



Saint Paul Hospital Millennium Medical College

Department of Public Health

Field Epidemiology Training program

Thesis on

Prevalence and Determinant of chronic malnutrition (stunting) among children aged 6 to 59 months in Logia Samara City Administration, Afar Region, Ethiopia: community-based Analytic Cross-Sectional Study

By Moti Edosa (MD, 2nd Year EFETP Resident)

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Abstract

Introduction

Stunting affected an estimated 22.9 per cent or 154.8 million children under 5 globally. Africa and Asia bear the greatest share of chronic malnutrition (stunting). Malnutrition is related to about 41% (2.3 million) death of children with in age group of 6 to 24 months in developing countries.

Objective

Objective of this study is to assess prevalence and determinant of chronic malnutrition among children from 6 to 59 months old, Samara Logia city administration, Afar Region, Ethiopia from May 16 to July 20, 2019

Methods and Materials

Community based cross-sectional study was conducted in selected kebeles of samara logia city administration, Afar Region. Children of age 6 to 59 months were included in the study. stratified sampling was used. Single population proportion formula ,5% non-response rate and design effect of 1.5 was used in calculation of total sample of 509. Data was collected using questionnaires after approval from Institutional Review Boards and responsible body.

Result

Result of the study revealed that the prevalence of stunting in the community was 29.9%. Among stunted children, age group 24 to 35 months most affected 28.3% (43). children who were breast fed for less than 24 months were 3.485:95% C.I [2.519,7.941] times at risk of developing stunting when compared to children who were breast fed for more than 24 months. Frequency of breast feeding less than 8 times per day during exclusive breastfeeding was also associated with stunting 2.184:95% C. I [0.452, 6.178] than those breasts fed more than eight times per day. Birth order of above 3 was associated with stunting 4.57: 95%C. I [1.271,9.483] compared to birth order less than or equal to three. Wealth index 1st quartile was 3.425: 95%C. [I 2.492, 8.716] times at risk of developing stunting when compared to children whose family's wealth was in the 4th quartile.

Conclusions and Recommendations

Stunting is more prevalent in female than males. Breast feeding child for less than 24 months, breast feeding child less than eight times per day during period of exclusive breast feeding, birth order greater than three and children of the families with lower wealth index were associated with stunting. based our finding we recommend that health education importance of breast feeding (period and frequency) should be given to community, the government should empower those who were disadvantaged economically.

Key word: stunting, Afar Region, Ethiopia

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List of acronyms and abbreviations

AFI	Acute Febrile Illness
DM	Diabetes Mellitus
DPRK	Democratic People's Republic of Korea
FAO	Food and Agricultural Organization
HFA	Height for Age
HIV/AIDS	Human Immune Deficiency Syndrome
KG	Kindergarten
PI	Primary Investigator
SD	Standard deviation
SPHMMC	Saint Paul's Hospital Millennium medical collage
UNICEF	United Nations international children's Emergency Fund
WHO	World Health Organization

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1. INTRODUCTION

1.1. Background

Intellectual level(cognitive), motor movement, verbal response and ability of disease containment can show children's nutritional level but child physical growth is commonly used. Child mental and physical development is fast during the first 1000 days of life.(1).child is stunted when his/her height is below expected for his/her age.

Stunting is measure of chronic malnutrition which is resulted in below average growth of child's physical and mental for his /her age which may be irreversible(2).The three commonly used measures of undernutrition are stunting measured by height for age and indicates chronic malnutrition(undernutrition),underweight(measured by weight for height) and wasting measured by weight for age(3).Stunting occurs in child when child is deprived of nutrition for a long time. Chronic infections like HIV/AIDS, Type one DM, malabsorptive syndromes can also lead to chronic malnutrition. Recurrent infection by intestinal parasitosis, other infectious diseases are also significant causes of nutritional deprivation. Low birth weight and extreme psychosocial stress without nutritional depravity can also lead to stunting(4)(5).

Thus, as depicted above, causes of malnutrition can be classified into somatic (infections and inflammations of gastrointestinal system),functional (if a person is not ambulatory and no one is at his /her disposal of helping),psychological(anxiety, grief, depression and impaired cognition)and social factors includes loneliness, no social network that could arrange shopping, and poverty(6).

Globally, different forms of malnutrition are responsible for 45 percent of under 5 years mortality of which stunting is a significant contributor. Children who are stunted are at an increased risk for repeated infections and are more likely to die from diarrhea, pneumonia, and measles, and may be at an increased risk in adulthood for chronic diseases such as cardiovascular disease(7).

1.2. Statement of the problem

In Africa ,high burden of chronic malnutrition is with in East Africa.(8)Our Country Ethiopia ranks seventh after Democratic People's Republic of Korea(DPRK),Zambia, Burundi, Nepal, Afghanistan and Yemen in prevalence of chronic malnutrition(9).

In Ethiopia stunting account for 38% of under five years children. Afar region account for 41% of overall stunting in Ethiopia ranking third after Amhara Region and Gumuz Benishangul Region(10). Samara Logia city administration is one of the administrative zones with in Afar Region. There is no study available showing burden and determinants of chronic malnutrition(stunting) available in this area despite our study area is declared by FAO to be with in hot spot priority one for along tome(11).

There are several studies done on stunting in different part of Ethiopia. One of the studies is study done in Gurage zone with a title of Factors associated with stunting among children of age 24 to 59 months in Meskan district, Gurage Zone, South Ethiopia. Though stunting is chronic, study was a case control study. EDHS 2016, reported only the prevalence of stunting in the region at large.it didn't reported the determinant of stunting. The other study done in Somali region with a title of Magnitude and factors associated with malnutrition in children 6-59 months of age in pastoral community of Dollo Ado district, Somali region, Ethiopia.

2. LITERATURE REVIEW

Malnutrition is one of the diseases of public health importance globally as its responsible for the deaths of over 41% (2.3 million) of children with in age group of 6 to 24 months living in the developing countries(12). In 2017 UNICEF / WHO / World Bank Group Joint Child Malnutrition estimated Stunting affected an estimated 22.9 per cent or 154.8 million children under 5 years globally. These children are surrounded by major problems such as less cognitive function and hence learning difficulties, psychosocial barriers, physical problems, and most importantly their ability to with stand infectious diseases low and their risk of developing chronic disease is high. Africa and Asia are the most affected in the world. In 2016, more than half of all stunted children under 5 years (56%) lived in Asia and more than one third (38%) lived in Africa.(2).

In 2010 WHO reported that chronic malnutrition is behind almost half of child hood death. Sub-Saharan Africa has high burden of malnutrion of which stunting was the leading. And hence sub Saharan Africa countries shares high burden of child mortality directly or indirectly related to chronic malnutrition(13). Over the last decades most of the African countries have recorded high economic growth including our country Ethiopia two-digit growth. Though, millions of people in Africa are below poverty line as the vicious circle of chronic malnutrion and poverty is difficult to escape. Poor parents can't feed their families with enough nutritious food, living children malnourished. Malnutrition leads to irreversibly stunted development and shorter, less productive lives. Less productive lives mean no escape from poverty(14). Metanalysis used data of DHS (2006 to 2016) of selected African countries in which Ethiopia was one of the study participant showed prevalence of stunting in east Africa was the leading with 39% ,followed by west Africa 31.8%,Southern Africa 30.6% and Central Africa 28.8%.Countries with the highest significant prevalence of stunting in each sub-region were: Burundi 57.7%and Malawi 47.1% in East Africa, Niger 43.9% , Mali 38.3%, Sierra Leone 37.9% and Nigeria 36.8% in West Africa; Congo DR 42.7% and Chad 39.9% in Central Africa. Lesotho reported the highest prevalence in Southern Africa 33.2%(1).

Other study done by UNICEF / WHO / World Bank Group Joint Child Malnutrition also showed prevalence of stunting amoung underfive is highest in Eastern Africa (24%) followed by western Africa (19.2%) and southern Africa with better record 1.8%(2).

In 2011 Nigeria, one study revealed that child's variables (age and gender), mother's variables (education and nutrition) and health variables (clean water and toilet) were the significant determinants of child malnutrition. The study found that, other things being equal, male and older children are more likely to be chronically malnourished(15).

Study done in Democratic Republic of Congo 2007 showed that stunting in children below age of five years was strongly associated with sex(male), higher age group ranging from 4 years, followed by 3 years, place of residence(rural), place of delivery(children born outside the hospital) and maternal education(higher among children from non-educated mother)(16).

Other study done in Kenya showed that most child characteristics are important and significant determinants of nutritional status. Specifically, older children, children of multiple births, boys and children of higher birth order are more likely to suffer malnutrition than their counterparts. The results also show that household size is inversely related to children's nutritional status, suggesting competition for food among siblings. Children's nutritional status improves with the age of the mother, Mother's height is also positively correlated with children's nutrition, suggesting the importance of genetics and phenotype in influencing the stature of children(17).

In Ethiopia prevalence of stunting in under five years children has decreased considerably from 58% in 2000 to 38% in 2016, average decline of more than 1 percentage point per year. Stunting for children under age 5 sharply increases between age 6 and 23 months, and peaks at age 24- 35 months; this may show significance of the first 1000 days of the child. Amhara, Benishangul-Gumuz, Afar, and Dire Dawa are most highly affected by child stunting(10). Poor maternal and demographic situations such as parental education, rural residence, place of delivery and regional differentials are the most important factors for stunting. In addition, socioeconomic conditions including poor feeding, long term breast feeding and poor wealth index were significantly associated with both severe and moderate stunting(18).

Study done in west Gojjam in 2006 showed the prevalence of stunting to be 43.2%. The study showed that demographic determinant factors of stunting in the study area. A high prevalence of stunting was observed among children who had diarrhea in the two weeks before the survey. The results of this study demonstrated that a negative practice (bottle use) is strongly associated with higher HAZ in West Gojjam Zone(19). Other study done in Gurage Zone Meskan district Children living in households with eight to ten and five to seven family members were more likely to be stunted than those living in households with two to four family members. Similarly, children living in households with three under-five children were more likely to develop stunting than those living in households with one under-five child. Children whose mothers worked as merchants were more likely to be stunted than children whose mothers worked as house wives. Children who breast fed for <2 years were more likely to be stunted than those who breast fed ≥ 2 years. Children who were exclusively breast fed for <6 months were more likely to develop stunting than children who were exclusively breast fed for the first 6 months. Children who bottle fed were more likely to be stunted than children who fed their complementary food using spoon/cup(3).

Other study done in pastoral community of Somali region Dolo Ado district, showed the prevalence of stunting to be 34.4%. The shows that the significant determinants of malnutrition were gender and age of child, marital status, maternal education, monthly HH income, decision making, having of livestock, presence of ARI, total number of children ever born, health status during pregnancy, pre-lactation practice, mode of feeding, access to clean water and type of floor in the households(20).

3. OBJECTIVES

3.1. General objective

To assess prevalence and determinant of chronic malnutrition(stunting) among children from 6 to 59 months old, Samara Logia city administration, Afar Region, Ethiopia from June 03 to July 20,2019

3.2. Specific objectives

- i. To assess prevalence of chronic malnutrition(stunting)among children from 6 to 59 months old, Samara Logia city administration, Afar Region, Ethiopia from June 03 to July 20,2019.
- ii. To assess determinants of chronic malnutrition(stunting)among children from 6 to 59 months old, Samara Logia city administration, Afar Region, Ethiopia from June 03 to July 20,2019.

4. METHODS

4.1. Study Area

Samara-Logia town is the capital city of the region. It is located at 600 km North-east of Addis Ababa on the main road from Addis Ababa to Djibouti with in coordinates 11|47|32|N|41|0|31|E|. It is bordered by Mile woreda in the South, Dubti woreda in the North, East and West. The climatic condition is arid and semi-arid with low and erratic rainfall. Temperature varies from 20°C in higher elevations to 48°C in lower elevations. Rainfall is bi-modal with a mean annual rainfall below 500 mm to 150 mm. There is asphalt main road to Djibouti and cobble stone covering some of the road inside the city. There is one university and health college. Four KG schools, two elementary and two high school. It has total of four urban kebeles. Each kebele constituted of four “Ketenas”.

Total number of children with in age group of 6 to 59 months are 6,924.

4.2. Study period

June 03 to July 20,2019

4.3. Study Design

Community based Analytic Cross-sectional study was used.

4.4. Source population

All children living in samara logia city administration.

4.5. Study population

All children with in age category of 6 to 59 months residing in Samara Logia city administration.

4.6. Inclusion criteria

All children with in age category of 6 to 59 months residing in Samara Logia city administration who reside in the city administration for the last 6 months.

4.7. Exclusion criteria

Children with in age category of 6 to 59 months residing in Samara Logia city administration who has a chronic illness.

4.8. Sample Size and Sampling

The sample size was calculated using a formula for estimation of a single proportion by taking proportion of birth order greater than three to be 30% (6) (P), with 95% confidence interval and 5% marginal of error (d), $Z_{\alpha/2}=1.96$.

$n = Z^2 \frac{p(1-p)}{d^2}$, The calculated sample size was 323. As a multistage sampling technique was employed to identify study subjects, a design effect of 1.5 was used due to homogeneity of people living there. Also 5% was added for non-responses rate. Thus, the final sample size was 509.

A multistage sampling technique was used. Two kebeles out of four kebeles in Samara logia city administration was choose by Simple random sampling method (lottery method). Four Ketenas was choose out of eight Ketenas by simple random sampling method (lottery method). House hold in the choose Ketenas was selected by systematic Random sampling method.

4.9. Data collection methods

Data was collected using structured questionnaire which has three parts (sociodemographic, house hold belongings and height measurement) via face to face interview with participant's mothers or care takers. The questionnaire was initially prepared in English and translated into local language, then retranslated to check consistency. The instrument was pre-tested in 5% of sample size in non-selected Ketena. The data was collected by four data collectors who have first degree in public health after two days training. Filled questionnaires was checked daily for its completeness by supervisors.

Anthropometry

The anthropometric measurements were measured by the data collators mentioned above. Height of infants aged 6 to 59 months was measured in a recumbent position for children 6 months to 24 months and in standing position for those from 24 to 59 months to the nearest 0.1 cm using a standard vertical board with a detachable sliding headpiece according to EDHS 2016.

4.10. Data Analysis

Data was entered to Epi info version 7.21.0, and then imported to SPSS windows version 23.0 first descriptive statistics (mean, median, frequency, standard deviations) were performed. Then Univariable analysis was performed and those variables with P value of less than 0.2 were included in multivariable analysis by using SPSS windows version 23.0. Statistical associations were considered significant whenever the p value is less than 0.05 for multivariable analysis.

4.11. Variables

4.11.1. Dependent variable

Stunting (chronic malnutrition) those with height for age below -2SD

4.11.2. Independent variables

Child age, child sex, religion, ethnicity, wealth index, family size, parental age, marital status, parental occupation, maternal knowledge, number of under-five children, antenatal care, place of delivery, time of initiation of breast feeding, duration of exclusive breast feeding, duration of breast feeding, time of initiation of complementary feeding, type of complementary food, method of complementary feeding and number of meals per day, type of birth (singleton or multiple), birth order of the child were assessed.

4.12. Operational definition

Wealth index

Was computed as a composite indicator of living standard based on variables related to ownership of selected household assets, quantity of livestock and materials used for housing construction. The computation was made using principal component analysis and a single continuous variable was generated by summing up the principal components into one. Quartiles of wealth index was generated using the composite score.

Resident

A person is said to be residence of a particular place if he resides there for 6(six) consecutive months.

4.13. Ethical consideration

The ethical clearance was obtained from SPHMMC, Ethical review board. After explaining that there is no risk to them from answering the questions or allowing us to take measurements of their child, the result of the study might be used for the policy making in prevention and rehabilitation of stunting in children. They were assured on the privacy of their information. Written consent was obtained from caretakers of under-five children after explaining that there is no cost, they will be paid for being part of this study

5. RESULT

A total of 509 children from ages 6 months to 59 months, with mean age of 27 months and standard deviation of 12.4 took part in this study. Male respondents were 52.5%. Birth order of majority of the children took part in this study were above 3 (90.8%). Educational level of mothers of the children in this study was, can read and write only (56.2%), illiterate (26.5%), elementary school (6.5%), collage and above (10.4%). Majority of the children mother were married currently (96.9%), 2% were widowed and 1.2% divorced. Majority of the children's mothers (care takers) were with in age category of 25 to 29 years (45.2%), followed by 30 to 35 years of age category (37.3%) and only 2.6% of them were ≥ 35 years. Majority of the mothers (care takers) were housewife (53%), 27.9% of them were merchant and 9.8% of them were government employee. Almost all mothers had ANC follow up at least 3 times during this child's pregnancy (98.6%) time. In the 97.1% of households, the head of house were father(men).

Table 1: Sociodemographic characteristics of household respondent of Samara Logia City Administration, Samara, Afar Region, 2019

SOCIODEMOGRAPHIC		Number	%
Ethnicity	Afar	407	80.0%
	Amhara	71	13.9%
	Tigre	30	5.9%
	Oromo	1	0.2%
Gender of the child	Male	267	52.5%
	Female	242	47.5%
	health facility	509	100.0%
Religion of mother	Muslim	489	96.3%
	Orthodox	19	3.7%
Birth order of child	1 to 3	47	9.2%
	Above 3	462	90.8%
Educational status of mother	illiterate	135	26.5%
	read and write only	286	56.2%
	elementary school	33	6.5%
	secondary school	2	0.4%
	collage +	53	10.4%
Marital status of mother	married	493	96.9%
	widowed	10	2.0%
	divorced	6	1.2%
Age category of the mother (care taker) in	20 to 24	76	14.9%
	25 to 29	230	45.2%

years	30 to 34	190	37.3%
	>=35	13	2.6%
Head of house	father	494	97.1%
	mother	15	2.9%
ANC during pregnancy	yes	502	98.6%
	no	7	1.4%
Occupation of mother	house wife	270	53.0%
	merchant	142	27.9%
	government employee	50	9.8%
	daily laborer	43	8.4%
	private employee	4	0.8%
Head of house	father	494	97.1%
	mother	15	2.9%

From 509 children in the age category of 6 months to 59 months, about 30%(152) of them were stunted. Prevalence of stunting in the city administration was 29.9%.

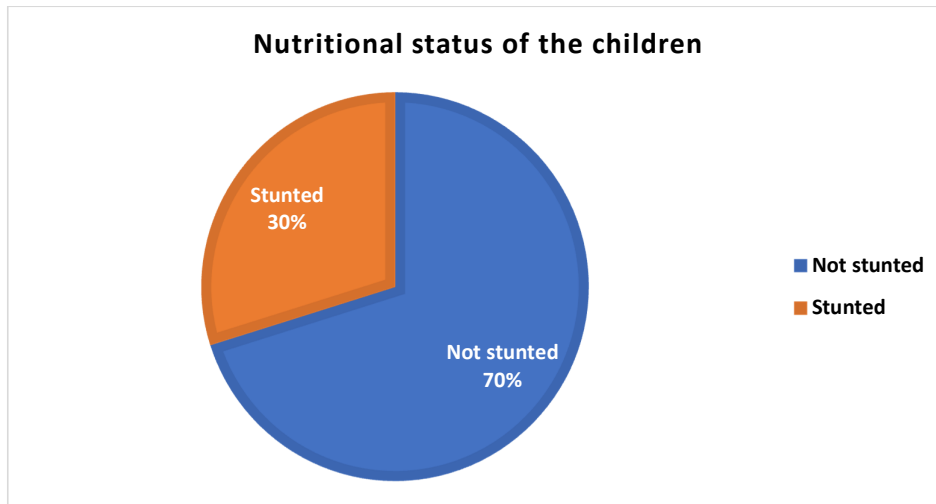


Figure 1: Nutritional status of children aged from 6 months to 59 months living in Samara Logia City Administration, Samara, Afar Region, 2019.

About 53% those stunted were females while 47% of males were stunted. Prevalence of stunting in female children was 33% and 27% for males.

Table 2: Gender specific prevalence of stunting among children aged from 6 months to 59 months living in Samara Logia City Administration, Samara, Afar Region, 2019.

Gender	Total Number of children screened	Total number children stunted	Prevalence
Male	267	72	27%
Female	242	80	33%

Among stunted children, age group 24 to 35 months account 28.3% (43) followed by age group 36 to 47 months with values of 17.8% (27), comes third was age group 12 to 17 months account for about 15.8% (24). Age group 48 to 59 months account for 15.1(23). The age group with relative lower number of stunting was 6 to 8 months 3.3% (5).

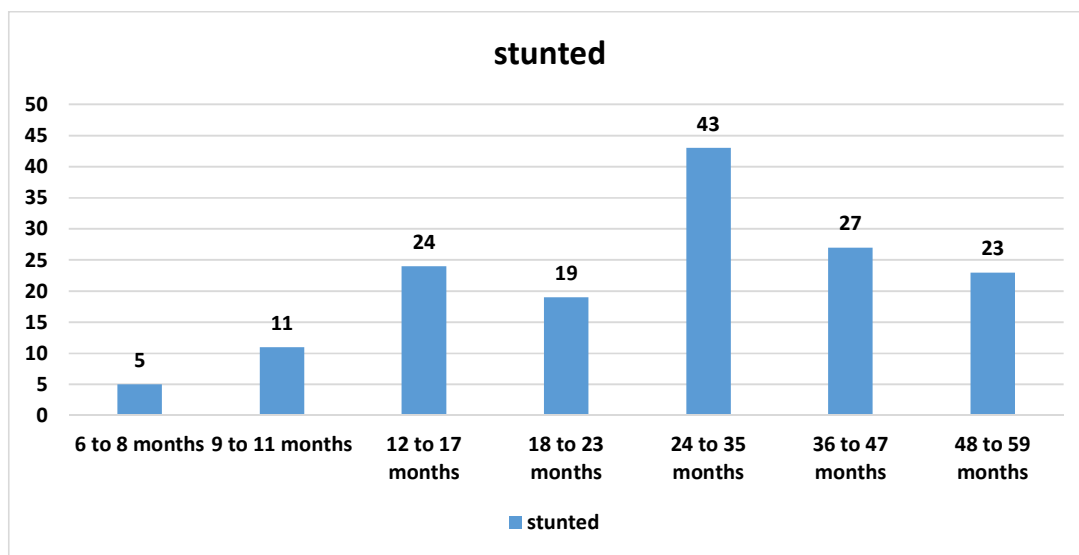


Figure 2: Distribution of stunting by age category of children aged from 6 months to 59 months living in Samara Logia City Administration, Samara, Afar Region, 2019.

Child in the birth order 3rd and above were more stunted (86.8%) when compared to second and below birth order (13.2%).

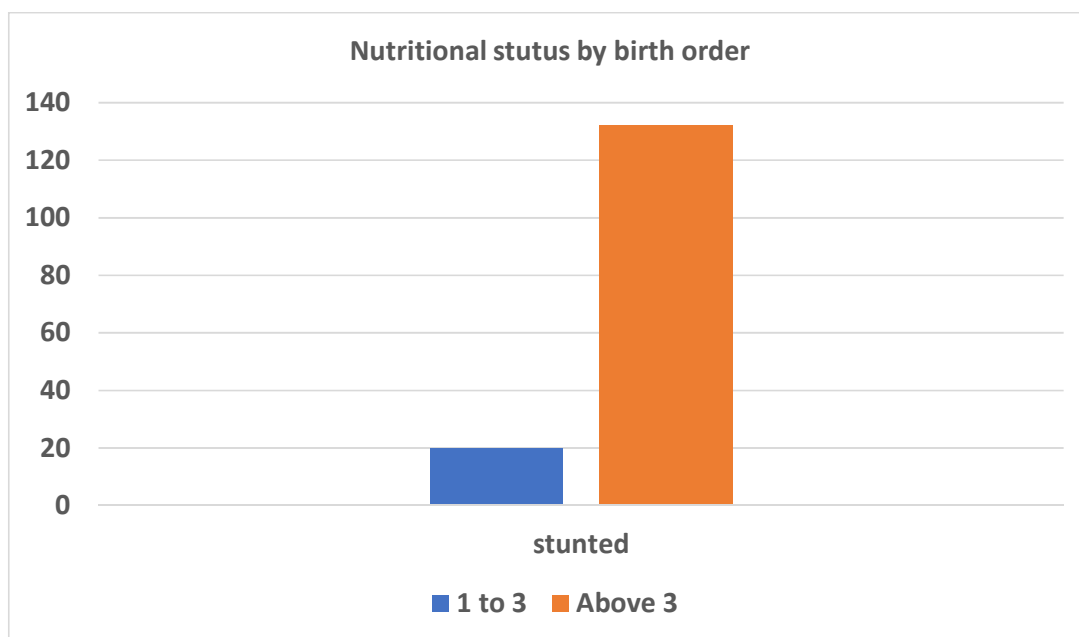


Figure 3: Distribution of stunting by birth order among children aged from 6 to 59 months living in Samara Logia City Administration, Afar Region, 2019

Among stunted children, 115 of them were exclusively breast fed for less than six months, 36 of them were breast fed exclusively for six months.

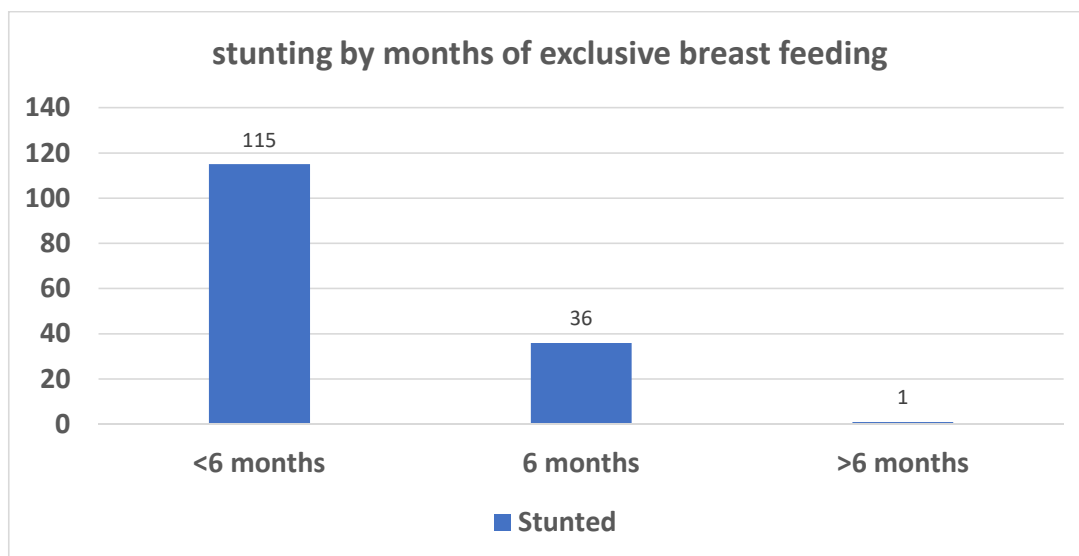


Figure 4: Distribution of Stunting by duration of exclusive breastfeeding among children of age ranges from 6 to 59 months living in Samara Logia city Administration, Afar Region, 2019

Among stunted children in our study 86% of them were breast fed for less than 24 months while only about 14% of them were breast fed for more than or equals to 24 months

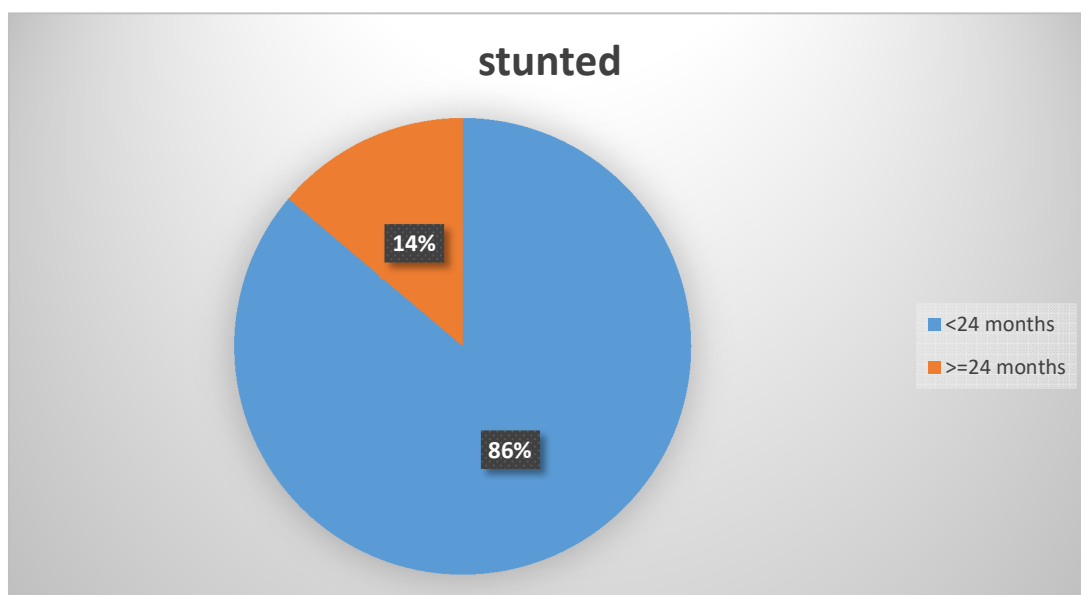


Figure 5: Distribution of stunting by duration of total breastfeeding among children of age ranges from 6 to 59 months living in Samara Logia city Administration, Afar Region, 2019

As depicted in the table below, “ketena 5” had the highest prevalence of stunting 9%, followed by “ketena 1” with 8% of prevalence and “ketena 7” had the lowest prevalence 5.1%.

Table 3: Prevalence and distribution of stunting by place among children of age ranges from 6 to 59 months living in Samara Logia city Administration, Afar Region, 2019

Ketena name	Total No	Total No stunted	Prevalence
Ketena1	123	41	8%
Ketena 4	131	39	7.7%
Ketena 5	142	46	9%
Ketena 7	113	26	5.1%

As shown in the table below, four variables have association with stunting; those children who were breast fed for less than 24 months were 3.485:95% C.I [2.519,7.941] times at risk of developing stunting when compared to children who were breast fed for more than 24 months. Children who were breast fed less than 8 times a day were 2.184:95% C. I [0.452,

6.178] times at risk of developing stunting when compared to children who were breast fed for more than 8 times a day. Children in the birth order of above 3 were 4.57: 95%C. I [1.271,9.483] times at risk of developing stunting when compared to children who were in the birth order of 1st and second. Children whose family's wealth index was in 1st quartile was 3.425: 95%C. [I 2.492, 8.716] times at risk of developing stunting when compared to children whose family's wealth was in the 4th quartile.

Table 4: Association of independent variables with stunting among children of age ranges from 6 to 59 months living in Samara Logia city Administration, Afar Region, 2019

		Stunted		P value	AOR	95 C. I	
		Yes (number)	No (number)			Upper limit	Lower Limit
Duration of breast feeding	<24 months	131	319	0.03	3.485	2.519	7.941
	>=24 moths	21	38	Constant	Constant	Constant	Constant
Frequency of breast feeding	<8 times	91	241	0.04	2.184	0.452	6.178
	8 times	47	105	0.53	3.127	1.286	5.643
	>8 times	14	11	Constant	Constant	Constant	Constant
Duration of exclusive breast feeding	<6 months	115	306	0.84	3.819	0.948	8.349
	6 months	36	46	0.56	10.831	5.846	28.974
	>6 months	1	5	Constant	Constant	Constant	Constant
Birth order of child	1 to 3	20	27	Constant	Constant	Constant	Constant
	Above 3	132	330	0.02	4.571	1.271	9.483
Family Size	2 to 4	38	52	Constant	Constant	Constant	Constant
	5 to 8	113	303	0.38	23.86	7.147	42.142
	>8	1	2	0.09	5.896	2.871	15.697
Educational status of mother	Illiterate	44	91	0.09	4.871	1.743	14.283
	read and write only	83	203	0.27	2.168	0.469	9.371
	elementary school	12	21	0.42	3.174	0.512	10.112
	secondary school	2	0	0.975	5.875	0.789	8.569
	collage +	11	42	Constant	Constant	Constant	Constant
Wealth Index	1st Quartile	119	21	0.02	3.425	2.492	8.716
	2nd Quartile	28	171	0.07	5.574	3.492	15.842
	3rd Quartile	5	111	0.12	5.147	2.497	30.875
	4th Quartile	0	54	constant	Constant	Constant	Constant

6. DISCUSSION

Prevalence of stunting in our study was 29.9%. Mini Ethiopian demographic health survey for Afar Region presented higher result(21). A community based study done in pastoral community of Dollo Ado District, Somali Region, Ethiopia” stated the prevalence of stunting to be 34.4% which is comparably higher value as well(20), but the result is comparable with the other city administration in Ethiopia (Dire Dawa)(21). Possible explanation of the result might be due to the fact that the area of our study was urban (Samara Logia City Administration and Dire Dawa City Administration). In this study, stunting was more prevalent in female than males. In contrary with this study, community based study done in Dolo Ado(20) and west Gojjam(19) showed more prevalence in male. Traditional male favoritism in Afar culture might have role.

Age group 24 to 35 months was the most affected age group in our study. Mini Ethiopian demographic health survey showed similar result. Study done in west Gojjam also showed high burden of stunting around 24 month of age(19). This might be due to the fact that this age group is around the end of the first 1000 days of a child which is a critical period.

Birth order above three had high burden of stunting. Other community based study done in Miskan district of Gurage zone showed comparable result(3). This might be due to the fact that resource sharing increase as number of children increases.

In our study there was significant association between stunting and children with in age category 24 to 35 months. Ethiopian Demographic Health survey 2019 showed similar result.(21) study done in 2013 “Prevalence and Determinants of Chronic Malnutrition Among Under-5 Children in Ethiopia ‘also showed similar result(18). the other study done in west Gojjam also showed children with in age group of 25 to 36 months were significantly associated with stunting.(19)another study done in Somali Region Dolo Addo District also showed age group 24 to 35 months strongly associated when compared to other age group.(20) This due to the fact that this age group lies in the last phase of the critical the first 1000 days of child, when stunting start manifest.

Breast feeding child for less than 24 months was also associated with our study. On other hand study done in west Gojjam shows children who were breast fed for 12 to 24 months were associated with stunting.(19) Study done in Maskan District of Gurage Zone showed comparable result(children who were breast for less than 12 months were significantly associated with stunting)(3).

Children with birth order of three and above were significantly related with stunting in this study. Study done in 2012 with title of “Prevalence and Determinants of Chronic Malnutrition Among Under-5 Children in Ethiopia ” showed comparable result(18). Other study in Dollo Ado showed similar result. The possible explanation for this might be, as number of the child increase in the house they share resource of limited resource. Other possible explanation might be child care eagerness may decrease as number of children increase.

Breastfeeding children for less than eight times a day was also associated to stunting I this study. Study done in west Gojjam revealed comparable result that children who were breast fed less than three times a day were associated with stunting(19).

Families lower wealth index was also strongly associated with stunting in this study. Family whose wealth lays in the first quartile was strongly associated in this study. Study done with title of “Prevalence and Determinants of Chronic Malnutrition Among Under-5 Children in Ethiopia” also showed that children with lowest wealth index were at risk of stunting(18).

7. CONCLUSION

- Prevalence of stunting is lower than national figure for Afar region and more prevalent in female.
- Children whose age group lies within the end of the first 1000 days of their life are more affected.
- Breast feeding child for less than 24 months is strongly associated with stunting.
- birth order greater than three is also associated with stunting.
- Frequency of breast feeding during exclusive breast feeding (less than eight times) has a strong association
- Lower wealth index is also found to be associated with stunting.

8. RECOMMENDATIONS

- There should be extensive and continuous community-based awareness creation to break tradition of gender favoritism. (to Samara Logia city administration health bureau, to children and female affairs office of Samara Logia city administration)
- Federal Ministry of Health, Afar Region Health Bureau, and Samara Logia city administration health bureau should closely evaluate implementations of Sekota Declaration in Samara Logia City Administration.
- Afar Health Bureau and Samara Logia city administration health bureau should evaluate way of giving health education on breast feeding importance and teaching material should be reevaluated.
- Afar Health Bureau, Samara Logia city administration Health bureau, Family Guidance Association and other NGOs working on Family Planning in the city Administration should evaluate way of giving health education on family planning (importance of family planning)
- We recommend health education on importance of frequent breast feeding in decreasing chance of their child being stunted.
- It is important that Samara Logia city administration take and strength measures to empower economically those who are at the lower wealth index.

Limitation of the study

1. As the study was questionnaire-based, questions that required a good memory were vulnerable to recall bias.
2. Qualitative aspects of data were not included in this study to explore some associated factors and to triangulate the finding of the quantitative study through qualitative data. (for instance, why male favoritism).
3. As the study is cross-sectional in design, it does not establish causal relationship.

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ANNEXES

Annex 1: English version of information sheet and consent form

Information Sheet

ID No _____

Title: *Prevalence and determinant of chronic malnutrition(stunting) among children aged 6 months to 59 months in Samara Logia City Administration, Afar Region, Ethiopia*

Introduction:

Hello, my name is..... I am a member of the above titled research team. Thank you for taking your time to speak to us today. We are studying Prevalence and determinant of chronic malnutrition(stunting) among children aged 6 months to 59 months in Samara Logia City Administration, Afar Region, Ethiopia. We are very interested in your experiences and your point of view. You have all the right to withdraw at any point during this interview.

Purpose: To study prevalence and determinants of stunting among children aged 6 months to 59 months in Samara Logia City Administration, Afar Region, Ethiopia.

Procedure: If you agree to take part, this interview will take about 40 minutes of your time. There are three parts. First, we will ask you about demographic information of you and your family, knowledge you have on your feeding practice and finally we will take measurement (height of the child). Then finally we take some parametric measurement of your child. All information collected during this study will be kept private and will only be known by the investigators.

Benefits: The study result might be used for the policy making in mitigation of stunting.

Risks: There is no risk to you from answering the questions or allowing us to take measurements of your child.

Privacy: We will keep information about you private. We will not collect your name. Only the investigators will have access to the data and only for investigation purpose. We will not use any information that might identify you when we present or publish the study's results.

Payment: there is no cost to you for being part of the project. The approximate time that this study will take is 40 minutes.

Consent form

Participant Agreement: The project has been explained for me and my house hold members. I have been given a chance to ask questions. I feel that all my questions have been answered. Being in this study is my choice. I may change my mind and leave the study any time during the interview.

Participant Signature _____ Date _____

Name of persons obtaining consent _____

Signature of persons obtaining consent _____

Thank You for Your Cooperation!

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	Socio Demography			
	Responder	_____		
	Address	Sub city _____ Kebele _____ Ketena _____		
	Ethnicity	1. Afar 2. Oromo 3. Amhara 4. Tigre	5. Gurage 6. Walayita 7. Others(specify)	
	Gender of child	1. male	2. female	
	Age of child	Month _____		
	Age Category of mother(caretaker) in year	1. <=19 2. 20 to 24 3. 25 to 29	4. 30 to 34 5. >=35	
	Head of the house	1. Father	2. Mother	
	Mother had ANC during this child's pregnancy	1. Yes	2. No	
	Occupation of mother	1. House wife 2. Pastoralist 3. Merchant 4. Gov't Employee 5. Private Employee	6. Daily Laborer 7. Unemployed 8. Other____	
	Occupation of Father	1. Pastoralist 2. Merchant 3. Gov't Employee 4. Private Employee	5. Daily Laborer 6. Unemployed 7. Other _____	
	Religion of the mother(caretaker)	1. Muslim 2. Orthodox 3. Protestant	4. Catholic 5. Others(specify)	
	Marital status of mother(caretaker)	1. Married 2. Divorced	3. Widowed	
	Level of Education mother(caretaker)	1. Illiterate 2. Read and writing only 3. Elementary school (1-8)	4. Secondary School (9-12) 5. Tertiary School(college +)	
	Family size	1. 2 to 4 2. 5 to 8	3. 8 to 10	
	Place of delivery	1. Home	2. Health facility	
	Order of birth	1. 1 to 3	2. Above 3	

o .	Question	Coding Classification		Go To
	Twin birth	1. Yes	2. No	
	Duration of exclusive breast feeding	1. Below six months 2. For six months	3. Above six months	
	Child feed colostrum	1. Yes	2. No	
	Duration of breast feeding	1. <24 months	2. >=24 months	
	Method of breast feeding	1. Spoon and cup 2. Bottle	3. Hand	
	Frequency of breast feeding in a day	1. <8times 2. 8 times	3. >=8 times	
	First food given at time of weaning	1. Milk 2. "Attmit"	3. "Enjira" 4. Mashed potato	
1. Household belongings				
	Does the household have electricity?	1. Yes 2. No		
	Does the household have radio?	1. Yes 2. No		
	Does the household have television?	1. Yes 2. No		
	Does the household have table?	1. Yes 2. No		
	Does the household have chair?	1. Yes 2. No		
	Does the household have computer?	1. Yes 2. No		
	Does the household have refrigerator?	1. Yes 2. No		
	Is there air conditioner (AC) in the house	1. Yes 2. No		
	Does member of the household own bicycle?	1. Ye 2. No		
	Does member of the household own mobile phone?	1. Yes 2. No		
	Does member of the household own motorcycle?	1. Yes 2. No		
	Does member of the household own car?	1. Yes 2. No		
	They rented the house	1. Yes 2. No		
	They own house	1. Ye 2. No		

o .	Question	Coding Classification	Go To
	Their house has corrugated iron sheet roof	1. Yes 2. No	
	Their house has Cement wall	1. Yes 2. No	
	Their house has Cement floor	1. Yes 2. No	
	They use Firewood for cooking	1. Yes 2. No	
	Measurement		
	Height (in cm)	<u> </u>	

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