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NURSING AND MIDWIFERY

THE PREVALENCE OF STUNTING AND ASSOCIATED FACTORS AMONG CHILDREN  
AGE 6-59 MONTHS AT MIZAN-AMAN TOWN, BENCH MAJI ZONE, SNNPR REGION,  
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BY:-ERMIAS AYALEW (BSC)

ADVISOR: - HUSSEN MEKONNEN (MPH)

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Internal examiner

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Full Name

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Date

Research Advisor/Supervisor:

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Full Name

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Date

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## Table of Contents

<b>AKNOWLEDGEMENT</b> .....	iii
<b>Table of Contents</b> .....	iv
<b>List of tables</b> .....	vi
<b>List of figures</b> .....	vii
<b>Acronyms</b> .....	viii
<b>Abstract</b> .....	ix
<b>1. INTRODUCTION</b> .....	1
1.1. <b>Background</b> .....	1
1.2. <b>Statement of the problem</b> .....	2
1.3. <b>Justification of the study</b> .....	4
<b>2. LITERATURE REVIEW</b> .....	6
2.1. <b>Magnitude of the problem</b> .....	6
2.2. <b>Factor associated with stunting</b> .....	7
2.2.1. <b>Demographic and Socio-economic factors</b> .....	7
2.2.2. <b>Socio-economic factors</b> .....	8
2.2.3. <b>Environmental factors</b> .....	9
2.2.4. <b>Health care factors</b> .....	10
2.2.5. <b>Dietary factor</b> .....	11
<b>3. Conceptual framework</b> .....	12
<b>4. OBJECTIVES</b> .....	13
4.1. <b>General Objectives</b> .....	13
4.2. <b>Specific Objectives</b> .....	13
<b>5. METHODOLOGY</b> .....	14
5.1. <b>Study Design</b> .....	14
5.2. <b>Study Area</b> .....	14
5.3. <b>Populations</b> .....	14
5.3.1. <b>Source Population: -</b> .....	14
5.3.2. <b>Study population: -</b> .....	14
5.4. <b>Inclusion and Exclusion criteria</b> .....	15

5.4.1.	<b>Inclusion criteria</b> .....	15
5.4.2.	<b>Exclusion criteria</b> .....	15
5.5.	<b>Sample Size</b> .....	15
5.6.	<b>Sampling procedures</b> .....	16
5.7.	<b>Study Variables</b> .....	17
5.7.1.	<b>Dependent variables</b> .....	17
	<b>Independent variables</b> .....	17
5.8.	<b>Operational Definitions</b> .....	18
5.9.	<b>Data collectors</b> .....	19
5.10.	<b>Data Collection Procedure</b> .....	19
5.11.	<b>Data quality control</b> .....	20
5.12.	<b>Procedure for data processing and data analysis</b> .....	20
5.13.	<b>Ethical consideration</b> .....	21
5.14.	<b>Dissemination of the result</b> .....	21
<b>6.</b>	<b>Results</b> .....	<b>22</b>
6.1	<b>Demographic and socio-economic characteristics</b> .....	22
6.2.	<b>Health care and environmental characteristics</b> .....	24
6.3.	<b>Dietary characteristics</b> .....	27
4.	<b>Magnitude of stunting among 6-59 months children</b> .....	31
6.5.	<b>Factor associated with stunting among 6-59 months children</b> .....	32
<b>7.</b>	<b>Discussion</b> .....	<b>34</b>
<b>8.</b>	<b>Recommendations</b> .....	<b>38</b>
<b>9.</b>	<b>Reference</b> .....	<b>39</b>
<b>10.</b>	<b>Annexes</b> .....	<b>44</b>
	<b>Annex-I. Information sheet and consent form</b> .....	44
	<b>Annex-II Amharic Version Information sheet and Consent form</b> .....	46
	<b>Annex III English Questionnaires</b> .....	48
	<b>Annex IV. Amharic Questionnaires (የአማርኛ መጠይቅ)</b> .....	54
	<b>Annex V: Declaration</b> .....	59

## List of tables

Table 1: demographics and Socio-economic characteristics of children among 6 to 59 months in Mizan-Aman town, SNNPR, Ethiopia, 2015.....	23
Table 2: health care and environmental characteristics of children among 5 to 59 months in Mizan-Aman town, SNNPR, Ethiopia, 2015.....	26
Table 3: dietary characteristics of children among 6 to 59 months in Mizan-Aman town, SNNPR Ethiopia, 2015.....	28
Table 4: factors associated with prevalence of stunting among children 6-59 months in Mizan-Aman town, SNNPR, Ethiopia 2015.....	29

## List of figures

Figure 1: Global conceptual frame work of causes of malnutrition.....	12
Figure 2: Schematic presentation of sampling procedure for the prevalence of stunting and association factors among 6-59 months children's in Mizan-Aman town, Bench Maji zone, southern Ethiopia,2015.....	16
Figure 3: Distribution of prevalence of stunting with age groups among children's 6-59 months in Mizan-Aman town, Bench Maji zone,Southern Ethiopia,2015.....	31

## **Acronyms**

ANC- Antenatal care

BF- Breast feeding

EBF- Exclusive Breast Feeding

EDHS- Ethiopian Demographic and Health Survey

FAO- Food and Agriculture Organization

GO- Governmental Organization

HAZ- Height -for-age

IYCF- Infant and Young Child Feeding

NGO- Non-Governmental Organization

ORS- Oral Rehydration Solution

PNC- Postnatal care

SSSF -Solid, Semi Solid and Soft Food

SNNPR- South Nation Nationality Peoples Region

TBA- Traditional Birth Attendant

UNICEF- United Nations Children's Fund

WHO- world health organization

## **Abstract**

**Introduction:** -Stunting remains a problem of greater magnitude than underweight or wasting, and it more accurately reflects nutritional deficiencies and illness that occur during the most critical periods for growth and development in early life. Stunting in early childhood results in diminished cognitive and physical development, which puts children at a disadvantage for the rest of their lives. Most studies indicated that stunting is associated with low socio-economic status, low educational level of parents, poor water supply and sanitation, and high infectious diseases burden. Stunting is one of the most important public health problems in Ethiopia.

**Objectives:** - The study was aimed to assess the magnitude of stunting and associated factors among under five children in Mizan-Aman town, Bench Maji Zone, SNNPR Region, Ethiopia.

**Methods:** - A community based cross-sectional study was conducted by simple random sampling technique with sample size of 734 6-59months children. Interviewer administered structured questionnaires was used to collect data. The data was entered using EPI INFO version 7.0.9.34 2014 and analysis was done by SPSS version 22 and ENA for SMART, 2011 software. Bivariate and multivariate logistic regression analysis was used. The variables which had significant association were identified on the bases of P value.  $\leq 0.05$  and 95%CI

**Result:** - In the study, 35.4% (34.6%-36.3%; 95% C.I) 6-59 month children were stunted. Of the total number of stunted children, 138 (53.1%) were male children. Children within age group 24-35 months (AOR=2.29; 95%CI: 1.10, 4.82), children whose mothers had no education (AOR=5.38; 95%CI: 2.27, 12.77), low income households (AOR=3.92; 95%CI: 2.54-6.06), children who had small size at birth (AOR=2.10; 95%CI: 1.13, 3.93), having 4 and above birth order (AOR=2.32; 95%CI: 1.28, 4.21), children who had breast feed for more than 24 months long (AOR=2.49; 95%CI: 1.03, 6.00) and mothers not used cup to feed children (AOR=2.08; 95%CI 1.05, 4.15) were more likely to be stunted.

**Conclusion:** - Stunting was a highly prevalent problem in the study area and child's age. Mother's education, household income, birth order, Size at birth, duration of breast feeding and cup feeding were found to be associated factors of stunting. There is need for linking nutrition interventions and social protection program in Mizan-Aman town.

**Key Words:** Stunting, Anthropometric index

# 1. INTRODUCTION

## 1.1. Background

Malnutrition is one of the most important health and welfare problems among infants and young children in Ethiopia [1]. Even though the prevalence of chronic malnutrition in the last eleven years has decreased significantly, children under five years of age still experience one of the highest rates of malnourishment in the world [1], that is, 44% of the children under age of five were stunted with a greater regional differences ranging from Amhara (52%), Tigray (51%), above the national prevalence to the lowest level in Addis Ababa (22%) and Gambella (27%) [1].

There is a consensus among many researchers that a complex set of factors determine malnutrition among young children while inadequate and inappropriate dietary intake and infectious diseases appear the immediate/direct causes. Also, numerous socioeconomic and demographic factors influence feeding patterns and health of children [2], which in turn results in decreased food intake, poor diet quality, and a high burden of early childhood infections that contribute to significant growth faltering, morbidity and mortality. The factors leading to any Anthropometric deficiency (stunting, wasting, and underweight) differ from one context to the other. For example, according to the recent national report [1], the prevalence of stunting increases as the age of children increases and male children are slightly more likely to be stunted than female children (46% and 43%, respectively). Based on national data, Patricia [3] indicated that environmental factors (access to water and sanitation at the community level) were key predictors of underweight children in Ethiopia. Another study based on a large sample size drawn from five zones of Southern Ethiopia by Gugsu [4] determined that women's education, household economic status, age of the child and infant feeding practice were the significant predictors of stunting.

Despite few studies done at national and regional levels, the prevalence and risk factors at sub-regional or community level have been insufficiently emphasized, which makes interventions difficult in such circumstances. For example, according to the 2011 DHS [1], the prevalence of stunted, wasted and underweight children in the region (SNNPR) was 44.1%, 7.6% and 28.3%, respectively, indicating that there are several zones and districts with higher prevalence rates than the regional average[1]. Therefore, this study investigated the current prevalence and key risk factors of malnutrition among children under five years of age in Mizan-Aman town, Bench Maji zone of SNNPR. This study, thus, posed and addressed the prevalence of stunting among children 6–59 months of age in the study area and predictors of stunting among children 6–59 months of age in the study area.

## **1.2.Statement of the problem**

Malnutrition is an underlying cause of more than 2.6 million child deaths every year, a third of the total of child deaths. Every hour of every day, 300 children die because of malnutrition but it's not recorded on death certificates and, as a result, it's not effectively addressed [4, 5].

Worldwide, an estimated 171 million children do not have the opportunity to reach their full potential because of poor nutrition in the earliest months of life. More than a third of children in Asia are stunted, which accounts for almost 100 million of the global total. In Africa, almost two in five children are stunted that is a total of 60 million children [5, 6]. Stunting is an indicator of chronic malnutrition, meaning long-term or accumulated nutritional deficiency resulting from lack of adequate dietary intake over a long period of time and/or recurrent illness. Stunting is defined by a height-for-age (HAZ) z-score below two SDs of the median WHO standards [7]. Stunting is

a result of prolonged or repeated episodes of under nutrition starting before birth. The first 1,000 days of life beginning with conception, through a mother's pregnancy and up until the age of two is the most critical period in a child's development [6].

At the most immediate level, stunting is caused by inadequate diet and by infection. These primary causes of malnutrition are influenced by food access and availability, healthcare, water and sanitation, and the way a child is cared for (for example, whether the infant is breastfed and whether basic hygiene practices are used, such as hand-washing). Underlying all of these primary and intermediate causes of malnutrition are poverty, lack of resources (financial and human resources), and social, economic and political factors [6, 8, 9].

Stunting can have an intergenerational effect in which a mother who is stunted may in turn give birth to a small baby, because the fetus's growth in the womb may have been restricted [6,7]. Stunting in early childhood also results in diminished cognitive and physical development, which puts children at a disadvantage for the rest of their lives. They may perform poorly in school. And as adults they may be less productive, earn less and face a higher risk of disease than adults who were not undernourished as children [9, 10].

Height at 2 years of age is clearly associated with enhanced productivity and human capital in adulthood, so early nutrition is also an important contributor to economic development in which a 1% loss in adult height due to childhood stunting is associated with a 1.4% loss in productivity [8]. Progress in reducing childhood malnutrition in developing countries has been slow. The larger burden for Africa is stunting that is the failure to grow in stature [11]. In Africa, this has seen an overall reduction of just 2% in 20 years from 40.3% in 1990 to 38.2% in 2010 [5, 6].

Stunting is continued to be one of the most important public health problems in Ethiopia. In recent years Ethiopia has only had limited success in reducing the prevalence of stunting with annual reduction of 1.3% over the past eleven years from 58% in 2000 to 44% in 2011. In urban Ethiopia is 32% in 2012 and in Southern region of Ethiopia (SNNPR) 41% of under five children were stunted. In SNNPR only 2.5% of children 6-23 months of age fed minimum acceptable diet according to the IYCF recommendations [1, 12].

There are differences in morbidity, child caregiving behaviors, and access to health care among others warrants a population-specific approach when studying the risk factors for malnutrition. This study is therefore, aimed to assess the magnitude of stunting and associated factors among under five children in Mizan-Aman town, Bench Maji Zone, SNNP region, Ethiopia.

### **1.3. Justification of the study**

Stunting reflects the cumulative effects of socio-economic, environmental, health, and nutritional conditions. Stunting is directly associated with many of the Millennium Development Goals (MDGs) particularly MDG 1 (eradicate extreme poverty and hunger) and MDG 4 (reduce child mortality) so, properly addressing stunting helps for the success of achieving the goals. Stunting is not only a significant contributor to child mortality and development, but also to future productivity and national economic development in Ethiopia stunting is continued to be one of the most important public health problems with severity that defined as "very high" stunting prevalence according to WHO criterion,  $\geq 40\%$  [11].

The locus of poverty and under nutrition among children appears to be gradually shifting from rural to urban areas, as the number of the poor and undernourished increases more quickly in urban than in rural areas [3], In urban Ethiopia 32% of under five children were stunted. Mizan-Aman

town as part of Southern Region of Ethiopia (SNNPR) only 2.5% of children 6-23 months of age in the region fed minimum acceptable diet according to the IYCF recommendation and also the town has shortage of safe water supply, increase population and other related factors which is directly associated with stunting. This study will includes the most important factors that are demographic and socio-economic, environmental, health care and infant and young child feeding factors of stunting also there Is no published study conducted on this topic in the study area, therefore, it is essential to assess the current magnitude of stunting and associated factors among under five children of children in study area The results of this study also serve as baseline data for program managers, decision makers and advocates so as to design and focus on interventions.

## **2. LITERATURE REVIEW**

### **2.1. Magnitude of the problem**

Globally, an estimated 171 million children do not have the opportunity to reach their full potential because of poor nutrition in the earliest months of life [5, 6]. Under nutrition is an underlying cause of more than 2.6 million child deaths every year, a third of the total of child deaths [6]. In Latin America, 15% of children affected by stunting in 2012 [3]. The studies conducted in Peru 26.6 % [13] and in Brazil 29.9% [14] under five children were stunted. According to UNICEF 2012 reports In Asian countries, 34% children were stunted [4]. The prevalence of stunting based on study conducted In Nepal Were 37% [15], in Bangladesh 43.2% [16], in India 51.6% [17] of under-5 children were stunted. The cross-sectional studies conducted revealed that, the prevalence of stunting in Laos PDR were 40% [18], in Sri Lanka 11.8% [19] and in Cambodia 45% [20] among children of age 0-59 month(s).

The global estimates taking the most recent available data for the years 2012, the prevalence of stunting among under five children in sub-Saharan Africa were 39% [3]. In Ghana, 36% [21], in South Africa 25% [22], in Democratic Republic of Congo 43.9% [23], in Uganda 41.6 % [24], in Tanzania 44% [25], in Kenya 40% [26] and in Sudan Khartoum 51% [27] of under five children were stunted.

The magnitude of stunting In Ethiopia is one of the highest from sub-Saharan Africa countries. According to study conducted by Girma and Genebo in 2002 indicated that the prevalence of stunting was 52% nationally, 42% in Urban and in the same study in SNNPR 54% among under five children [28], study conducted by Macro International Inc. in 2008 indicated that 47% of under five children were stunted [29]. And also studies done by Edris .M in Gumbrit, Northwest

Ethiopia 24 % [30] and in West Gojam Zone by Teshome .B et al 43.2 % (29) of children were stunted. According to the EDHS 2011, 44 % nationally, 32 % in Urban Ethiopia and in SNNPR 41.1 % of under five children were stunted [1].

## 2.2. Factor associated with stunting

### 2.2.1. Demographic and Socio-economic factors

**Age of child:** - Study conducted in Peru indicated that the level of stunting increases with increasing age of child (OR 6-month 1.14; 95% CI 1.02, 1.27) [13]. In Nepal, the mean z-score for height for age was found to be decreasing with age [15]. Studies, in Ghana [21], in South Africa [22], in Uganda [25] and in Ethiopia [1, 28, 29, 31]. Indicated that older children had a higher prevalence of stunting than younger children.

**Sex of Child:**-The studies conducted in DRC [23]. In Nairobi Kenya [26] and Secondary data analysis in Sub-Saharan Africa [32] confirmed that the prevalence of stunting was higher among boys compared to girls. A cross sectional study in Gojam investigated that, male children were 1.5 times more likely to be stunted as female children [31]. In contrast the studies conducted in Cambodia [20] and in Ethiopia (26) suggested that, there is no significant difference in prevalence of malnutrition by sex of the child.

**Birth order of the child:** - In Cambodia stunting prevalence was significantly higher among children of higher birth order [20] and also in Nairobi Kenya study suggested that, the odds of stunting for children born to mothers who have two births, and three or more births are 31% and 39 % higher compared to those that have one child respectively ( $p < 0.05$ ) [26]. Study conducted in Egypt indicated that, higher levels of stunting were found in children of higher birth order (24.31% for birth order 5 vs 17.26% birth order 1) [33]. The study in Ethiopia to the contrary concludes,

the risk of stunting was also 1.2 times higher for children of first birth order as compared with children of birth order six or more [28].

**Birth interval of the child:-** Study conducted by Girma and Genebo in Ethiopia showed that, children whose preceding birth interval was less than two years were 1.8 times more likely to be stunted as compared with children whose preceding birth interval was 48 months and more[28]. According to EDHS 2011, there is an inverse relationship between the length of the preceding birth interval and the proportion of children who are stunted. The longer the interval, the less likely it is that the child was stunted [1].

**Age of the mother:-** In Nepal, when maternal age at pregnancy was more than 55 Years, there was 2.6 times risk of stunting in the children [OR= 2.615 (1.139<OR<6.005)] [6] Study conducted in Nairobi Kenya suggested that, mothers' age do not determine stunting [26].

**Marital status of the mother:** - Study in Nairobi Kenya suggested that, the odds of stunting for children born to mothers who were never married are 56 % higher relative to those who are currently in union respectively [26]. In DRC there were no statistically significant association observed between the prevalence of stunting and mother's marital status [23].

### 2.2.2. Socio-economic factors

**Education status of mother:** - Stunting were found to be associated with mother's educational status in Nepal [15], In India, stunting was found to be significantly associated maternal education [17].Studies in Tanzania [25], in Nairobi Kenya [26] and also in Ethiopia [28, 29] revealed that, mother's level of education has an inverse relationship with stunting levels. According to the EDHS 2012 survey, children of mothers with more than secondary education are the least likely to be

stunted (19 percent), while children whose mothers have no education are the most likely to be stunted (47 percent) [1].

**Educational status of father:** - In Ethiopia study showed the likelihood of being stunted was also 1.4 times higher among children of father who has no education compared with children whose father has some secondary or higher education [28].

**Household economic status:**-Most study confirmed that there were linearly associated between stunting and economic status. Studies in India [17], in Nepal [15] and in Cambodia [20] concluded that household economic status was a risk factor for stunting. In Ethiopia studies also indicated, as compared with children from medium or higher economic status households, children of poor households were 1.9 times more likely to be stunted [28]. According to the EDHS 2012, in Ethiopia there is an inverse relationship of household wealth quintile and the stunting levels of children; that is, a higher proportion of children in the lowest household quintile are stunted (40 percent) than on the highest wealth quintile (30 percent) [1].

### 2.2.3. Environmental factors

**Source of water:** - in Cambodia study revealed that availability of safe drinking water was not associated with prevalence of stunting [20]. In Ethiopia study shows that the Prevalence of stunting among children of households with no protected water source was significantly higher as compared with those who have [28] Study by Macro International Inc. in Ethiopia also confirmed that children whose drinking water is from a non-improved water source are more likely to be stunted than children with access to an improved water source [29].

#### 2.2.4. Health care factors

**Child's weight and size at birth:** - According to the study conducted in Ghana indicated that, children who were very small at birth had a higher probability to be stunted than children with normal size [21]. In Kenya, 62 % of children who had low birth weight (less than 2500) were stunted compared to 36 % of the children who were of optimal weight (above 2500) [26].

**Child Immunization status:** - The study in Gojam showed that, the proportion of stunted children were slightly higher for unimmunized children [31].

**Child morbidity:** - In Southern Ghana showed that, stunting were 44.2% in children with diarrhea and 27.4% without diarrhea, OR = 2.10 [95% CI, 1.110-3.972], P = 0.026) [35]. The study in Gojam showed that, Children experiencing diarrhea were 2.3 times more likely to be stunted compared to children without diarrhea [31]. In contrary study conducted in Ethiopia indicated, the association was not statistically significant [28].

**Antenatal care visits of mother:** - Study conducted in Ethiopia indicated that, the odds of stunting among children whose mothers have had no prenatal care visit were also 1.5 times more compared with children whose mothers had five or more prenatal care visits [28].

**place of delivery of the child:** - Study in DRC suggested that, stunting were higher among children born outside the hospital compared with their counterpart born in hospitals [23], In Nairobi Kenya study indicated that the odds of stunting for a child born to a mother who gives birth at home are 39 % higher compared to giving birth in a health facility (P<0.05) [26].

### 2.2.5. Dietary factor

**Early initiation of breast feeding:** - In India studies showed that. the proportions of stunting among children whose mothers initiated breastfeeding within six hours (49.6%) was significantly less ( $P < 0.02$ ) than that (64.6%) for those whose mothers initiated breastfeeding after six hours [17]. In contrary study in Gojam indicated. there was no significant difference in prevalence of stunting by initiation of breastfeeding after delivery [31].

**Colostrum feeding** - study in India indicated that stunting among children who were fed colostrum (42.1%) was significantly less ( $P < 0.01$ ) than that among those who were not fed colostrum (59.0%) [17]. Study in Gojam Ethiopia indicated that, deprivation of colostrum feeding and stunting was found highly significant ( $p < 0.001$ ) for children under age five [31].

**Pre-lacteal feeding practices:** - Study conducted in Gojam Ethiopia indicated that. Pre-lacteal feeds were significantly associated with stunting [31].

**Duration of breastfeeding:** - In Cambodia, the prevalence of stunting increased with duration of breastfeeding [20]. Study by Disha et al indicated that, the negative association between continued breast-feeding and HAZ that was observed in both Ethiopia and Zambia [35], In Gojam, a significantly higher prevalence of stunting (48.7%) was observed among children who were breastfed between 1 and 2 years than among children breastfed for less than 1 year [31].

**Introduction of SSSF:-** The study conducted by Disha et al showed that, infant young and child feeding practices related to complementary feeding were positively and significantly ( $p < 0.05$ ) associated with under nutrition indicators, particularly HAZ. [35]. Study in Gojam indicated that, age of the child when complementary foods were started had a highly significant negative association with long-term nutritional status [31, 36].

**Bottle feeding practice:** - Study conducted in Gojam showed that, there was significantly more stunting among children who were bottle fed (49.8%) [31].

### 3. Conceptual framework

The etiology of malnutrition is complex, and interrelated risk factors often vary in different biological, environmental and cultural settings. UNICEF has developed a conceptual framework for malnutrition that recognizes the complexity and interrelation between various factors. Our study has main focus on the immediate determinants of malnutrition: inadequate dietary intake and illness, with emphasis on breastfeeding, complementary feeding and acute watery diarrhea. However, some of the underlying socio economic determinants will also be explored.

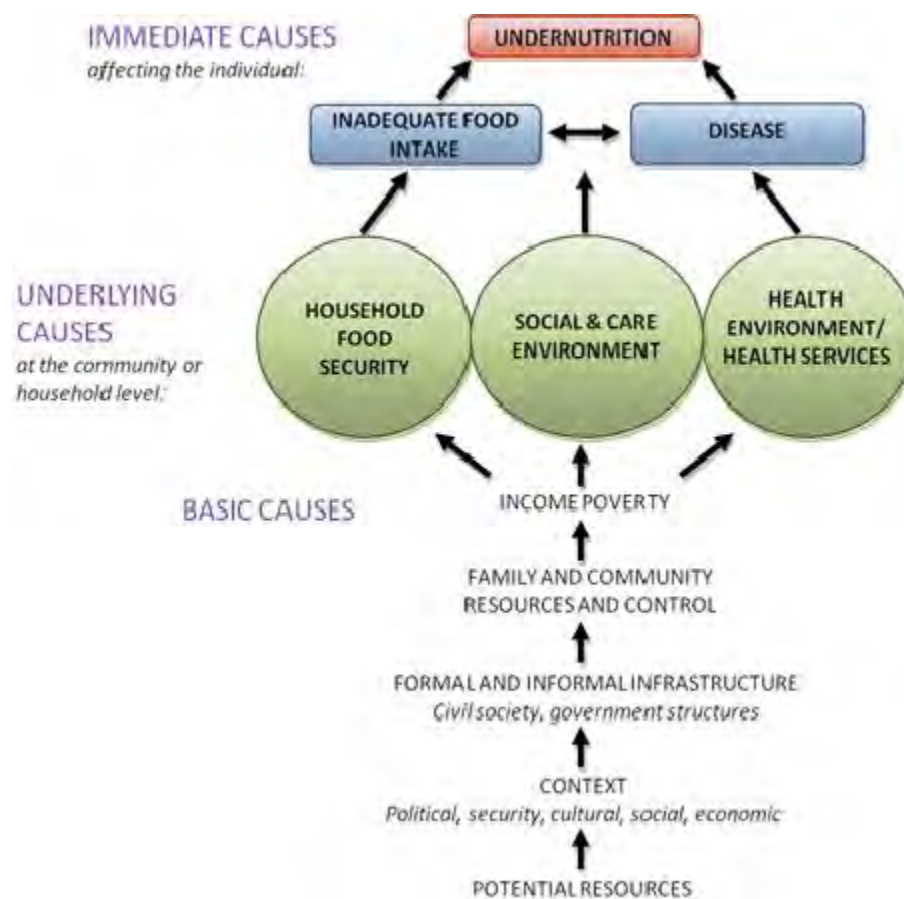


Fig1. Global conceptual frame work of the causes of malnutrition.

Source: Redrawn From UNICEF <http://www.fao.org/docrep/005/Y4249E/y4249e0d.htm>

## **4. OBJECTIVES**

### **4.1.General Objectives**

The general objective of this study was to assess the prevalence of stunting and associated factors among children age 6-59 months at Mizan Aman town, Bench Maji Zone, SNNPR Region, Ethiopia.

### **4.2.Specific Objectives**

The specific objectives of the study were to:-

- To assess the prevalence of stunting among children age 6-59 months at Mizan-Aman town, Bench Maji Zone, SNNPR region, Ethiopia.
- To identify associated factors for stunting among children age 6-59 months at Mizan Aman town, Bench Maji Zone, SNNPR Region, Ethiopia.

## **5. METHODOLOGY**

### **5.1. Study Design**

A community based cross-sectional quantitative study was conducted.

### **5.2. Study Area**

The study was conducted in Mizan-Aman town, Benchi Maji zone, Southern Nations Nationalities and people's Regional State (SNNPR) region located about 160 km from South West of jimma. Based on central statistical agency in 2010 this city has an estimated total population of 34,080, of whom 18,138 are men and 15,942 women. The majority of the inhabitants practiced Ethiopian orthodox Christianity, with 45.97% of the population, 33.8 were protestant and 17.71 were Muslim.

### **5.3. Populations**

#### **5.3.1. Source Population: -**

The Source populations was all children 6-59 months of age who lived with their mother's in the house holds of Mizan-Aman town administration

#### **5.3.2. Study population: -**

The Study populations was children 6-59 months of age who lived with their mothers in the sampled kebeles of Mizan-Aman town administration.

## 5.4. Inclusion and Exclusion criteria

### 5.4.1. Inclusion criteria

Children 6-59 months of age who lived with their mothers and whose mothers were available in the selected households.

### 5.4.2. Exclusion criteria

Children 6-59 months of age and whose mothers were both critically ill at the time of data collection in the selected households.

## 5.5. Sample Size

The sample size was determined based on the formula used to estimate a single population proportion assuming that 32% of under five children in Ethiopia are stunted [1]. And a 5% margin of error with 95% confidence level with anticipated a 10% non-response rate.

$$n = \frac{z^2 p(1 - p)}{d^2}$$

$$n = \frac{(1.96)^2(0.32)(0.68)}{0.05^2} = 334$$

The required sample size was 334 and with adjustment for non-response rate (10%) and the design effect of 2. The final required sample size was 734 mother child pair.

## 5.6. Sampling procedures

From the total of 5 Kebles of Mizan-AmanTown, 2 Kebles (Hibret and Addis Ketema) were randomly selected by lottery method. Study participant were selected by using systematic random sampling technique. Participating households from the selected Keble's were identified using the sampling frame of each Keble's taken from urban HEWs. Finally every K<sup>th</sup> child mother pairs from each house hold of two Keble's were identified until the required sample size fulfilled and the starting household was selected using a lottery method. If there were more than one eligible child lottery method was used.

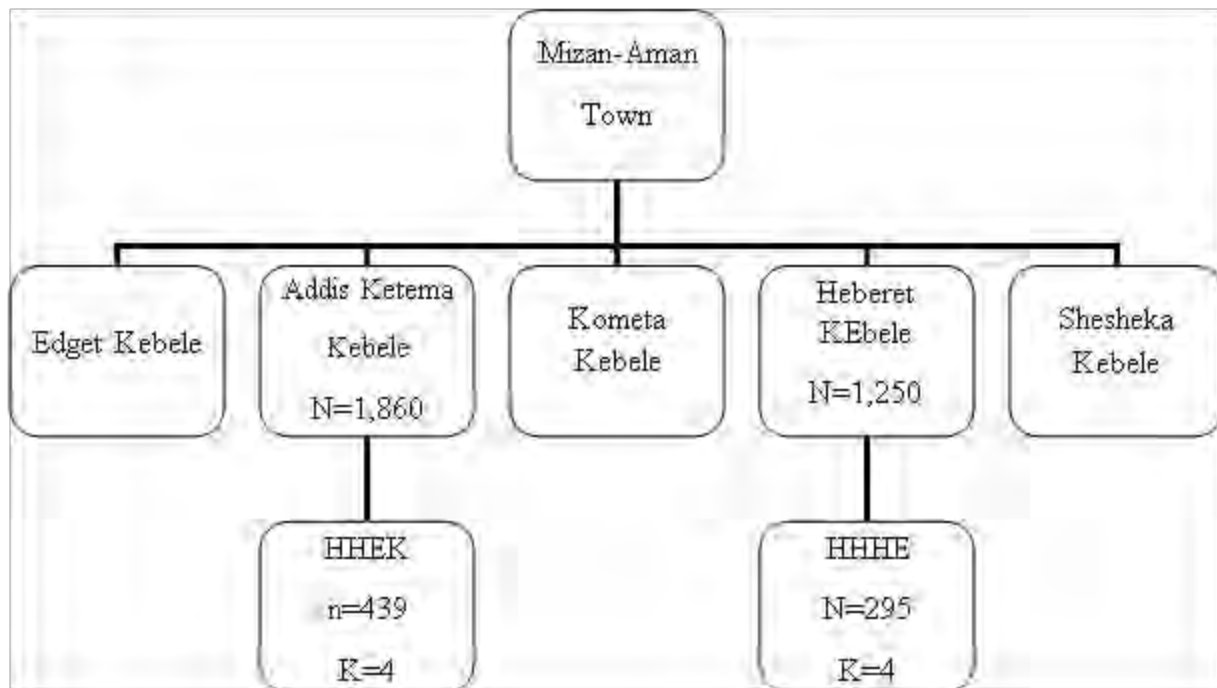


Figure 1 Schematic presentation of sampling procedure for the prevalence of stunting and association factors among 6-59 months children's in Mizan Aman town, Bench Maji zone, southern Ethiopia, 2015

## 5.7. Study Variables

### 5.7.1. Dependent variables

- Stunting (height for age)

### Independent variables

#### **Socio economic and demographic factors**

Age of child

Sex of Child

Birth order of the child

Preceding birth interval of child

Mother's Ethnicity

Mother's Religion

Marital status of the mother

Mother's education

Father's education

Household Monthly income

#### **Environmental factors**

Source of drinking water

Latrine facility availability

#### **Health care factors**

Child's weight and size of birth

Childs immunization status

Child morbidity

Mother's antenatal care visits

Mother's age of pregnancy

Mother's place of delivery

#### **Dietary factors**

Ever breast feeding

Time for initiation of breast feeding

Colostrum feeding

Pre-lacteal feeding

Duration of breastfeeding

Age for Introduction of complementary food

Method of feeding

## 5.8.Operational Definitions

- **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).
- **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.
- **Fully Immunized:** - Children who had receiving a vaccination against tuberculosis (BCG), three doses each of the DPT and polio vaccines, and a measles vaccination by the age of 12 months.
- **Currently on vaccination:**-children who had receiving a vaccination according to the schedule because of their age.
- **Non-Fully vaccinated:**-Children who had not received a vaccination against tuberculosis (BCG), three doses each of the DPT and polio vaccines, and a measles vaccination by the age of 12 months.
- **Size at birth:**-based on mothers estimation and verbal report.
- **Pre-lacteal feeding:** - Children given something other than breast milk during first three days of life.
- **Duration of breastfeeding:**- The number of months of breast feeding among Children
- **Complementary feeding:** - the child receives both breast milk or a breast milk substitute and solid (semi-solid or soft) foods.
- **Low income:** - households with monthly income below mean income of the sample 1566ETB.
- **High income:**-households with monthly income 1566ETB and above the mean income of the sample households.

### **5.9.Data collectors**

Data collectors was four Diploma nurses working from health center and two BSc Nurses who work in Mizan-Aman hospital for supervision activities. Training was given for data collectors and supervisor for about four days on method of extracting the needed information through interviewing, how to fill the information on a structured questionnaire and the ethical aspect in approaching the care givers which was in a polite and respectful manner. The interviewers was collected the information based on the given guide line using a structured questionnaire. The supervisors was monitored the data collection process of the interviewers and try to solve problems by themselves and by informing the principal investigator.

### **5.10. Data Collection Procedure**

Data on stunting (chronic malnutrition) and demographic, socio-economic, environmental healthcare and dietary factors among children age (6- 59months) in Mizan-Aman town was collected using structured questionnaire. Structured interviewer administered closed ended questionnaire was used to collect data using interviewer administered technique which is adapted from UNICEF and after reviewing different literatures of similar studies. The English version questionnaire was translated to Amharic language and again translated back to English to check by experts who are fluent in both language to check consistency.

## **Anthropometry**

**Height:-** Length measurement for children below 24 months was taken in laying down or recumbent position and standing height was taken for children 24-59 months and the measurement was taken to the nearest 0.1 cm using Short's Height Measuring Board (Short Productions, Woonsocket, RI, United Kingdom), with the subjects shoeless [38, 39].

**Age:-** The child's age was collected from the mother and confirmed by using birth certificate or vaccination cards and also we will use a "local-events calendar" [38, 39].

### **5.11. Data quality control**

In order to achieve a good data quality: Questionnaires was prepared in English and translate into Amharic language and then back to English to keep its consistency. Data collectors was selected based on profession and previous experience of data collection. Pre-testing was conducted on 5% of sample size prior to the actual data collection process.

### **5.12. Procedure for data processing and data analysis**

Data processing and analysis after coding the data was entered, using EPI INFO version 3.5.3 2011 and it was exported by Stata-transfer version 9 to SPSS and analysis was done by using SPSS version 22. The descriptive statistic was carried out to compute the different frequency, percentage and different diagrams. To determine the actual predictors for the stunting, binary logistic regressions was applied and the variables ( $p \leq 0.5$ ) found to have association with the outcome variable was entered into multivariate analysis which uses to control confounding factors. Finally,

the variables which have significant association was identified on the basis of p-values 0.05 and AOR, with 95% CI to measure the strength of the associations.

#### 5.13. **Ethical consideration**

Ethical clearance was obtained from Institutional Review Board (IRB) of Addis Ababa University, Department of Nursing and Midwifery and support letter was issued from Addis Ababa University then delivered to SNNPR Regional Health Bureau and finally to the respective health institution. In addition, informed consent was obtained from study participant to confirm their willingness for participation after explaining the objective of the study. The respondents was notified that they have the right to refuse or terminate at any point of the interview. Respondents was told that, their name will not be mentioned and information provided by each respondent was kept confidential.

#### 5.14. **Dissemination of the result**

Finally the findings of the study was submitted to the Department of nursing and midwifery, Addis Ababa University. It will also be communicated to, regional health bureau and will be presented and a copy of it will submitted to the respective health facility.

## **6. Results**

### **6.1 Demographic and socio-economic characteristics**

A total of 734 children aged 6-59 months were included in analysis with response rate 100% of the 734 under-five children in the study, 374(51%) were female and, 234 (31.9%) found in the age group 12-24 months. The mean age was 26.72 and SD  $\pm$  13.07 months. Of the respondents of the study, 504(68.7%) were Christianity followers and 471 (64.2%) were Bench in ethnic group.

From the total number of the children's mothers, 682(92.9%) were married, 406 (55.3%) were housewives and 268 (36.5%) of the children mothers had attended secondary education. Of the total children's' fathers, 60 (39.7%) were governmental employed and 292 (39.8%) were secondary in education level while 45 (6.1%) were had no education. Of the total number of households, 409 (55.7%) were classified as having low economic status. The mean income of the household was 1,745ETB. The details of demographic and socio-economic characteristics of the child – parent pairs is presented in Table1.

Table 1 demographics and Socio-economic characteristics of children among 6 to 59 months in Mizan-Aman town, SNNPR, Ethiopia, 2015 (n=734)

Variables	Frequency	Percent
<b>Sex of child</b>		
Male	360	49.0
Female	374	51.0
<b>Children's age in month</b>		
6-11	91	12.4
12-23	234	31.9
24 -35	200	27.2
36-47	137	18.7
48-59	72	9.8
<b>Mother's age at pregnancy</b>		
Less than 20 years	49	6.7
20 to 35 years	672	91.6
More than 35 years	13	1.8
<b>Marital status of the mother</b>		
Married	682	92.9
Divorced	34	4.6
Windowed	15	2.0
Never married	3	4
<b>Ethnicity</b>		
Bench	471	64.2
Amhara	113	15.4
Kefa	58	7.9
Oromo	49	6.7
Gurage	27	3.7
Silta	16	2.2
<b>Religion</b>	504	68.7
Protestant	117	15.9
Orthodox	84	11.4
Muslim	29	4.0
Catholic		
<b>Mother's education</b>	86	11.7
No education	258	35.1
Primay	268	36.5
Seconday	122	16.6
More than secondary		
<b>Father's education</b>	45	6.1
No education	186	25.3
Primary	292	39.8
Secondary	211	28.7
More than secondary		

<b>Mother's occupation</b>		
House wife	406	55.3
Government employee	83	11.3
Non-government employee	29	4.0
Merchant	122	16.6
Self-employee	94	12.8
<b>Father's occupation</b>		
Government employee	223	30.4
Non-government employee	49	6.7
Merchant	182	24.8
Self-employee	280	38.1
<b>Household monthly income in ETB</b>		
Less than 1745	409	55.7
1745 and more	325	44.3

## 6.2. Health care and environmental characteristics

Four hundred forty-seven (65%) of children participated in the study were normal size and 168 (22.9%) were small size at birth according to the mother verbal reports. From the children 686 (93.5%) children were fully immunized. Among the children, 122(16.6%) had got diarrhea during two weeks period prior to data collection and 36(4.9%) children were affected by recurrent diarrhea. Of those children of the study the first birth order were 351(47.8%). Concerning the preceding birth interval children, 161 (42.0%) were less than 24 months and 222 (58.0%) were 24 months and more:

Form all child mothers, 390(53.1%) were attended 4 times and more Antenatal care visits and 34(4.6%) no attended Antenatal care visits at all. Majority of the mothers, 672 (91.6%) were pregnant within the age group 20-35 years and 49 (6.7%) were pregnant at teenage. Concerning mother's place of delivery, 563(76.7%) children were born at public health facility while 144(19.6%) children were born at home. Postnatal care was attended by 83 (11.3%) mothers in the health institution. Among the study participated households main source of drinking water, 363(49.5%) households used piped into dwelling as a source of drinking water. Majority (97.7%) of had functional toilet.

Table 2: health care and environmental characteristics of children among 5 to 59 months in Mizan-Aman town, SNNPR, Ethiopia, 2015 (n=734)

<b>Variables</b>	<b>Frequency</b>	<b>Percent</b>
<b>ANC visits of mother</b>		
None	34	4.6
1	18	2.5
2-3	292	39.8
4 and above	290	53.1
<b>Mother's age at Pregnancy</b>		
Less than 20 years	49	6.7
20 to 35 years	672	91.6
More than 35 years	13	1.8
<b>Mothers place of delivery</b>		
Public facility	563	76.7
Private facility	27	3.7
Home	144	19.6
<b>PNC attendance of Mother</b>		
Yes	83	11.3
No	651	88.7
<b>Birth order</b>		
1	351	47.8
2-3	286	39.0
4 and above	97	13.2
<b>Preceding birth interval (n=3863)</b>		
Less than 24 months	160	41.8
More than 24 months	223	58.2
<b>Child's size at birth</b>		
Small	168	22.9
Normal	477	65.0
Large	89	12.1
<b>Immunization Status</b>		
Fully immunized	686	93.5
Currently on immunization	36	4.9
Not fully immunized	12	1.6
<b>Diarrhea in the past 2 weeks</b>		
Yes	122	16.6
No	612	83.4
<b>Had recurrent diarrhea in the past 2 weeks</b>		

Yes	36	4.9
No	698	95.1
<b>Main source of drinking water</b>		
Piped into dwelling	363	49.5
Piped in yard/plot	274	37.3
Public tap/stand pipe	97	13.2
<b>Toilet facility availability</b>		
Yes	717	97.7
No	17	2.3

### 6.3. Dietary characteristics

Breast feeding was almost universal in the study area children who breast fed were 723 (985.5%). Five hundred twenty three (71.3%) children started breast feeding within the first one hour. Children who not received colostrum's were 79 (10.9%) and one hundred thirty seven (18.9%) child received pre-lacteal feed.

Children who breast fed for 12 -24 months long were 474 (65.6%). Of the children who breast fed for less than 12 months were 171 (23.7%). The mean duration of breast feeding was 18.82 months.

Among the study participant children 501 (68.3%) were started complementary feeding at the age 6 month based on the WHO standard. Concerning the method of feeding mother who used cup to feed their children were 672 (91.6%) and 364 (49.6%) used bottle to feed their children. The detail was shown in table3.

Table 3: dietary characteristics of children among 6 to 59 months in Mizan-Aman town, SNNPR Ethiopia, 2013, (n=734)

<b>Variables</b>	<b>Frequency</b>	<b>Percent</b>
<b>Ever breast fed child</b>		
Yes	723	98.5
No	11	1.5
<b>Time for initiation of BF (n=723)</b>		
Within 1 hour	523	71.3
Within 24 hours	194	26.4
More than 24 hours	6	8
<b>Child received pre-lacteal feeds (n=723)</b>		
Yes	137	18.9
No	586	81.1
<b>Child fed colostrum (n=723)</b>		
Yes	644	89.1
No	79	10.9
<b>Duration of breast feeding (n= 723)</b>		
Less than 12 months	171	23.7
12 – 24 months	474	65.6
More than 24 months	78	10.8
<b>Age complementary food started</b>		
At 6 month	501	68.3
Before and after 6 month	233	31.7
<b>Cup for feeding</b>		
Yes	672	91.6
No	62	8.4
<b>Spoon for feeding</b>		
Yes	697	95.0
No	37	5.0
<b>Hand for feeding</b>		
Yes	548	74.7
No	186	25.3
<b>Bottle for feeding</b>		
Yes	364	49.6
No	370	40.4

Table 4 factors associated with prevalence of stunting among children 6-59 months in Mizan-Aman town, SNNPR, Ethiopia 2013 (n=734)

Explanatory variables	Stunning		COR 95% CI	AOR 95% CI	P-Value
	Yes	No			
<b>Children's age in month</b>					
6-11	68	1		1	
12-23	155		1.51(0.87,2.59)	2.47(0.87,7.21)	0.098
24-35	128		1.66(0.96,2.89)	2.29(1.10,4.82)	0.029
36-47	73		2.59(1.45,4.63)	2.29(1.10,4.76)	0.027
48-59	50		1.30(0.65,2.59)	3.34(1.58,7.06)	0.002
<b>Mothers education</b>					
No education	24		13.24(6.53,26.81)	5.38(2.27,12.77)	<0.001
Primary	143		5.42(3.08,9.54)	1.69(0.85,3.40)	0.137
Secondary	199		2.27(1.27,4.04)	1.388(0.70,2.76)	0.350
Above secondary	108	1		1	
<b>Monthly income in ETB</b>					
Less than 1745	203		5.09(3.59,7.23)	3.92(2.54,6.06)	<0.001
1745 and more	271	1		1	
<b>Birth order</b>					
First	247	1		1	
2-3	176		1.48(1.07,2.07)	1.35(0.88,2.05)	0.17
4 and above	51		2.14(1.35,3.39)	2.32(1.28,4.21)	0.006
<b>Child size at birth</b>					
Small	54		2.59(1.53,4.39)	2.10(1.13,3.93)	0.020
Normal	371		0.35(0.22,0.56)	0.30(0.17,0.53)	<0.001
Large	49	1		1	
<b>Duration of BF</b>					
Less than 12 months	135	1		1	
12-24 months	301		1.77(1.19,2.62)	2.35(1.18,4.66)	0.015
More than 24 months	38		3.40(1.94,5.99)	2.49(1.03,6.00)	0.042
<b>Cup of feeding</b>					
Yes	42	1		1	
No	20		4.37(2.51,7.63)	2.08(1.05,4.15)	0.037
<b>Sex of child</b>					
Male	222		1.28(0.95,1.74)		
Female	252	1			
<b>Father's education</b>					
No education	10		5.95(2.56,13.84)		
Primary	102		2.88(1.87,4.44)		
Secondary	194		2.00(1.35,2.98)		
More than secondary	168	1			
<b>Mothers occupation</b>					

Housewife	253	1
Government employee	69	0.34(0.18,0.62)
Ngo employee	24	0.34(0.13,0.92)
Merchant	80	0.87(0.57,1.33)
Self employee	48	1.59(1.01,2.49)
<b>Father's Occupation</b>		
Government employee	174	1
Non- government employee	33	1.72(0.88,3.39)
Merchant	113	2.17(1.40,3.35)
Self employee	154	2.91(1.96,4.31)
<b>ANC visits of mother</b>		
None	12	4.08(1.95,8.50)
1	8	2.78(1.07,7.22)
2-3	185	1.29(0.93,1.77)
4 and above	269	1
<b>Pr. Birth interval (n=383)</b>		
Less than 24 months	84	1.65(1.09,2.49)
More than 24 months	144	1
<b>Immunization status</b>		
Fully immunized	443	1
Currently on immunization	46	0.77(0.37,1.59)
Not fully immunized	5	2.28(0.61,8.55)
<b>Main source of drinking water</b>		
Piped into dwelling	261	1
Piped to yard/plot	158	1.88(1.35,2.62)
Public tap/stand pipe	55	1.95(1.23,3.10)
<b>Child received pre-lacteal feeds (n=723)</b>		
Yes	70	2.01(1.38,2.93)
No	397	1
<b>Child fed Colostrums (n=723)</b>		
Yes	441	1
No	27	4.15(2.54,6.81)
<b>Age complementary food started</b>		
At 6 months	93	1
Before and after 6 months	381	0.60(0.42,0.86)
<b>Hand feeding</b>		
Yes	332	2.09(1.43,3.05)
No	142	1
<b>Bottle feeding</b>		
Yes	226	1.28(0.95,1.73)
No	248	1

#### 4. Magnitude of stunting among 6-59 months children

In the analysis stunting was defined as having a-z score below – 2 SD of the WHO standards. The prevalence of stunting among children of 6-59 months in the study area was 35.4% (95% CI: (34.6-36.3). the prevalence was 79(30.4%) in children age group 12-23 months. Of the total 138 (53.1%) of male children were stunted.

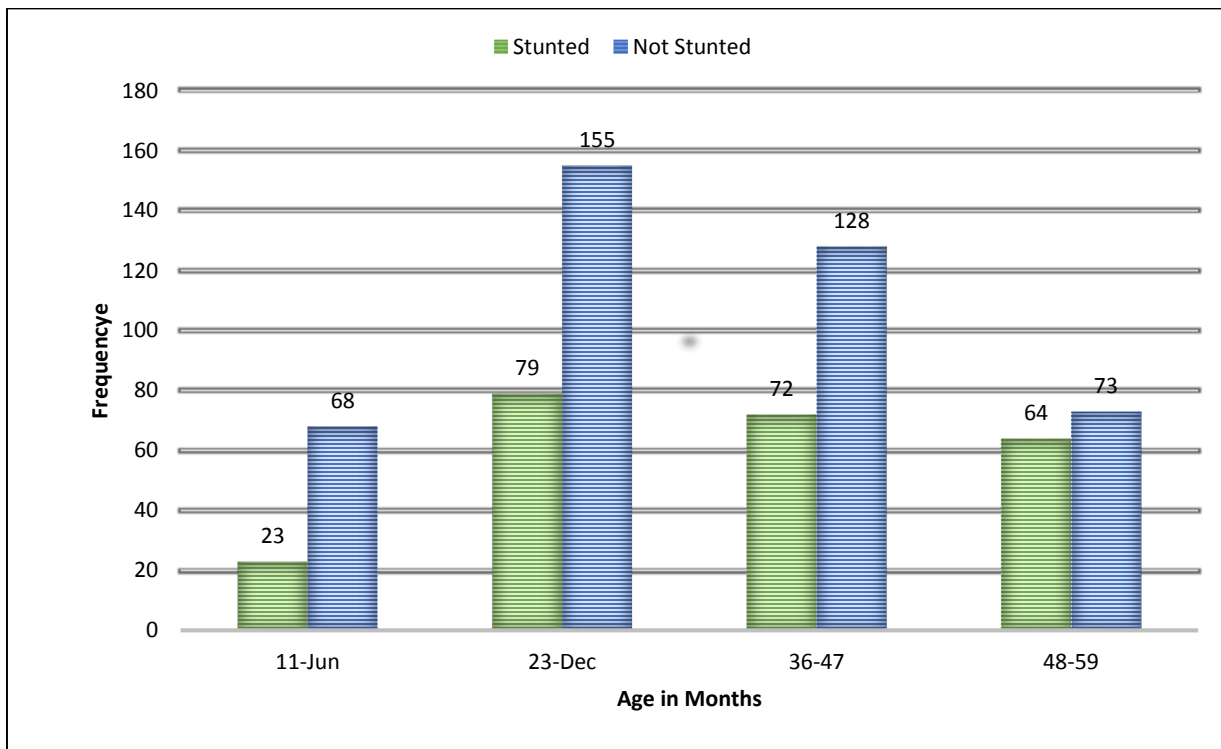


Figure 3. prevalence of stunting with age groups among children 6-59 months in Mizan- Aman town, Bench Maji zone, SNNPR, Ethiopia, 2015.

## **6.5. Factor associated with stunting among 6-59 months children**

In the study sex of child. Father education mother occupation and father occupation ANC visits of mother, preceding birth interval and immunization status of the child household main source of drinking water and also child received pre-lacteal feeds, child feed colostrum, age complementary food started hand feeding and bottle feeding were multivariate logistic regression analysis.

In the multivariate logistic regression analysis, the finding of the study indicated that, child's age. Mother's education, monthly income, and size at birth order, duration of breast feeding, and cup feeding were identified as factors associated with stunting among children in the study area.

Child's age was one of the risk factors which were significantly associated with stunting in the study area. Comparing with children 6-11 months, children within age group 24-35 months had 2.29 higher odds of being stunted (AOR=2.29;95%CL:1.10,4.82) and children within age group 36-47 months had 2.29 higher odds of being stunted than children age 6-11 months of being stunted (AOR=2.29;95%CL:1.10,4.76). The result also indicated that, children age group 48-59 months were 3.34 higher odds of being stunted than children age 6-11 months (AOR=3.34;95%CL:1.58.7.06).

Form the analysis, children whose mothers had no education were 5.4 times more likely to be stunted as compared to mother with educational status of above secondary (AOR=5.38;95%CL:2.27.12.77).

Children from household with low monthly income were 3.92 times more likely to be stunted than children from high monthly income (AOR=3.92; 95%CL: 2.54.6.06).

Children who had born with small size were 2.10 times more likely to be stunted than children born larger (AOR=2.10; 95%CL: 1.13.3.93). the result also showed that children who had normal birth size were 70% less likely to develop stunting as compared to children with large birth size (AOR=0.30;95%CL:0.17.0.53).

The result of the study indicated that, birth order of the child was associated with risk of stunting. Children of 4 and above birth order were 2-3 times more likely to be stunted than children of first birth order (AOR=2.32; 95%CL: 1.28.4.21).

Duration of breast feeding was associated with risk of stunting in the study. Children who had been breast feed for 12-23 months long were 2.35times more likely to be stunted than children who breast feed for than less than 12 months long (AOR=2.35;95%CL:1.18.4.66). in the study finding children who had breast feed for more than 24 months long were 2.49 times more likely to be stunted than children who breast feed for than less than 12 months long (AOR=2.49;95%CL:1.03.6.00).

Cup feeding as method of feeding was also associated with risk of stunting in the study. In the study mothers not used cup to feed their children were 2.08 times more likely to be stunted than mothers used cup to feed their children (AOR=2.08;95%CL:1.085.4.15). Detail was shown in table 4.

## 7. Discussion

This study tried to assess the prevalence of stunting and associated factors among 6-59 months children. Based on the findings. The prevalence of stunting in this study was 35.4% 95% CI: (34.6%-36.3%) this study was in line with study conducted in Ghana, 36% (22). The magnitude of stunting in this study was higher than study conducted in Peru 26.6 (14), Brazil 29.9% (15), Sirlanka 11.8% (20), South Africa 20.2 %( 23) and Egypt 13.8 %( 34) and the national prevalence in EDHS done in 2011, 32 %( 10). However, the prevalence of stunting in the study was lower than study conducted in, Nepal 37%(17), India 51.6%(18), Lao PDR 40%(19), Cambodia 38.6%(21) and also the studies conducted in Democratic Republic of Congo 43.9% (24) , Uganda 41.6%(25), Tanzania 44%(26), Nairobi Kenya 40%(27) and Sudan Khartoum 51%(28).

This difference in prevalence of stunting might be due to population migration from rural to urban in order to get better job and living condition, decreased purchasing power of the community, increment of food prices. Inappropriate infant and young child feeding practices and child health care.

Child's age was one of the factors significantly associated with stunting in the study area. Comparing with children 6-11 months. Children within age group 24-35 months, 36-47 months and 48-59 months were more likely to be stunted. The finding was in agreement with the studies in Egypt (35) and Ethiopia (1).

This might be due to stunting in children age 24 months and above were resulted from poor nutritional status of mother's at pregnancy, inappropriate infant and young child feeding practices and other related factors which were needed to be undergone beginning form conception, through

a mother's pregnancy and up until the age of two which was the most critical period in a child's development after child reaches above 24 months of age stunting was irreversible.

Mother's education was another variable which significantly associated with stunting. Children whose mothers had no education were more likely to be stunted as compared to mother with educational status of above secondary. This finding was consistent to the study conducted in India (18), Tanzania (26), and Nairobi Kenya (27) and also in Ethiopia (9.10, and 27).

This might be due to mother who had no education had shortage of knowledge which related to better child feeding and caring, low income and low living conditions.

Birth order of children is one of the demographic variables explaining the risk of stunting in children. Children of 4 and above birth order were more likely to be stunted than children of first birth order. This finding was in line with the study conducted in Cambodia (21), Nairobi Kenya (24), Egypt (35) and Ethiopia (1).

This might be due to family unable to satisfy child dietary and other health care related services because of more number of children and might also be due to low awareness of family planning.

Children from household with low monthly income were more likely to be stunted than children from high monthly income households. This might be children from low income households had low access to adequate dietary intake in kinds and the amounts and also it may be due to increment of food prices, decreased purchasing power of the family and also shortage of other important materials and utilities.

Children who had born with small size were more likely develop stunting than children born larger. The finding was in line with the studies conducted in Kenya (27) and in Ethiopia (1). This may be due to the mother's health and nutritional status before and during pregnancy in which determined size of the child during intra-uterine period and also those small sized children were frequently exposed to an infection which leads to mal absorption of nutrients in their body.

The result of the study also indicated that children who had normal birth size were less likely to develop stunting as compared to children with large birth size

The finding of this study might be due to children having optimal birth weight was mostly protective to most disease conditions related to proper growth and maturity of their body may help them to sustain the external environment.

Duration of breast feeding was associated with risk of stunting in the study. Children who had been breast feed for 12-23 months long and more than 24 months long were more likely to be stunted than children who breast feed for than less than 12 months long. The association between continued breast-feeding and stunting was also observed in similar studies conducted in Cambodia (21) and study conducted in Gojam North West Ethiopia (32). This might be due to poor maternal nutrition status which mothers who are breastfeeding need two additional meals a day and had direct relation with breast milk quality and quantity, even if the duration of breast feeding long poorly attached and positioned breast feeding could affect the optimal breast feeding of children and mothers of children continue breast feeding without providing adequate, safe, appropriate solid, semi-solid and soft foods for the children which directly related to children growth.

Cup feeding as method of feeding was also associated with risk of stunting in the study. In the study children whose mothers not used cup to feed them were more likely to be stunted than children whose mothers used cup to feed children. The studies which directly support this finding was not available at this point in time but WHO/UNICEF child feeding guideline support the use of cup as a method can prevent the contamination. This might be due to mothers low awareness about the advantages of cup feeding and mothers of children who were not used cup as method of feeding they may use bottle as alternative method which was not recommended at any age to feed the children which was high risk of infection.

## **8. Recommendations**

Based on the findings of the study, the following recommendations are made:

For FMOH

- Need to expand programmers which links nutrition interventions and social protection in low income urban communities in order to reach young children and pregnant or breastfeeding mothers.

For Mizan-Aman town Health office

- Need to plan nutrition interventions to effectively address the nutritional conditions with participation of stakeholders and community at large.
- Need to increase awareness about family planning especially its importance for optimal growth of children in the community.

For HEWs

- Need to give nutrition education for the community about maternal and child nutrition to accelerate prevention of stunting by focusing the most critical periods of child development.
- Need to provide appropriate counseling on good child feeding practice to the mothers and care givers with practical demonstration of how to prepare and give optimal foods for infant and young child.

For researchers

- Need to conduct further studies to determine the predictors of stunting with qualitative and longitudinal studies.

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## 10. Annexes

### **Annex-I. Information sheet and consent form**

Title: Magnitude of stunting and associated factors among 6-59 months children in Mizan-Aman town Bench Maji zone, Sothern Ethiopia.

Name of Principal Investigator: Ermias Ayalew

Name of the Organization: Addis Ababa University

Name of the sponsor: Addis Ababa University

Information sheet and consent form prepared for mothers of under-five children prior to the study to participate in this research project.

Introduction:- this information sheet and consent form is prepared with the aim of assessing magnitude of stunting and associated factors among under five children in Mizan-Aman town, Bench Maji zone, SNNPR Ethiopia, 2015. The research group includes the principal investigator. Five data collectors, two supervisors, and two advisors from Mizan-tepi University.

Purpose of the study: - the aim this study is to assess magnitude of stunting and associated factors among 6-59 months children.

Procedure: - the study involves 6-59 months children and mothers pair in Mizan-Aman town. You are selected to be one of the study participants if you are willing to participate. We are so happy finally you are kindly requested to give your genuine response in the questionnaires.

Benefits, risk and/or discomfort: - by participating in this research project you may feel some discomfort in wasting your time (a maximum of 30 minutes). However, your participation is definitely important to assess the magnitude of stunting and associated factors among under five children in Mizan-Aman town, Bench Maji zone, SNNPR Ethiopia, 2015. There is no risk or direct benefit in participation in this research project.

Incentives/payments for participating: - you will not provide any incentives or payment to take part in this project.

Confidentiality: - we will keep the confidentiality by using codes instead of any personal identifiers and is meant only for the purpose of the study.

Right to refusal or withdraw: - you will not be forced to participate; you have the full right to refuse and have the right to discontinue the process at any point in this research.

Person to contact: - this research project was reviewed and approved by the ethical committee of the University of Gondar. If you have any question you can contact any of the following individuals and you may ask at any time you want.

Name: Ermias Ayalew

Tele: + 251-913 06 68 93

E-mail: [mlermias@gmail.com](mailto:mlermias@gmail.com)

If you have read the document and you have been given the chance to ask any questions now or at a later time or if the document has been read and explained to you agree to be in this study, may I continue?

Yes                       No

**Annex-II Amharic Version Information sheet and Consent form**

የስምንት ማብራሪያ ቅጽ

የምርምር ኘሮጀክት ስም:- በደቡብ ክልለዊ መንግስት በቤንች ማጂ ዞን በሚዛን-አማን ከተማ ዕድሜያቸው ከ6-59 ወራት በሆኑ ህጻናት ላይ ቁመታቸው ከዕድሜያቸው ጋር ሲነጻጸር ዝቅተኛ የሆኑትን ህጻናት መጠን እና ተጓዳኝ ምክንያቶችን ለመለየት የተዘጋጀ ነው።

ዋና ተመራማሪ:- ኤርምያስ አያሌው

የድርጅቱ ስም :- አዲስ አበባ ዩኒቨርሲቲ የህክምናና ጤናሳይንስ ኮሌጅ ።

የስፖንሰር ድርጅት ስም :-አዲስ አበባ ዩኒቨርሲቲ የህክምናና ጤናሳይንስ ኮሌጅ ።

በጥናት እና ምርምሩ ለሚሳተፉ ዕድሜያቸው ከ6-59 ወራት ለሆኑ ህጻናት እናቶች በጥናት እና ምርምሩ ከመካፈላቸው በፊት የተዘጋጀ ማብራሪያና የስምምነት ቅጽ።

መግቢያ:- ይህ የስምምነት ቅጽ አሁን እርስዎ እንዲሳተፉበት የምንጠይቅዎትን የጥናት እና ምርምር የሚያብራራ ነው። በዚህ ጥናት ለመሳተፍ ከመወሰንዎ በፊት ይህንን ቅጽ በጥንቃቄ በማንበብ ጥያቄዎች ካሉዎት ይጠይቁ። በዚህ ጥናት መሳተፍ ከጀመሩ በኋላም ቢሆን በማንኛውም ጊዜ ጥያቄዎች ካሉዎት መጠየቅ ይችላሉ።

የጥናት እና ምርምሩ አላማ:- የዚህ ጥናት እና ምርምር አላማ ዕድሜያቸው ከ6-59 ወራት በሆኑ ህጻናት ላይ ቁመታው ከዕድሜያቸው ጋር ሲነጻጸር ዝቅተኛ የሆኑትን ህጻናት መጠን እና ተጓዳኝ ምክንያቶችን ለመለየት ነው።

የአሰራር ሂደት:- ጥናቱ ዕድሜያቸው ከ6-59 ወራት የሆኑ ህጻናትን እና እናቶቻቸውን ያካትታል። የጥናቱ ተሳታፊ እንዲሆኑ በመመረጥዎቻችን ደስታ እየገለጹን በጥናቱ ለመካፈል ፈቃደኛ ከሆኑ የሚጠየቁትን ጥያቄዎች በታማኝነት እንዲመልሱልን በትህትና እንጠይቃለን።

የሚጠበቁ ጥቅሞች አደጋዎች ወይ አለመመቻቸት። በዚህ ጥናት በመሳተፍ ከ30 ደቂቃ በማይበልጥ የጊዜ ሽሚያ ምክንያት አነስተኛ የምችት መጓደል ሊከሰትብዎ ከመቻሉ በስተቀር በርስዎም ሆነ በልጅዎ ላይ ምንም አይነት ጉዳት የማያደርስ መሆኑን እና በተሳትፎዎም ቀጥተኛ የሆነ ጥቅም የሚያገኙ መሆኑን አረጋግጣለሁ። የእርሶዎ ተሳትፎ ግን በ2005 ዓ.ም በደቡብ ክልላዊ መንግስት በቤንች ማጂ ዞን በሚዛን-አማን ከተማ ዕድሜያቸው ከ6-59 ወራት በሆኑ ህጻናት ላይ ቁመታቸው ከዕድሜያቸው ጋር ሲነጻጸር ዝቅተኛ የሆኑትን ህጻናት መጠን እና ተጓዳኝ ምክንያቶችን ለመለየት ለሚደረገው ጥናት እና ምርምር ግላማ መሳካት ወሳኝ ነው።

የተሳትፎ ክፍያን በተመለከተ፡- በዚህ ጥናት በመክፈልዎት ምንም የሚከፈልዎት ነገር የለም።

ሚስጥር መጠበቅ፡- በዚህ ጥናት ከእርስዎ የሚሰጡት ምላሾች ሚስጥራዊነታቸው የተጠበቀ እንደሚሆን እየገለጽኩኝ ለዚህም አላማ ሲባል የእርስዎም ሆነ የልጅዎ ስም በመጠይቁ ላይ የማይጻፍና በተለየ ኮድ የሚቀመጥ ሲሆን የጥናቱ የመጨረሻ ውጤት ከየእርስዎም ሆነ ከልጅዎ የግል ማንነት ጋር የማይገናኝ መሆኑን ከወዲህ አረጋግጣለው።

የሚገናኙት ሰው፡- ይህ ጥናት የጥናቱ ተሳታፊዎች ከጉዳት መጠበቃቸውን በሚያረጋግጠው አዲስ አበባ ዩኒቨርሲቲ የስነ-ምግባር ኮሚቴ ታይቶ ድጋፍ አግኝቷል። ከጥናቱ ጋር በተያያዘ ለሚከሰቱ ማንኛም ዓይነት ጉዳዮች ከዚህ በታች በተቀመጠው አድራሻ ሊያገኙን ይችላሉ።

ኤርምያስ አያሌው ሞባይል፣ 09 13 06 68 93

ይህንን ቅፅ አንብበው ከሆነ እና አሁንም ሆነ በሌላ ጊዜ ጥያቄ ለመጠየቅ እድል ተሰጥቶዎት ከሆነ ወይም ይህ ቅጽ ተነቦ እና ተብራርቶሎት ከሆነ እርስዎ በጥናቱ ለመሳተፍ ወይም ላለመሳተፍ መስማማት እና አለመስማማትዎን ይግለጹልኝ?

እስማማለሁ  አልስማማም

### **Annex III English Questionnaires**

Our study focus to assess magnitude of stunting and associated factors among 6-59 months children in Mizan-Aman Town, Bench Maji Zone, SNNPR, Ethiopia.

Hello, my name is \_\_\_\_\_ I am working in a research team of Addis Ababa University College of Medicine and Health sciences. This questionnaire is prepared to conduct a study the magnitude of stunting and associated factors among 6-59 months population to complete the questionnaire designed by the researcher because you fulfill requirement for sampling. The finding of this study will help provide timely and proper nutritional and health care services to yours and other children's. Thus this interview is prepared for this purpose to get appropriate data on the study we are conducting. The in data that I will obtain using this interview was used only for research purpose and your response was kept confidential. For this purpose our name will not be written here and there was no way of linking our individual responses to the final result of the study findings. The study has no risk to you and your child except sparing a maximum of 30 minutes of your time and if you face any problem in relation to the research you can contact responsible person based on the address below. You have the right not to respond at all or to withdraw in the meantime, but your participation is highly valuable for the success of our research objectives. Therefore, I politely request our cooperation to participate in this interview.

Do you agree to participate in this study? Yes, \_\_\_\_\_ continue No \_\_\_\_\_ thank you

Name of the data collector \_\_\_\_\_ signature \_\_\_\_\_ Data \_\_\_\_\_

Questionnaire code \_\_\_\_\_

S.No	Questions	Response and coding category	Skip
1	<b>Demographic and socio economic factors</b>		
	Characteristics of the child		
101	How many months old is your child?	.....(months)	
102	What is the sex of your child?	1. Male 2. Female	
103	What is the birth order your child?	1. 1 2. 12-3 3. 4-5 4. 6+	
104	How many months does your child have between the preceding birth interval?	1. First birth 2. <24 months 3. ≥24 months	

S.No	Questions	Response and coding category	Skip
2	Charactersites of the parent and household		
201	How old are you?	.....(yrs)	
202	What is yo7ur marital status?	<ol style="list-style-type: none"> <li>1. Married</li> <li>2. Divorced</li> <li>3. Widowed</li> <li>4. Never married</li> </ol>	
203	What is your ethnicity	<ol style="list-style-type: none"> <li>1. Bench</li> <li>2. Amara</li> <li>3. Kefa</li> <li>4. Oromo</li> <li>5. Gurage</li> <li>6. Silte</li> <li>7. Other specify?</li> </ol>	
204	What is your religion?	<ol style="list-style-type: none"> <li>1. Protestant</li> <li>2. Orthodox</li> <li>3. Muslim</li> <li>4. Catholic</li> <li>5. Others(specify) .....</li> </ol>	
205	What is your main occupation?	<ol style="list-style-type: none"> <li>1. House wife</li> <li>2. Government employee</li> <li>3. Non-government employee</li> <li>4. Merchant</li> <li>5. Self employee</li> <li>6. Others (specify) .....</li> </ol>	
206	What is your husband's main occupation?	<ol style="list-style-type: none"> <li>1. Government employee</li> <li>2. Non-Government employee</li> <li>3. Merchant</li> <li>4. Self-employee</li> <li>5. Others (specify).....</li> </ol>	
207	What is your educational	<ol style="list-style-type: none"> <li>1. No education</li> <li>2. Primary education (1-8)</li> <li>3. Secondary (9-12)</li> <li>4. Above secondary</li> </ol>	
208	What is your husband's educational level?	<ol style="list-style-type: none"> <li>1. No education</li> <li>2. Primary education (1-8)</li> <li>3. Secondary (9-12)</li> <li>4. Above secondary</li> </ol>	
209	How much is your monthly income in birr?	..... birr	

S.No	Questions	Response and coding category	Skip
3	Environmental factors		
301	What is the main source of drinking water for members of your household?	1. Piped into dwelling 2. Piped to yard/plot 3. Public tap/stand pipe 4. <i>bottled water</i> tknow 5. Protected well 6. Unprotected well 7. Other (specify).....	
302	Do you have functional toilet facility in our house?  (if possible observe it)	1. Yes 2. No	

S.No	Questions	Response and coding category	Skip
4	Health care factors		
401	How many times you visited Antenatal care in health institution when you are pregnant of this child?	8. none 9. 1 10. 2-3 11. 4 <sup>+</sup> 12. don'tknow	
402	Where did you deliver your child?	3. Public health facility 4. Private health facility 5. Home	
403	Did you attend post natal care service after delivery of your child?	1. Yes 2. No	
404	How much is your child's weight or size at birth?	1. Smaller than average (<2.5kg) 2. Average (2.5 -4 kg) 3. Large (>4kg)	
405	Did your child received vaccination?	1. Yes 2. No	If no skip to 407

406	If yes did your child took all vaccination? If card available check	1. Fully Vaccinated 2. Currently on vaccination 3. Not-fully vaccinated	
407	Did your child have been ill with diarrhea in the last two weeks	1. Yes 2. No	
408	Did you child have recurrent episodes of diarrhea (2times and more) in the past two weeks?	1. Yes 2. No	

S.No	Questions	Response and coding category	Skip
5	Dietary factors		
501	Have you ever breast fed your child?	1. Yes 2. No	If no skip to 506
502	When did you start breast feeding after delivery?	1. $\leq 1$ hour of birth 2. Within the first 24 hours 3. $>24$ hours	
503	Did your child receive the first milk (colostrums)?	1. Yes 2. No	
504	Did your child receive any food or liquids other than breast milk during the first three days of life?	1. Yes 2. No	
505	For how long the child breast fed?	..... (months)	
506	When did you start giving complementary foods to your child?	..... (months)	
507	What mehod did use for feeding your child?	1. Spoon 2. Cup 3. Hand 4. bottle	More than one answer is possible

Sr.NO	Anthropometric measurement	Measurement in cm	Remark
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6	Length or height measurement		
601	Length or height	.....(cm)	

**Thank you for your participation!!**

**Annex IV. Amharic Questionnaires (የአማርኛ መጠይቅ)**

ይህ የጥናት መጠይቅ የሚያተኩረው በደቡብ ክልላዊ መንግስት በቤንሻ ማጂ ዞን ሚዛን-አማን ከተማ ዕድሜያቸው ከ6-59 ወራት በሆኑ ህጻናት ላይ ቁመታቸው ከዕድሜያቸው ጋር ሲነጻጸር ዝቅተኛ መጠን ያላቸውን ህጻናትን እና ተጓዳኝ ምክንያቶችን ለመለየት የተዘጋጀ ነው።

ጤና ይስጥልኝ ስሜ ..... የተባልኩኝ እኔ አዲስ አበባ ዩኒቨርሲቲ የህክምናና ጤና ሳይንስ ኮሌጅ የጥናት እና ምርምር ባልደረባ ነኝ። ከላይ እንደጠቀስኩት ይህ ጥናት መጠይቅ የሚያተኩረው በሚዛን-አማን ከተማ፤ ዕድሜያቸው ከ6-59 ወራት በሆኑ ህጻናት ላይ ቁመታቸው ከዕድሜያቸው ጋር ሲነጻጸር ዝቅተኛ መጠን እና ተጓዳኝ ምክንያቶችን ለመለየት የተዘጋጀ ሲሆን እርስዎ ለጥናቱ የሚያስፈልጉ መስፈርቶችን አሟልተው በመገኘትዎ የጥናቱ አካል አድርገንዎታል ፤ ስለሆነም የጥናቱ ግኝት ለርስዎ እና ለልሎችም ልጆች ወቅታዊ የስነ-ምግብ እና የጤና እንክብካቤ እንዲያገኙ ይረዳል። በመሆኑም ይህ መጠይቅ ሲዘጋጅ ተገቢ የሆኑ መረጃዎችን ለማግኘት ሲሆን ከእርስዎ የሚገኘው መረጃም ለጥናት እና ምርምሩ ተግባር ብቻ የሚውል ነው። ከእርስዎ የሚሰጡት ምላሾች ሚስጥራዊነታቸው የተጠበቀ እንደሚሆን እየገለጹኩኝ ለዚህም አላማ ሲባል የእርስዎም ሆነ የልጅዎ ስም በመጠይቁ ላይ የማይጻፍ እና የጥናቱ የመጨረሻ ውጤት ከየእርስዎም ሆነ የልጅዎ የግል ማንነት ጋር የማይገናኝ መሆኑን ከወዲሁ አረጋግጣለሁ።

በተጨማሪም ይህ መጠይቅ ከ30 ደቂቃ ያልበለጠ ጊዜ ከመሻማተ ያለፈ በእርስዎም ሆነ በልጅዎ ላይ ምንም አይነት ጉዳት የማያደርስ ሲሆን ከጥናቱ ጋር በተያያዘ ለሚከሰቱ ማንኛውም ዓይነት ጉዳዮች ከዚህ በታላቅ በተቀመጠው አድራሻ ሊያገኙን የሚችሉ መሆኑን እያስገነዘብኩ በጥናት ላይ ያለመሳተፍ እና የማቋረጥ መብትዎ የተጠበቀ ነው። የእርስዎ መሳተፍ ግን ከምንም በላይ ለጥናቱ ዓላማ መሳካት ወሳኝ በመሆኑ በመጠይቱ እንዲተባበሩኝ ስል በታላቅ አክብሮት እና ትህትና እጠይቃለሁ።

በጥናቱ ለመሳተፍ ፈቃደኛ ነዎት? አዎ አይደለም  :: አመሰግናለሁ!

መጠይቁን የሚሰበሰበው ሰው ስም \_\_\_\_\_ ፊርማ \_\_\_\_\_ ቀን \_\_\_\_\_

የመጠይቁ ኮድ \_\_\_\_\_ የተጠያቂ ኮድ \_\_\_\_\_ የቤት ቁጥር \_\_\_\_\_

ተ.ቁ	ጥያቄዎች	ምላሽ እና ኮድ	አልፍ
1.	ማህበራዊ፣ ኢኮኖሚያዊ እና ስነ-ህዝባዊ መረጃን በተመለከተ		
1.1.	ልጅን በተመለከተ		
101	የልጅዎ እድሜ ስንት ነው?	----- ወር	
102	የልጅዎ ፆታ?	1. ወንድ 2. ሴት	
103	ይህ ልጅ ስንተኛ ልጅዎ ነው/ ናት?	1. የመጀመሪያ 2. ከ2-3ኛ 3. ከ4-5ኛ 4. 6 እና ከዚያ በላይ	
104	የአሁኑ ልጅዎ ከታላቁ/ቋ ምን ያህል የዕድሜ ልዩነት አላቸው?	1. ከ 24 ወራት በታች 2. 24 ወራት እና ከዚያን በላይ	

ተ.ቁ	ጥያቄዎች	ምላሽ እና ኮድ	አልፍ
2	ወላጆችን እና ቤተሰብን በተመለከተ		
201	ይህን ልጅዎን ነፍሰጡር የነበሩ ጊዜ ዕድሜዎ ስንት ነበር?	-----ዓመት	
202	የጋብቻ ሁኔታ?	1. ያገቡ 2. የተፋቱ 3. ባላቸውን በሞት ያጡ 4. ያላገቡ	
203	ብሄረዎ ምንድን ነው?	1. ቤንሻን 2. አማራ 3. ከፋ 4. አሮሞ 5. ጉራጌ 6. ስልቴ 7. ሌላ ካለ ይጥቀሱ-----	
204	ሀይማኖቶዎ ምንድን ነው?	1. ፕሮቴስታንት 2. ኦርቶዶክስ 3. ሙስሊም 4. ካቶሊክ 5. ሌላ ካለ ይጥቀሱ-----	

205	ዋና ስራ ዘርፍዎ ምንድን ነው?	<ol style="list-style-type: none"> <li>1. የቤት እመቤት</li> <li>2. መንግስት ሰራተኛ</li> <li>3. መንግስታዊ ያልሆኑ ተቋም ሰራተኛ</li> <li>4. የንግድ ስራ</li> <li>5. የግል ሰራተኛ</li> <li>6. ሌላ ካለ ይጥቀሱ-----</li> </ol>	
206	የትምህርት ደረጃዎ ስንት ነው?	<ol style="list-style-type: none"> <li>1. ማንበብና መጻፍ አለመቻል</li> <li>2. አንደኛ ደረጃ</li> <li>3. ሁለተኛ ደረጃ</li> <li>4. ከሁለተኛ ደረጃ በላይ</li> </ol>	
207	የባለቤትዎ የትምህርት ደረጃ ስንት ነው?	<ol style="list-style-type: none"> <li>1. ማንበብና መጻፍ አለመቻል</li> <li>2. አንደኛ ደረጃ</li> <li>3. ሁለተኛ ደረጃ</li> <li>4. ከሁለተኛ በላይ</li> </ol>	
208	የቤተሰብዎ ወርሃዊ ገቢ ስንት ይሆናል?	-----ብር	

ተ.ቁ	ጥያቄዎች	ምላሽ እና ኮድ	አለፍ
3.	አካባቢያዊ ሁኔታን በተመለከተ		
301	የመጠጥ ውሃ አቅርቦት በዋናነት የምታገኙት ከየት ነው?	<ol style="list-style-type: none"> <li>1. የግል ቧንቧ</li> <li>2. የጋራ ቧንቧ</li> <li>3. የቦኖ ውሃ</li> <li>4. የታሸገ ውሃ</li> <li>5. ከተጠበቀ የጉድጓድ ውሃ</li> <li>6. ካልተጠበቀ የጉድጓድ ውሃ</li> <li>7. ሌላ ካለ ይጠቀሱ...</li> </ol>	
302	በቤትዎ የሚገለገሉበት መጻዳኛ ቤት አልዎት?	<ol style="list-style-type: none"> <li>1. አዎ</li> <li>2. አይደለም</li> </ol>	

ተ.ቁ	ጥያቄዎች	ምላሽ እና ኮድ	አለፍ
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4	የጤና እንክብካቤን በተመለከተ		
401	ልጅዎን ነፍሰጡር በነበሩበት ጊዜ ለቅድመ ወሊድ አገልግሎት ክትትል ወደ ጤና ተማቋት ስንተ ጊዜ ሄደዋል?	<ol style="list-style-type: none"> <li>1. አልሄድኩም</li> <li>2. 1 ጊዜ</li> <li>3. 2-3 ጊዜ</li> <li>4. 4 ጊዜ እና ከዚያ በላይ</li> </ol>	
402	ልጅዎን የት ነበር የወለዱት?	<ol style="list-style-type: none"> <li>1. በመንግስት የጤና ተቋም</li> <li>2. በግል የጤና ተቋም</li> <li>3. በቤት</li> </ol>	
403	ልጅዎን ከወለዱ በኋላ የድህረ-ወሊድ አገልግሎት በጤና ተቋማት አግኝተዋል?	<ol style="list-style-type: none"> <li>1. አዎ</li> <li>2. አይደለም</li> </ol>	
404	ልጅዎ ሲወለድ የነበረው ክብደት/ መጠን ምን ያህል ነበር?	<ol style="list-style-type: none"> <li>1. አነስተኛ (&lt;2.5 ኪ.ግ)</li> <li>2. መካከለኛ (2.5-4ኪ.ግ)</li> <li>3. ከፍተኛ ክብደት (&gt;4ኪ.ግ)</li> <li>4. አላውቅም</li> </ol>	
405	ልጅዎን አስከትበውት ያውቃሉ?	<ol style="list-style-type: none"> <li>1. አዎ</li> <li>2. አይደለም</li> </ol>	አላውቅም ከሆነ መልሱ ወደ 407 ይለፉ
406	ልጅዎ ተከትቦ የሚውቅ ከሆነ፣ ሁሉንም የክትባት ዓይነቶች ወስዷል?	<ol style="list-style-type: none"> <li>1. አዎ ጨርሷል</li> <li>2. አልጨረሰም እየወሰደ ነው</li> <li>3. አልጨረሰም እየወሰደ አይደለም</li> </ol>	
407	ባለፉት ሁለት ሳምንታት ውስጥ ልጅዎን የትኩሳት ምልክት ታይቶበት ነበር?	<ol style="list-style-type: none"> <li>1. አዎ</li> <li>1. አይደለም</li> </ol>	
408	ልጅዎን 2 ጊዜ እና ከዚያ በላይ በተደጋጋሚ (በመካከል ከተቆማጥ ነፃ 2 ቀናት ልዩነት) ተቆማጥ ያጠቃዋል?	<ol style="list-style-type: none"> <li>2. አዎ</li> <li>3. አይደለም</li> </ol>	
409	ባለፉት ሁለት ሳምንታት ውስጥ ልጅዎ የተቆማጥ ምልክት ታይቶበት ነበር?	4.	

ተ.ቁ	ጥያቄዎች	ምላሽ እና ኮድ	አለፍ
5	የአመጋገብ ሁኔታን በተመለከተ		
501	ልጅዎን ጡት አጥብተው ያውቃሉን?	1. አዎ 2. አይደለም	አላውቅም ከሆነ መልሱ ወደ 506 ይለጉ
502	ከወሊድ በኋላ ከስንት ሰዓት በኋላ ነው ልጅዎን ጡት ያጠቡት?	1. በ1 ሰዓት ውስጥ 2. በ24 ሰዓት ውስጥ 3. ከ 24 ሰዓት በላይ	
503	ልጅዎን የመጀመሪያውን ቢጫ መልክ ያለውን የጡት ወተት /እንገር/ አጥብተውታል?	1. አዎ 2. አይደለም	
504	ከወሊድ እስከ ሶስት ቀን ባለው ጊዜ ለልጅዎ ከጡት ወተት ሌላ ተጨማሪ ምግብ ወይም ፈሳሽ ነገር ሰጥተውታል?	1. አዎ 2. አይደለም	
505	ልጅዎን ለምን ያህል ጊዜ ያጠባሉ?	-----ወር	
506	ለልጅዎ ተጨማሪ ምግብ መስጠት የጀመሩት መቼ ነው?	-----ወር	
507	ልጅዎን ለመመገብ የተጠቀሙበት መመገቢያ ዘዴ ምንድን ነው?	1. ማንኪያ 2. ኩባያ 3. በእጅ 4. በጡጦ	

ተ.ቁ	ጥያቄዎች	ምላሽ እና ኮድ	
6	የሰውነት አቋም ልኬት		
601	ቁመት ወይም ርዝመት?	-----ሴንቲ ሜትር	

**Annex V: Declaration**

I, the undersigned declare that this thesis is my original work and has not been presented for a degree in this or any other university and that all sources of materials used for this thesis have been duly acknowledged.

**Name of the principal investigator:** ERMIAS AYALEW (BSc, MSc candidate)

**Date:** \_\_\_\_\_ **Signature:** \_\_\_\_\_

**Confirmation of the advisor**

**Name of the Advisor:** HUSSEN MEKONNEN (MPH)

**Place of submission:** College of Health Sciences, School of Allied Health Sciences Department of Nursing and Midwifery

**Date of Submission:** June, 2015

This thesis work has been submitted for examination with my approval as University advisors

**Advisor:**

**Date:** \_\_\_\_\_ **Signature:** \_\_\_\_\_

