.43 (1.43, 8.22)*	3.39 (1.21, 9.48)**
Partially	77	39	2.69 (1.70, 4.28)*	1.87 (0.95, 3.70)
Fully vaccinated	373	70	1	1
Child age group (m)				
6 - 11	41	27	1	1
12 - 23	148	22	0.23 (0.12, 0.44)*	0.20 (0.09, 0.44)**
24 - 35	119	23	0.29 (0.15, 0.57)*	0.29 (0.14, 0.64)**
36 - 47	91	23	0.38 (0.19, 0.75)*	0.33 (0.15, 0.75)**
48 - 59	65	23	0.54 (0.27, 1.06)	0.36 (0.15, 0.85)**

Table 7: *Factors associated with underweight of child under-nutrition, Mareka Woreda, Dawuro Zone, March 2018.*

Factors associated with wasting

Variables	Normal	Wasting	Crude OR	Adjusted OR
Family size				
< 5	440	47	1	1
> 5	115	38	1.62 (1.39, 3.73)*	1.43 (1.28, 3.38) **
Meal during pregnancy				
Yes	437	53	1	1
No	108	32	1.68 (1.01, 2.99)*	1.45 (1.32, 2.86)**
Childhood diarrhea in the last 2 week				
Yes	170	35	1.28 (1.18, 2.12)*	1.11 (1.14, 1.98)**
No	375	50	1	1
HH DDS				
Low dietary intake	172	75	2.29 (1.78, 5.2)*	1.83 (1.29, 4.99)**
Middle and high	328	65	1	1

Table 8: *Factors associated with wasting of child under nutrition, Mareka Woreda, Dawuro zone March 2018.*

Discussion

The prevalence of stunting, underweight and wasting in this survey were 38.8%, 23.3% and 13.1% were nearly consistent with to EMDHS 2014 [6]. The prevalence of stunting was nearly comparable with different studies conducted in different districts of Ethiopia [10-14].

The multivariate logistic regression showed that stunting was associated with child sex, source of drinking water, family wealth index and child dietary diversity score were as child immunizations, extra meal during pregnancy/lactation and child age group also associated with underweight.

This study showed that male children were more likely to be stunted than female children (AOR = 1.75, 95% CI = 1.01, 3.03) which is consistent with survey from Ginbi and Bule Hora [12,15]. Moreover, economic status were consistence with studies done in Oromia and Tigray regions [10,11,16].

Households with poor water supply had significant role to stunting which is with study done Fars, families used unprotected spring for drinking purpose were more likely to had stunted children [17]. Low dietary score (< 3) were also significantly associated with stunting like survey from different part of the world this result was consistence with study done in Somali Region, Ethiopia [18-20].

The current study showed that the prevalence of underweight was 23.3% which comparable with survey of EMDHS (6), Haramaya (10) and survey form Bule Hora 29.2% [12], Ginbi (23.5) [15], Hidabu Abote District of Northern Shewa, Oromia region, Ethiopia (30.9%) [11] but higher than study from Tigray, Somalia and Amhara regions [13,16,21].

Male children were 2.04 times increased risk of developing underweight than female children (AOR = 2.04; 95%CI = 1.27, 3.27 which is consistent with the finding from Bule Hora district revealed that male children are more likely to be underweight [12].

Households having family size more than five were about 1.43 times more likely to have wasted children (AOR = 1.43; 95% CI = 1.28, 3.38). The rate of wasting in the present study was nearly consistent with a number of studies like from Northern Shewa (16.7%) [11], Tahtay Adiyabo woreda of Tigray region (17.8%) [16], Haramaya (10.7%) [10] and Bule Hora of Oromia region, Ethiopia (13.4%) [12].

Survey conducted in different part of the world revealed large family size is a factor for stunting, wasting and underweight [16,22]. This difference of association may be showed that the factor affecting one indicator of under nutrition being able to affect the other indicator of under nutrition.

Child sickness with diarrhea in the last two week was 71% times odds of increased risk of wasting (AOR = 1.71; 95%CI = 1.04, 2.8). Child sickness in diarrhea within the last two weeks were associated with wasting is consistence with the study conducted in Somalia, Bule Hora and Kunema district [12,16,23].

Finally, household dietary intake was significantly associated with wasting. Mothers who had not been taken additional meal during her pregnancy/lactation were 1.85 times more likely to have wasted children (AOR = 1.85; 95%CI = 1.02, 3.36). As compared to families with a high and middle dietary intake, low dietary intake families were 3.49 times more likely to have wasted child (AOR = 1.83;95%CI = 1.29, 4.99). This is like study done in East and West Gojjam Zones of Amhara Region, Ethiopia [24].

Conclusion

The prevalence of under nutrition in the study area was high (stunting = 38.76, underweight = 23.43 and wasting = 13.31). The main determinant factor of under nutrition in this study were family wealth index, child dietary diversity score, source of drinking water supply, child immunization, additional meal taking during pregnancy/lactation, child age group, household dietary score, family size and child sickness within the last two week. Child dietary diversity score and source of drinking water supply were significantly associated with stunting. Child immunization, ever used of family planning and child age group were significantly associated with underweight. Household dietary diversity score, family size and child sickness within the last two weeks were significantly associated with wasting. Sex of child was the only factor that had an association with both stunting and underweight.

Competing Interets

The authors declare that they have no competing interest.

Acknowlegements

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Data Availability

Data are available with the corresponding author in SPSS based.

Ethical Concerns

Ethical clearance was obtained from Mareka Woreda Health Office. Verbal consent was required from each selected participant mothers to confirm willingness to participate in the study. Confidentiality was ensured throughout the process. Prior to enrolling any of the eligible study participants, the purpose, the benefits and the confidential nature of the study was described and discussed for each participant. Only those consented and proved their willingness to take part in the study was enrolled in the study.

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