Prevalence and Factors Associated with Stunting Among Children 6-59 Months in Pastoralist Communities of Southeast Ethiopia

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Abstract

Background: In Ethiopia, stunting is one of the most important public health problems. It affects human capital and productivity in several dimensions like impairing learning potential, increased economic costs to health systems and families. Hence, this study was aimed to determine the prevalence and factors associated with stunting among children 6-59months in pastoralist communities of Bale Zone, south-east Ethiopia.

Methods: A community- based cross-sectional study design was executed involving 657 children paired with their mothers. A structured questionnaire was administered. Anthropometry was conducted on children following standard procedures. A stepwise logistic regression with backward elimination method was used to identify factors associated stunting. Adjusted odd ratios with 95% confidence interval and p-value of $\leq 0.05$ were used to assess level of significance.

Results: prevalence of stunting was 43.2 (95% CI: 39.9–47.5). Male children (AOR=3.5, 95%CI, 1.59 -7.71), mothers with primary education level (AOR=8.8 ,95%CI, 7.36 -9.19), and bottle feeding practice (AOR: 3.7, 95%CI, 1.74 -7.69) were positively associated with child stunting, whereas colostrum's feeding practice(AOR:0.14, 95% CI, 0.06 -0.32),improved source of drinking water(AOR=0.3, 95%CI: 0.11-0.71), exclusively breast feeding (AOR: 0.4 [95%CI, 0.20 -0.92), timely of complimentary feeding initiation(AOR: 0.04, 95%CI 0.00, 0.01), growth monitoring follow up (AOR=0.3 [95%CI, 0.13 -0.59), were showed negative association.

Conclusion: Prevalence of stunting was high. Therefore, due attention has to be given on child nutritional education, safe drinking water supply, and promotion of community-based growth monitoring in order to in order to end stunting in children by 2030.

Background

Stunting is defined as a height that is more than two standard deviations below the World Health Organization (WHO) median child growth standard [1]. Childhood stunting starts in the beginning of life and lasts throughout the life time and has long term effects on individuals and societies, including diminished cognitive and physical development, reduced productive capacity, poor health, and increased risk of degenerative diseases [2]. Moreover, findings from longitudinal studies of children from various countries have associated stunting with a reduction in schooling, lower household expenditure per capita, and a greater likelihood of living in poverty [3, 4]. According to World Bank estimates, a 1% loss in adult height due to childhood stunting is associated with a 1.4% loss in an individual's economic productivity and stunted children earn 20% less as adults compared to non-stunted individuals [5, 6]. Stunting affects 178 million children in low and middle-income countries. Globally, the prevalence of stunting is highest in Eastern Africa where 50% of children under 5 years old are stunted [1, 2]. According to the Ethiopian Demographic and Health Survey (EDHS) report of 2016, stunting among children less than five years of
age is 38% and 37% children aged 6 to 59 months in Oromia Regional State of Ethiopia are stunted. This indicates that stunting continues to be one of the most important public health problems in Ethiopia [7].

The World Health Organization adopted a resolution with a target to reduce the number of stunted children under-five by 40% in 2025 [8]. In Ethiopia, although nutrition indicators have improved over the years, the rate of change in stunting is slow with decline rate from 47% in 2005 [9] to 38% in 2016 [8]. This indicates that the prevalence is still high and immense efforts are required to reduce the prevalence of stunting. Ethiopia has demonstrated a strong political commitment to nutrition by launching the multi-sectorial National Nutrition Strategy (NNS) in 2008 and being one of the first countries in sub-Saharan Africa to commit to the Scaling Up Nutrition (SUN) movement in 2010. The NNS in Ethiopia is now operationalized through the multi-sectorial National Nutrition Programme (NNP) 2015–2020 with ten stakeholder ministries. In 2015, the Ethiopian government also signed the Sekota Declaration, which commits different sectors to reduce stunting to 0% by 2030[10]. However, if this trend continues, Ethiopia will still fall short of its own commitment to reduce stunting to 20% by 2020 and 0% by 2030[10].

This could be multiple factors contribute to child malnutrition in Ethiopia and these vary across different contexts, livelihood zones and groups of people. Although this problem is well documented among agrarian communities and urban dwellers of Ethiopia, the evidence on prevalence of malnutrition and factors affecting in pastoralist communities of Ethiopia, particularly Oromia Region is limited. Hence, the aim of this study was to determine the prevalence and factors associated with stunting among children 6–59 months in pastoralist communities of Bale Zone, Southeast Ethiopia.

Methodology

Study design and period

Community-based descriptive cross-sectional quantitative study design was employed. The study was conducted from March to April, 2017.

Study Population

The study population included all households at least having 6–59 months old children (paired with their mothers) who lived in the selected three woredas of pastoralist communities of Bale Zone.

Inclusion and exclusion criteria

Children 6–59 months of age who lived with their mothers and whose mothers were available in the selected households were included whilst children who were critically sick and having physical disabilities, were excluded as measurements were difficult to obtain.

Variables of the study
Dependent variable: nutritional stunting of children aged 6–59 months coded as 0 if not stunted and 1 if stunted.

Independent variables

Socio-economic and demographic factors

Sex of the child’s, age of child in completed months, age of mother at index child pregnancy, maternal educational status, maternal occupation, sex of household head, number of 6–59 months children, household income and family size.

Dietary factors

exclusive breast-feeding, time of initiation of breast feeding, first milk feeding, duration of breast feeding, age for introduction of complementary food, dietary diversity practices, bottle feeding practices and presence or absence of food taboos for children in the study area.

Health care factors

place of delivery of indexed child, immunization status of indexed child, history of child diarrheal status, antenatal care and postnatal care service follow up, Family planning utilizations and child growth monitoring status of the children.

Environmental factors

source of drinking water (Improved Vs. un-improved water sources), and availability of latrine at household level

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) [1].

Age for introduction of complementary food

If the child has started complementary food at 6 months of age, it is categorized as complementary food is introduced at the right time. If the child has started complementary food either before age of 6 months
or after 6 months of age, it is categorized as complementary food is introduced not at the right time.

**Monthly Household income**

Households with monthly income below the median score of the sample, 2000ETB were considered as low income whilst above the median score was categorized as high income.

**Sample size determination and sampling techniques**

Sample size was computed based on single population proportion formula by using: 95% CI (two-sided), 5% margin of error and proportion of stunting among child 6-59 months at national level, 38%[7], design effect of 2.0 and 10% of non-response rate. Finally, the sample size was 657 children paired with their mothers/caregivers were involved in this study.

**Sampling and Data collection procedures**

**Sampling Procedures**

From a total of pastoral woredas found in the Bale zone, three woreda's namely: Dello-mena, Dawekachen and sawena were selected by simple random sampling. From each selected woredas, 3 kebeles were selected through simple random sampling techniques. Prior to the actual data collection, census was conducted in each selected kebeles to know the eligible households. Then, households were selected by using systematic random sampling techniques with sampling interval of 4 and took child-mother pair from each selected household until the required sample size was fulfilled. The starting household was selected by using lottery method. In case of more than one child in age groups of 6–59 months lottery method was used to select the child for this study.

**Data collection tools and methods**

Socio demographic variables, dietary factors, Health care factors and environmental factors were collected using interviewer administered questionnaire. Anthropometric data were collected through measurement of length/height of all children. Measurement of length was done in a lying position with wooden board for children of age under two years and measurement of height for children above two years was measured in a standing position in centimeters to the nearest of 1.0 cm. WHO Anthro version 2.0.4 software was used to convert the anthropometric measures into Z-scores of the indices. Then, nutritional status, stunting, of children was categorized as stunted and not stunted using WHO reference standard by taking − 2SD as the cut-off point[8].

**Data Quality Assurance**
Data collecting tools was pre-tested with 20 children who lived with their mothers from Goba town. Data collectors were trained intensively on purpose of the study, sampling methods, Anthropometric measurements and ethics during field work. Data collectors were supervised during data collection process. Anthropometric measurements were taken twice each child and the average measurement was recorded.

The collected data were checked out for the completeness and clarity by assigned supervisors on each day of data collection and tool with no clarity was given back to the respective data collectors for clarification.

The data collection tool was prepared in English and then translated in to Afaan Oromo, then back to English to maintain the consistency of each question.

**Data analysis methods**

Data entry and analysis were done using IBM SPSS statistical software version 20. Age of child, sex, and height were entered into World Health Organization (WHO) Anthro software to create measurement indices of height-for-age. Data recorded in WHO Anthro was transferred to SPSS version 20. Descriptive analysis was done for appropriate variables. The Nutritional indices of the children was dichotomized as follows; Stunting [1 = stunted, 0 = not stunted]. Multivariate logistic regression with stepwise method was carried to identify factors associated with stunting. P-value < 0.05 was considered as statistical significant and odds ratio with 95% CI was used to see the strength of associations.

**Results**

**Socio demographic characteristics of Mothers/care givers**

Majority of the mothers or care givers of children were at age category of 25–34, $n = 335(51\%)$ whilst $100(15.3\%)$ were aged above 35 years. Regarding the marital status, $612(93.2\%)$ of them were married and currently living with their husband whilst $17(2.6\%)$ were divorced and $24(3.7\%)$ were widowed. Being housewives is a commonest maternal occupation, $573(87.2\%)$ followed by merchant, $50(2.4\%)$. Two hundred and fifty eight ($39.3\%)$ of the mothers/care givers were educated whereas $399(60.7\%)$ were not educated. Regarding the education status of their husband, $349(53.1\%)$ were educated whereas, $308(46.9\%)$ were not educated. Five hundred and twenty nine, $80.5\%$ of their husband were farmer/pastoralist in occupation followed by merchant and employee, $64(9.7\%)$ and $44(6.4\%)$ respectively. Regarding their family number, $325(49.5\%)$ reported less than five whilst $332(50.6\%)$ reported having greater than five family numbers. Three hundred and seventy seven, $57.4\%$ reported monthly income of greater than 2000 birr and $276(42.0\%)$ reported greater than 2000 monthly income. Regarding the exposure statues of mothers/caregivers to mass medias, $481(73.2\%)$ had exposed, $176(26.8\%)$ was not exposed [Table 1].
Table 1
Socio-demographic and economic characteristics of the sampled mothers having children aged 6-59 months at pastoral woredas Southeast Ethiopia, 2017

| Variables                      | Response category | Frequency | Percent |
|-------------------------------|-------------------|-----------|---------|
| Maternal age                  | 15–24             | 222       | 33.8    |
|                               | 25–34             | 335       | 50.9    |
|                               | 35+               | 100       | 15.3    |
| Marital status                | Married           | 612       | 93.2    |
|                               | Divorced          | 17        | 2.6     |
|                               | Single            | 4         | 0.6     |
|                               | widowed           | 24        | 3.7     |
| Maternal occupation           | House wives       | 573       | 87.2    |
|                               | Farmer/pastoralist| 14        | 2.1     |
|                               | Merchant          | 50        | 7.6     |
|                               | Government        | 16        | 2.4     |
|                               | Daily laborer     | 4         | 0.6     |
| Maternal educational status   | Illiterate        | 269       | 40.9    |
|                               | Educated          | 388       | 59.1    |
|                               | Illiterate        | 269       | 41.0    |
|                               | Primary school    | 334       | 50.8    |
|                               | Secondary and above| 54    | 8.2     |
| Husband occupational status   | Illiterate        | 308       | 46.9    |
|                               | Educated          | 349       | 53.1    |
| Family number                 | less than 5       | 325       | 49.5    |
|                               | greater than 5    | 332       | 50.5    |
| Monthly income                | < 2000 ETB        | 377       | 57.4    |
|                               | ≥ 2000 ETB        | 280       | 42.0    |
| Sources of drinking water     | Improved source   | 203       | 30.9    |
|                               | Unimproved source | 454       | 69.1    |
| Exposure to mass media        | Yes               | 176       | 26.8    |
Variables | Response category | Frequency | Percent
---|---|---|---
| No | 481 | 73.2

Two hundred and seventy eight (42.3%) of the children were males whereas, 379(57.7%) were female children. Three hundred and eighty one children, 58% were at age group of 6–23 months while 276(42.0%) were at age group of 24 to 59 months [Table 2].

Table 2
Demographic characteristics of the sampled children at pastoral woredas of Southeast Ethiopia, 2017

| Category | frequency | Percentage |
|---|---|---|
| Sex of the child | Male | 278 | 42.3 |
| | Female | 379 | 57.7 |
| Age of the child in months | 6–11 months | 170 | 25.9 |
| | 12–23 months | 211 | 32.1 |
| | 24–59 months | 276 | 42.0 |

Environmental factors

In the study area, 454(69.1%) used unimproved drinking water sources whereas 203(30.9%) used improved drinking water sources. Regarding availability of toilet facility at household level, 503 (76.6%) reported that they do have the facility whilst the rest did not [Table 3].

Table 3
Environmental factors distributions of selected households at Pastoralist communities of Southeast Ethiopia, 2017

| Category | Number | Percentage |
|---|---|---|
| Sources of drinking water | Improved water sources | 203 | 30.9 |
| | Un-improved water sources | 454 | 69.1 |
| Availability of latrine | Yes | 503 | 76.6 |
| | No | 154 | 23.4 |

Maternal health service utilization

Regarding maternal ANC follow up during pregnancy time child under survey, 505(76.9%) reported ANC follow up whilst 152(23.1%) were not reported. Of these, 202(29.8%) visited ANC services four times and only 16(2.4%) had reported one visit. Among those who reported ANC follow up, 483(95.6%) reported folic acid supplementation and 495(98%) reported HE on infant feeding during their ANC visit during
pregnancy. Regarding age of mother at indexed child pregnancy, 412 (62.7%) were less than 18 years while the rest, 245 (37.3%) were 18 and above years old [Table 4].
| Category                                                                 | Category | Number | Percentage |
|------------------------------------------------------------------------|----------|--------|------------|
| Ever used Family planning                                              | Yes      | 295    | 44.9       |
|                                                                        | No       | 362    | 55.1       |
| Age at this pregnancy                                                  | < 18     | 412    | 62.7       |
|                                                                        | >=18     | 245    | 37.3       |
| Plan for indexed child pregnancy                                       | Yes      | 462    | 70.3       |
|                                                                        | No       | 195    | 29.7       |
| ANC follow up                                                          | yes      | 505    | 76.9       |
|                                                                        | no       | 152    | 23.1       |
| Frequency of ANC visit                                                  | 1        | 16     | 3.2        |
|                                                                        | 2–3      | 287    | 56.8       |
|                                                                        | 4 and above | 202    | 40.0       |
| Folic acid supplementation during indexed child pregnancy              | Yes      | 483    | 95.6       |
|                                                                        | No       | 22     | 4.4        |
| HE on infant feeding during indexed child pregnancy ANC follow up     | Yes      | 495    | 98.0       |
|                                                                        | No       | 10     | 2.0        |
| Place of deliver for indexed child                                      | Health institution | 310 | 47.2 |
|                                                                        | Home     | 347    | 52.8       |
| Immunization statues                                                   | Full immunized | 467    | 73.8       |
|                                                                        | Currently on immunization | 94    | 14.8       |
|                                                                        | Not immunized | 72     | 11.4       |
| De worming                                                             | yes      | 200    | 30.4       |
|                                                                        | No       | 457    | 69.6       |
| Vitamin A supplementation                                              | Yes      | 472    | 71.8       |
|                                                                        | No       | 185    | 28.2       |
| Growth monitoring for the indexed child                                 | Yes      | 291    | 44.3       |
|                                                                        | no       | 366    | 55.7       |
**Child feeding practices**

Of total mothers/care givers involved in this study, all of them were breast feeding their child. Regarding the time of breast feeding initiation, 370(56.3%) started before an hour of birth whilst 287(43.7%) started after an hour of birth. Five hundred and fourteen reported that they had fed colostrum to their child and the rest did not. Concerning EBF of their child, 433(65.9%) exclusively breast fed their child while the rest, 224(34.1%) were not exclusively breast fed. About 58% of mothers reported that they had started complimentary feeding at the right time (at 6 months of age) for their child whereas 280(42.6%) had not started CF at the right time for their child [Table 5].

| Category                                      | Frequency | Percentage |
|-----------------------------------------------|-----------|------------|
| Ever breast feed your child                   | Yes       | 657        | 100       |
|                                               | No        | 0          | 0.0       |
| Time of BF initiation                         | Less than 1 hour | 370    | 56.3      |
|                                               | After an hour | 287    | 43.7      |
| Child fed colostrum                           | yes       | 514        | 78.2      |
|                                               | No        | 143        | 21.8      |
| Duration EBF for this child                   | < 6 months | 433    | 65.9      |
|                                               | > 6 months | 224    | 34.1      |
| Bottle feeding                                | Yes       | 434        | 66.1      |
|                                               | No        | 223        | 33.9      |
| Meal other than breast milk within the 1st 6 months | yes    | 176        | 26.8      |
|                                               | No        | 481        | 73.2      |
| Food taboo                                    | Yes       | 30         | 4.6       |
|                                               | No        | 627        | 95.4      |
| Age complementary food started                | At 6 months | 377    | 57.4      |
|                                               | Before or after six months | 280 | 42.6 |

**Prevalence of stunting among children aged 6–59 months**

This study found that of all children included in the study, 287(43.7%) were stunted whilst 370(56.3%) were not stunted. Of these, 86(30.0%) were at age group of 6–11 months, 65(22.6%) were at 12–23
months and 136(47.4%) were at age group of 24–59 months (Fig. 1).

**Factors Associated with nutritional stunting among children aged 6–59 months**

Accordingly children who were fed complimentary food were 70% less likely to be stunted compared to children who were not fed complimentary food (AOR = 0.3, 95%CI, 0.13–0.59).

Children who were exclusively breast-fed were 60% less likely to be stunted compared to children who were not exclusively breast-fed (AOR = 0.4, 95%CI, 0.20–0.92).

This study also found that children from mothers with primary school level of education were 8.8 times more likely to be stunted compared to those mothers who at least completed secondary or higher level of education (AOR = 8.8, 95%CI, 7.36–8.19). Male children were 3.5 more likely to be stunted compared to female children (AOR = 3.5, 95%CI, 1.59–7.71). Children of households who had drinking water from improved sources are 72% less likely stunted compared to who got drinking water from un-improved sources (AOR = 0.28, 95%CI, 0.11–0.71). Children who were bottle fed are 3.7 more likely stunted compared to children who were not bottle fed (AOR = 3.7, 95%CI, 1.74–7.69).

Children who had growth monitoring were 70% less likely stunted compared to their counterparts (AOR = 0.3, 95%CI, 0.13–0.59). Children who were fed colostrum were 86% less likely to be stunted compared to children who were not fed colostrum (AOR = 0.14, 95%CI, 0.06–0.32).

Children of families having monthly income of less than 2000 ETB were about 5 times more likely stunted compared to children of families having monthly income of greater than 2000 ETB (AOR = 4.6, 95%CI, 2.29–9.38) (Table 6).
Table 6
Factors associated with stunting in 6–59 months old children in pastoralist communities of southeast Ethiopia, 2017

| Variables                                | Responses          | AOR  | P value | 95.0% C.I.  |
|------------------------------------------|--------------------|------|---------|-------------|
| Growth monitoring for indexed child      | yes                | 0.3  | < .001 | 0.13–0.59   |
|                                          | No                 | 1    |         |             |
| Monthly Household income                 | < 2000Birr         | 4.6  | < .001 | 2.29–9.38   |
|                                          | > 2000Birr         | 1    |         |             |
| Age at pregnancy of Indexed child        | < 18 years         | 8.6  | < .001 | 3.76–9.47   |
|                                          | >=18 years         | 1    |         |             |
| Complimentary food initiation for indexed child | at right time     | .004 | < .001 | 0.00-0.01   |
|                                          | Not at right time  | 1    |         |             |
| Exclusively breast fed the indexed child | yes                | 0.4  | .029   | 0.20–0.92   |
|                                          | No                 | 1    |         |             |
| source drinking water                    | Improved           | 0.3  | .007   | 0.11–0.71   |
|                                          | Un improved        | 1    |         |             |
| Ever bottle feed the indexed child       | Yes                | 3.7  | < .001 | 1.74–7.69   |
|                                          | No                 | 1    |         |             |
| Fed colostrum’s of indexed child         | yes                | 0.14 | < .001 | 0.06–0.32   |
|                                          | No                 | 1    |         |             |
| Sex of indexed child                     | Male               | 3.5  | .002   | 1.59–7.71   |
|                                          | female             | 1    |         |             |
| Maternal educational status              | Primary            | 8.8  | < .001 | 7.36–8.9    |
|                                          | Secondary and above| 1    |         |             |
Discussion

This study revealed that magnitude of stunting among children aged 6–59 months at pastoral woredas of Bale zone was 43.7%. This is higher than finding from north-eastern Ethiopia (32.2%)\[11\], and the national prevalence (40%)\[12\] Uganda (33.3%)\[13\], Somalia(31%)\[14\]. However, the apparent prevalence of stunting in the current study area nearly comparable with finding in Tigray Region, Afar Region (46%)\[12\] and Sidama zone of South Ethiopia (45.8%)\[15\] and Bule Hora district, South Ethiopia (45.9%)\[16\], SNNPR's (44%) and Amhara Region\[12\]. These considerable variations might be due difference in socio-economic and instantly access to comprehensive health services, topographical difference and cultural difference of the study areas.

Despite some considerable improvement in observed trends of malnutrition in last 15 successful years in Ethiopia, this descriptive study typically found that the proportion of stunting still remains a severe public health issue. According to the published report of the social and economic impacts of children under nutrition study in Ethiopia in 2009, Ethiopia undoubtedly lost 16.5% of GDP and 16% of all school repetition in primary school due to stunting\[15\]. Hence, this high magnitude of stunting implies that due attention has to be given to young children since stunting is associated with poor physical growth and prevent proper brain development which results in poor cognitive abilities, less schooling, high school dropout and country GDP loss\[15\].

Compared to girls, the likelihood of stunting was higher among boys. Similarly, different studies done in different parts of Ethiopia and studies done in Nairobi, Kenya and Democratic Republic of Congo have reported that under-five male children are more likely to become stunted than their female counterparts\[17–20\].

This could be because boys are more influenced by environmental stress than girls. Hence, boys are expected to display the impact of chronic under nutrition due to repeated infections and exposure to different pollutants\[18, 20\].

This study indicated that maternal educational status was inversely associated with stunting. This was consistent with reports in Nepal\[21\],India\[22\], Nigeria\[23\], Tanzania\[24\], Kenya\[25\], Somalia\[14, 26\], and Ethiopia\[27\]. The current study also found maternal education increase knowledge about their children's health and nutrition, which can have impact on prevention of childhood malnutrition.

This study indicated that children living in households that have low monthly income were more likely to develop stunting than children living in high monthly income. This finding was consistent with the study done Nepal\[21\], India\[22\], Iran\[28\], Indonesia\[29\], and Ethiopia\[15\]. This could be due to the fact that, low income levels of households limits the kinds and the amounts of food available for consumption and will not have access to health care and get quality food.

This study found that stunting among children who were fed colostrum (First Breast milk) were less likely than among those who were not fed colostrum. This finding is congruent with findings of studies
conducted in Gojjam, Ethiopia [18], in India[22], Nepal [21] and Somali regional state[26]. This is due to the first milk/colostrum can protect children from different diseases such as diarrhea and pneumonia and it also indicates the importance of colostrum feeding to tackle childhood malnutrition.

Current study revealed that bottle-feeding as a risk factor of childhood stunting. This finding is congruent with findings from Gojjam [19], and Somali region of Ethiopia [30] Somali regional state (26), Gurage Zone [31]. This could be due to a high prevalence of bottle feeding in the current study area and it bottle feeding can increase repeated infection of children by diarrhea due to that bottle is easily contaminated and inappropriate for child feeding.

Growth monitoring is the process of following the growth rate of a child in order to assess growth adequacy and identify faltering early through frequent anthropometric measurement. The current study found that children who had growth monitoring follow up were less likely stunted. This finding indicates the needs of growth monitoring follow up for under-five children to address the multiple causal factors impacting on a child's growth and development.

In this study, using unimproved source of drinking water showed significant association with stunting. This was consistent with findings from Nigeria[23], and Somali Regional State of Ethiopia [26]. This might be due to that under five children were children were risk group for a high rate of parasitic infection that simultaneously predisposes to malnutrition, hidden hunger, and other chronic and acute infectious diseases.

**Conclusions**

Prevalence of stunting among under-five children in the study area is still high. Sex of child, age of child, maternal education, household monthly income, source of drinking water, children feeding first milk and bottle feeding were found the predictors of stunting. Therefore, educating mothers on child feeding practice, growth monitoring and important of first milk can reduce stunting. Moreover; safe water supply to the community can reduce the magnitudes of under-five stunting and its grave consequences.

**Abbreviations**

ANC Antenatal Care

AOR Adjusted Odds Ratio

COR Crude Odds Ratio

EBF Exclusive Breast Feeding

ETB Ethiopian Birr

NNP National Nutrition Program
Declarations

Ethics approval and consent to participate

This study was approved by the research ethical review committee of Madda Walabu University Research and Publication Office. An informed verbal consent was obtained from all respondents.

Consent for publication

Study subjects were informed during Informed consent to participate in this research as this research work will be published for sharing information to scientific communities.

Competing interests

We, declare that no competing Interest

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Authors Contributions

Study conceptualization and –design, literature research, and material preparation, analysis and manuscript preparation were performed by TBT and MTH. SSB, MTA MAH and GG reviewed the manuscript. All author(s) read and approved the final manuscript.

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Figure 1

Percentage distribution of stunting among children aged 6-59 months in pastoralist communities of southeast Ethiopia, 2017