



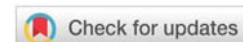
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Research Article

Prevalence of malnutrition and its associated factors among under five children at debretabor town north-west ethiopia

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Abstract

Background: An estimated of 230 million under-five children are believed to be chronically malnourished in developing countries. Similarly, about 54% of deaths among children of this age group are believed to be associated with malnutrition in developing countries. In Sub-Saharan Africa, 41% of under-five children are malnourished and deaths from malnutrition are increasing on daily basis in the region. Malnutrition continues to be a major public health problem in developing countries. It is the most important risk factor for the burden of disease causing about 300,000 deaths per year directly and indirectly responsible for more than half of all deaths in children. So to minimize these direct or indirect causes of death additional investigation is needed since there is shortage of evidences.

Objective: To assess prevalence of malnutrition among children of age 6-59 months in Debre Tabor town, North-West Ethiopia in December 2019.

Methods: A community based cross sectional study was conducted. The study area is Debre Tabour Town which is located North-West of Ethiopia, and is 97Km away from Bahir Dar. The sample size of the study was 277. Data were collected using structured questionnaire and anthropometric measurements. After the completion of data collection; editing, coding and cleaning was carried out. The data was analyzed manually. Different frequency tables, graphs and descriptive summaries were used to describe the study variables. Chi-square test and 95% CI were computed to measure the presence of the association between the outcome and the explanatory variables. P-value <0.05 was considered as a statistical significant.

Result: The prevalence of stunting, underweight and wasting was 23.2%, 11.9%, 7.6% respectively. About 1.8% of the children had acute malnutrition.

Variables like family size, income, maternal and paternal educational status, diarrhea, health status during pregnancy, ANC visit were highly significant (associated) with chronic malnutrition (stunting) at P-value <0.005.

Conclusion and recommendation: Based on the findings of this study we can conclude that; child malnutrition is still high in the study area even though it is lower than the national and regional EDHS 2016 national report. I recommend that nutritional education should be given by health extension workers to improve feeding and hygiene practice at HH level. There should be safe and adequate water supply, Immunization to overcome malnutrition in long term.

Abbreviation

BMI: Body Mass Index; CDC: Centre for Disease Control and Prevention; CI: Confidence Interval; DHS: Demographic and Health Survey; EBF: Exclusive Breast Feeding; H/A: Height-for-Age; HAZ: Height for age Z score; HH: House Hold; MOH: Ministry of Health; MUAC: Mid-Upper Arm Circumference;

NCHS: National Centre for Health Statistics; OR: Odds Ratio; PEM: Protein-Energy Malnutrition; SD: Standard Deviation; UNICEF: United Nations Children's Fund; W/A: Weight-for-Age; W/H: Weight-for-Height; WAZ: Weight for Age Z score; WFP: World Food Program; WHO: World Health Organization; WHZ: Weight for Height Z score

Introduction

Background

Insufficient supply of protein, carbohydrates and fat, the next major cause of protein–energy malnutrition is severe and chronic infections — particularly those producing diarrhea, but also other diseases such as helminthic infections. The underlying mechanisms include decreased food intake because of anorexia, decreased nutrient absorption, increased metabolic requirements and direct nutrient losses. Malnutrition is a condition that results from eating a diet in which nutrients are either not enough or too much such that the diet causes health problem it may involve calories, protein, carbohydrate, vitamins or minerals. Malnutrition continues to be a major public health problem in developing countries [1]. It is the most important risk factor for the burden of disease causing about 300, 000 deaths per year directly and indirectly responsible for more than half of all deaths in children [2].

Much of the burden of deaths resulting from malnutrition, estimated to be over half of childhood deaths in developing countries, can be attributed to just mild and moderate malnutrition, varying from 45% for deaths due to measles to 61% for deaths due to diarrhea [3]. It's estimated that 53 % of deaths among pre–school children in the developing world are due to the underlying effects of malnutrition on diseases such as measles, pneumonia, and diarrhea.

In Ethiopia, child malnutrition rate is one of the most serious public health problem and the highest in the world [4]. High malnutrition rates in the country pose a significant obstacle to achieving better child health outcomes. Underweight and stunting rates among young children are the highest in sub–Saharan Africa [5,6] Malnutrition in Ethiopia, in the form of stunting, underweight and wasting were identified as 38%, 24% and 10 % and. Amhara National region state 46 %, 28.4% and 9.8%, respectively in children under five. A community based cross–sectional survey conducted West Gojam zone revealed that 49.2 % children were found to be under–weight ,43.2 % of the children under age five were suffering from chronic malnutrition and 14.8 % acutely malnourished [6 7].

The cross sectional survey conducted rural communities of Tigray region also revealed that, the levels of stunting, under weight and wasting were 42.7%, 38.3% and 13.4%, respectively [8]. A cross sectional study conducted in Aynalem village in Tigray region, the overall prevalence of stunting, underweight and wasting were 45.7%,43.1% and 7.1% ,respectively [8,9].

Statement of the problem

Malnutrition is the result of complex interactions between food consumption and the overall status of health and health care practices. Numerous socioeconomic and cultural factors influence patterns of child feeding and nutritional status of women and children [4,5].

Appropriate and adequate feeding is a pre–requisite to good nutritional status in any given time of human life because consumption of nutritionally inadequate diet leads to

malnutrition [6,7]. Proper nutrition in the early years of life is usually determined by feeding practice, which includes the methods and frequency of feeding, degree of stimulation and interaction with parents [8,9]. Traditional feeding practices(No special emphasis on feeding of children)are those practices that are directly related to the nutritional and dietary aspects of feeding. Ethiopia is a large country with cultural diversification reflected by different feeding habits and traditional feeding practices [10,11]. Malnutrition remains one of the most common causes of morbidity and mortality among children throughout the world. It has been responsible, directly or indirectly, for 60% of the 10.9 million deaths annually among children under five ages [12,13].

But, there is no information available on the stated problem in Debre Tabor town since the national data obtained from demographic health survey may not represent the study area and the data is generated every five years. This study, therefore, aimed at assessing prevalence of malnutrition in Debre Tabor town town, North–west Ethiopia. Among Children age 6–59 Months.

Significance of the study

As malnutrition can vary by background characteristics, there is a need to investigate underlying variations of these nutritional indicators and determinant factors among regions and localities or residence for proper priority setting and interventions.

Despite the fact that the government of Ethiopia health sector has increased its efforts to enhance good nutritional practices, child malnutrition is still among the highest in the world. Malnutrition is one of the main health problems in Amhara National Regional State as well as to the study area. Determining the prevalence for malnutrition among children age 6–59 months will assist the health system and other concerned stakeholders to plan appropriate and efficient nutrition intervention. There is no recent study done and documented to this specific topic in the area. The result of this study, which specifies the prevalence of child malnutrition with these various causes, can serve as reference in priority setting, designing effective nutritional programs to address the problem and its consequences

Methodology

Study area and study period: The study was conducted in Amhara regional state, south Gondar Zone, Debre Tabour town in December 2019 .Debre tabor town is one of the wereda found in South Gondar zone it is located North West Ethiopia, and 666 km from Addis Ababa and is 97km far from the capital of Amhara Bahir Dar in addition 50kms far from Lake Tana. Debre tabor town has 4 kebeles. The town was established in 1327 and it has the altitude and longitude of 11. 51N 38 1E and 11.850N 38.017E respectively and with an elevation of 2,706m above sea level. The town has 1 General Hospital , 3 Health centers 4 Medium private clinics , 4 private pharmacies and 1public pharmacy and it has 4 private KG , 6 public elementary , 4 private elementary , 4 public secondary , 1public preparatory

schools and 2public and 2private colleges and 1 Governmental University.

As 2007 CSA population projected the town has a total population of 81,644 with female population 40,414 and male population 41,230 and the wereda has 18,987 total households and it has a total of 1007, 0–59months of children.

Study design: A community based, cross-sectional study was conducted.

Source population

All children 6–59 months of age living in Debre Tabor town.

Study population

All sampled/selected children of age 6–59 months who were available during the data collection period in the town.

Inclusion (eligibility) criteria

Children who are 6–59 months of ages selected for the study.

Exclusion criteria

Children who were seriously ill were excluded.

Disabled children were also be excluded.

Sample size determination

Total of 276 children who are aged from 6–59 month were assessed in the study.

Sample size was calculated by using 46% prevalence of Stunting in Ethiopia of Amhara Data in DHS 2016.

$$n = (Z/2)^2 p (1-p)$$

d^2

Where, n= sample size

p= 46% (prevalence of stunting (EDHS 2016))

z= confidence interval at 95%

d=margin of error (5%)

$$n = (1.96)^2 \times 0.46(1-0.46) / (0.05)^2 = 382$$

But, total population of the town is less than 10,000. So, we used correction formula;

Where; N number of children aged 6–59month

$$n = n_0 / 1 + n_0 / N$$

n_0 initial sample size

n final sample size

$$= 382 / 1 + 382 / 1007 = 277$$

Similarly, when we used 29% of prevalence of underweight of EDHS 2016, the sample size becomes 241. When we used 10% of prevalence of wasting of EDHS 2016, SS become 122. Since,

SS of 276 which is calculated from prevalence of stunting of EDHS 2016 is the largest SS, so we have taken 276 to be our SS.

Sampling procedure

Systematic random sampling technique was used to assess Prevalence of malnutrition in child at Debre Tabor town. if there is refusal or if there is no child in the selected HH , the next HH will consider for the study.

$$\text{Sampling interval} = N/n = 1007/276 = 4 = k$$

Were N=Total number of households with under five children

n= sample size

k= sample interval

Randomly select by lottery method the first house to be 3. Then, 3+k, 3+2k, 3+3k.....and I had selected 276 households. Where impossible to get them or if there is refusal, the next HH was consider for the study. In households with more than one children of age between 6–59 months, one child was selected randomly.

Data collection instruments/tools

A structured questionnaire was used to obtain socio-demographic information, environmental related factors and dietary habit, and Malnutrition. The questionnaire was developed in English and then was translate into Amharic language during the interview to obtain correct data since the local language is Amharic. The data collectors were regularly supervised by the principal investigator for proper data collection.

Data processing and analysis

Data was assessed, should be cleaned and edited using tally sheet for independent variable frequencies, percentage, mean, range and proportion were calculated and presented using tables and figures. The associations of independent and outcome variables were tested. Chi-square test and 95% CI was computed to measure the presence of the association between the outcome and the explanatory variables. P-value <0.05 was considered as a statistical significant.

Data quality control

To ensure quality of data, pre-test for the data collection tools was done on Health centers Findings and experiences from the pre-test was utilized in modifying the data collection tool. 6 Data collectors were trained by the principal investigator. Supervision was done during data collection. The collected data were checked for completeness and clarity by supervisors and principal investigators on daily basis.

Study variables

Dependent variables

- Stunting,



- Wasting
- Underweight

Independent variables

Five categories of factors were assessed as independent variables;

- Socio-economic and demographic variables; family size, income, maternal and paternal education and occupation.
- Child characteristics; Age, Sex, birth weight and morbidity status.
- Child caring practices; breast feeding and immunization
- Maternal Caring and characteristics; ANC visits, health status during pregnancy.
- Environmental Health condition; Water supply, sanitation and housing conditions

Operational definitions

Acute respiratory illness: A child with cough and fast breathing or difficulty in breathing

Complementary foods: Are foods which are required by the child, after six months of age, in addition to sustained breastfeeding.

Diarrhea: A child with loose stools for three or more times in a day and a sign of dehydration

Family size: refers total number of people living in a house during the study period.

Fever: A child with elevated body temperature than usual

Income: It is periodical monthly earning from one's business, lands, work, investment etc

Malnutrition: refers to under nutrition or deficiency in protein-energy nutrition.

Measles: A child with fever, generalized rash and conjunctivitis (red eyes)

Stunting: H/A that is less than the international median NCHS reference value by more than two standard deviations, below -3SD is severe stunting.

Underweight: W/A that is less than two SD below the international median NCHS reference value.

Wasting: W/H less than the international median NCHS reference value by more than two SD.

HHs were 91.3 percent and the rest 8.7 percent were female headed HHs.

From the study subjects 88 percent were married, 5.1 percent divorced, 4.0 percent were separated, 2.5 percent were widowed and 0.4 percent was single.

About 50.7 % of the HHs had a total family size of more than four while, 49.3% of the HHs had family size of less than or equals to four. About 62.3% of the HHs had one under five year children, 33.7 percent of the HHs had two under five year children and 4.0 percent had three under five children.

Regarding to educational status of mothers and fathers respectively shows that 36.2% and 33.0 % were illiterate,

Table 1: Socio- Demographic characteristics of study subjects.

| Variables | | Number | Percent |
|-----------------------------|-----------------|--------|---------|
| Head of the HH | Male | 252 | 91.3 |
| | Female | 24 | 8.7 |
| | Total | 276 | 100 |
| Marital status | married | 243 | 88 |
| | divorced | 14 | 5.1 |
| | widowed | 7 | 2.5 |
| | separated | 11 | 4 |
| | single | 1 | 0.4 |
| Family size | Total | 276 | 100 |
| | Less than or =4 | 136 | 49.3 |
| | >4 | 140 | 50.7 |
| <5 children in the HH | Total | 276 | 100 |
| | 1 | 172 | 62.3 |
| | 2 | 93 | 33.7 |
| | 3 | 11 | 4 |
| Maternal educational Status | Total | 276 | 100 |
| | illiterate | 100 | 36.2 |
| | read and write | 79 | 28.6 |
| | grade 1-8 | 70 | 25.4 |
| | 09-Dec | 10 | 3.6 |
| Paternal educational Status | Total | 276 | 100 |
| | illiterate | 91 | 33 |
| | read and write | 72 | 26.1 |
| | grade 1-8 | 64 | 23.2 |
| Monthly income of the HH | Total | 276 | 100 |
| | <500 | 28 | 10.1 |
| | 500-1000 | 90 | 32.6 |
| | >1000 | 158 | 57.2 |
| Ethnicity | Total | 276 | 100 |
| | Amhara | 275 | 99.6 |
| | Oromo | 1 | 0.4 |
| | Total | 276 | 100 |

Results

Socio- demographic

From the total 276 planned study subjects, complete response was obtained. As indicated in Table 1, male headed



28.6% and 26.1% can read and write, 25.4% and 23.2% were from Grade 1-8, 3.6% and 9.4% were Grade 9-12, 6.2% and 8.3% were above Grade 12.

Occupations of the heads of the households were farming (43.8%), merchant (30.1%), government employee (16.3%), Daily laborer (6.2%) and private org. employer(3.6%).

About 57.2% of the HHs earns monthly income of more than 1000 birr, 32.6% earn 500-1000 and the rest 10.1% earn less than 500.

Majority of the respondents were Amhara ethnic group (99.6%), Oromo (0.4%). Their religion was 85.5% Orthodox Christian, 13.4% Muslim and 1.1% were Protestants Figures 1,2, Tables 2,3.

Child characteristics

From the total children, 50.4% were males, while 49.6% were females. Their age were 30.8% among 6-12 months, 30.1% were Toddlers (13-24 months) and 39.1% were Preschool age groups (25-59 months). Place of delivery at Health institution was 77.9% of the children whereas 22.1% at home. Their gestational age at birth was 9 month for 88.8% of children, 6.9% was greater than 9 months and 4.3% was less than 9 month.

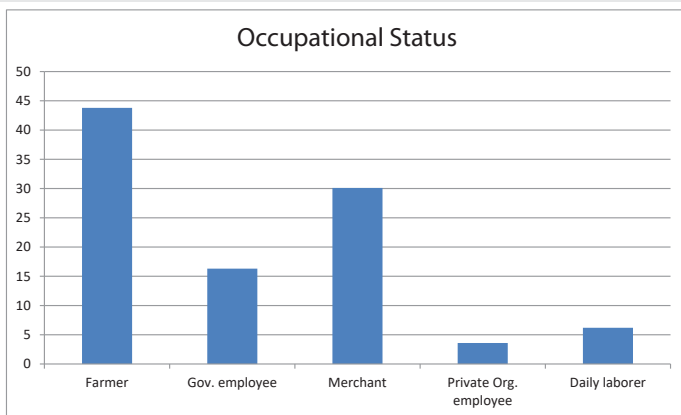


Figure 1: Occupational status of HH.

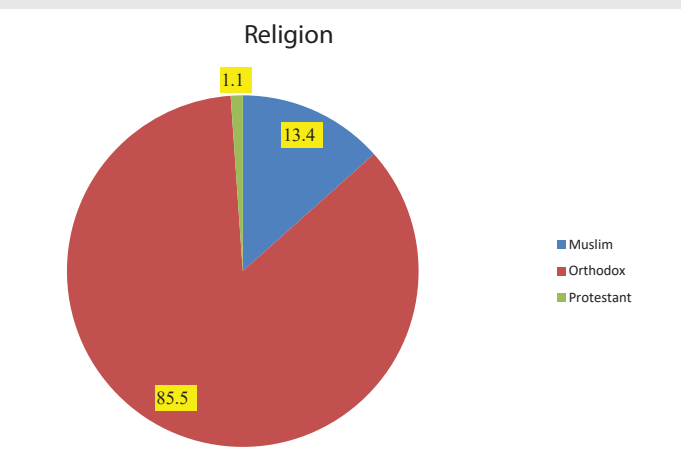


Figure 2: Religion of HH.

Table 2: Associations of selected socio-demographic factors of stunting.

| Variables | Stunting | | | X ² | p-value (p<0.05) | |
|------------------------------|------------------------------|------------|-------|----------------|------------------|---------|
| | yes | No | Total | | | |
| Marital status | Married | 50 | 193 | 243 | 10.46 | 0.033 |
| | Divorced | 6 | 8 | 14 | | |
| | Widowed | 2 | 5 | 7 | | |
| | Separated | 5 | 6 | 11 | | |
| | Single | 1 | 0 | 1 | | |
| | Total | 64 | 212 | 276 | | |
| | Family size | < or =4 | 21 | 115 | | |
| >4 | | 43 | 97 | 140 | | |
| Total | | 64 | 212 | 276 | | |
| No of child <5 | 1 | 30 | 142 | 172 | 10.3 | 0.005 |
| | 2 | 26 | 67 | 93 | | |
| | 3 | 8 | 3 | 11 | | |
| | Total | 64 | 212 | 276 | | |
| | Educational status of mother | Illiterate | 25 | 75 | | |
| read and write grade 1-8 | | 20 | 59 | 79 | | |
| 9-12 | | 14 | 56 | 70 | | |
| >12 | | 2 | 8 | 10 | | |
| Total | | 3 | 14 | 17 | | |
| Total | | 64 | 212 | 276 | | |
| Educational Status of father | Illiterate | 31 | 60 | 91 | 11.71 | 0.02 |
| | read and write grade 1-8 | 17 | 55 | 72 | | |
| | 9-12 | 10 | 54 | 64 | | |
| | >12 | 4 | 22 | 26 | | |
| | Total | 2 | 21 | 23 | | |
| | Total | 64 | 212 | 276 | | |
| Occupation | Farmer | 32 | 89 | 121 | 2.06 | 0.72 |
| | got'tal employer | 8 | 37 | 45 | | |
| | Merchant | 17 | 66 | 83 | | |
| | private org. employer | 3 | 7 | 10 | | |
| | daily laborer | 4 | 13 | 17 | | |
| | Total | 4 | 13 | 17 | | |
| | Total | 64 | 212 | 276 | | |
| Income | <500 | 19 | 9 | 28 | 44.06 | 0.00001 |
| | 500-1000 | 26 | 64 | 90 | | |
| | >1000 | 19 | 139 | 158 | | |
| | Total | 64 | 212 | 276 | | |
| Ethnicity | Amhara | 51 | 175 | 226 | 0.025 | 0.613 |
| | Oromo | 13 | 37 | 50 | | |
| | Total | 64 | 212 | 276 | | |
| Religion | Orthodox | 49 | 187 | 236 | 0.034 | 0.512 |
| | Muslim | 15 | 22 | 36 | | |
| | Protestant | 0 | 3 | 3 | | |
| | Total | 64 | 212 | 276 | | |

From the total children, 65.2% were weighted at birth. From the weighted children 55.8% were b/n 2500-4000grams, 8% were low (1500-2499grams) and 1.1% were very low (less than 1500grams). Concerning Immunization, 98.6% were immunized. Among the total children 97.5% were single birth, the rest 2.5% were multiple.

Prevalence of common childhood illnesses

Diarrhea: 47 children (17%) had diarrhea in the two weeks preceding the study. About 72.2% of them were having two and above episodes of diarrhea in a year.

About 7.2% and 10.1% of the Children had fever and URTI respectively two weeks preceding to the study. There was no any child who was affected by measles in the last one year. There were 5(1.8%) children with bilateral pitting edema Figures 3,4, Tables 4,5.

child caring practice

Breast feeding: All children had breast fed after birth, among these 76.1% were breast fed immediately(within an hour), 15.6% were breast fed b/n 1-23 hours and only 0.7% were breast fed after 24 hours.10.5% of children were exclusively breast fed for less than six months, 80.1% of the children for six months and the rest 9.4% were EBF for greater than six months About 6.5% of the respondents squeezed out(threw) the first milk(colostrums) and 7.2% of mothers had given prelactational food for their newborn baby. The commonest type of food given was butter which was 90.9%.

From the total number of study subjects, 50% are still breast feeding. About 48.2% breast feed less than eight times in 24 hours, 48.9% from 8 up to 12 times and 2.9% above 12 times in 24 hours. Most of respondents used cup and spoon for feeding (64.5%) whereas 35.1% used bottle feeding and 93.5% of households, mothers were usually taking care of babies feeding.

Table 3: Child characteristics.

| Variable | Frequency | Percentage |
|--------------------|-----------|------------|
| Child sex | | |
| male | 140 | 50.7 |
| female | 136 | 49.3 |
| Child age | | |
| 6-12 months | 85 | 30.8 |
| 13-24 months | 83 | 30.1 |
| 25-59 months | 108 | 39.1 |
| Place of Delivery | | |
| home | 61 | 22.1 |
| health institution | 215 | 77.9 |
| Child weighted | | |
| Yes | 180 | 65.2 |
| No | 92 | 33.3 |
| Type of birth | | |
| single | 269 | 97.5 |
| multiple(twin) | 7 | 2.5 |
| Immunization | | |
| Yes | 272 | 98.6 |
| No | 4 | 1.4 |
| Diarrhea | | |
| Yes | 47 | 17 |
| No | 229 | 83 |
| Total | 276 | 100 |
| Fever | | |
| Yes | 20 | 7.2 |
| No | 256 | 92.8 |
| Total | 276 | 100 |
| Edema | | |
| Yes | 5 | 1.8 |
| No | 271 | 98.2 |
| Total | 276 | 100 |

WEIGHT OF CHILDREN

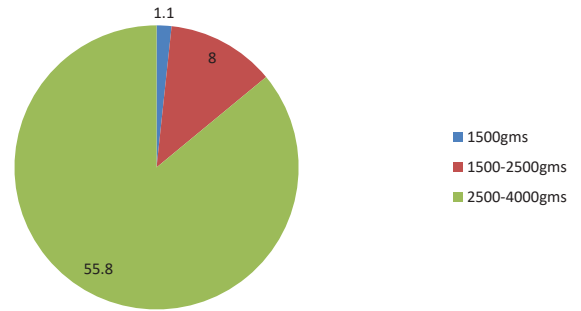


Figure 3: Weight of children in grams.

frequency of Diarrhea in the last two weeks

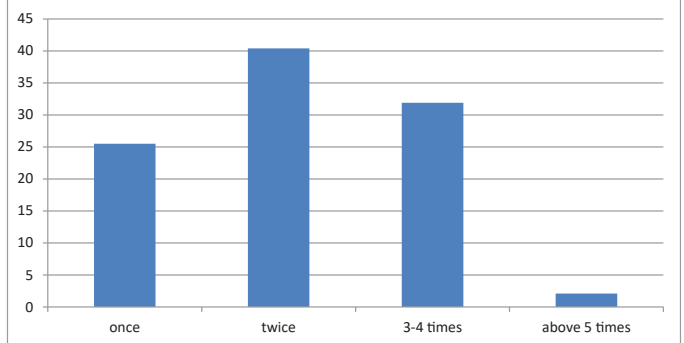


Figure 4: Frequency of Diarrhea in the last two weeks.

Table 4: Associations of selected child characteristic factors of stunting.

| Variables | Stun ting | | | X ² | p-value | |
|-------------------|--------------------|----|-------|----------------|---------|---------|
| | yes | no | Total | | | |
| Child Sex | Male | 29 | 110 | 139 | 0.91 | 0.34 |
| | Female | 35 | 101 | 136 | | |
| Child age | Total | 64 | 212 | 276 | 1.86 | 0.39 |
| | 6-12 months | 16 | 69 | 85 | | |
| | 13-24 months | 23 | 60 | 83 | | |
| | 25-59 months | 25 | 83 | 108 | | |
| Place of delivery | Total | 64 | 212 | 276 | 13.92 | 0.0002 |
| | Home | 25 | 36 | 61 | | |
| Type of birth | health institution | 39 | 176 | 215 | 9.38 | 0.002 |
| | Total | 64 | 212 | 276 | | |
| | Single | 59 | 210 | 269 | | |
| Immunization | multiple(twin) | 5 | 2 | 7 | 1.64 | 0.2 |
| | Total | 64 | 212 | 276 | | |
| Diarrhea | Yes | 62 | 210 | 272 | 47.17 | 0.00001 |
| | No | 2 | 2 | 4 | | |
| Total | Total | 64 | 212 | 276 | | |
| | Yes | 29 | 18 | 47 | | |
| | No | 35 | 194 | 229 | | |

All of the children visited health institution for treatment of illness Tables 6,7.

As shown above from chi square test (At p- value<0.05), Exclusive breast feeding and colostrums squeezed out are



significantly associated with stunting whereas the person who is caring the child is not significantly associated with stunting.

Maternal characteristics

As indicated in Table 4, Mothers who gave first birth at their age less than 18 years were 15.9%, while 84.1% were in b/n 18–28 years. Most of the mothers (92.8%) had ANC follow up. Among these mothers 97.1% had good health during pregnancy. About 93.8% of mothers had knowledge about family planning, and 74.5 %of mothers had used FP in the past. But Currently only 46.4% of mothers are using FP. Among them 66.5% of

Table 5: Child feeding and caring characteristics.

| Time of breast | | | |
|---|-----|------|--|
| Feeding after birth | | | |
| 1-23 hours | 43 | 15.6 | |
| > 24 hours | 2 | 0.7 | |
| don't know(not sure) | 21 | 7.6 | |
| Prelactation food given | | | |
| Yes | 20 | 7.2 | |
| No | 256 | 92.8 | |
| Prelactation food | | | |
| Water | 1 | 4.5 | |
| Butter | 20 | 90.9 | |
| Milk | 1 | 4.5 | |
| Colostrums given | | | |
| Yes | 18 | 6.5 | |
| No | 258 | 93.5 | |
| Still breast feed | | | |
| Yes | 138 | 50 | |
| No | 138 | 50 | |
| Frequency of breast feeding In 24 hours | | | |
| <8 | 66 | 48.2 | |
| 8-12 | 67 | 48.9 | |
| >12 | 5 | 2.9 | |
| Feeding materials | | | |
| Bottle | 97 | 35.1 | |
| cup/spoon | 178 | 64.5 | |
| Other | 1 | 0.4 | |
| Exclusive breast Feeding | | | |
| <6 months | 29 | 10.5 | |
| at 6 months | 221 | 80.1 | |
| >6 months | 26 | 9.4 | |
| Who is taking care of child | | | |
| Mother | 258 | 93.5 | |
| Sister | 10 | 3.6 | |
| grand mother | 6 | 2.2 | |
| house made | 2 | 0.7 | |

Table 6: Associations of selected child caring practice factors of stunting.

| Variables | stunting | | | X ² | p-value | |
|-----------------------------|--------------|-----|-------|----------------|---------|---------|
| | yes | no | total | | | |
| Yes | 9 | 9 | 18 | 7.77 | 0.005 | |
| No | 55 | 203 | 258 | | | |
| Colostrums squeezed out | Total | 64 | 212 | 276 | | |
| Exclusive breast feeding | <6 months | 16 | 13 | 29 | 22.37 | 0.00012 |
| | at 6 months | 39 | 182 | 221 | | |
| | >6 months | 9 | 17 | 26 | | |
| Who is taking care of child | Total | 64 | 212 | 276 | 5.51 | 0.13 |
| | Mother | 56 | 202 | 258 | | |
| | Sister | 5 | 5 | 10 | | |
| Total | grand mother | 2 | 4 | 6 | 5.51 | 0.13 |
| | house made | 1 | 1 | 2 | | |
| | Total | 64 | 212 | 276 | | |

Table 7: Maternal characteristics.

| | Frequency | Percentage |
|--------------------------------|-----------|------------|
| Age at first birth% | | |
| < 18 | 44 | 15.9 |
| 18-28 | 132 | 84.1 |
| Health status during pregnancy | | |
| Good | 268 | 97.1 |
| not good | 8 | 2.9 |
| ANC Visit | | |
| Yes | 256 | 92.8 |
| No | 20 | 7.2 |
| Knowledge about FP | | |
| Yes | 259 | 93.8 |
| No | 17 | 6.2 |
| Ever used FP | | |
| Yes | 204 | 74.5 |
| No | 70 | 25.5 |
| Total | 274 | 100 |
| Currently using FP | | |
| Yes | 128 | 46.4 |
| No | 148 | 53.6 |
| Hand washing Materials | | |
| water only | 3 | 1.1 |
| soap and water | 273 | 98.9 |

mothers are using Depo-Provera, 16.7% are using Implanol, 13.5% are using Pills and only 3.3% are using IUCD [13–15].

Regarding Hand washing, All mothers wash their hands after latrine use, before preparing food, before serving food and after cleansing child feace. 98.9% of mothers used water and soap for washing and 1.1% of them used only water for washing.

About 70.7% of mothers thought that their child physical looks normal, 13.8% looks thin, 9.4% looks heavy, 5.8% looks tall and 0.4% looks small. From the total number of



respondents 87.3% of mothers thought that EBF is given for the first 6 months, 5.4% thought EBF should be given for less than 6 months whereas 7.2% of them thought should be given for more than 6 months Figure 5, Tables 8-10.

Environmental health condition

Majority of the respondents were using pipe water(99.3%) as shown in Table 5 but none of them had treated the water to make safer. About 40.2% of the respondents used above 40 liters per HH per day, 55.8% used 20-40 liters and only 4% used less than 20 liters [15-20].

All of the HHs have latrine. in the rural area lacks latrine. Traditional private pit latrine with wooden slab was the commonest type (53.6%) being utilized. Regarding solid waste disposal about 39.9% of the respondents dispose garbage on open field, 38.4% dispose to common municipal pit whereas 21.7% dispose in private pit.

All houses of the respondents were corrugated iron sheet roof. Their house floors were 59.4% cement/brick, 38.0% Earth/soil and 0.7% wooden/ bamboo. About 94.9% of HHs have separated kitchen.

Nutritional status of the children

The overall prevalence of stunting, underweight, and wasting were 23.2%, 11.9% and 7.6% respectively. About 5(1.8%) of the children had bilateral pitting edema (sever acute malnutrition, kwashiorkor).

From 276 children, about 22(7.9%) had MUAC measurement of less than 12cms.

Table 9: Environmental condition.

| Variables | Frequency | Percentage |
|----------------------------|-----------|------------|
| Source of drinking water | | |
| pipe water | 274 | 99.3 |
| un protected spring | 1 | 4 |
| public tab | 1 | 0.4 |
| Total | 276 | 100 |
| Amount of drinking water | | |
| < or = 20 liters | 11 | 4 |
| 20-40 liters | 154 | 55.8 |
| >Or =40 liters | 111 | 40 |
| Total | 276 | 100 |
| Type of Latrine | 148 | 53.6 |
| private pit/cement slab | 105 | 38 |
| shared latrine/wooden slab | 23 | 8.3 |
| Total | 276 | 100 |
| Solid waste disposal | | |
| open field | 110 | 39.9 |
| Private pit | 60 | 21.7 |
| common pit | 106 | 38.4 |
| Total | 276 | 100 |
| House Floor | | |
| earth/soil | 105 | 38 |
| cement/brick | 164 | 59.4 |
| wooden/banbo | 2 | 0.7 |
| Ceramic | 5 | 1.8 |
| Total | 276 | 100 |
| Separated kitchen | | |
| Yes | 262 | 94.9 |
| No | 14 | 5.1 |
| Total | 276 | 100 |

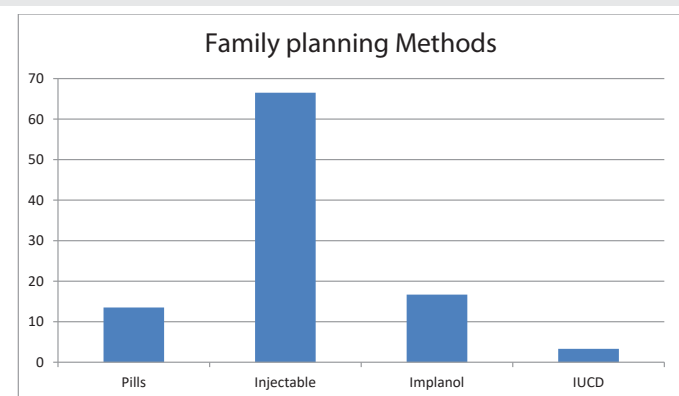


Figure 5: Family planning methods.

Table 8: Associations of selected maternal characteristic factors of stunting.

| Variables | | Stunting | | | X ² | p-value |
|--------------------------------|----------|----------|-----|-------|----------------|---------|
| | | Yes | No | Total | | |
| Health status during pregnancy | Good | 59 | 209 | 268 | 7.14 | 0.007 |
| | not good | 5 | 3 | 8 | | |
| | Total | 64 | 212 | 276 | | |
| ANC visit | Yes | 52 | 204 | 256 | 16.4 | 0.00013 |
| | no | 12 | 8 | 20 | | |
| | Total | 64 | 212 | 276 | | |

Associated factors of stunting

Significant associated factors of stunting with chi square test and p-value<0.05 (95% CI)respectively are; marital status(10.46, 0.033), family size (9.03, 0.002), number of children<5 years(10.30, 0.005), maternal educational status(13.13, 0.018), paternal educational status(11.71, 0.02), income(44.06, 0.00001), place of delivery(13.92, 0.0002), type of birth(9.38, 0.002), immunization (1.64, 0.20), diarrhea(47.17, 0.00001), colostrums(7.77, 0.005), exclusive breast feeding(22.37, 0.00012), health status during pregnancy(7.14, 0.007), ANC visit(16.4, 0.00013).

Discussion

Generally prevalence of stunting, underweight and wasting was 23.2%, 11.9%, 7.6% respectively, Which is lower than that of the national DHS 2016 stunting (46%), underweight(29%), wasting(10%) as well as regional stunting(52%), underweight(33.4%) and wasting (9.9%).

The prevalence of stunting, underweight and wasting



of my finding is also lower than that of a cross sectional study conducted in Tigray region stunting(45.7%), underweight(43.1%), wasting(7.1%). Similarly it is lower than that of a cross sectional study conducted in west Gojam stunting (49.2%), underweight (43.2%) and wasting(14.8%) [20-25].

Even though the prevalence of child malnutrition of our finding is lower than the above different studies, socioeconomic status, study subject, study period, sample size and the like might different compared with this study.

As indicated from this study about 5(1.8%) children had bilateral pitting edema.

It signifies acute nutritional problem due to illness and/or recent food shortage. High chronic malnutrition also signifies children's failure to grow; impact on both physical and mental capacity.

Variables like family size, income, maternal and paternal educational status, diarrhea, health status during pregnancy, ANC visit were highly significant (associated) with chronic malnutrition (stunting) at P-value <0.005.

Conclusion and recommendation

Conclusion

Based on the findings of this study we can conclude that; child malnutrition is still high in the study area even though it is lower than the national and regional EDHS 2016 national report.

According to investigation of independent variables with dependent variables in chi-square test, marital status, number of children under 5 years, family size, monthly income of the HH, maternal and paternal educational status, place of delivery, type of birth, immunization, diarrhea, edema, EBF, health status during pregnancy and ANC visit were significantly associated with chronic malnutrition (stunting).

Strength and limitation

Strength

Valid questionnaires used in other studies were adapted for this study.

Finishing of the study in short period of time.

Limitation

I had done association factors for only stunting due to shortage of time. I couldn't address underweight and wasting. Since, stunting is long term indicator of child malnutrition (chronic malnutrition) I had selected it.

Ethical approval and informed consent

The ethical approval and clearance for this study have been obtained from Debre Tabor University College of Health Sciences Institutional Research Ethics Review Committee (IRERC). At all

levels, officials were contacted with the letter obtained from the IRERC to secure permission. A permission letter has been submitted to South Gondar Zonal Health Bureau, Debre Tabor town administrative health office, and District Health Offices and Kebeles involved in the study. Informed written signed consent has been obtained from mothers of the children or their care givers.

(Supplementary data)

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