

Prevalence and Associated Factors of Stunting Among Children Aged Six Month - Five Year in Ataye Town, Northeast Ethiopia

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Abstract: Adequate nutrition is vital to children's growth and development. Globally, about 155 million children were stunted. In Ethiopia, about half of child's mortality was related to malnutrition. Hence, this study was aimed to assess the prevalence of stunting among children aged six month- five year in Ataye town, Northeast Ethiopia. A cross-sectional study was conducted among 415 children from March to April, 2018. Interviewer administered structured questionnaire and measurement was used to collect the data. Multivariate logistic analysis was used and variables with a P-value of < 0.05 were considered statistically significant. Overall, nearly half of children (48.4%) were stunted. Children with age group of 25-59 months (AOR= 1.9, 95% CI: 1.15, 3.23), being male (AOR=1.7,95% CI: 1.03, 2.89), non-exclusive breast feeding (AOR= 1.9,95% CI: 1.03, 3.51), maternal illiteracy (AOR= 2.4, 95% CI: 1.005-6.08), and getting monthly income of less than 500 Ethiopian birr (AOR= 3.2, 95% CI: 1.76-6.01) had statistically significant association with stunting. In Ataye town, the burden of stunting was significantly higher than the overall prevalence of stunting in Ethiopia as well as in Amhara region and it is continued as a major public health problem in Amhara region. Children aged between 2-5 years old, being male, non-exclusive breast feeding practice, maternal illiteracy, and low monthly income were independent predictors of stunting. Thus, this study underlines the need for increasing the awareness of mothers/caregivers about child feeding and the necessity of exclusive breast feeding in the first six months of life. Moreover, it requires collaborative activity from national and regional health office to reduce the burden of stunting.

Keywords: Stunting, Six Month-Five Year Children, Northeast Ethiopia

1. Introduction

Double burden of malnutrition can occur at individual, households and population levels [1]. Globally, the death of children was reduced significantly from 93 deaths per 1,000 live births in 1990 to 41 deaths in 2016 [2]. Ethiopia has planned to reduce children's mortality to less than 20 deaths per 1,000 live births in 2035. The main strategy to achieve this plan is by reducing undernutrition [2]. In 2016, about 155 million under five children were stunted globally [1, 3]. Of all stunted children, half of them were found in Asia, whereas one-third of cases were existed in Africa. In Africa,

the burden of stunting is higher in eastern and western parts of the region [4]. In order to alleviate this problem, World Health Organization (WHO) has been planned to reduce the prevalence of stunting by 40% up to the year 2025 [4].

In Ethiopia, under five year children were accounted for about 15.2 million of the total population [2]. Although many countries in the world were suffered from the double burden of malnutrition, Ethiopia is mostly affected by undernutrition [5]. In the country, about 53% of Childs' mortality was related to malnutrition [6]. In Ethiopia, food insecurity, hunger and poor nutritional status of children has been a consistent problem for decades [7]. Undernutrition is mainly

occurred in areas where there is food insecurity. A study in Ethiopia revealed that the prevalence of stunting was higher in food unsecured households than food secured households [8]. Between 2000 and 2016, Ethiopia has made significant progress in reducing the level of undernutrition. In the country, the prevalence of stunting in under five year children was declined from 51% in 2005, 44% in 2011, and 38% in 2016 [9, 10]. National statistical reports showed that, Amhara region has the highest proportion of stunted cases (46%), followed by Benishangul-Gumuz (43%), and Afar regions (41%) [11]. Women are recommended to take balanced diet during pregnancy so as to reduce the risk of stunting in their child [4]. In addition, they are also expected to nourish their child well in the first three years. Optimal breast feeding practice, good nutrition in the first three years, and Biofortification are successful interventions to reduce malnutrition in Africa [12]. Adequate nutrition is critical to children's growth and development [13]. Stunted children have risks of serious health problems such as low immunity, poor academic performance, and chronic illnesses [3-5]. In addition, undernutrition has an impact on the economic status of individual, households and the country at large [14]. In Ethiopia, stunting in early childhood was one of the determinant factor that could affect the cognitive performance of children in their school education [15]. Thus, this study was aimed to assess the prevalence of stunting and its associated factors among children aged six month - five year in Ataye town, Northeast Ethiopia.

2. Methods and Materials

2.1. Study Design, Period and Setting

A community based cross sectional study was conducted among children aged from six months to five years in Ataye town, Northeast Ethiopia from March to April, 2018. A total of 415 children were participated in the study using simple random sampling technique. Ataye town is found in Amhara region and located 256 km far from Addis Ababa (the capital city of Ethiopia) and has one Health centre and one public Hospital. According to the 2007 census conducted, it has a total population of 29,036 and three kebeles.

2.2. Study Participants

The source populations of this study were all children aged six month - five year (paired with their mothers or caregivers) who lived in Ataye town. The study populations were randomly selected children (paired with their mothers or caregivers) in the sampled kebele of Ataye town. Children who were critically sick and that made difficulty to take measurement of height or length were excluded

2.3. Data Collection Tool and Measurements

For data collection, interviewer administered structured questionnaire adopted from previous studies was used [16-19]. Measurement of length was done in a lying position with wooden board for children less than two years, and height was measured in a standing position with stadiometer for those above two years of age in centimeters.

2.4. Operational Definitions

Stunting: height/length -for-age ≤ -2 standard deviations of the median for children aged 6month - 5 years based on WHO child growth chart

2.5. Data Analysis

The data was entered using Epi Info version 3.5.1 and it was exported to SPSS version 20 for further statistical analysis. Descriptive statistics like frequencies and proportions were presented by tables. For anthropometric calculation, Emergency Nutritional Assessment (ENA) 2007 software was used and WHO 2007 growth chart was used to analyze the anthropometric data. Bivariate and multivariate logistic analysis model was used with odds ratio and 95% confidence interval. In bivariate analysis, variables having significant association with the dependent variable at p-value of 0.2 and below were entered into multivariate analysis. In multivariate analysis, p value < 0.05 was considered statistical significant.

2.6. Ethical Issues

Ethical approval was obtained from Wollo University, ethical review committee. All study subjects were participated voluntarily and data was collected after written consent was obtained. Confidentiality was preserved for all collected data.

3. Results

3.1. Socio Demographic Characteristics of Study Participants

From the total of 422 study participants (children paired with their mothers), 415 were participated in the study. Among the respondents, more than half of mothers (care givers) (65.5%) were house wife, 359 (86.5%) were married and, 152 (36.6%) were illiterates. Furthermore, the age difference between the index child and the younger sibling was exceeded by two years in about 49% of cases. In addition, of all children; 219 (43.1%) were male, 196 (47.2%) founded in the age group of 25-59 months, and about 57.3% had birth weight of between 2.5-4kg (Table 1).

Table 1. Socio demographic characteristics of study participants (children and their mothers) in Ataye town, Northeast Ethiopia, 2018 (n=415).

Variables		Frequency	Percent
Ethnicity	Amhara	333	80.2
	Oromo	73	17.7
	Others	9	2.1

Variables		Frequency	Percent
Religion	Orthodox	212	51.1
	Muslim	157	37.8
	Protestant	46	11.1
Age of mother (year)	15-24	212	51.1
	25-35	173	41.7
	>=36	30	7.2
Marital status	Married	359	86.5
	Divorced	39	9.4
	Widowed	17	4.1
Occupation	Housewife	272	65.5
	Government employee	78	18.8
	self employed	33	8.0
	Daily laborer	17	4.1
	Employee in private organization	15	3.6
Educational status	No formal education	152	36.6
	Primary education	80	19.3
	Secondary education	101	24.3
Family monthly income (in Ethiopian Birr)	College and above	82	19.8
	<=500	144	34.7
	501-1500	23	5.5
	1501-2500	112	27.0
Age of the child (in month)	>2500	136	52.8
	6 -24	179	43.1
Sex of the child	25 - 59	236	50.9
	Male	219	52.8
Birth weight (in kilogram)	Female	196	47.2
	<2.5 Kg	93	22.4
	2.5-4 Kg	238	57.3
	>4 Kg	55	13.3
Birth order of index child	Unknown	29	7.0
	1 st	120	28.9
	2-3	216	52.0
Age difference from younger sibling (in month)	4-6	79	19.1
	No previous birth	114	27.5
	<=24	97	23.4
	>24	204	49.1

3.2. Children's Nutritional History, Prenatal and Related Factors

Of all participants, 23.1% of women were visited the Ante Natal Care (ANC) service at least four times and 84.6% were delivered in public health facilities and 82.9% were attended post-natal care service at least once. Regarding feeding practice, 72.5% of women were feed their child with breast

milk exclusively in the first six months of life.

Overall, 33.7% of children were feed breast milk for more than two years and more than 90% of children were vaccinated. Regarding morbidity, about 26.7% of children had at least one episode of diarrhea in the last two weeks. Furthermore, 93.5% of respondents had toilet and about two-third of respondents had access for pipe water (Table 2).

Table 2. Children's nutritional history, Prenatal and related characteristics of respondents (children and their mothers) in Ataye town, Northeast Ethiopia, 2018 (n=415).

Variables		Frequency	Percent
Number of ANC follow up (in number)	No	50	12.0
	1	26	6.3
	2-3	243	58.6
	>=4	96	23.1
Place of delivery	public health facility	351	84.6
	Private health institutions	34	8.2
	At home	30	7.2
Post-natal care follow up	Yes	344	82.9
	No	71	17.1
Exclusive breast feeding	Yes	301	72.5
	No	114	27.5
Child received the first milk (colostrum)	Yes	340	87.4
	No	49	12.6
Duration of breast feeding (in months)	<12	29	7.0
	12-24	245	59.0
	>=24	141	34.0

Variables		Frequency	Percent
Method of feeding child	Spoon	133	32.0
	Cup	35	8.4
	Hand	217	52.3
	Bottle	30	7.2
Did your child had diarrhea in the last two weeks?	Yes	111	26.7
	No	304	73.3
Vaccination stats of children	Fully Vaccinated	384	92.5
	Not fully Vaccinated	31	7.5
Have you toilet?	Yes	388	93.5
	No	27	6.5
Main source of water	Private pipe water	319	76.8
	Public pipe water	92	22.1
	Others	4	1.1
Stunting	Yes	201	48.4
	No	214	51.6

Overall, the prevalence of stunting in the study area was 48.4% (95% CI: (43.6, 53.5)). Of those stunted children, 64.6% were found within the age group of 25-59 months and 23 (11.4%) were severely stunted (Table 2).

3.3. Factors Associated with Stunting

A total of 19 independent variables were included in the bivariate logistic regression analysis. Those variables associated with the dependent variable at P-value of less than

0.2 were subjected into multiple logistic regression analysis. In multivariate analysis, children with age group of 25-59 months old (AOR= 1.9, 95% CI: 1.15, 3.23), being male (AOR=1.7,95% CI: 1.03, 2.89), non-exclusive breast feeding (AOR= 1.9,95% CI: 1.03, 3.51), maternal illiteracy (AOR= 2.4, 95% CI: 1.005-6.08), and getting monthly income of less than 500 Ethiopian birr (AOR= 3.2, 95% CI: 1.76-6.01) were independent predictors of stunting (Table 3).

Table 3. Bivariate and multivariate analysis of factors associated with stunting among children 6month-five year in Ataye town, Northeast Ethiopia, 2018 (n=415).

Variable	Stunting		COR (95%CI)	AOR (95%CI)
	No	Yes		
Age of the child				
6-24 month	108 (60.3)	71 (39.7)	1 (ref)	1 (ref)
25-59 month	106 (44.9)	130 (55.1)	1.86 (1.25-2.76)**	1.92 (1.15-3.23)*
Sex of child				
Male	94 (42.9)	125 (57.1)	2.1 (1.42-3.1)***	1.73 (1.03-2.89)*
Female	120 (61.2)	76 (38.8)	1 (ref)	1 (ref)
Age difference from younger sibling (in month)				
<24 Month	27 (27.8)	70 (72.2)	2.41 (1.35-4.30)*	1.14 (0.40-3.25)
>=24 Month	132 (64.7)	72 (35.3)	0.50 (0.32-0.81)*	0.33 (0.12-0.99)
No (first child)	55 (48.2)	59 (51.8)	1 (ref)	1 (ref)
Maternal age				
15-24	80 (37.7)	132 (62.3)	3.85 (1.68-8.82)*	3.2 (0.93-9.84)
25-35	113 (65.3)	60 (34.7)	1.24 (0.53-2.87)	2.86 (0.90-9.10)
>=36	21 (70.0)	9 (30.0)	1 (ref)	1 (ref)
Religion				
Orthodox	120 (56.6)	92 (43.4)	1 (ref)	1 (ref)
Muslim	71 (45.2)	86 (54.8)	1.30 (0.68-2.47)	0.85 (0.34-2.12)
Protestant	23 (50.0)	23 (50.0)	1.58 (1.04-2.39)*	1.37 (0.76-2.49)
Marital status				
Married	197 (54.9)	162 (45.1)	1 (ref)	1 (ref)
Divorced	8 (20.5)	31 (79.5)	4.71 (2.10-10.53)**	2.14 (0.69-8.72)
Widowed	9 (52.9)	8 (47.1)	1.08 (0.40-2.86)	1.73 (0.48-6.25)
Education status of mother				
Uneducated	68 (44.7)	84 (55.3)	3.36 (1.87-6.04)***	2.47 (1.005-6.08)*
Primary education	28 (35.0)	52 (65.0)	5.06 (2.59-9.90)**	2.09 (0.69-6.35)
Secondary education	58 (57.4)	43 (42.6)	2.02 (1.07-3.78)*	1.45 (0.58-3.66)
college above	60 (73.2)	22 (26.8)	1 (ref)	1 (ref)
Family monthly income				
<500	48 (33.3)	96 (66.7)	3.23 (1.98-5.27)***	3.26 (1.76-6.01)***
500-1500	7 (30.4)	16 (69.6)	3.69 (1.42-9.57)**	1.68 (0.51-5.56)
1500-2500	75 (67.0)	37 (33.00)	0.79 (0.47-1.34)	0.76 (0.39-1.45)
>=2500	84 (61.8)	52 (38.2)	1 (ref)	1 (ref)
Main source of water				
Private Pipe	182 (57.1)	137 (42.9)	1 (ref)	1 (ref)

Variable	Stunting		COR (95%CI)	AOR (95%CI)
	No	Yes		
Public Piped	29 (31.5)	63 (68.5)	2.88 (1.76-4.72)***	1.02 (0.51-2.06)
Others	3 (75.0)	1 (25.0)	0.44 (0.04-4.30)	0.21 (0.01-3.26)
Toilet				
No	7 (25.9)	20 (74.1)	3.26 (1.35-7.90)**	0.78 (0.21-2.87)
Yes	207 (53.4)	181 (46.6)	1 (ref)	1 (ref)
ANC visit in health facilities				
No	17 (34.0)	33 (66.0)	3.88 (1.88-7.99)**	2.91 (0.13-7.52)
1	12 (46.2)	14 (53.8)	2.33 (0.96-5.62)	3.51 (0.19-10.33)
2-3	121 (49.8)	122 (50.2)	2.01 (1.23-3.30)**	2.04 (0.08-3.85)
>=4	64 (66.7)	32 (33.3)	1 (ref)	1 (ref)
Place of delivery				
Public health facility	195 (55.6)	156 (44.4)	1 (ref)	1 (ref)
Private health facility	12 (35.3)	22 (64.7)	2.29 (1.10-4.77)*	1.18 (0.38-3.61)
At home	7 (23.3)	23 (76.7)	4.10 (1.71-9.82)**	1.75 (0.46-8.59)
Post-natal care service in health facility				
Yes	191 (55.5)	153 (44.5)	1 (ref)	1 (ref)
No	23 (32.4)	48 (67.6)	2.60 (1.51-4.47)**	1.54 (0.61-3.90)
Diarrhea in the last two weeks				
Yes	37 (33.3)	74 (66.7)	2.78 (1.76-4.34)**	2.97 (0.64-5.38)
No	177 (58.2)	127 (41.8)	1 (ref)	1 (ref)
Exclusive breast feeding				
Yes	178 (59.1)	123 (40.9)	1 (ref)	1 (ref)
No	36 (31.6)	78 (68.4)	3.13 (1.98-4.95)***	1.90 (1.03-3.51)**
Methods of child feeding				
Spoon	69 (51.9)	64 (48.1)	1 (ref)	1 (ref)
Cup	7 (20.0)	28 (80.0)	4.31 (1.76-10.55)**	2.61 (0.79-8.57)
Hand	126 (58.1)	91 (41.9)	0.77 (0.50-1.20)	0.69 (0.39-1.34)
Bottle	12 (40.0)	18 (60.0)	1.61 (0.72-3.62)	1.40 (0.45-4.38)

Asterisk shows significant associations at different P-value: 0.05-0.01*, 0.01-0.001**and < 0.001***

4. Discussion

The prevalence of stunting in Ataye town was 48.4% (95% CI: 43.6, 53.5). This finding is comparable with studies conducted in northeast Ethiopia; in Gondar town (45.7%) [20], Lasta (49.7%) [21], and Libo-Kemekem district (49.4%) [22]. The finding is also similar with study findings in southern part of Ethiopia; Wondo Genet (50.3%) [23], Bule Hora (47.6%) [18], and Haramaya district (45.8%) [24]. Furthermore, our finding is in line with studies done in Kenya [25] and Tanzania (49.7%) [26].

On contrary, our finding is higher than the national prevalence (38%) [11] and the overall pooled prevalence estimate of stunting in Ethiopia (42%) [27]. In the study area, stunting is higher in comparison with studies done in Bahir Dar (42%) [28], Filtu (22.9%) [29], Haramaya (36%) [30], Hawassa (39.3%) [31], Shey Bench district (33.3%) [32], and Yirgalem town (35.2%) [33]. This variation might be due to the difference in the socio demographic, agro-ecological and economical characteristics of participants in the study area. It is also higher compared with studies done in Nigeria (29%) [34], Bangladesh (39.3%) [35], and Tanzania (35.5%) [19].

Our study showed that males were 1.7 times more likely to be stunted than females. This finding is comparable with the studies done in Lasta district [21], Hawassa town [31], Bule Hora district [18], Tigray [17], Tanzania [20], Nigeria [36], and Sub-Saharan Africa [37, 38]. Children aged from 25-59 month old were 1.9 times more likely to be stunted than young infants. This finding is supported by studies in Lasta

[21], Libo-Kemekem [22], Haramaya district [24], and Sub-Saharan Africa [38]. Whereas, it contradicts with the study finding in Shey Bench [32] and East Belesa [39].

Children with illiterate mother were 2.4 times more likely to be stunted than those who attained diploma and above. This is in line with the study done in Lasta district [21], Tanzania [19], and Bangladesh [35]. Furthermore, children who lived in a family with monthly income of less than 500 Ethiopian birr were 3.2 times more likely to be stunted than those who had high monthly income. This is in line with study findings from Northwest Ethiopia [39, 40]. This could be related to the high prevalence of stunting in food insecure households of Ethiopia [8]. As a limitation, recall and social desirability biases could affect the data.

5. Conclusion

In Ataye town, the burden of stunting was significantly higher than the overall prevalence of stunting in Ethiopia as well as in Amhara region and it is continued as a major public health problem in Amhara region. Children aged between 2-5 years old, being male, non-exclusive breast feeding practice, maternal illiteracy, and low monthly income were independent predictors of stunting. Thus, this study underlines the need for increasing the awareness of mothers or caregivers about child feeding and the necessity of exclusive breast feeding in the first six months of life. Moreover, it requires collaborative activity from national and regional health office to reduce the burden of stunting.

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Conflict of Interest

We have no competing interests.

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