Severe Acute Malnutrition and Feeding Practice of Children Aged 6-59 Months in Pastoral Community, Afar, Ethiopia: Descriptive Cross-Sectional Study

Getahun Fentaw Mulaw[*], Bizunesh Fantahun Kase, Adebabay Dessie Manchilo, Bereket Lopiso Lombebo and Begna Melkamu Tollosa

Department of Public Health, College of Medical and Health Sciences, Samara University, Samara, Afar, Ethiopia

Abstract:

Background: Severe acute malnutrition remains one of the most common causes of morbidity and mortality among children in developing countries, including Ethiopia. Knowing the local burden of SAM has huge importance for public health interventions. Therefore this study aimed to assess the level of severe acute malnutrition and feeding practice of children aged 6–59 months in Abaa'la district, Afar, Northeast, Ethiopia.

Methods: Community-based descriptive cross-sectional study was conducted on 422 mother-child pairs of children aged 6–59 months. Kebeles were selected randomly after stratifying the district in to urban and rural, and study participants were selected using a cluster sampling technique. Data were collected using an interviewer-administered questionnaire, and child nutritional status was measured using WHO Mid upper arm circumference measuring tape. Data were entered into Epi data version 3.1 and exported to SPSS version 22 for analysis. The result was presented using Descriptive statistics.

Results: The prevalence of severe acute malnutrition (SAM) was found to be 4.3% (95% CI, 2.3-6.1%) and that of moderate acute malnutrition (MAM) was 21.1 %. Almost all (98.8%) of children were ever breastfed. Prelacteal feeding and bottle feeding was practiced by 31% and 33.9% of children, respectively. Only 68.5% of children were feed colostrum. Around 45.5% of children were exclusively breastfed for the first six months, and 70.4% of children wean breastfeeding before the age of two years.

Conclusion: The prevalence of severe acute malnutrition in the study area was lower than the regional figures, but still, it is a public health priority. There are improper child care and feeding practices. Therefore, public health interventions that can improve those practices should be strengthened.

Keywords: Severe acute malnutrition, Abaa'la, Afar, Ethiopia, Children aged 6-59 Months.

1. BACKGROUND

Malnutrition is described as the cellular imbalance between the supply of nutrients and energy, and the body demands them to ensure growth maintenance and specific functions [1]. Malnutrition can be manifested as both over-nutrition and under-nutrition [2]. Malnutrition can be presented as acute malnutrition (wasting) or as chronic malnutrition (stunting). Severe Acute malnutrition (SAM) is defined by the presence of bilateral pitting edema, and Weight-for-height < 70% (<-3SD), or MUAC less than 110 mm [3]. Malnutrition during childhood is a result of unsatisfactory food intake, severe and repeated infections, inadequate care of women and children, insufficient health care, and an unhealthy environment. There are also economic, social, and cultural causes of malnutrition [4, 5].

Globally, it is estimated that there are nearly 20 million severe acute malnourished children [6, 7]. In sub-Saharan Africa, nearly 1 in 10 children under the age of five were wasted. More than 80 % of the 2 million children treated for acute malnutrition were found in sub-Saharan Africa [8]. The United Nations (UN) estimates that around one million children under the age of five die every year from SAM [1]. SAM remains a major killer of children under five years of age [7]. It kills children by increasing the case fatality of childhood infections, and therefore it is an immediate or direct cause of child death [9-11)]. An estimated 53% of infection death is the effect of malnutrition on diseases such as measles, pneumonia, and diarrhea [12].

SAM is one of the leading causes of morbidity and mortality in children under the age of five in developing countries, including Ethiopia [13, 14]. In Ethiopia, according to EDHS 2016, the prevalence of SAM (WHZ<-3SD) is 3% while Moderate acute malnutrition (MAM) or (wasting) (WHZ<-2SD) is 10%, specifically in the Afar Region, it was 5.3% and 17.7 % respectively [14].

According to another study done in Asayita district, Afar showed that the prevalence of moderate acute malnutrition is 12.8% [15].

*Address correspondence to this author at the Department of Public Health, College of Medical and Health Sciences, Samara University, Samara, Afar, Ethiopia; Tel: +251910143645; E-mail: gechfentaw1014@gmail.com

The country continued its efforts to end child malnutrition by launching nutritional programs such as National Nutrition Program (NNP) and Seqota declaration [16, 17]. To accelerating its reduction and for achieving the set targets, Ethiopia should do context specified evidence-based interventions. Identifying local and context-specific information is vital, but the country lacks actually. Moreover, there is no specific study on the prevalence of SAM among children aged 6–59 months in the study area. Thus, this study's rationale was to explore the prevalence of severe acute malnutrition (SAM) and the feeding practice of children aged 6-59 months in Abaa'la district Afar, Ethiopia.

2. METHODS

2.1. Study Setting and Design

A community-based descriptive cross-sectional study was conducted in Abaa'la District, Afar, Ethiopia, from March 10-30, 2018. The district is found in the Afar regional state located around 942km northeast of Addis Ababa, the capital city of Ethiopia, and 491 km North of Samara, the capital city of the Afar region. According to the projection of the 2007 census, the total population of the district was estimated to be 37,963 [18]. The district has one general hospital, four health centers, and eight functional health posts.

2.2. Sample Size and Sampling Technique

The sample size was calculated using a single population proportion formula, considering a 95% confidence interval, 5% margin of error, P of 50%, and 10% non-response rate. Therefore, the calculated final sample size was 422. The district had fourteen kebeles, from which eight were urban, and six were rural. After stratification to urban and rural, three from urban and two from rural kebeles were selected by simple random sampling. Then the sample size was allocated proportionally based on the total number of under-five children for each selected kebeles. Then, the study units were selected using the cluster sampling techni-que. For households with more than one eligible child, one was selected randomly using the lottery method.

2.3. Study Variables

The potential studied variables were classified into five groups. Socio-demographic and economic related determinants (Maternal age, maternal religion, marital status, ethnicity, parents education, maternal occupation, family size, number of under-five children within the household, decision-maker of the household,

child sex, child age), maternal and child health care characteristics (antenatal visit, birthplace, preceding birth interval, vaccination status of the child, childhood illness (history diarrhea, fever, and cough in the last two weeks)), child feeding practice and nutritional status of children related characteristics (breastfeeding initiation time, prelacteal feeding, colostrum feeding, duration of exclusive breastfeeding, complementary feeding material, Child MUAC), and sanitation and hygiene-related characteristics (source of drinking water, ownership of latrine, type of latrine, hand washing practice, solid waste disposal).

2.4. Data Collection Tools and Instruments

Data were collected using an interviewer-administered semi-structured questionnaire with mothers or caregivers of children aged 6-59 months. The questionnaire was prepared in English and translated into the local language (Afar af) and retranslated back to English to check the consistency. Pre-testing was done in 10% of the calculated sample size in none-selected kebeles of the district, and then the necessary modification was done accordingly.

SAM was determined using MUAC less than 11.0 centimeter (cm). MUAC measurement was performed using WHO MUAC measuring tape (shaker's strip) marked in appropriate colors (green, yellow, and red) to the nearest 0.1 cm following WHO standardized procedures. Readings less than 11 Cm/red was recorded as severely malnourished, between 11-12.5 cm/yellow was recorded as moderately malnourished while above 12.5 cm/green was recorded as normal [19, 20]. The valid age of children was determined using written official documents like vaccination cards. For those who had no written evidence of birth date, to minimize errors in the recall of the child age, pre-prepared local calendar and cross-checking with the other family member were done. The vaccination status of the child was assessed by card, BCG scar, and mother's recall.

Four female diploma-holder health professionals were employed as data collectors, and two male BSC-holder public health professionals were recruited as supervisors. The field team was fluent in the local language. Two days of training were given for data collectors and supervisors on the purpose of the study, the data collection procedures, and ethical issues.

2.5. Data Processing and Analysis

Data were checked for incompleteness and inconsistency, edited, cleaned, coded, and entered into

Epi data version 3.1 and then exported to SPSS version 22 for analysis. Descriptive statistics were used to present the result. The result of categorical variables was presented using frequency and percentage and that of continuous variables with a mean (±SD).

3. RESULT

3.1. Socio-Demographic Characteristics of Study Participants

A total of 422 subjects were included in this study, with a response rate of 100%. About 61.8% of mothers

Table 1:   Characteristics of Study Participants in Abaa'la District, Afar, Northeast Ethiopia, 2018

Variables	Category	Frequency (N=422)	Percent (%)
Age of mother (in years)	<20	40	9.5
	20-34	295	69.9
	>34	87	20.6
Mean age (±SD) of mothers	28(±7.4) years		
Ethnicity	Afar	261	61.8
	Tigray	143	33.9
	Others*	18	4.3
Maternal religion	Orthodox	149	35.3
	Muslim	267	63.3
	others**	6	1.4
Maternal occupation	Housewife	84	19.9
	Pastoral	139	32.9
	Merchant	125	29.6
	Government employee	43	10.3
	Others***	31	7.3
Educational status of mother	Not able to read and write	219	51.9
	Able to read and write	203	48.1
Marital status of mother	Married	407	96.4
	others****	15	3.5
Household family size	< 4	198	46.9
	>=4	224	53.1
Head of household	Father of index child	387	91.7
	Mother of index child	35	8.3
Number of <5 children within the household	Only one child	39	9.2
	Only two children	145	34.4
	Three or more children	238	56.4
Occupation of father	Farmer	89	21.1
	Pastoral	147	34.8
	Merchant	73	17.3
	Government employee	82	19.4
	Others***	31	7.3
Educational status of father	Unable to read and write	189	44.8
	Able to read and write	223	55.2
Child sex	Male	198	46.9
	Female	224	53.1
Age of the index child (in complete months)	6-11	93	22.0
	12-23	129	30.6
	24-35	112	26.5
	36-47	53	12.6
	48-59	35	8.3
Mean (±SD) age of children	22 (± 6.8) months		

*Amhara, Somalie, **Protestant, catholic, ***Daily labor, NGO, ****Divorced, widowed.

were Afar by ethnicity. Only less than half, 48.1% of the mothers were able to read and write. More than half of the children, 53.1%, were females (Table **1**).

3.2. Child Feeding Practice and Nutritional Status

The majority, 98.8% of children were ever breastfed. Prelacteal feeding was practiced by 31% of study participants. Less than half 45.5 % of children were exclusively breastfed for the first six months. Using child MUAC measurements, 4.3% and 21.1% of children were severely malnourished and moderately malnourished, respectively (Table **2**).

3.3. Child and Maternal Healthcare-Related Characteristics

According to maternal recall, 14.7%, 13.3%, and 7.6% of children had diarrhea, fever, and cough two weeks before data collection time, respectively.

Regarding vaccination status, 81.3% of children get at least one kind of vaccine. But from those who were vaccinated, only 23.6% were fully vaccinated. Near to two-third, 62.6% of mothers had at least one ANC follow-up. More than two-third, 68.9% of mothers gave birth at home. From the total respondents, around two-third, 67.7%, had a preceding birth interval of fewer than 24 months (Table **3**).

3.4. Sanitation and Hygiene-Related Characteristics

From the total study participants, 77.2% of them dispose of solid waste in the open field. More than half, 60.7% of study participants had a restroom, of which 98.8% were pit type, and 93% of them did not have an attached hand washing facility. Less than one-third, 30.1% of mothers were used soap for handwashing. Less than half, 46.9% of them got water from the protected source (Table **4**).

Table 2: Feeding Practice and Nutritional Status of Children in Abaa'la District, Afar, Northeast Ethiopia, 2018

Variables	Category	Frequency	Percent (%)
Ever breastfeed	Yes	417	98.8
	No	5	1.2
Time of initiation of breastfeeding after birth	Immediately	344	82.1
	After an hour	75	17.9
Colostrum feeding	Yes	289	68.5
	No	133	31.5
Prelacteal feeding	Yes	130	31.0
	No	289	69.9
Frequency of breastfeeding per day	< 8 times	147	35.1
	>=8 times	272	64.9
Exclusively breastfeed for the first 6 months	Yes	192	45.5
	No	230	54.5
Frequency of complementary diet with 24 hours	<=3 times per day	248	58.8
	>=4 times per day	174	41.2
Materials to feed complementary feeding	Bottle	143	33.9
	Cup	195	45.2
	Spoon	84	19.9
Time of weaning breastfeeding	< 24 months	297	70.4
	>= 24 months	125	29.6
MUAC of the index child (in Cm)	<11	18	4.3
	11-12.5	89	21.1
	>12.5	315	74.6

Table 3:   Healthcare-Related Characteristics of Study Participants in Abaa'la District, Afar, Northeast Ethiopia, 2018

Variables	Category	Frequency	Percent
Having history of diarrhea in the last two weeks	Yes	62	14.7
	No	360	85.3
Having history of fever in the last two weeks	Yes	56	13.3
	No	366	86.7
Having history of cough in the last two weeks	Yes	32	7.6
	No	390	92.4
Vaccination status of the child (at least one type)	Yes	343	81.3
	No	79	18.7
Vaccination status of the child (Fully vaccinated)(n=343)	Fully vaccinated	81	23.6
	Partially vaccinated	262	76.4
Maternal Antenatal care(ANC) follow-up	Yes	264	62.6
	No	158	37.4
Frequency of ANC follow-up (n=264)	One times	42	15.9
	Two times	96	36.4
	Three times	38	14.4
	>= Four times	88	33.3
Place of delivery of the index child	Home	290	68.7
	Health institution	132	31.3
Preceding birth interval for the index child	First child	44	10.4
	< 24 months	286	67.8
	>= 24 months	92	21.8

Table 4:   Sanitation and Hygiene-Related Practice of Study Participants in Abaa'la District, Afar, Northeast Ethiopia, 2018

Variables	Category	Frequency	Percent (%)
Water source	Protected	198	46.9
	Unprotected	224	53.1
Solid waste disposal site	Private pit	28	6.6
	Open field	326	77.2
	Municipality/Communal pit	52	12.4
	Others*	16	3.8
Latrine ownership	Yes	256	60.7
	No	166	39.3
Type of latrine	Pit latrine	253	98.8
	VIPL	3	1.2
Attached hand washing facility to the toilet	Yes	15	7.0
	No	238	93.0
Hand washing practice of the mother	Before food preparation	343	81.3
	After cleaning the child	297	70.3
	After toilet	248	58.7
	Soap usage for hand washing	127	30.1

*They burn it inside their compound, VIPL=Ventilated Improved Pit Latrine.

4. DISCUSSION

This study was planned to assess the prevalence of severe acute malnutrition among children aged 6-59 months in Abaa'la district, Afar, Northeast Ethiopia, using a community-based descriptive cross-sectional study design. Accordingly, the prevalence of severe acute malnutrition (MUAC less than 11cm) in the study area was found to be 4.3 % (95% CI, 2.3, 6.1%), and moderate acute malnutrition (MUAC between 11cm and 12.5 cm) was 21.1%.

The finding is comparable with studies done in Bule Hora district, Oromia regional state, Ethiopia, in which 3.9 % of children were found to be severely malnourished [21], in Bure town, West Gojam, Amhara region in which 4.4% of children were diagnosed with severe acute malnutrition, and in Hadaleala district, Afar Region, in which 11.8% of children were found to be acutely malnourished [22]. But the finding of this study is lower than the studies conducted in the Somali region in which 52.5% of children were severely malnourished [23]. This difference could be the difference in socio-demographic and dietary feeding practices. But The figure is also slightly higher than the national EDHS result in which 3% of children are severely wasted but lower than the regional EDHS figure (5.3% of children are severely wasted) [14]. The discrepancy might be due to a small sample size compared to that of national data and the exclusion of children under the age of six months in the present study.

Even though colostrum is considered as the golden milk and considered as the first natural vaccine, in this study, only 68.5% of children were taken it. In this study, prelacteal feeding practice was high, which is 31%. Bottle feeding was also practiced by 33.9% of children. Only 68.5% of children were feed colostrum. Around 45.5% of children were exclusively breastfed for the first six months, and 70.4% of children wean breastfeeding before the age of two years.

Dealing with vaccination, 81.3% of children had ever been vaccinated, from which only 18.7% were fully immunized. Around 37.5 % of mothers did not attend ANC at all, and 68.9% of mothers give birth at home. More than half 53.1% of study participants did not get a protected water source. Open field solid waste disposal was practiced by 77.2% of study participants. This indicates that there is an improper infant and young child feeding (IYCF) practices, inadequate maternal health care, and sanitation and hygienic practices in the study area.

This study could have the following limitations. Since the design is a descriptive cross-sectional study, it couldn't assess the association between nutritional status and other factors. Findings could be affected by recall bias, interviewer bias, and anthropometric measurement bias. However, due attention was given to the training of data collectors, standardization of anthropometric measurements, and close supervision throughout the fieldwork.

5. CONCLUSION

The prevalence of severe acute malnutrition in this study area was lower than the regional figures. However, it is still public health priority because of its major effect on morbidity and impairment of intellectual and physical development in the long‑term. There are improper child care and feeding practices. Therefore, stakeholders working in the district should consider and strengthen public health interventions that can improve those practices.

ABBREVIATIONS

ANC　　　= Antenatal Care

CI　　　　= Confidence Interval

EDHS　　= Ethiopian Demographic and Health Survey

ETB　　　= Ethiopian Birr

MAM　　　= Moderate Acute Malnutrition

MUAC　　= Mid Upper Arm Circumference

NNP　　　= National Nutrition Program

SAM　　　= Severe Acute Malnutrition

SNNP　　= Southern Nations Nationalities Peoples

SPSS　　= Statistical Package for Social Science

UNICEF　= United Nations Children's Fund

UN　　　　= United Nations

VIPL　　　= Ventilated Improved Pit Latrine

WHO　　　= World Health Organization

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AVAILABILITY OF DATA AND MATERIALS

The datasets analyzed during the current study are available from the corresponding author upon reasonable request.

AUTHORS' CONTRIBUTIONS

GFM, BF, and AD conceived and designed the study, performed analysis, interpreted the data. GFM prepared the manuscript, and all authors read and approved the final manuscript.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Institutional Review Board of the college of medical and health sciences, Samara University [protocol approval: **ERC-0928/2010**]. An official letter of support was obtained from the Afar Regional Health Bureau and Aba'ala district health and administrative Offices. The objectives of the study were explained to the parents. Privacy and confidentiality of collected information were ensured at all levels. Interview and anthropometric measurements were conducted in a private area, and their name was not requested and recorded. Informed written consent was obtained from the mother or caregivers of children. Counseling, advice, and linkage to appropriate health care and support were given for cases.

CONSENT FOR PUBLICATION

This manuscript does not report personal data such as individual details, images, or videos; therefore, consent for publication is not necessary.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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