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Undernutrition status and associated factors in under-5 children, in Tigray, Northern Ethiopia

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ABSTRACT

Objective: The aim of this study was to assess the nutritional status and associated factors in children <5 y in the Medebay Zana District, northern Ethiopia.
Methods: A community-based cross-sectional study was conducted in the Medebay Zana District from September 8 to 29, 2013. A two-stage cluster-sampling technique was used to select 605 children age <5 y. Descriptive, binary, and multiple logistic regression analyses were performed.
Results: The results of this study demonstrated that the level of stunting was 56.6%, underweight 45.3%, and wasting 34.6%. Stunting was predicted by having mothers who attended high school (adjusted odds ratio [AOR], 0.75; 95% confidence interval [CI], 0.09–0.85), living in a household where providing priority food was given to the father (AOR, 4.32; 95% CI, 2.10–9.05), and water was taken from unprotected sources (AOR, 2.13; 95% CI, 1.09–4.14). In all children, initiation of breast-feeding within 1 to 3 h after birth (AOR, 4.06; 95% CI, 1.77–9.33), having mothers who could make financial decisions (AOR, 0.09; 95% CI, 0.02–0.51), and being breast-fed for 12 to 23 mo (AOR, 0.07; 95% CI, 0.01–0.40) were predictors of wasting. Moreover, in girls (AOR, 1.84; 95% CI, 1.25, 2.69), initiation of breast-feeding 6 h after birth (AOR, 12.94; 95% CI, 4.04–41.49) and having mothers who could make financial decisions (AOR, 0.33; 95% CI, 0.15–0.74) were predictors of being underweight.
Conclusion: The undernutrition status among children <5 y was high. Children's age group, time initiation of breast-feeding, child's sex, source of water, parents' educational status, type of food used for starting of complementary feeding, and mothers' financial decision-making ability could have an influence in undernutrition of children in this age group.

Introduction

Undernutrition is usually the result of a combination of inadequate dietary intake and infection [1–3]. In children, undernutrition is synonymous with growth failure in which the malnutritioned child is shorter and lighter than appropriate for age, has a high risk for developing physical and mental impairment, and finally, dies between the first and fifth year of life [1,2]. Worldwide, >10 million children age <5 y die annually from preventable and treatable illnesses. Almost all of these deaths occur in poor countries, including Ethiopia. Currently, 195 million <5 y children are affected by undernutrition; 90% of them live in sub-Saharan Africa and South Asia [4]. The nutritional status of under-5 children in Ethiopia is alarming: 53% of the mortality rates can be attributed directly or indirectly to undernutrition [5]. The 2011 Ethiopian Demographic Health Survey (EDHS) reported that nearly 44% of Ethiopian children <5 y are being stunted, 10% are wasted, and 29% are underweight. According to the estimates, 1 in every 17 Ethiopian children dies before the first birthday, and 1 in every 11 children dies before the fifth birthday [6].

Furthermore, poor nutritional status is a common characteristic of Ethiopian children, despite increased efforts by the health sector to enhance good nutritional practices through health education, treatment of extremely malnourished children, and

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provision of micronutrients to the most vulnerable group of the population [6]. Improving the nutritional status of children is crucial because their nutritional status results in a healthy and productive future generation. In the long run healthy nutritional status leads to an increase in the strength of the labor force and thereby contributes positively to the economic growth. Thus, good nutrition is essential for healthy, thriving individuals, families, and a nation [7]. Therefore, the aim of this study was to assess the undernutrition status and associated factors among <5 y children in the Medabay Zana District.

Methods

Setting and study design

A community-based cross-sectional study was conducted in the Medebay Zana District from September 8 to 29, 2013. The total population of the area is 130 623, with 17 934 children ages 6 to 59 mo. There are 2 health centers and 20 health posts [8]. Tigraway is the dominant ethnic group in Medebay Zana. All children ages 6 to 59 mo were considered as source population. To determine the sample size, a single population proportion formula with the proportion of stunting in Tigray region, 51.4% [6], a 95% confidence level, and a 5% degree of precision, were used. A nonresponse rate of 10% was also calculated. From this, the final sample size calculated was 634. Two stage-cluster sampling techniques with a design effect of 1.5 were used. In the first stage, 4 kebeles (city districts) were selected from a possible 18. Systematic random sampling was used to select the study participants. There total sample size was proportionally allocated to the selected kebeles based on the available number of children <5 y. Based on the sample fraction, children were selected at equal intervals using systematic random sampling. Those who did not meet the inclusion criteria were excluded and the next children fulfilling the criteria were included. However, mothers of children who refused to participate were excluded from the study without replacement.

Data collection instrument and quality issue

A structured and pretested questionnaire, guided by the interviewer, was used to collect the information. The questionnaire was adapted from different literature and considered the local situation of the participants [6–8]. It was first prepared in English and then translated to Tigrigna and then translated back to English for consistency by two different language experts. Information collected included sociodemographic characteristics, child health and caring practices, and anthropometric measurement and household information. Six health extension workers who spoke local languages were employed in the data-collection process. Two clinical nurses were selected as to supervise. Training was given to the data collector and supervisor for 2 d on the objectives of the study, the contents of the questionnaire, anthropometric measurement, and particularly on issues related to the confidentiality of the responses and the rights of respondents. One week before the data collection, a pretest was conducted in another woreda (Wukro Maray) on 5% of the sample size. Weight-measuring scales were checked for accuracy and calibrated by using known weights before measuring the children. Standard techniques were used while measuring children's weight and height. For instance, length was measured in a recumbent position in children <2 y old to the nearest 1 mm and for children >2 y and adults in a standing position to the nearest 0.1 cm. The assistance of two people is needed in taking the measurement. Weight measurement was performed to the nearest 10 g and 0.1 kg for children <2 y and >2 y, respectively.

Data analysis

Collected data were cleaned, edited, coded, entered, and analyzed by using SPSS for windows version 20.0 (SPSS Inc. version 20, Chicago, IL, USA). Weight, height, and age data were used to calculate weight-for-age, height-for-age, and weight-for-height *z* scores based on the World Health Organization's Anthro reference and categorize accordingly. Wasting refers to low weight-for-height less than −2 SD of the median value of the National Center for Health Statistics (NCHS/WHO) international weight-for-height reference. Severely wasted is defined less than −3 SD. Stunting is defined as low height-for-age at less than −2 SD of the median value of the NCHS/WHO international growth reference. Severely stunted is defined as less than −3 SD. Underweight is an index of weight-for-age that represents body weight relative to age. Underweight is defined as low weight-for-age at less than −2 SD of the median value of the NCHS/WHO international reference. Severely underweight is defined as less than −3 SD. Descriptive and multiple logistic regressions were used to estimate the respective indicators, and effects of factors on the malnutrition (stunting, wasting, and underweight) of the under-5 children. Colinearity among independent factors was checked using variance inflation factor. The sample effect size was estimated using odds ratio (OR) and the parameters were estimated using 95% confidence interval (CI) of the OR. For all the analyses, $P < 0.05$ was considered statistically significant.

The study protocol was approved by the ethical committee of Mekelle University, College of Health Science Research and Community Service Committee. Written consent was obtained from the study respondents (caregivers). The right of the respondent to withdraw from the interview or not to participate at all was assured.

Results

Sociodemographic and economic characteristics

This study included 605 children age <5 y, with a response rate of 95.4%. The majority of the children were boys (297; 49.4%) and had a mean of age 32.14 mo (±17.29 mo). Participants were from families with an average of 5.44 (±2.19) and 1.68 (±0.62) family members and under-5 children, respectively. The majority of the mothers (421; 70%) were illiterate, housewives (562; 93.3%), orthodox followers (597; 99.3%), and married (569; 94.7%). Fathers were the head of household (509; 84.7%) and made the financial decisions for the family (481; 80%). Of the households, 520 (86.6%) reported a monthly income <26.1 $ (Table 1).

Nutritional status of children

Of the children in the study, 56.6% were found to be stunted, 45.3% underweight, and 34.6 to be wasted. Moreover, severe malnutrition was found among the stunted (22%), underweight (23.3%) and wasted (12%) children.

Factors associated with stunting

Multiple logistic regressions showed no significant association between stunting malnutrition and mother's antenatal care during pregnancy; mother's receipt of counseling on exclusive breast-feeding; having a pet in the home; head of household; and monthly income. However, children from mothers who attended high school were less likely stunted compared with children from mothers who were illiterate (adjusted odds ratio [AOR], 0.75; 95% CI, 1.10–12.85). In families where food was provided to the father as a priority (priority food), children were four times more likely to be stunted than in families with equal food distribution (AOR, 4.32; 95% CI, 2.10–9.05). Fathers' educational level was negatively associated with having stunted children; primary school-, high school-, and college-educated fathers had children who were less likely to be stunted (AOR, 0.041; 95% CI, 0.23–0.71; AOR, 0.30; 95% CI, 0.10–0.90; AOR, 0.14; 95% CI, 0.03–0.68, respectively) compared with illiterate fathers. When unprotected sources of water were used in the household, children were twice as likely to be stunted compared with those from households using protected water (AOR, 2.13; 95% CI, 1.09–4.14). Stunting was more likely in children ages 12 to 23 mo and 24 to 35 mo (AOR, 2. 06; 95% CI, 1.09–3.95; AOR, 4.01; 95% CI, 1.87, 8.57, respectively) compared with 6 to 11 mo old children. Girls were less likely than boys to be stunted (AOR, 0.47; 95% CI, 0.31–0.72). Children who started breast-feeding 6 h after birth were four times more likely to be stunted than those who started breast-feeding within 1 h (AOR, 4.34; 95% CI, 1.41–13.34). Children from a single household with 10 to 13 members were 12 times more likely to be stunted