



Nutritional Status and Feeding Practice of Children 6-59 Months Old, Metekele Zone of Benishangul-Gumuz Region, Northwest Ethiopia

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Abstract: Introduction: Malnutrition has been responsible, directly or indirectly, for 60% of all deaths annually among children. Over two-thirds of these deaths, which are often associated with inappropriate feeding practices, occur during the first year of life. Objectives: To assess child feeding practices of Gumuz mothers and its correlation with the nutritional status of their children in Metekele Zone; Benishangul Gumuz region, North West Ethiopia. Methods: The study was conducted from February to March 2013, on randomly selected mothers with under-five children. A structured questionnaire was used to collect data for quantitative while in-depth interview was used for the qualitative. Z-scores of anthropometric indices were computed using ANTHRO PLUS 2007. The data was analyzed using SPSS version 16.0. Association between independent variables affecting nutritional status of under-five children was identified by using multiple logistic regressions. Result: out of the 795 mothers interviewed, almost all (99.5%) ever breast-feed the baby, 95.6% imitated breast feed timely but 38.6% discard colostrum. From the sampled children 50.1% were in stunting, 14.2% underweight, and 10.2% with wasting. Place of residence (AOR: 1.5, 95% CL (1.07 - 2.12)), child age (AOR: 1.99, 95% CL (1.13 - 3.52)), mothers age (AOR: 3.62, 95% CL (1.08 - 12.18)), child currently not eat any solid/semi solid food (AOR: 2.38, 95% CL (1.45 - 3.92)), children receiving pre-lacteal feeding (AOR: 8.23, 95% CL (1.73 - 39.28)), frequency of feeding (AOR: 0.4, 95% CL (0.22 - 0.73)) and currently breast-feeding (AOR: 0.46, 95% CL (0.28 - 0.77)) were significantly associated with malnutrition of under-five children in the study area. Conclusion and recommendation: This study revealed higher proportion of malnutrition among children according the WHO classification. Optimal infant feeding practices should be promoted to improve nutritional status by providing adequate Information, Education and communication (IEC) on child feeding practices and further study were recommended.

Keywords: Exclusive Breastfeeding, Complementary Feeding, Wasting, Stunting, Underweight, Metekele Zone, Benishangul-Gumuz

1. Introduction

Though children comprise a large proportion of a given society, still many of them are at a greater disadvantage in terms of high child morbidity and mortality. The WHO estimated that about 10.5 million under-five child die each year with 3.8 million deaths in Africa [1]. Over 70% of under-five deaths occur within the first year of life [2]. The ratio of child mortality in Sub-Saharan Africa is one of the

highest in the world, at levels of 175 per 1,000 live births [3].

Malnutrition has been responsible, directly or indirectly, for 60% of all deaths annually among children under five. Well over two-thirds of these deaths, which are often associated with inappropriate feeding practices, occur during the first year of life [4].

Child mortality rate was shown to have the largest

discrepancy between developed and developing countries, among others. As under-five mortality rates have fallen more sharply in richer developing regions, the disparity between Sub-Saharan Africa and other regions has grown. By 2010 a child born in Sub-Saharan Africa faced a probability of dying before age 5 was 5.3 times higher than in Latin America and the Caribbean, 6.7 times higher than in Eastern Asia and 17.3 times higher than in developed regions [2].

International experts have ranked Ethiopia as the sixth highest country in the world in terms of the number of under-five deaths, with over 472,000 under-fives dying each year [5].

An Ethiopian child is 30 times more likely to die by his or her fifth birthday than a child in Western Europe is and the most common cause of child death is the interacting combination of malnutrition and infection [6].

2. Methods and Materials

2.1. Study Area and Period

The study was conducted from February to March; 2013. Metekele Zone is one of the three Zones found in Benishangul Gumuz regional State, Gilgel Beles located at 385kms from the regional city Assosa and 570 Kms North West of Addis Ababa. The Zone is bounded by Amhara region to the North East, by Kamashi Zone & Assosa Zone to the South and by Assosa Zone and Sudan to the West. Administratively, the zone is structured in to seven woredas, having 13 urban and 152 rural kebeles. The total population of the zone is estimated to be 384,389 of which 191,425(50%) females and 62,271 were estimated to be children under-five years of age. Gumuz is the predominant ethnic group in the zone followed by Shinasha. The Zone has 1 hospital, 12 health centers, and 122 health posts. Health service coverage of the zone in 2011; was 88% [43].

2.2. Study Design

A community based cross sectional study involving both quantitative and qualitative method.

2.3. Population

2.3.1. Source Population

All children of age 6 – 59 months and their mothers residing in Metekele zone for 6 months or more.

2.3.2. Study Population

The study population for the quantitative study was the part of the source population that was selected and included in the study during sampling procedure that are children 6 – 59 months age and their mother.

2.4. Inclusion and Exclusion Criteria

Children that was too ill that could not able to stand or

with abnormality that creates difficulty for measuring and Mothers who were seriously ill, unable to hear or other disabilities hindering communication were excluded from study.

2.5. Sample Size and Sampling Procedure

2.5.1. Sample Size Determination

The sample size (n) required for the study was calculated using the formula to estimate a single population proportion. The following assumptions were made to calculate the sample size. According to the EDHS 2011 the prevalence of stunting of children under five years of age living in Benishangul Gumuz region was equal to 49% ($p=0.49$). Considering $\alpha = 0.05$ for the risk of rejecting the null hypothesis that is true. The desired precision or the margin of error between the sample and true population is 5% ($d=0.05$). The sampling procedure was utilized multi-stage sampling technique. Therefore to have adequate and representative sample size, a design effect ($D=2$) for two stage sampling technique was considered. Non-response rate of 10% was added as an attrition rate for any dropout of the study participants during the study period for the fear that the Gumuz women may refuse to respond as data collection from them is not well practiced before and the rural population are widely scattered.

Therefore, sample size was calculated as

$$n = (Z_{\alpha/2})^2 p (1-p) / d^2$$

Where n= required sample size

$Z (1-\alpha/2)$ = critical value for normal distribution at 95% confidence interval which equals to 1.96 (Z value at $\alpha=0.05$).

P = Established prevalence based on the DHS 2011, the national prevalence of stunting /proportion of population (49%).

d = the margin of error (0.05)

Based on the above assumptions, the final sample size was 845 children 6-59 months of old.

2.5.2. Sampling Procedure

The study was employed multi-stage sampling scheme in selecting the participants for this study. For financial and logistic reasons randomly two woredas (Mandura and Dangur) were selected. All the Gumuz kebeles in the two selected woredas (12 from Mandura and 9 from Dangur) were selected purposively and was included in the sampling frame and out of the 21 (twenty-one) kebeles 7 (seven) kebeles were randomly selected using lottery method. Allocation of study participants to each selected kebeles was done using proportional allocation based on the total number of children aged 6 – 59 months and study participants were identified by simple random table from health extension workers registration book. In addition, from these target population that the required sample size was taken according to the size of sample frame in each kebele. During the availability of more than one eligible child of under-five in a

household, the youngest child was selected to avoid recall bias. Two visits were done in case of absents. To supplement the quantitative data by qualitative method, key informants were interviewed from the seven selected kebele. Fourteen [14] Participants were selected using purposive sampling technique based on their knowledge on child feeding from the seven selected kebeles. Six respected elder individuals, 4 TBAs, and 4 women involved in female's affair at kebele level were interviewed. Data was collected until reached to a point of saturation of information. In order to minimize bias, those who participated in in-depth interviews were excluded from participating in quantitative study. Participants in the quantitative part have identification number and those out of this were included in qualitative study.

2.6. Data Quality Control

Eight diploma nurses, who are fluent speakers of the local languages (at least Amharic and "Gumuzigna" were recruited and trained to collect the data for the quantitative survey. Two BSc health officers were also selected and trained on method of data collection and supervision hence used as supervisors. Both the data collectors and supervisors were trained for two days on objective and methodology of the research, data collection and interviewing approach, anthropometric measurement and data recording.

For the house-to-house survey, the questionnaires were developed after reviewing different literatures, prepared in simple words, pre-tested in similar setup. Weighing scales were calibrated with known weight object regularly. The scales were checked against zero reading after weighing every child. The supervisors and investigator checked each questionnaire on the same day. To reduce recall bias prominent local events was used to measure age of the child.

The WHO standards were used to determine the nutritional status of children [44]. To see for the accuracy of responses and to estimate time needed prior to the actual data collection; the questionnaires were pre-tested in the same Woreda but in kebele's, which were not included in the study, on similar population using 5% of the sample size. The principal Investigator and the local expert that speaks "Gumuzigna" conducted the in-depth interview.

2.7. Data Collection Methods

2.7.1. Data Collection Instrument

Children aged 6 - 59 months in the catchment area were recruited for the study. Data collectors interviewed mothers' in the local language. Data was collected using structured questionnaire and anthropometric measurements. The structured questionnaires was prepared in English, translated to Amharic language, and then back translated to English by different experts to check for its conceptual equivalence. Amharic (the Official working language) was used for data collection because the common local language, 'Gumuzigna' has not yet started for writing. For the qualitative one, interview guide was prepared in English, translated to Amharic, and was used for in-depth interview of Key

informants. Tape recorder was used at the same time.

Weight was measured with minimum clothing and no shoes using a spring balance (Salter scale model 2356S with a capacity of 25 kg) to the nearest 10g (0.01kg) in under two children. For > 2 years old children digital weight scale was used (with capacity of 150kg) and the measurement was performed to the nearest 0.1 kilogram.

Length was measured using a measuring board. Measurement of length was done in a lying position with wooden board for children of age under two years. For children above two years was also measured in standing position using a studio-meter with a precision of 1cm while standing straight on a horizontal surface with their heels together and eyes straight forward.

2.7.2. Data Collector Training and Pre-testing

Health care providers (who understand, speak and write the local language) were used as data collectors. They were trained for one day by the principal investigator on the objective of the study, data collection tools and sampling procedures.

Before the actual data collection, the questionnaire was pretested on a similar kebele which were not included in the study. Amendments on the questionnaire were made accordingly after the pre-test.

2.7.3. Data Collection Process

After identifying the study subjects with random selection infant paired mother, face to face interview data collection method was employed. To maximize the data quality obtained by the use of semi- structured questionnaires FGDs were undertaken in group of infant paired mother. Each FGD were consisting of minimum of six members. The members of each FGD were selected by principal investigator (Researcher) or supervisors. FGD were moderated by Principal investigators/supervisors and translator who able to speak, hear and write local languages.

2.8. Data Processing and Analysis

The collected quantitative data were cleaned, coded, and entered into a SPSS data base by the principal investigator. Z-scores of anthropometric indices were computed using ANTHRO PLUS 2007 software developed by WHO. SPSS version 16.0 software (SPSS, Inc., Chicago, IL) was also used for analysis. Statistical significance was set at $p < 0.05$. Simple frequencies were used to see the overall distribution of the study respondents with the variables under study. Bivariate and multiple logistic regression analyses was carried to analyze the effects of child feeding practice and maternal health services on the nutritional status of children. All variables that had significant association through bivariate analysis ($p < 0.05$) were included in the multivariate analysis.

The data of the qualitative method or the recorded audio from interviewee was transcribed in full text in Amharic and was translated in to English, organized in narrative forms in congruent with the respondents' own words on the same day

and was analyzed manually by thematic frame work analysis.

2.9. Study Variables

2.9.1. Dependent Variable

Nutritional status of children 6-59 months (stunting, wasting, underweight)

2.9.2. Independent Variable

Socio demographic variables: Educational status, occupation, Place of residence, marital status, Household income, maternal age, Religion. Household related factors: Toilet facility, Water supply sources. Health care services: (antenatal and postnatal healthcare services, place of delivery), Number of children in the household. Individual related factors: Birth weight, birth order, age, sex, Child health status. Time of initiation of breastfeeding: Duration of breast-feeding, age start of complementary feeding

3. Ethical Consideration

The approved proposal got ethical clearance from Ethical Review Committee of Pawe health science college, and then submitted to both zonal and woreda health bureau where study is conducted. The study participants were informed about the purpose of the study and finally their oral consent were obtained before interview. They also notified that the information provided by each respondent was kept confidential with assurance of the right to refuse or terminate the interview at any point.

4. Result

4.1. Socio-demographic Characteristic of the Respondents

Out of 845 total samples, 795(94.1%) mothers with children 6-59 months of age from two woreda were respond to the questionnaire. The majorities (70.4%) were from rural residents. Higher numbers (40.1%) were in the age range of 25-29 years and the overall mean age of respondents was 29.41 years. 18(2.3%) and 146(18.4%) of the children were born from teenage mothers and mothers over 35 years of age, respectively.

Table 1. Socio-demographic characteristics of respondents in Metekele Zone, Benishangul Gumuz Region, Northwest Ethiopia, February - March 2013 (n = 795).

Variables	no.	%
Place of residence		
Urban	235	29.6
Rural	560	70.4
Age of child's mother		
15-19	18	2.3
20-24	117	14.7
25-29	319	40.1
30-34	195	24.5
>=35	146	18.4
Mothers educational Status		
Illiterate	763	96.0
literate	31	4.0
Marital Status of mothers		

Variables	no.	%
Married	765	96.2
Others	30	3.8
Occupation of mothers		
House wife	782	98.4
Others	13	1.6
Religion of respondents		
Orthodox	156	19.6
Muslim	221	27.8
Catholic	68	8.6
Traditional belief	332	41.8
Protestant	18	2.3
Husband's educational status*		
Unable to read and write	620	78
Able to read and write	42	5.3
Primary /1-8/	83	10.4
Secondary and above	20	2.5
Husband's Occupation*		
Farmer	746	93.8
Others	19	2.48
Monthly income (Eth. Birr) (n=541)		
<500	482	89.1
>=500	59	10.9

4.2. Maternal Health Services

Study participants were asked about history of ANC visit for the index child. Only 263(63.8%) had at least one ANC visit. Most of the respondents were received information during their visit to the health institution on exclusive breast-feeding (28.2%) and avoidance of pre-lacteal feeding (24.4%). From the total participants, 488(61%), 238(29.9%) and 58(7.3%) delivered the index children at home, in the forest, and at health facility respectively. Only 110(13.8%) of respondents were attended PNC at health institution after delivery.

Table 2. Maternal health service conditions of respondents in Metekele Zone, Benishangul Gumuz Region, Northwest Ethiopia, and February – March 2013.

Variables	no.	%
ANC follow up		
Yes	263	33.1
No	532	66.9
Health advice/information during ANC visit (n=263)		
Yes	242	30.4
No	21	2.6
Topics of information's given (n=263) ¹		
Continue BF during illness	85	22.8
Initiation of BF with in 1 hour	62	16.6
Exclude pre-lacteal feed	91	24.4
EBF for 6 months	105	28.2
Age appropriate complementary feeding	20	5.4
BF until 2 years	5	1.3
Other	5	1.3
Number of ANC visit (n=412)		
1	263	63.8
2	96	23.3
3	42	10.2
>=4	11	2.7
Place of delivery (n=795)		
Health facility	58	7.3
Home	486	61.1
Forest	238	29.9
Other *	13	1.6

Variables	no.	%
PNC follow up (n=795)		
Yes	110	13.8
No	685	86.2
Receive information on child feeding during PNC visit (n=110)		
Yes	108	98.2
No	2	1.8
Number of children (n=795)		
≤3	319	40.1
4-5	251	31.6
≥6	225	28.3
Birth order of the index child (n=795)		
1 st	72	9.1
2 nd	123	15.5
3 rd	143	18.0
4 th	129	16.2
5 th and above	328	41.3

4.3. Nutritional Status of the Children

The proportion of chronic malnutrition was 50.1% (with 37% severe and 13.1% moderate stunting).

While wasting and underweight among 6-59 months children in the study area were 10.2% and 14.2% respectively

Table 3. Overall proportion of wasting, stunting and underweight in the study population (n=795).

Anthropometric indices	no.	%
WHZ (Wasting)		
Normal	714	89.8
Moderate	51	6.4
Severe	30	3.8
HAZ (stunting)		
Normal	397	49.9
Moderate	104	13.1
Severe	294	37
WAZ (Underweight)		
Normal	682	85.8
Moderate	85	10.7
Severe	28	3.5

4.4. Factors Affecting of Children Nutritional Status

As shown in table four below stunting was significantly associated with place of residence (AOR: 1.51, 95% CL

Table 4. Factors associated with chronic Malnutrition among under-five children in Metekele Zone, Benishangul Gumuz Region, Northwest Ethiopia, and February – March 2013.

Variables	Stunted		Crude OR (95%CI)	Adjusted OR (95%CI)
	Yes (%)	No (%)		
Place of residence				
Urban	105(44.7)	130(55.3)	1.00	1.00
Rural	293(52.3)	267(47.7)	1.36(1.00-1.85)	1.51(1.07-2.12) *
Religion				
Orthodox	62(39.7)	94(60.3)	1.00	1.00
Muslim	117(52.9)	104(47.1)	1.71(1.13-2.55) *	1.61(1.02-2.55) *
Catholic	40(58.8)	28(41.2)	2.17(1.21-3.87) **	1.63(0.87-3.06)
Traditional belief	165(49.7)	167(50.3)	1.5(1.02-2.20) *	1.2(0.78-1.84)
Protestant	14(77.8)	4(22.2)	5.31(1.67-16.87) *	4.27(1.19-15.27) *
Child age in months				
6-11	86(46.7)	98(53.3)	1.63(0.96-2.79)	1.4(0.8-2.47)
12-23	97(56.8)	94(49.2)	1.92(1.13-3.27) *	1.99(1.13-3.51) *
24-35	131(64.5)	72(35.5)	3.39(1.98-5.79) ***	3.19(1.81-5.61) ***
36-47	55(41)	79(59)	1.3(0.74-2.29)	1.19(0.65-2.17)

(1.07 - 2.12)). Children whose mothers were living in rural area were 1.5 times more likely to be stunted than children whose mothers were living in urban area. The Odds of stunting among children of Muslim' and Protestant' was more than 1.6 times and 4 times (AOR: 1.61, 95% CL (1.02 - 2.55)), (AOR: 4.27, 95% CL (1.19 - 15.27)) higher compared with children of Orthodox mothers respectively.

Child age was not found to have association with stunting in all age groups. However, there was an association only for age groups 12-23 months (AOR: 1.99, 95% CL (1.13 - 3.51)) and 24-35 months (AOR: 3.19, 95% CL (1.81- 5.61)). Similarly mothers age was found to be associated with stunting for age groups 15-19 years (AOR: 3.62, 95% CL (1.08 - 12.18)). Therefore, a child in the age range of 12-23 months and 24-35 months is almost 2 times and 3 times more stunted than a child with 48-59 months of age. Similarly, children of teenage mothers were 3.6 times more stunted than children of old age mothers.

Hand washing practice of respondents in the study area was found to be significantly associated with stunting. A child having a mother who did not practice hand washing before preparing food was 2.46 times stunted than a child whose mother practice hand washing before preparing food AOR: 2.46, 95% CL (1.2 -4.99).

The parameter that was found statistically significant in both analyses was child-eating status 24 hours before the survey. Therefore, a child who did not currently feed solid or semi-solid food showed an association with stunting and likely to be stunted 2 times more than a child fed solid or semi-solid food (AOR: 2.38, 95% CL (1.45 - 3.92)).

children from household getting water source with greater than 30 minutes round trip was about 9 times more likely to be underweight (AOR: 8.9, 95% CL (2.09 - 37.94)). Similarly, children feed < 3 times, 3 times were 60% (AOR: 0.4, 95% CL (0.22 - 0.73)), 61% (AOR: 0.39, 95% CL (0.21 - 0.73)) less likely to be underweight than children feed > 3 times per day. A child currently not breast-feed was 54% times less likely underweight when compared with a child currently breast-feeding (AOR: 0.46, 95% CL (0.28 - 0.77)).

Variables	Stunted		Crude OR (95%CI)	Adjusted OR (95%CI)
	Yes (%)	No (%)		
48-59	29(34.9)	54(65.1)	1.00	1.00
Mother age in year				
15-19	14(77.8)	4(22.2)	5.16(1.62-16.45) **	3.62(1.08-12.18) *
20-24	66(56.4)	51(43.6)	1.91(1.17-3.12) *	1.64(0.95-2.81)
25-29	153(48)	166(52)	1.36(0.91-2.02)	0.95(0.6-1.50)
30-34	106(54.4)	89(45.6)	1.76(1.14-2.71) *	1.48(0.92-2.4)
>=35	59(40.4)	87(59.6)	1.00	1.00
Hand wash practice before prepare food				
Yes	361(48.5)	384(51.5)	1.00	1.00
No	37(74)	13(26)	3.03(1.58-5.79) **	2.46(1.21-4.99) *
Child eat any solid/semi solid food 24 hrs before data collection				
Yes	322(46.8)	366(53.2)	1.00	1.00
No	76(71)	31(29)	2.79(1.79-4.34) ***	2.38(1.45-3.92) ***

***p<0.001, **p<0.01, *0.05

Table 5. Factors associated with Explanatory variables on Underweight among under-five children in Metekele Zone, Benishangul Gumuz Region, North West Ethiopia, February – March 2013.

Variables	Underweight		Crude OR (95%CI)	Adjusted OR (95%CI)
	Yes (%)	No (%)		
Child age				
6-11	32(17.4)	152(82.6)	2.7(1.08-6.74) *	
12-23	27(14.1)	164(85.9)	2.11(0.84-5.33)	
24-35	28(18.7)	165(81.3)	2.96(1.2-7.29) *	
36-47	10(7.5)	124(92.5)	1.04(0.36-2.96)	
48-59	6(7.2)	77(92.8)	1.00	
Mother age in years				
15-19	6(33.3)	12(66.7)	3.56(1.19-10.65) *	
20-24	19(16.2)	98(83.8)	1.38(0.69-2.77)	
25-29	39(12.2)	280(87.8)	0.99(0.55-1.8)	
30-34	31(15.9)	164(84.1)	1.34(0.72-2.51)	
>=35	18(12.3)	128(87.7)	1.00	
Time taken to fetch water				
<=30 minutes	108(13.8)	674(86.2)	1.00	1.00
>30 minutes	5(38.5)	8(61.5)	3.9(1.25-12.14) *	8.9(2.09-37.94) *
Frequency of feeding				
< 3 times/day	45(13.4)	291(86.6)	0.43(0.24-0.77) **	0.4(0.22-0.73) *
3 times	35(12.8)	238(87.2)	0.41(0.22-0.75) **	0.39(0.21-0.73) *
>3 times	21(26.6)	58(73.4)	1.00	1.00
Number of children				
<=3	53(16.6)	266(83.4)	1.00	
4-5	37(14.7)	214(85.5)	0.87(0.55-1.37)	
>=6	23(10.2)	202(89.8)	0.57(0.34-0.96) *	
Currently BF				
Yes	87(17.9)	399(82.1)	1.00	1.00
No	26(8.4)	283(91.6)	0.42(0.27-0.68) ***	0.46(0.28-0.77) *
Child start CF				
Yes	111(14)	681(86)	1.00	
No	2(66.7)	1(33.3)	12.27(1.10-136.46) *	

***p<0.001, **p<0.01, *0.05

5. Qualitative Result

Most of the key informants responded that Gumuz mothers practice initiation of breast-feeding immediately after birth in the study area.

Fifty years old women explained the issue as,

“We (Gumuz women) give breast milk for the newborn immediately after birth; nothing is given to him/her.”

Some informants mentioned that breast milk was not secreted immediately after birth; the reason is norm for late initiation of breast milk after 12 hours stay. Those who said late initiation of breast-feeding stated as *“Women gave breast*

milk to their child after one night of birth this was a ‘demb’ especially when the child is first birth order.”

Similarly, 32 years old, TBA explained, *“Women did not feed their children immediately because breast milk was not secreted soon that’s why they offer to children water immediately after birth.”*

Regarding prelacteal feeding some of the informants cited ‘Bordie’, water and alcohol were mentioned as the main items given before breast-feed.

Regarding practice of the first milk/colostrum, 35 years old women elaborated as *“.....after birth nothing was given before breast milk.....it was given after discarding the*

colostrum; the dirty part of breast milk and we (Gumuz women) gave the other part (white milk item)."

Porridge, bean, "duba," cabbage and leaves of "duba" were the common foods given to children in the area during they introduce complementary feeding stated by key informants during interview. A 30 years old, illiterate mother cited preference of these types of food for their children as follows;

"When children fed the food items they became fat, would have better strength, helped them to prevent from illness, and if failed to feed these foods the final out comes of the children were sickness."

Similarly, one key informant said,

"These foods preferred for our children because they helped for growth, when we gave them they would grow well, if not became thin and no proper growth will have."

6. Discussion

This community based cross-sectional study tried to assess the status of feeding practices, nutritional status and factors associated with child nutrition of 6-59 months of children in Metekele Zone, Benishangul Gumuz region, North West Ethiopia.

Infant feeding practices captured in this study fell below the WHO's guidelines. Early initiation has been identified as one of the intervention area to save newborn lives, and reduce neonatal and infant morbidity and mortality rate. In this study, it was found that majority (99.5%) of mothers practice ever breastfeeding indicating that breastfeeding is a universal practice among the mothers in the study area. This finding was congruent with the national survey done in 2011 both in Benishangul Gumuz and in national level that is 97.5% [7] and study in Addis Ababa with 96.2% [31].

Timely initiation of breast-feeding was 95.6%. This finding was in line with the study conducted in rural Kwazulu Natal South Africa 96% [29]. However, it was better when compared with the finding in Addis Ababa 54% [31], case study in Sudan 6% [18], urban slums of western India 47.5% [19] and Nepal 43.5% [20]. It is also by far better than the finding from the result in Benishangul Gumuz region that indicated timely initiation of breast-feeding 42% according to the Ethiopian demographic and health survey 2011 [7]. The high prevalence rate of timely initiation of breastfeeding 95.6% indicates that breast-feeding initiation is well understood. It could also be explained in terms of higher proportion of mothers had experienced breast-feeding as a norm. Mothers having such practice are an encouraging point that contributes much to reduce morbidity and mortality among infants and children.

However, this study showed low proportion of exclusive breastfeeding practice. Only 33% of mothers reported that they were exclusively breast fed their baby for the first six months that was similar with the result in Addis Ababa 34% [31] and Sudan 29.5% [18]. It was also much more than the study in Kwazulu Natal [29] that was nonexistent of exclusively breast feed, in pre-urban Kolkata; India 18% [22]

but less than the result in Nepal 57% [20], urban slums of western India 61.5% [19] and Gujarat India 54% [23]. This study also indicated that exclusive breast-feeding for less than 6 months was 56%, which was greater than the Ethiopian demographic and health survey report (52%) [7]. For > 6 months of duration it was found that 11% which was much less than the study done in Beijing 47.6% [28] and by far less than the result in Ethiopia, Beta-Israel 83% [30]. It was Understandable because this study conducted in area that had a difference in culture compare to previous studies.

Mothers gave various reasons for not following exclusive breast-feeding like harmful practice of giving pre-lacteal feeds, for instance, "bordie", 65.7%, water with sugar and butter. This was in line with the studies done in Nigeria, Maharashtra, Ethiopia and china [24, 25, 26, 27]. In this study mothers have less ANC follow-up and lead them to have less knowledge regarding appropriate child feeding.

Beside this pregnancy, child refusal to breastfeed, encourage the child to eat solid foods, advice from husband, mother too sick and advice from health providers were the most common reasons stated by respondents for not exclusively breast feed their child, which are similar with result in Maharashtra and Sudan (18, 24).

Although World Health Organization (WHO), global and national infant and young child feeding guidelines recommend that all newborns should start breastfeeding immediately (with in the first hour after delivery) and the feeding of colostrums should be promoted. The current study showed that 38.6% of mothers squeezed and discarded the colostrums. This revealed lack of understanding on the rationale behind given the yellow milk (colostrums). This is due the cultural belief that considers colostrum is dirty and causes abdominal pain in the child. Feeding of colostrums in this study was lower than the study in urban slum in western India 75.5% [23]. Only 43.4% of mothers started complementary feeding at the appropriate age that is 6 months and above. This was less than the EDHS result, 2011(51%) [7] and greater than the result in Nepal 38% [20]. The reason behind for early introduction of complementary feeding was mothers in the area considered that breast milk was insufficient for their children.

High proportion of outcomes (stunting, underweight, and wasting) was observed among children. The effect of nutritional problems affected survival of children and development at the family, society and even at the national level.

Proportion of chronic malnutrition was found to be very high (50.1%) with 37% sever condition. The proportion of stunting in this study was much higher than the studies done in food surplus area in west Gojjam 43%, EDHS, 2011, 44%, Ethiopia, Beta-Israel, 37.2%, Nigeria, 31%, Kenya, 40%, Latin America, 10%, Mexico, 14%, Bangladesh, 41%, Serbia, 20%, and Vietnam, 44.3% (7, 17, 30, 33-38, 40). This study was relatively similar with studies done in Sudan 51% [39] and India 51.6% [11]. There was very high proportion of stunting in the study area alarming to increase risk of death to children. Stunting showed failure to get adequate food over

long period and affected through infections. The highest proportion of stunting in the study area specifically in the Gumuz children could be due to less farming practice leads to less agricultural productivity in the area.

The present study revealed proportion of acute malnutrition (low weight for height) 10.2% which is consistent with the result of EDHS, 2011, 10% [7], Kenya, 10.1% [40], Vietnam, 11.9% [17] and study conducted in developing countries 10% [32], but greater than the result in Ethiopia, Beta-Israel, 4.5%, Mexico, 3.8%, and Serbia, 4% (30, 34, 36). On contrary, it was less than the result in west Gojjam, 15% [42], Sudan, 19% [39] and Sri Lanka 43.7% [41]. Wasting is indicator of acute malnutrition that can occur due to recent infection or weight loss due to periodical variation of food supply. In this study high pattern of continue breast feeding beyond 12 months may contribute as protective effect for acute malnutrition by reducing acute infections of children.

Underweight prevalence was found to be lower (14.2%) compared with the national prevalence, 29%, as well as other studies conducted in the country, for instance, west Gojjam, 49%, and other countries like Sudan, 35%, Nigeria, 39%, Vietnam, 31.8%, India, 36.4% and Sri Lanka, 41.2% (7, 11, 17, 38, 39, 41, 42). Nevertheless, it was consistent with the study conducted in Ethiopia, Beta-Israel, 14.6%, Kenya, 13.9% (30, 40) and somewhat higher than the result in Serbia, 8% [36]. The possible explanation for the improvement in weight for age may be related to improved health intervention than previous days including the impact of health extension workers at the community level.

According to the finding of this study, proportion of stunting found to be higher among rural than urban children. Rural area increased the likely hood of stunting by about 1.5 times. This result is inline with Ethiopian demographic and health survey and a community based study in Mexico (7, 34). This could be urban mothers have enough knowledge since most (76.5%) of them were received advice/information regarding child-feeding practices during their PNC visit to the health institution. In addition, urban mothers practiced breast feed for longer time than rural counterparts do.

The risk of stunting among children of Muslim and Protestant mothers was more than 1.6 and 4 times higher compared with children of Orthodox mothers respectively. This could be due to cultural influences (for instance-discarding colostrum due to the fear that can cause abdominal pain and it is dirty) and differences in child feeding practices. Age at start of complementary feeding was earlier in Muslim and Protestant children than orthodox children.

The prevalence of stunting in this study increased as age of children increased. This was consistent with studies in EDHS, Beta-Israel, West Gojjam, Mexico and Vietnam [7, 17, 30, 34, and 42]. The age groups of 12-23 and 24-35 months were increasing the likely hood of stunting 2 and 3 times more than the other age groups of under-five years children respectively. This may be due to the period of

introductory of complementary feeding and adoption of family foods, which may not adequately supplement the continued breast-feeding up to 24 months and beyond. The other possibility could be also food items introduced during complementary feeding may not contain adequate nutrients that could support for normal growth of children.

In this study, the practice of exclusive breast feeding for at least six months among teenage mothers were not exist and their children lacked adequate nutrients from breast milk. It may also lead them to start complementary food early, which can initiate them diarrheal diseases. This could be the possible explanation which children having teenage mothers were more than 3.5 times more likely to be stunted than children from old age mothers. In contrast, prevalence of stunting was found high in older mothers as indicated from the study in Kenya [37]. This study was different from the previous studies (7, 11, 17, 30, 35, 36, 39, 42)

The result of this study revealed children having mothers practicing hand washing before preparing food was less likely to be stunted. This could be due to its lesser effect on diarrheal diseases and intestinal parasitic infestation. This study was different from the results of (11, 17, 30, 35, 36, 39, 40, 41, 42).

Current feeding status of children found statistically significant with chronic malnutrition. Children currently not received solid /semi-solid foods were 2.3 times more likely to be stunted when compared with their counterparts. This finding was in line with the WHO and UNICEF recommendation that is appropriate and sufficient weaning food should be added after six months of life (5, 8, 9). Therefore, children who did not receive adequate nutrients were at higher risk of nutritional problems.

In this study whether educated or not educated, rich or poor households having under-five children in the area were more stunted if they were from rural, children in the age group of 12-35 months, children from teenagers and mothers not practicing hand washing before preparing food. This could be due to lack of awareness on appropriate child feeding practices.

Pre-lacteal feeding was found significantly associated with acute malnutrition. Therefore, children received pre-lacteal feeding before breast milk were 8 times more likely to be wasted when compared with children who did not get pre-lacteal feeding. This was properly cited by WHO, which revealed inappropriate feeding practices were a major cause of the onset of malnutrition in young children [10]. In addition, a study result from food surplus West Gojjam revealed that pre-lacteal feeding was found prominent predictor of malnutrition [39]. None of the infant feeding practices were found to be associated with wasting which is inline with the results in Serbia and India [11, 36].

This study reported the association between water sources and nutritional status of children. Therefore, children from household getting water with greater than 30 minutes round trip were around 9 times more likely to be underweight. This possibly could be due to those households were more likely to obtain water from unsafe sources. Where water is not

readily available, food hygiene is often inadequate. This again increases the risk of diarrheal diseases and under nutrition. This current study is different from the results in [7, 11, 17, 30, 36, 37, 39, and 42].

Children who were feeding less than 3 times per day were 60% less likely to be underweight than those who feed >3 times/day. Similarly children feeding 3 times were also 61% less likely to be underweight than those who feed >3 times. Regarding breast-feeding status of children in the study area, those not currently breast-feeding were 54% less likely underweight than children currently breast-feeding. This was inline with the WHO recommendation [5, 8, 9] for children six months and above should start complementary feeding with age appropriate in addition to continued breast-feeding. This was because breast-feeding only could not support the overall nutrient need of the growing child unless it supplemented with adequate nutrients.

In general, most of the identified associated factors were found to be supported by different studies, which were conducted in different areas in the country as well as in other developing countries. In addition, it had been observed that no one solution by itself would be effective in eliminating child malnutrition. Therefore, comprehensive strategy was required for tackling this problem of malnutrition. Moreover, health, food security, child, and maternal care require special attentions to achieve rapid reduction in child malnutrition. Access to education, healthcare, safe water, environmental sanitation, and micronutrient were the key elements to alleviate this problem.

7. Conclusion

This study revealed that the timely initiation of breastfeeding in the study area was better as compared to the national and regional prevalence. However, mothers tend to introduce early feeding by considering that breast milk is insufficient to their children. Mothers also practice discarding of colostrum and giving pre-lacteal feeding. The prevalence of exclusive breastfeeding for the first six months and complementary feeding beyond six-month was found to be lower than the national level and WHO recommendation.

Proportion of child malnutrition was high in the study area. Residence, religion, age, Hand washing practice before preparing food, Child currently eat any solid/semi solid food, pre-lacteal feed, distance from water source, frequency of feeding and currently breast-feeding were identified as factors affecting nutritional status of under five children in the study area.

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