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Prevalence of Acute Malnutrition and its Associated Factors among Children aged 6-59 months in Mai-Aini Eritrean Refugees' Camp, Northern Ethiopia

Habtom Kelati, Bezatu Mengiste, Tadesse Alemayehu and Bereket Damtew*

Department of Public Health, College of Health and Medical Sciences, Haramaya University, Ethiopia

Abstract

Background: Acute malnutrition refers to someone who has lost a significant amount of weight over a short period of time, resulting in being underweight or wasting. In refugee situations where the population is often extremely dependent on the humanitarian assistance and food aid, the value of the food will greatly determine their nutritional status.

Objective: The main objective of this study was to assess the prevalence of acute malnutrition and its associated factors, among children aged 6-59 months in Mai-Aini Eritrean refugees' camp, Northern Ethiopian in 2014.

Methods: Community based cross-sectional study was conducted on 593 mother-child pairs between January 1 and 30, 2014. Anthropometric measurements of height and weight of children were taken and questionnaire prepared in local language (Tigrigna) were used to collect the data. Data were entered using EPI-data software (version 3.2) and exported to SPSS (version 16.0) for analysis. ENA for SMART 2007 software was used to convert nutritional data into Z-scores of the indices; weight-for-height and weight-for-age. Bivariate and multivariate analyses were used to identify factors associated with child malnutrition.

Results: The finding of this study revealed that 33.4% and 24.6% of children were underweight and wasted, respectively. Prevalence of acute malnutrition was higher in males compared to females. Underweight was associated with child age, consuming extra food during pregnancy and maternal BMI less than 18.5 Kg/m^2. Children age and receiving pre-lactate food was independently associated with wasting.

Conclusion: The prevalence of malnutrition among children aged 6-59 months was high, indicating that the nutrition situation in study area is very critical issue. Therefore, especial attention should be given on intervention of malnutrition.

Keywords: Child malnutrition; Wasting; Feeding practices; Mai-Aini eritrean refugee camp; Underweight; Ethiopia

Introduction

Malnutrition is responsible for nearly half 45% (around 3.1 million) of all deaths in children under five years of age annually. The effects of poor nutrition represent one of the most serious and preventable tragedies of our time [1]. Under nutrition traps the individuals and society in the vicious circle of poverty. Children growing up in poor households are more likely to suffer from under nutrition, which undermines their ability to learn and makes them more prone to disease and illness. This hinders a child's capacity to secure a job as an adult and to lead a productive life, thus perpetuating generational poverty [2].

In Ethiopia prevalence of wasting and underweight were 10% and 29%, respectively [3]. According to the Eritrean demography and health survey of 2002, 13% of children under-five years of age were wasted and 40% were underweight [4]. However, report of World Bank in 2011 revealed that 15% of children under-five years of age were wasted [5].

Malnutrition is the major health problems of refugees especially among under-five children. The magnitude and severity of the malnutrition may differ from one refugee camp to another [6]. In refugee situations where the population is often extremely dependant on the humanitarian assistance and food aid, the value of the food will greatly determine their nutritional status [7].

Food rations supplied by the United Nations High Commission for Refugees (UNHCR) are usually based on the minimum caloric intake of 2,100 kilocalories per person per day. Moreover, caloric intake is well below minimum standards due in part to low acceptability of the ration and in part to sale of the ration to purchase other food and non-food items [7,8]. Therefore, the purpose of this study was to assess the prevalence of acute malnutrition and its associated factors among children aged 6-59 months in Mai-Aini Eritrean refugees' camps in Tigray region, Northern Ethiopia from Jan 1 to 30, 2014.

Methods

Study design

A cross-sectional study was conducted in Mai-Aini Eritrean refugees' camp in Tigray region, Northern Ethiopia, from January 1 to 30, 2014. The source population were all children aged 6-59 months in

***Corresponding author:** Bereket Damtew, Department of Epidemiology and Biostatistics, College of Health and Medical Sciences, Haramaya University, Ethiopia, P.O. Box 1570, Harar, Ethiopia, E-mail: bekiofdu@gmail.com

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Mai-Aini Eritrean refugees' camps during the specified study period. The study population were all selected children aged 6-59 months in Mai-Aini Eritrean refugees' camp during the specified study period. All children aged 6-59 months and their mothers with complete information and a signed consent were eligible for inclusion into the study. A total of 593 mother-child pairs participated in the study. The maternal socio-demography and family planning together with child's feeding and clinical assessments were used as independent variables. The outcome variables were *Z*-scores of weight-for-age and weight-for-height.

Sample size and sample size determination

The sample size for the study was determined using the assumptions of single population proportion formula assuming the prevalence of stunting of 36.4% [9], 5% margin of error, 95% confidence level, adding 10% for possible non-response rate, the calculated sample sizes was 612. Systematic random sampling was used to select the study participants. When there is more than one child under-five years of age in the selected household, lottery method was used to randomly select the child who will participate in the study.

Data collection and quality control

A pre-tested structured interview questionnaire and anthropometric measurements were used for the collection of data. Questionnaire prepared in English was translated to Tigrigna language for data collection purpose and translated back to English for checking language consistency. To assess the physical growth and nutritional status of the children, measurements of height and weight were taken. The data was collected by a data collection team comprised of six data collectors, two anthropometric measurement recorders and two supervisors. The collected data were reviewed and checked for completeness and consistency by principal investigator on daily bases at the spot during the data collection time. And possible errors were returned to the collectors for correction.

Study variables and measurements

Salter hanging spring scale with graduations of 100 g and a capacity for 25 kg was utilized for measuring the weight of the children with minimum clothing and no shoes to the nearest 0.1 kg. Weighting scales were calibrated with known weight object regularly. The scales indicators were checked against zero reading after weighing every child and they measured twice. Recumbent length measurement was taken for children under two years of age while for children above two years stature was measured in a standing position in centimeters to the nearest of 0.1 cm.

For assessing the nutritional status of children, we adopted two anthropometric indices: weight-for-age and weight-for-height, expressed as percentage or Z-score of individual weight to the median or 50th percentile of the WHO growth references. Acute malnutrition is defined as normal (-2 to +2 Z-scores), moderate (-2 to -3 Z-scores) and severe (< -3 Z-scores) [10].

Data analysis

Data was checked, sorted, categorized and coded. After coding data, it was fed to the computer to make them ready for processing and analysis. Data was entered to EPI data (version 3.2) and analysed by using SPSS 16.0 statistical program. ENA for SMART software was used to convert nutritional data into Z-scores of the indices; weight-for-height and weight-for-age taking age and sex into consideration using WHO standards. Binary logistic regression was used to identify variables associated with malnutrition, and variables significant at P<0.25 were entered into the final multivariate model to identify significant factors independently predicting under-five malnutrition at P<0.05. Tables and charts were used to present results.

Ethical consideration

Ethical approval for the research was obtained from the Haramaya University, college of health and medical science; institutional research ethics review committee (IRERC). Data collection was carried out after receiving ethical clearance letters from the administration of the Mai-Aini camp. Informed verbal consent was obtained from each study subjects prior to data collection. Privacy and confidentiality of respondents were secured.

Results

Demographic and socio-economic conditions

From the total 612 planned study participants, complete responses were obtained from 593, with a response rate of 96.9%. As described in Table 1, male headed household (HHs) were 371 (62.6%) and females were 222 (37.4 %). The mean age of the head of HHs was 28.5 years (SD ± 6.53). The majority, 503 (84.8%) of the respondents were married. Average family size was 4.32 persons (SD ± 1.7), while 233 (39.3%) of the HHs have more than four family members. About 39.6 per cent of the HHs had two children under-five years of age. Majority of the respondents were Tigrigna ethnic group (93.3%) and with regard to religious views, 87.2% were Orthodox Christians. Regarding educational status, 23.8% of the mothers and 11.3% of the fathers did not attend formal education (Table 1).

Child characteristics

From the total of 593 children aged 6-59 months, 309 (52.1%) were males and 284 (47.9%) were females. The mean age of children was 28.25 months (SD ± 13.2). Among the study participants, 60 (10.1%) of children were delivered at home and 533 (89.9%) children were delivered at health facilities. Out of the 593 children, 176 (29.7%) had a history of diarrhoea in last two weeks before data collection, of which 73 (12.3%) of them had 3 to 4 episode of diarrhoea per year and 63 (10.8%) had five or more than episodes per a year. One hundred seventy (28.7%) and 119 (20.1%) of children had fever and ARI in the last two weeks, respectively. No oedema case was recorded in the study area two weeks prior to or during the data collection period (Table 2).

Child care practice

From the total study participants, breastfeeding practice was initiated immediately after birth for 396 (66.8%) children. Ninety (15.2%) children had received pre-lactation food or fluids. And about 184 (31%) children didn't receive colostrum's at birth. Most of the children, 537 (90.6%) children were exclusively breastfeed until six months of age (Table 3).

Maternal characteristics

The mean age of the mothers was 25.9 years (SD ± 4.7) and mean age at first child birth was 20.03 years (SD ± 3.04). Majority, 444 (74.8%) of mothers were in the age group of 20-29 years. About 110 (18.5%) of mothers gave first child birth below 18 years of age. About 278 (46.9%) of mothers did not take extra food during pregnancy or lactation and 268 (45.2%) did not have good health status during their pregnancy. Almost all, 590 (99.5%) of mothers visited health facilities for antenatal care during pregnancy of the child in the present study.

Variables	Frequency	Percentage (%)
Head of the HHs		
Male	371	62.5
Female	222	37.4
Marital status of the HHs		
Married	503	84.8
Divorced	7	1.2
Widowed	20	3.4
Separate	38	6.4
Single	25	4.2
Mother's education		
Illiterate	141	23.8
Primary	268	45.2
Secondary school	177	29.8
Tertiary level	7	1.2
Father's education		
Illiterate	67	11.3
Primary	202	34.1
Secondary school	286	48.2
Tertiary level	38	6.4
Monthly family income		
Monthly ration only	474	79.9
<400	54	9.1
400-800	50	8.4
>800	15	2.5
Family size		
2	71	12
3	141	23.8
4	148	25
≥5	233	39.3
Decision making		
Mainly wife	167	28.2
Mainly husband	119	20.1
Only husband	51	8.6
Both jointly	256	43.2
Ethnicity		
Tigrigna	553	93.3
Shaho	37	6.2
Others	3	0.5
Religion		
Orthodox	517	87.2
Muslim	37	6.2
Protestant	14	2.4
Catholic	25	4.2
Last residence in Eritrea		
Debub	500	84.5
Maekel	38	6.4
Gash barka	29	4.9
Other	26	4.3

Table 1: Socio-demographic characteristics of the households in Mai-Aini Eritrean refugees' camp, Tigray region, Northern Ethiopia (N=593), February 2014.

Nearly two-thirds of mothers, 379 (63.9%) used family planning with 284 (47.9%) using injections. Eighty per cent (475) of the mothers had awareness about exclusive breast-feeding (Table 4).

Environmental health characteristics of households

All households used public tap as main sources of drinking water. Almost all of HHs didn't treat their domestic water to make it safe to drink. Although the utilisation was not studied, every household had ventilated improved pit latrine. Regarding waste disposal system, 227 (38.3%) and 259 (43.7%) households were disposing their garbage in common pit and use for composing, respectively. Regarding the roof of houses (64.1%) were Tent and 213 (35.9%) corrugated iron sheets.

Nutritional status of the children

Prevalence of acute malnutrition among children aged 6-59 months in the study area were 33.4% for underweight and 24.6% for wasting. Malnutrition was higher among male under-five children compared to females. Underweight was recorded in 109 (35.3%) children among males compared to 89 (31.3%) among females. Similarly, wasting was more prevalent in males (85; 27.5%) than in females (61; 21.5%). The overall prevalence of severe of acute malnutrition among the study participants was 13.7% for underweight and 10.1%, for wasting

Variables	Frequency	Percentage (%)
Child sex		
Female	284	47.9
Male	309	52.1
Child age		
6-11 months	65	11
12-23 months	168	28.3
24-35 months	168	28.3
36-47 months	121	20.4
48-59 months	71	12
Birth order		
First	272	45.9
Second	172	29
Third	77	13
Fourth and above	72	12.1
Place of delivery		
Home	60	10.1
Health facility	533	89.9
Type of birth		
Single	582	98.1
Multiple	11	1.9
Vitamin A		
Yes	549	92.6
No	44	7.4
Frequent Health problem		
Yes	131	22.1
No	462	77.9
Diarrhoea in the last two weeks		
Yes	176	29.7
No	417	70.3
Fever in the last two weeks		
Yes	170	28.7
No	423	71.3
Child sex		
Female	284	47.9
Male	309	52.1
ARI in the last two weeks		
Yes	119	20.1
No	474	79.9
Measles in the last year		
Yes	71	12
No	522	88

Table 2: Child characteristics of the households in Mai-Aini Eritrean refugees' camp, Tigray region, Northern Ethiopia (N=593), February 2014

Variable	Frequency	Percentage
Initiation of breastfeeding		
Immediately	396	66.8
Less than 24 hours	160	27
Days	37	6.2
Colostrum's		
Yes	184	31
No	409	69
Pre-lactation food/fluid		
Yes	90	15.2
No	503	84.8
Still breastfeeding		
Yes	221	37.3
No	372	62.7
Complementary feeding/day		
<3 times	59	26.7
3 times	97	43.9
>3 times	64	29.4
EBF child(In months)		
3-Jan	9	1.5
5-Apr	47	7.9
6	463	78.1
12-Jul	74	12.5
Care taker of child		
Mother	573	96.6
Sister	19	3.2
Grand father	1	0.2
Change of feeding during illness		
Yes	460	77.6
No	133	22.4
Utensils washing practice		
Once daily	13	2.2
Twice daily	100	16.9
Every other day	128	21.6
Immediately after use	352	59.4
Bath taking		
Daily	484	81.6
Every other day	101	17
Weekly	8	1.3

Table 3: Child caring practices of the households in Mai-Aini Eritrean refugees' camp, Tigray region, Northern Ethiopia (N=593), February 2014

respectively (Table 5).

Comparing age groups, the highest prevalence of underweight was seen among children aged 24-35 months with prevalence of 9.6%, followed by 9.3% among the children aged 36-47. However, the lowest prevalence of underweight was seen among children aged 6-11 months with prevalence of 0.5%. The highest prevalence (7.6%) of wasting was seen among children aged 24-35 months and the lowest prevalence (1.3%), in children aged 6-11 months (Figure 1).

Factors associated with underweight

As indicated below, the bivariate analysis showed that child age, place of delivery, still breast feeding, history of fever in last two weeks, frequency of taking health facility, current FP use and maternal BMI were significantly associated with underweight (Table 6).

Final multivariate analysis of this study showed that, children whose mother's BMI was < 18.5 Kg/m^2 were about 1.8 times more likely to be underweight as compared to those children whose mother's BMI was ≥ 18.5 Kg/m^2 (AOR: 1.79; 95%CI: 1.06-3.00). Children whose mother consuming extra food during pregnancy at least once week were about 0.6 times less likely to be underweight than those children whose mother did not consuming extra food during pregnancy at least once week (AOR: 0.61; 95%CI: 0.38-0.98). Children in age group 25-35 months were 0.4 times less likely to be underweight than those children in age group 48-59 months (AOR: 0.43; 95%CI: 0.19-0.97). However, underweight among children in age group 36-47 months was not found to be statically significant (Table 6).

Factors associated with wasting

The Bivariate analysis showed that children age group 36-47 months, taking pre-lactating food, still breast feeding, fever in the last

Variable	Frequency	Percentage (%)
Age of mother(years)		
18- 29	417	70.3
30-39	116	19.6
40-49	60	10.1
Age at first birth(years)		
Less than 18	110	18.5
18-24	426	71.9
25- 30	57	9.6
Total child born before		
1	196	33.1
2	199	33.6
3	93	15.7
4	58	9.8
≥5	47	7.8
Extra food at pregnancy/lactation		
Yes	315	53.1
No	278	46.9
Health status during pregnancy		
Good	325	54.8
Not good	268	45.2
First ANC visits at HF (months)		
2	64	10.8
3	194	32.7
4	204	34.4
5	72	12.1
≥6	59	10
Family planning used		
Yes	379	63.9
No	214	36.1
Types of family planning used		
Pills	31	8.2
Injection	284	74.9
Implant	55	14.5
Others	9	2.4
Method of hand washing		
Using water only	22	3.7
Using soap sometimes	255	43
Using soap always	316	53.3
Awareness of EBF (in months)		
< 6	43	7.3
at 6	475	80.1
> 6	75	12.6

Table 4: Maternal characteristics of the households in Mai-Aini Eritrean refugees' camp, Tigray region, Northern Ethiopia (N=593), February 2014

Nutritional status	Male		Female		Total	
	N (309)	%	N(284)	%	N(593)	%
Underweight (WAZ)	***109***	***35.30%***	***89***	***31.30%***	***198***	***33.40%***
Moderate	62	20.10%	55	19.40%	117	19.70%
Severe	47	15.20%	34	12.00%	81	13.70%
Wasting (WHZ)	***85***	***27.50%***	***61***	***21.50%***	***146***	***24.60%***
Moderate	49	15.90%	37	13.00%	86	14.50%
Sever	36	11.70%	24	8.50%	60	10.10%

Table 5: Prevalence of acute malnutrition and its degree of severity by sex among children aged 6-59 months in Mai-Aini Eritrean refugees' camp, Tigray region, Northern Ethiopia (N=593), February 2014

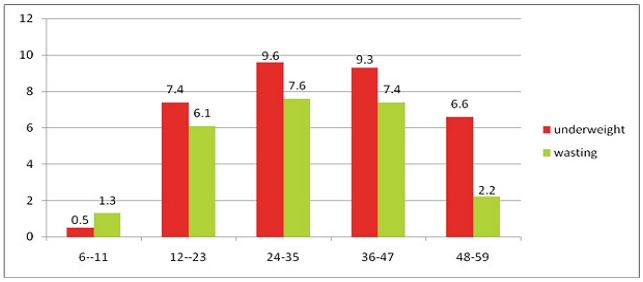

Figure 1: Comparing age groups, the highest prevalence of underweight was seen among children aged 24-35 months

two weeks, respiratory disease and disposal of garbage to individual and common pits were significantly associated with wasting (Table 7).

Final multivariate analysis of this study showed that children in age group 36-47 were 2.9 times more likely to be wasted than those children in age group 48-59 (AOR: 2.91; 95%CI: 1.39-6.11). And children who received pre-lactate food were 2.1 times more likely to be wasted as compared to children who were not receiving pre-lactate food (AOR: 2.14; 95%CI: 1.22–3.76) (Table 7).

Discussion

Prevalence of acute malnutrition among children aged 6–59 months in the study were 33.4% for underweight and 24.6% for wasting. Despite the absence of statistical significance, the percentage distribution of malnourished children shows that females are better off than males. According to WHO classification of the public health significance of malnutrition, underweight and wasting were a critical problem in the Mai-Aini refugee camp [10, 11].

The prevalence of underweight among under-five children at Mai-Aini refugee camp was higher compared to the Ethiopian national figure, 29% [3] and lower than the national figure of Eritrea, which was 40% [4]. However, underweight was nearly similar to that of 33.7% found in a study in Burmese refugee camp [9]. In this study, prevalence of wasting was higher as compared to the prevalence (3.6%–8.2%) reported from studies conducted at three different refugee camps in Kenya [12]. The prevalence of wasting was also higher than the national figures reported from both Ethiopia and Eretria [3,4].

Children whose mother's BMI was less than 18.5 Kg/m^2 were about 1.8 times more likely to be underweight as compared to those children whose mother's BMI was ≥ 18.5 Kg/m^2 (AOR: 1.79; 95%CI: 1.06–3.00). This is consistent with findings in a study conducted in Bangladesh [13]. Maternal malnutrition leads to poor foetal growth and low birth weight. Among undernourished women, balanced protein-energy supplementation has been found effective in reducing the prevalence of low birth weight [14].

In the present finding, children whose mothers were consuming extra food during pregnancy at least once a week were about 0.6 times

Variable	Underweight		Crude OR (95% CI)	AOR (95% CI)
	Yes	No		
Marital status				
Married	169	334	1.0 6(0.66-1.72)	1.44 (0.71-2.93)
Others*	26	64	1	1
Child sex				
Male	109	200	1.19 (0.85-1.68)	1.43 (0.89-2.29)
Female	89	195	1	1
Age of child (months)				
11-Jun	3	62	0.40 (0.11-0.14)†	0.02 (0.002-0.19)†
23-Dec	44	124	0.29 (0.16-0.52)†	0.30 (0.11-0.81)†
24-35	57	111	0.42 (0.24-0.74)†	0.43 (0.19-0.97)†
36-47	55	66	0.68 (0.38-1.23)	0.63 (0.28-1.41)
48-59	39	32	1	1
Place of delivery				
Home	29	31	2.02 (1.18-3.45)†	1.47 (0.66-3.28)
Health facility	169	364	1	1
Time of first breastfed				
Immediately	130	266	1.08 (0.75-1.55)	1.22 (0.72-2.04)
Not –immediately	68	129	1	1
Still breastfeeding				
Yes	46	175	0.38 (0.26-0.56)†	0.81 (0.38-1.71)
No	152	220	1	1
Length of breast fed				
≤ 24	167	350	0.69 (0.42-1.13)	1.32 (0.67-2.60)
>24	31	45	1	1
Diarrhoea in last 2 weeks				
Yes	62	114	1.12 (0.78-1.63)	1.70 (0.99-2.60)
No	136	281	1	1
Fever in last 2 weeks				
Yes	46	124	0.66 (0.45-0.98)†	0.65 (0.37-1.12)
No	152	271	1	1
Frequency of taking HF visits				
≤ 4 times	47	137	0.59 (0.40-0.86)†	0.82 (0.47-1.42)
> 4 times	151	258	1	1
Planned birth				
Yes	153	323	0.76 (0.50-1.15)	0.65 (0.35-1.19)
No	45	72	1	1
Extra food during pregnancy				
Yes	99	216	0.83 (0.59-1.17)	0.61 (0.38-0.98)†
No	99	179	1	1
Current FP using				
Yes	63	151	0.60 (0.39-0.92)†	0.64 (0.40-1.03)
No	68	98	1	1
Maternal BMI (Kg/m^2)				
< 18.5	69	100	1.58 (1.09-2.28)†	1.79 (1.06-3.00)†
≥ 18.5	128	296	1	1

Table 6: Factors associated with underweight among children aged 6-59 months in Mai-Aini Eritrean refugees' camp Tigray region, Northern Ethiopia (N=593), February 2014

Variable	Underweight		Crude OR (95% CI)	AOR (95% CI)
	Yes	No		
Marital status				
Married	120	383	0.77 (0.47-1.27)	0.77 (0.45-1.33)
Others*	26	64	1	1
Maternal education				
Illiterate	43	107	0.74 (0.45-1.23)	0.87 (0.51-1.48)
Primary	57	211	0.63 (0.41-0.97)	0.70 (0.44-1.13)
Secondary and above	55	129	1	1
Child sex				
Male	85	224	1.39 (0.95-2.02)	1.44 (0.96-2.15)
Female	61	223	1	1
Age of child (months)				
11-Jun	8	57	0.63 (0.24-1.63)	0.62 (0.19-2.00)
23-Dec	36	132	1.22 (0.60-2.46)	1.13 (0.47-2.71)
24-35	45	123	1.63 (0.82-3.26)	1.43 (0.69-2.97)
36-47	44	77	2.55 (1.26-5.17)†	2.91 (1.39-6.11)†
48-59	13	58	1	1
Time of first breastfed				
Immediately	107	289	0.67 (0.44-1.01)	0.64 (0.39-1.05)
Not –immediately	39	158	1	1
Pre-lactate food received				
Yes	30	60	1.67 (1.03-2.71)†	2.14 (1.22-3.76)†
No	116	387	1	1
Still breast feeding				
Yes	43	178	0.63 (0.42-0.94)	1.01 (0.53-1.94)
No	103	269	1	1
Vitamin A				
Yes	138	422	1.51 (0.69-3.33)	1.60 (0.70-3.69)
No	8	36	1	1
Diarrhoea in last 2 weeks				
Yes	46	130	1.12 (0.75-1.168)	1.30 (0.82-2.08)
No	100	317	1	1
Fever in last 2 weeks				
Yes	31	139	0.60 (0.38-0.93)†	0.67 (0.39-1.14)
No	115	308	1	1
ARI in last 2 weeks				
Yes	20	99	0.56 (0.33-0.93)†	0.69 (0.38-1.25)
No	126	348	1	1
Frequency of taking HF				
≤ 4 times	37	147	0.69 (0.45-1.06)	0.83 (0.52-1.33)
> 4 times	109	300	1	1
Maternal BMI				
< 18.5	50	119	1.44 (0.96-2.14)	1.48 (0.97-2.27)
≥18.5	96	328	1	1
Disposal of garbage				
Open field	12	39	0.67 (0.33-1.35)	0.74 (0.35-1.56)
Individual pit	9	46	0.42 (0.20-0.91)†	0.54 (0.24-1.21)
Common pit	53	206	0.56 (0.37-0.84)†	0.72 (0.45-1.16)
Composing	72	156	1	1

Table 7: Factors Associated with wasting among children aged 6-59 months in Mai-Aini Eritrean refugees' camp, Tigray region, Northern Ethiopia (N=593), February 2014

less likely to be underweight as compared to those children whose mothers were not consuming extra food during pregnancy (AOR: 0.61; 95%CI: 0.38–0.98). Nutritional status before and during pregnancy has an influence on maternal and child health outcomes. Although the refugees were able to procure some non-ration foods through purchasing and exchanging ration foods for other items, the quantity and quality were not sufficient to compensate for the nutrients that were low or lacking in the ration. The overwhelming majority of dietary nutrients were provided by ration foods, and although the ration and the overall diet may be adequate for short-term subsistence, they do not suffice for long-term survival and optimal growth [9].

In this study children who received pre-lactate food were 2.1 times more likely to end up wasted as compared to children who didn't receive pre-lactate food (AOR: 2.14; 95%CI: 1.22–3.76). Exclusive breastfeeding in the first six months of life saves lives. During this period, an infant who is not breastfed is more than 14 times more likely to die from all causes than an exclusively breastfed infant [6]. Poor breastfeeding and child feeding practices augmented by very early introduction of nutritionally inadequate and contaminated complementary foods are major factors contributing to persistent child malnutrition. The promotion of exclusive breastfeeding during the first 6 months and appropriate feeding practices has been the integral parts of the intervention processes [15].

The present study showed that children in age group 36–47 months were 2.9 times more likely to be wasted than those children in age group 48-59 months (AOR: 2.91; 95%CI: 1.39–6.11). Adequate intake of energy and nutrients is necessary for children to achieve their full growth and developmental potential. Under nutrition during these years impairs children's cognitive development as well as their ability to explore their environments [16]. It is essential that highly dependent refugee populations should be given sufficient macro and micro nutrients to support growth and development [7]. A study in Jordanian refugee camps on evaluation of the food rations supplied by the UNHCR revealed rationed foods supplied little of some micronutrients: only 33% of vitamin A needs were met. Dietary supplementation for refugees in camps is always warranted [17].

Limitation of the Study

Since the refugees were displaced from their homeland inconveniently, most of them did not bring their birth certificate or immunization card, especially those children born outside of Ethiopia. So the information was vulnerable to recall bias.

Conclusion

The finding of this study revealed high prevalence rate of acute malnutrition (underweight and wasting) among the under five children at Mai-Aini refugee camp. Males were more likely to become wasted and under-weight than females. Consuming extra food during pregnancy at least once week, maternal BMI and receiving pre-lactating food were associated with at least with one form of malnutrition.

The health centre and partner non-governmental organizations (NGOs) which are engaged in nutrition intervention at the Mai-Aini refugee camp should design integrated nutrition programs with special focus to children with the risk factors for acute malnutrition. As improvements in maternal health have important role in reserving the child health, attention should be given to maintain maternal BMI ≥ 18.5 Kg/m^2 and provide additional calories to pregnant and lactating mothers than the normal times. Nutrition education should be strengthened to improve the feeding practice of parents, so as to

promote mandatory exclusive breast feeding practices till 6 months and avoid traditional pre-lacteal feeding by refugee community. Continues nutrition surveillance needs to be done to identify and emphasize on interventions to children of vulnerable groups.

Competing Interests

The authors (s) declare that they have no competing interests.

Authors' Contributions

HK was the lead author who carried out the designing and development of the study. BM participated in designing the study, statistical analyses and development of the manuscript. TA participated in the study design, data collection and write-up of the research article. BD participated in the analyses and interpretations of study findings, and narration of the manuscript for publication. All authors read and approved the final manuscript.

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