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Magnitude of Stunting and its Determinants among Children Aged 06-59 Months in Semen Bench Woreda, Genja District-A Community Based Cross-Sectional Study in South West Ethiopia, 2017

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Abstract

Background: Children are most vulnerable to stunting in developing countries because of inadequate health services, poor water and sanitation, poor maternal and child care practices and insufficient access to food. Malnutrition in Ethiopia, in the form of stunting is higher than other forms of malnutrition among under five children.

Objective: To assess magnitude of stunting and its determinants among children aged 06-59 Months in Semen Bench Woreda, Genja District, South West Ethiopia.

Methods: A Community based cross-sectional study was conducted from March 7 to May 28, 2017 in Genja district, southwest Ethiopia. Data were collected using structured questionnaires and measuring height of children. Bivariate and multivariate regression analyses were used using SPSS version 21 software to see the relevant associations. Descriptive statistics, binary and multivariable logistic regressions were done to identify factors associated with. P<0.05 were used to declare statistical significance. Anthropometric data were also converted into indices of nutritional status using Emergency Nutrition Assessment (ENA) for SMART.

Results: A total of 309 households were included in the study giving the response rate 100%. The prevalence of stunting among children 6-59 month in Genja district was 23%. From its 3.6% of them were severely stunted whereas 19.4% was moderately stunted. In multivariate analysis income and history of diarrhea were independent predictors of stunting with p- value <0.05. Children who had no history of diarrhea in the past had 0.6 lower odds of stunting than their counterpart (AOR=0.63, (CI; 1.03, 3.44)) and also children's whose family had income between 500-1000 had 0.8 lower odds off stunting than their counterpart (AOR=0.84, (CI; 0.2, 0.92)).

Conclusion and recommendation: Prevalence of stunting among children aged 6-59 months was to some extent high in contrast to other studies and government plan. Thus, it is indispensable to strengthen health promotion actions and social, educational and income-generating investments for preventing and fighting these nutritional ailments, which are still significantly present in this study area.

Keywords: Stunting; Malnutrition; Nutritional status; Feeding practice

Introduction

Malnutrition encompasses both ends of the nutrition spectrum, from under nutrition (underweight, stunting, wasting, and micronutrient deficiencies) to overweight. It occurs when there is an imbalance between supply of nutrients and energy and the body's demand for them to ensure normal growth, maintenance, and specific functions. Each year 45% of total mortality of children below five years old worldwide is attributed to malnutrition [1].

Nutritional Stunting, which is height for age below, than expected on the basis of international growth reference, is a very serious type of malnutrition in that it develops slowly through time before it is evident [2]. The high prevalence of stunting among the children reflects inadequate health services, poor water and sanitation, poor maternal and child care practices and insufficient access to food [3]. Growth stunting in early life continues to be a critical public health concern and it is highly associated with impaired cognition and educational performance [4]. Especially, the period from birth to age two is more than ever imperative for optimal growth, health, and development. Unfortunately, in different parts of the world this period is often marked by micronutrient deficiencies that interfere with optimal health, growth and development [3].

Stunting is one of the most serious but least addressed health problems in the world. However, the human and economic expenses associated with it are enormous, falling hardest on the very poor and on women and children [5]. Worldwide, 162 million children below five years old were stunted in 2012, 56% of them lived in Asia and 36% in Africa. It is also estimated that, globally, stunting is responsible directly or indirectly, for at least 35% of deaths in children less than five years of age. Over two-thirds of these deaths, which are often associated with inappropriate feeding practices, occur during the first year of life [6].

Study done on malnutrition among under five children in Bangladesh revealed that the high prevalence of stunting and underweight, which is 42% and 40% of under five children were stunted and underweight respectively [7].

In developing countries nearly one-third of children are underweight or stunted. Under nutrition is causing an estimated 3.5 million preventable maternal and child deaths annually and its economic costs in terms of lost national productivity and economic growth is huge [5]. The most recent studies shows that in Africa the percentage of children who are stunted (below-2 SD) ranges from 46%-18.8%. Malnutrition is a major underlying cause of the persistently high child mortality, contributing to more than a third of all deaths among children under age of 5 in Eastern and Southern Africa [8].

In Ethiopia, one of the countries located at eastern part of Africa, child malnutrition rate is one of the most serious public health problem and the highest in the world. High malnutrition rates in the country pose a significant obstacle to achieving better child health outcomes [9]. According to EDHS 2016 the data show that 38 percent of children under 5 are considered short for their age or stunted (below -2 SD), and 18 percent are severely stunted (below -3 SD). The prevalence of stunting increases steadily from age 9 months through the first 4 years of life, before declining slightly in the fourth year of life. Children age 24-35 months have the highest proportion of stunting (48 percent) [10].

Currently, the Federal Government of Ethiopia has been working to reduce malnutrition extensively using public education and provision of nutritional supplements and financial support to vulnerable families as major instrument. Still, the risk factors of under-nutrition are diverse and could potentially change in space and time. It is fact that sufficient data related with magnitude of stunting and its determinant factors have a significant contribution for the government or other stakeholders to make appropriate intervention. However, in semen bench woreda, Genja district there is lack of data related with stunting.

Thus this study aimed to determine magnitude of stunting and its determinant factors among children aged 06-59 months in Semen Bench Woreda, Genja District providing inputs into developing feasible and sustainable community-based interventions to improve childhood survival. Also it might be used as a baseline to design educational program for the mothers to increase their knowledge about how to care and feed their children.

Objectives

General objective

To assess magnitude of stunting and its determinant factors among children aged 06-59 months in Semen Bench Woreda, Genja District, South West Ethiopia

Specific objective

- To determine the magnitude of stunting among children aged between 06-59 months in Genja district, South West Ethiopia.
- To identify determinant factors associated with stunting among children aged between 06-59 months in Genja district, South West Ethiopia.

Materials and Methods

Study area and design

Community based cross-sectional study design was conducted from March 7 to May 28 2017 to determine magnitude of stunting and its determinant factors among children aged 06-59 months in Semen Bench Woreda, Genja District, South West Ethiopia. The study was conducted in Genja district which is located about 764 km from Addis Ababa, capital of Ethiopia and 27 km from capital city of bench Maji zone (Mizan Town). The district consists of five kebele (lowest level of administrative unit) namely Genja, Kasha, Moyalsa Wala and Gola.Based on data from the Woreda administration this town has an estimated total population of 25, 776 of which 12456 were men and 13320 were women and 4024 were children.

Source population

The Source population was children (06-59 months) of age who lived with their mother's or caregivers in the house holds of Genja district.

Study population

The Study populations for this study were children of aged 06-59 months who lived with their mothers or care givers in the sampled kebele of Genja district.

Inclusion criteria

All children aged 6-59 months old who were in the selected households are included in the study.

Exclusion criteria

Children who were seriously ill during data collection time were excluded from the study.

Sample size determination

Sample size was determined by single population proportion (p) statistical formula using P=0.33, p=proportion of child who are stunted (taken from research conducted in Shey bench, southwest Ethiopia [11]), 5% margin of error and 95% confidence interval (z=1.96 for CI 95%).

$N=(Z_{\alpha/2})^2*P\ (1-P)/W^2$

$N=(1.96)^2*0.33(1-0.33)/(0.05)^2=335$

N=335

Since the source population is 4024 which is less than 10000 approximating this number using the correction formula

$N_F=n/1+ni/N$ where N_F =Final adjusted sample size

NI=Greater calculated sample

N=Total population of 06-59 months of children which was 4024

$N_F=309$

Thus, a total sample of 309 was selected for this study.

Sampling technique

Initially sampling frame was developed based on the list obtained from health post family folder. Then households were selected using systematic random sampling methods from every seventh household after selecting the first household randomly.

Data collection procedure

Data was collected using structured questionnaire and anthropometric measurements. To check consistency of the questionnaire initially it was developed with English language and translated into local Amharic language then back to English. It consists of socio-economic and demographic, child caring practices and health care, and environmental health condition.

Measuring board instrument was used to measure height of children. Height was measured in the upright position for children greater than two years of age, while for those younger than two years, length was taken. Length in children less than two years was taken by two examiners. One should position the child (with the child in recumbent position on a measuring board). Then the child's head should be held with the ear/eye plane vertical, the ankles gently pulled to stretch the child, and the feet turned up vertically and measured in the nearest 0.1 cm. The older children should stand straight against a wall or the erect measuring scale; and their head, shoulder, buttocks and heels was touch the wall or scale. Then, they took a deep breath to relax the shoulders and with a flat object such as a book, the upper level of their head should be marked against the scale and measured to the nearest 0.1 cm.

Data quality control

The data was cleared and checked every day for completeness and consistency before data processing and analyzing. Filled questionnaire and checklist was seen for completeness, accuracy, clarity, and consistency by the investigator and necessary correction and change was made timely.

Operational definition

Stunting: Children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the WHO reference population are considered short for their age (stunted).

Pre lacteal feeding: Any feeding before initiation of breast feeding after birth.

Feeding frequency: Number of diet taken per day.

Recurrent episodes of diarrhea: Child who had 2 or more an episode of diarrhoea begins with a 24-hour period with three or more loose or watery stools and an episode of diarrhea is considered to have ended after 48 hours without three or more loose or watery stools within a 24-hour period. This was determined as perceived by mother.

Data processing and analysis

The data was entered using computer programs using EPI data, ENA for smart for anthropometric measurement and then exported to SPSS for analysis. Associations between independent variables and dependent variables were analyzed first using binary logistic regression to identify factors which are significantly associated with stunting. All explanatory variables that were associated with the outcome variable in binary logistic regression analysis were included in the initial logistic models of multivariable analysis. The crude and adjusted odds ratio together with their corresponding 95% confidence intervals was computed. P-value<0.05 was considered to declare a result as statistically significant in this study. The results were presented in text, tables and graphs based on the types of data.

Study variables

Dependent variable: Stunting (height for age)

Independent variables:

- ***Socioeconomic and demographic variables:*** Sex of the child, age of the child, marital status, ethnicity, religion and income of households, mother's education and head of the household.
- ***Child caring and health care characteristics:*** Birth place, length of pregnancy, start of breast feed, time to start complementary food and method to take complementary food, additional food during pregnancy, mothers age during first pregnancy and morbidity status (diarrhea in the past two week).
- ***Environmental health condition:*** Source of water supply, availability of latrine and waste disposal method.

Ethical consideration

Ethical clearance was obtained from Mizan Tepi University, collage of health sciences, department of public health. In addition, informed consent was obtained from study participant to confirm their willingness for participation after explaining the objective of the study. Respondents were told that, their name will not be mentioned and information provided by each respondent was kept confidential.

Results

Socioeconomic and demographic characteristics

A total of 309 children are aged 6-59 month included in this study. The response rate was 100% and of total study participants 165 (53.2%) were male whereas 145 (46.8%) were female. Of the children included in the study 45.5% of were in age group between 12-24 month. The mean age of the child was 25.6 and SD ± 12.3 month. Of the respondents 62.3% were bench and 63.2% protestant in religion. From the children mothers 91.6% were married and 60% of them 27.7% can read and write, 60% attend primary school and 11.9% of them attend secondary and college education. Of the respondents 37.4% had monthly income between 500 to 1000 Ethiopian Birr (Table 1).

Health care characteristics

About 256 (82.6%) children were born on health center, 51 (16.5%) were born at home and 3 (1.0%) were born at hospital and also majority of the children were born in term or nine month pregnancy duration which account 92.9%. Majority of the children start breast feed immediately after deliver which account 97.7% and also 49.7% start complementary feeding in less than 6 month of their age and 49.3% of the children start complementary at 6 month. Of the respondents 88.7% of the children did not take additional food during pregnancy and only 11.3% of them take additional food during their pregnancy. From the study participant 24.2% of the children had history of recurrent diarrhea in the past two week (Table 2).

Variable		Frequency	Percent (%)
Sex of the child	Male	165	53.2
	Female	145	46.8
	6-12 month	29	9.7
Age of the child	12-24 month	141	45.5
	>24 month	139	44.8
	Married	284	74.8
Marital status (Head of house)	Not married (single)	39	12.6
	Divorce	39	12.6
	Bench	193	62.3
Ethnicity	Keffa	161	32.6
	Amhara	15	4.8
	Oromo	1	0.3
Religion	Protestant	196	63.2
	Orthodox	105	33.9
	Muslim	9	2.9
	Read and write	86	27.7
Mothers education	Primary school	187	60.3
	Secondary and above	38	12
	Husband	232	74.8
Head of household	Wife	39	12.6
	Both husband and wife	39	12.6
	<500	114	36.8
	>1000	80	25.9

Table 1: Socio-demographic and economic characteristics of children 6-59 month and head of households in Genja district, south west Ethiopia June 2017 (n=309).

Variable		Frequency	Percent
Place of birth	Home	51	16.5
	Health center	256	82.6
	Hospital	3	1.0
Length of pregnancy	<9 month	11	3.5
	at 9 month	288	92.9
	>9 month	11	3.5
When did start to breast feed	Immediately	303	97.7
	After some time	7	2.3
Time to start complementary feeding	<6 month	154	49.7

	At 6 month	153	49.3
Methods to take complementary food	Bottle	133	42.9
	Cup	42	13.5
	Spoon	117	37.7
	Hand	16	5.2
Additional food during breast feed or pregnancy	Yes	34	11.3
	No	275	88.7
Recurrent diarrhea in the past two weeks	Yes	75	24.2
	No	229	75.8
Mothers age at first pregnancy	<20	9	2.9
	20-35	292	94.5
	>35	8	2.6

Table 2: Health care characteristics of children 6-59 month in Genja district Bench Maji zone south west Ethiopia June 2017 (n=309).

Variable		Frequency	Percent (%)
Source for drinking water	River	12	3.9
	Spring	64	20.6
	Pipe water	234	75.5
Toilet availability	Yes	300	96.8
	No	10	3.2
Waste dispose site	Open field	42	13.5
	In pit	211	68.1
	Common pit	27	8.7
	Composing	25	8.1
	Burning	5	1.6

Table 3: Environmental characteristics of children 6-59 months in Genja district Bench Maji zone south west Ethiopia June 2017 (n=309).

Environmental characteristics

From the study participant 75.5% used pipe water as source of drinking water, whereas 20.6% and 3.9% used spring and river respectively. And also 96.8% of the study participant had toilet facility and majority of the respondents which accounts 68.1% dispose their waste in pit (Table 3).

Prevalence of stunting among 6-59 month children

This study found that the prevalence of stunting among children 6-59 month in Genja district was 23.3%. From its 3.6% of them were severely stunted whereas 19.7% was moderately stunted (Figure 1).

Determinant factors associated with stunting

In the bivariate analysis factor associated with stunting were educational status, history of recurrent diarrhea, income of family and additional food during pregnancy.

In multivariate analysis income and history of diarrhea were independent predictors of stunting with p-value <0.05. Children who had history of recurrent diarrhea in the past had 1.8 times higher odds of stunting than their counterpart (AOR=1.8, (95% CI: 1.03, 3.44)) and also children's whose family had income between 500-1000 had 0.8 lower odds off stunting than their counterpart (AOR=0.84, (95% CI; 0.2, 0.92)) (Table 4).

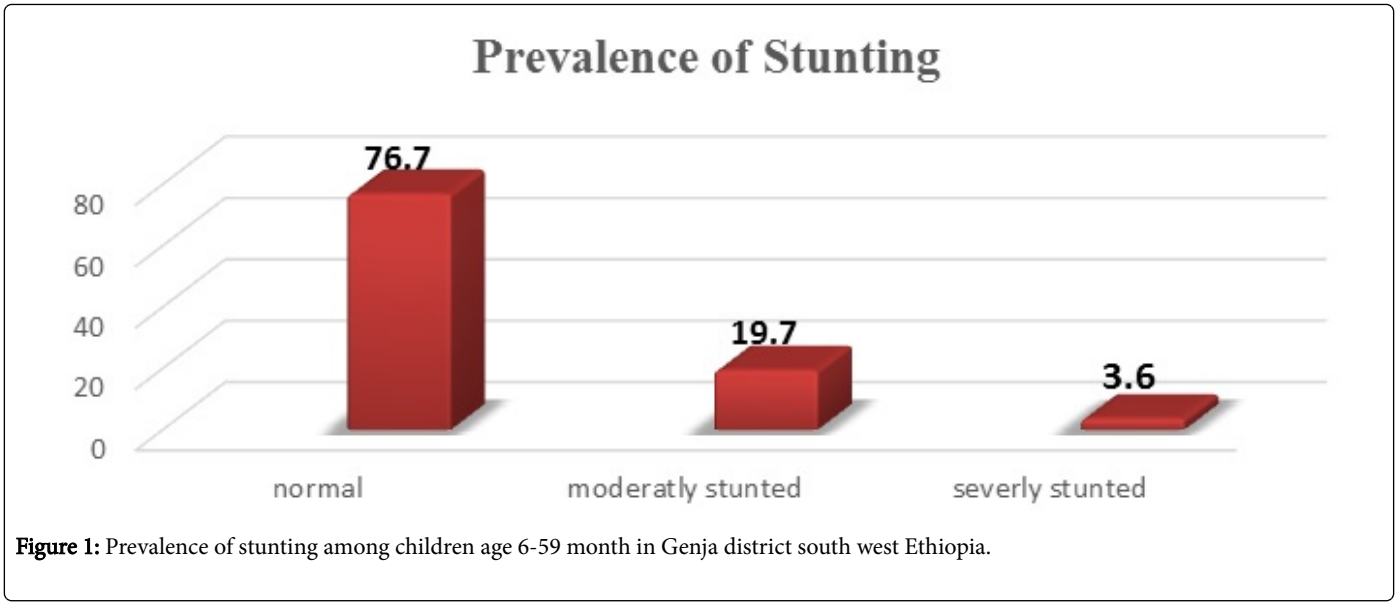

Figure 1: Prevalence of stunting among children age 6-59 month in Genja district south west Ethiopia.

Variable		Yes	No	COR (95% CI)	AOR (95% CI)
Income	<500	24	90	1.5 (0.7-3.2)	0.72 (0.32-1.6)
	500-100	35	80	2.4 (1.1-5.1)	0.4 (0.2-0.9)*
	>1000	12	68	1	1
History of recurrent Diarrhea	Yes	24	51	1.87 (1.007-3.3)	1.8 (1.03-3.44)*
	No	46	183	1	1
Add food During Pregnancy	Yes	11	24	1.64 (0.75-3.52)	1.8 (0.81-4.1)
	No	60	214	1	1
Educational	Read and write	21	65	2.003 (0.69-5.811)	0.6 (0.2-2.07)
Status	primary	45	142	1.96 (0.72-5.3)	0.6 (0.2-1.9)
	Secondary and above	5	31	1	1
Remark *significance at p value <0.05.					

Table 4: Multivariable logistic regression analysis on stunting among children 6-59 month in Genja district bench Maji zone south west Ethiopia; June 2017 (n=309).

Discussion

A report by world health organization (WHO) on the prevalence and trends of stunting among pre-school children in developing countries showed that the prevalence of stunting decreased by 40 million between 1980 and 2000, but that progress was uneven across regions. For instance, despite the overall decrease, stunting had increased in Eastern Africa [12].

This study was intended to assess the prevalence of stunting and associated factors among 6-59 months children in Genja district. This study revealed that, the prevalence of stunting was 23.3% among children aged 6-24 months, from it 3.6% were severely stunted and 19.7% were moderately stunted. Even if it was lower than some studies done in different parts of the country till now this figure indicates stunting was the severe public health significance of the problem. This study was in line with the study conducted by Ethiopian Base line survey 2010 which was 25% [13]. However the prevalence of stunting in the study area was lower than the study conducted in Shey bench, south west Ethiopia (33.3%) [11], Dabat (58.1%) [14] and Lalibela (47.3%) [15].

The reason behind declination of the prevalence in this study area compared to study conducted in other part of the country might be due to increased awareness of mothers or child care givers on child feeding practice. It might also due to improvement in health sectors and infrastructures in the community [4]. Similarly based on the result obtained from this study the presence of sanitary facilities in most interviewed households might contribute to this level of stunting.

Of the several interventions that may reduce diarrhea prevalence in a given community, the improvement of water supply and excreta

disposal facilities has attracted particular interest as best preventive strategy [1]. From the study participant 75.5% used pipe water as source of drinking water, whereas 20.6% and 3.9% used spring and river respectively. And also 96.8% of the study participant had toilet facility and majority of the respondents which accounts 68.1% dispose their waste in pit. Also this study identified that from the total studied children's, only 75 (24.2%) of them had history of recurrent diarrhea in the past two weeks.

It is fact that, social indicators have been crucial determinants of child malnutrition. Among these, improvement of families' economy and progress in maternal schooling levels has direct impact on positive linear growth evolution [16]. According to this study family monthly income was one of the socio-demographic factors associated with stunting. Children's whose family had income between 500-1000 had 0.8 lower odds off stunting than their counterpart (AOR=0.84, (96% CI; 0.2, 0.92)). This might be due to the fact that mothers of these families can able to purchase and utilize resources which are available at market for their children. This finding was not consistent with study conducted in Mizan Aman town [16] where income had higher odds for stunting. This discrepancy might be due to the categorical variation of income for analysis from the studies.

Another factor associated with stunting in the study area was recurrent diarrhea in the past two weeks. The result of this study revealed that children who had history of recurrent diarrhea in the past two weeks had 1.8 higher odds of stunting than their counterpart (AOR=1.8, (96% CI; 1.03, 3.44). This study was coherent with a result obtained in Dabat where only history of diarrheal morbidity was significantly associated with wasting (AOR=2.06; 95% CI: 1.29, 3.30) [14]. This might be due to diarrhea which might be related with loss of appetite, decreased absorption in the intestine, reduced immunity and exposes them to infections.

Conclusion

The result of this study found that the prevalence of stunting among children aged 6-59 months was to some extent high in contrast to other studies and government plan. However, mothers/child care givers awareness on child feeding practice was fine. The bivariate and multivariate result from this study revealed that children's family income and recurrent diarrhea in the past two weeks were found to be associated factors of stunting.

Recommendations

The prevalence of stunting in this studied area was more of attributed to finance and recurrent diarrhea among studied children. Therefore, the health extension workers and other members of the health staff should focus on nutrition education and different income generation activities for the sector. Also the health sector should work with other stakeholders like agricultural sectors to alleviate problems associated with lack of adequate food. Finally, the contribution of periodic deworming service to children should get more attention than ever to decrease the current magnitude of stunting. It is also imperative to enhance hygiene and sanitation condition of the community.

Competing Interests

The authors have declared that no competing interests exist.

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