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Prevalence and Determinants of Stunting and Wasting Among Under-Five-Aged Children in North Gondar Zone, Northern Ethiopia

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Abstract

Undernutrition is a leading cause of disease susceptibility, morbidity, and mortality in children. It is manifested in the form of stunting and wasting. Wasting is an acute form of undernutrition that indicates a recent food shortage and/or infectious diseases that lead to rapid and severe weight loss. The current study aimed to assess the prevalence and associated factors of stunting and wasting among under-five-aged children of displaced families in the North Gondar Zone. A cross-sectional study design was conducted from January to March 2022 among the under-five-aged children of the displaced family. A total of 205 randomly selected under-five-aged children from the displaced families were included in the study. A structured questionnaire was used to collect data, and the instrument was adopted from a previous study. Anthropometric measurements were carried out to determine the status of stunting and wasting. A bivariable and multivariable logistic regression analysis was used to find the factors associated with stunting and wasting. The prevalence of stunting and wasting among under-five-aged children was 26.2% and 18.7%, respectively. Out of the risk factors considered in the present study, age (AOR = 3.54; 95% CI: 0.2–3.54), family monthly income (AOR = 3.6; 95% CI: 1.3–7.5), eating only two meals per day (AOR = 2.8; 95% CI: 1.0–6.2), and not eating farm animal products (AOR = 2.2; 95% CI: 0.5–1.61) were important risk factors associated with stunting. In the other way, age, family monthly income, and eating only two meals per day were significant predictors of wasting. The result showed that the prevalence is severe in the study area. Therefore, the government should work on children under two years of age, take action to solve the nutritional issues, and encourage families with low monthly incomes to eat animal products at least once a week and nutritious food at least three times a day.

Keywords: Anthropometry; Determinant; Prevalence; Stunting, Undernutrition; Wasting

Abbreviations: AOR: Adjusted odds ratio; BAZ: Body Mass Index-for-Age Z score; CI: Confidence interval; COR: Crudes odds ratio; HAZ: Height-for-Age Score; HFSS: Household food security status; WHO: World health organization

Introduction

Nutrition-related problems are one of the major problems globally, but the problem is severe in developing countries, especially in Ethiopia [1-3]. Undernutrition is a leading cause of disease susceptibility, morbidity, and mortality in children, especially in resource-poor countries, where it accounts for half of all fatalities in this age group [4, 5]. Malnutrition among children has been linked with morbidity, hygienic practices, dietary intake, and family socioeconomic status [6]. Children are characterized by dynamic physical growth, mental development, and high vulnerability stages. Due to this, they have a greater requirement for nutrients [7, 8]. Undernutrition manifests in the form of stunting and wasting. Stunting and wasting are an acute form of undernutrition that indicates a recent food shortage and/or infectious diseases that lead to rapid and severe weight loss [9, 10]. Stunting, which is low height-for-age and wasting, has a weight-for-height (WHZ) of less than minus two standard deviations (2 SD) of WHO's child growth standards in children and poses a serious threat to child survival and development, with a heightened risk of mortality [11, 12].

WHO proposes the calculation of z-scores for the analysis and interpretation of anthropometric values either for population-based and individual assessment, and suggests z-scores as a sex-independent variable that can be grouped by combining sex and age groups. Moderate malnutrition is defined as a weight-for-age (WFA) between -3 and -2 SD below the mean of the WHO child growth standards. Similarly, moderate wasting (low weight-for-height (WFH)), stunting (low height-for-age (HFA)) are defined as z-score between -3 and -2 SD. Z-score values below -3 indicate severe wasting and stunting [12].

Stunting and wasting can be caused by various factors such as parental, socio-demographic, and economic status, as well as cultural practices and environmental and other health-related variables [13]. For instance, poverty, low parental education, lack of sanitation, low food intake, poor feeding practices, inadequate breastfeeding, repeated infections, family size, and birth interval are regarded as key determinants of stunting and wasting [13, 14]. According to the World Health Organization (WHO), stunting and wasting affect 150 million and 52 million children, respectively [15]. The global prevalence of stunting and wasting among preschool children was 26% and 8%, respectively [11].

In 2018, more than 49.5 million children under the age of five suffered from wasting. In poor countries, the problem is more serious. The total number of malnourished children in Sub-Saharan Africa will rise to 128 million. In sub-Saharan Africa, the share will rise from 19% to near 35% [16]. Undernutrition is one of the serious health problems among children in Ethiopia, where more than half of the population is younger than 20 years old. In line with this, the 2008 national nutritional survey indicated that 22.3% and 23.1% of schoolchildren were stunted and wasted, respectively [4, 17].

According to the United Nations International Children's Emergency Fund's (UNICEF) conceptual framework, determinants of undernutrition are categorized into immediate (disease and dietary intake), underlying (household and environmental factors such as food security, feeding practices, access to safe drinking water and toilet, and healthcare) and basic causes (geographical region, wealth, sociocultural, economic and political context) (6). Many studies conducted in SSA have found sex of the child, age, birth weight, birth interval, number of children under-five in the household, maternal education, breastfeeding status, household wealth index, unimproved water, poor hygiene and sanitation as factors associated with risk of undernutrition among children under-five years of age [11-14].

Different researchers conducted a study on stunting and wasting among schoolchildren in different parts of the country. Among these, the prevalence and associated factors of stunting and thinness among adolescent students in Finote Selam Town, Northwest Ethiopia, found a prevalence of 21.8% and 16.9%, respectively [18]. The prevalence and determinants of stunting and wasting among public primary school children in Gondar town, northwest Ethiopia, found a prevalence of 46.1% and 9%, respectively [3]. The prevalence and factors associated with stunting and thinness among adolescent students in Northern Ethiopia showed a prevalence of 28.5% and 26.1%, respectively [19]. However, there was no study report on stunting and wasting, including the study area

in the in the North Gondar Zone. Moreover, in the study area, several populations are displaced from different districts, such as Adirkay, Zarima, and Tselemit, due to the conflict between the Amhara and Tigray regions. These results in a problem with the supply of food among those populations, and children have no access to the right amount of nutrients to eat. Therefore, this study aimed to determine the prevalence and risk factors of stunting and wasting among under-five-year-old children's in North Gondar Zone, Northern Ethiopia.

Methods

Study Design, Setting and Population

A cross-sectional study design was conducted from January to May 2023 among under-five-aged children in the North Gondar Zone administration. This zone is bordered on the south by the Central Gondar zone, on the west by Sudan, on the north by the Tigray Region, on the east by WagHemra, and on the southeast by South Gondar. The town of Debark is located about 103 km away from Gander town. The area receives an average annual rainfall of 1280 mm. The minimum and maximum daily temperatures in the area are 12 and 28°C, respectively. The main economic activity of the rural population is mixed farming. Wheat, barley, peas, beans, and chickpeas are widely cultivated crops and cereals [20]. The total population size of this zone, according to the 2007 census report, was 905,000 (425, 846 males and 479,154 females).

Sample Size and Sampling technique

The minimum sample size required was calculated using the single proportion formula (n=Z2P (1-p)/d2) with the assumption of a confidence interval of 95%, a margin of error of 5%, and a 50% prevalence. n=Z2P (1-p)/d2, where n = sample size and Z = Z score at 95%. CI = 1.96, p = 50%, and d = marginal error = 0.05. N = (1.96)2 0.5 (1-0.5) / (0.05)2 = 384. By adding 5% for the non-response rate, a total of 403 under-five-aged children participated in the study. A simple random sampling technique was used to select the study participants.

Data Collection

A structured questionnaire, which was adopted from a study done by Zegeye et al. [3], was used to collect data on socio-demographic characteristics (child sex, age, residence, parents education, occupation, and monthly income), child illness in the last month, number of meals eaten per day, the habit of eating vegetables and meat, and nutrition and health information from child parents by face-to-face interviews. Anthropometric data were collected by trained data collectors who were health extension workers, with the investigator coordinating the overall activity. Children's height and weight were measured using a stadiometer and a Seca Digital Scale (Seca, Germany), respectively.

The weight was recorded to the nearest 0.1 kg. It was calibrated against the known weight regularly. During the procedure, the subjects wore light clothes and took off their shoes. Height was measured in cm using a portable stadiometer. All children were measured against the wall without footwear and with heels together, with their heads positioned and eyes looking straight ahead so that the line of sight was perpendicular to the body. The height was recorded to the nearest 0.1 cm. To avoid variability, the same measurer was employed for a given anthropometric measurement.

Data Quality Control and Management

To ensure the reliability and validity of the study, training was given to the data collectors; the data collection was done by two health extension workers**,** and close follow-up was done by the investigator during data collection. Completeness and consistency of recording on the questionnaire sheets were evaluated by the investigator at the end of each working day so that correction measures could be taken for the next time.

Data Analyses

Sociodemographic, anthropometric, nutrition, and health-related data were checked for completeness and consistency. Then, the data was analyzed using SPSS version 25 software. Descriptive statistics were used, and the results were reported using frequency and percentage. Anthropometric data of weight and height were converted to height for age Z scores (HAZ) and BMI for age Z scores (BAZ) using the WHO Anthro Plus version 1.4.1. For anthropometric data analysis, if the BMI-for-age Z-score is below minus two standard deviations (2 SDs) from the median of the reference population, then the child is stunted or wasted. A bivariable logistic regression model was fitted to identify factors associated with stunting and wasting. Variables with < 0.25 p-values in the bivariate analysis were fitted into the multivariable logistic regression analysis. Both crude (COR) and adjusted odds ratios (AOR) with the corresponding 95% confidence interval (CI) were calculated to show the strength of associations. In the multivariable analysis, variables with < 0.05 p-values were considered statistically significant.

Results

Sociodemographic Characteristics of Study Participants

A total of 385 under-5-year-old children with a 95.5% response rate participated in the study. Among these, 240 (62.3%) were males and 145 (37.7%) were females. Of the study participants, 138 (35.8%) were found in the age group of less than 2 years, 135 (35.1%) in the age group of 2-4 years, and 112 (29.1%) were found in the age group of 4-5 years. Regarding residence, 243 (69.8%) were from urban areas, whereas 142 (36.9%) were from rural areas. In terms of family education, the majority was illiterate, 185 (48.1%), and the least of them had college and university education levels of 12 (3.1%). Related to family occupation, the largest groups were farmers, 149 (38.7%), and the least, 34 (8.8%), were civil servants. The majority of the population, 198 (51.4%), had a monthly income of between 1000 and 3000 Ethiopian birr, while the minority, 46 (11.9%), had a monthly income of less than 1000 ETB (Table 1).

Table 1: Sociodemographic characteristics of under-five aged children of displaced family in North Gondar zone, 2023

Variables		Frequency	Percentage
Age group	<2 year	138	35.8
	2-4 year	135	35.1
	4-5 year	112	29.1
Sex	male	240	62.3
	female	145	63.1
Place of residence	urban	243	69.8
	rural	142	36.9
Family education level	Illiterate	185	48.1
	Read and write	85	22.1
	Primary education	67	17.4
	Secondary education	36	9.4
	College and university	12	3.1
Family occupation	Daily laborer	79	20.5
	merchant	123	31.9
	Farmer	149	38.7

	Civil servant	34	8.8
Monthly family income	<1000 birr	46	11.9
	1000-3000 birr	198	51.4
	>3000 birr	141	36.6

Nutrition and Health-Related Characteristics of Under-Five-Aged Children

Most of the under-five-aged children, 249 (64.7%), were consuming meals three times per day, whereas 136 (35.3%) of the children were consuming meals two times per day. Among the respondents, 340 (88.3%) reported having an illness in the last month, and the remaining 45 (11.7%) had no illness reported in the last month. Of the total respondents, 63 (16.4%) and 39 (10.1%) eat vegetables and fruits at least once per day and farm animal products at least once per week, respectively. 102 (26.5%) of the respondents had nutrition and health information, whereas the majority (283 (73.5%) had no nutrition and health information (Table 2).

Table 2: Nutrition and health-related characteristics of under-five aged children of the displaced family in North Gondar zone, 2023

Variables		Frequency	Percentage
Number of meals eaten per day	Two times	136	35.3
	Three times and above	249	64.7
Illness reported in the last one month	Yes	45	11.7
	No	340	88.3
Eating vegetables/fruits at least once per day	Yes	63	16.4
	No	322	83.6
Eating animal products at least once per week	Yes	39	10.1
	No	346	89.9
Nutrition and health information	Yes	102	26.5
	No	283	73.5

Prevalence of Stunting and Wasting Among Under-Five-Age Children

The prevalence of stunting and wasting among 385 under-five-aged children in the present study was 101 (26.2%) and 72 (18.7%), respectively. In terms of age group, the highest prevalence of stunting and wasting was obtained in the age group of less than two years (13.5%) and (9.1%), followed by the age groups of 2-4 years (8.8%) and (6.75%) and 4-5 years (3.6%) and (2.86%), respectively. According to sex, a higher prevalence of stunting and wasting was recorded in males (13.6%) and (12.2%) compared with females (10.4%) and (6.5%), respectively (Table 3).

Table 3: Prevalence of stunting and wasting among under-five aged children in terms of age and sex

		Prevalence	
		Stunting	Wasting
Age group	<2 year	52(13.5)	35(9.1)
	2-4 year	34(8.8)	26(6.75)
	4-5 year	15(3.6)	11(2.86)
Sex	male	61(13.6)	47 (12.2)
	Female	40(10.4)	25 (6.5)

Factors Associated with Stunting

Bivariable analysis revealed that age, gender, family education level, family monthly income, the number of meals eaten per day, and not eating animal products at least once per week were significantly related to stunting. However, the results of the multivariate analysis showed that only age, family monthly income, the number of meals eaten per day, and not eating animal products at least once per week were significant predictors of stunting among under-five-aged children ($p<0.05$). The odds of stunting were 3.54 times higher in children aged less than two years (AOR = 3.54; 95% CI: 0.2–3.54) as compared to children in the age group of 4-5 years.

Children with a family monthly income of less than 1000 birr had 3.6 times the odds of being thin (AOR = 3.6; 95% CI: 1.3–7.6) than children with a family monthly income of more than 3000 birr. Under-five-aged children who ate meals two times per day had 2.8 times higher odds of wasting (AOR = 2.8; 95% CI: 1.02-6.2) as compared to children who ate meals more than three times per day. The odds of stunting were 2.2 times higher in children who didn't eat animal products at least once per week (AOR = 2.2; 95% CI: 0.5–1.61) as compared to children who ate animal products at least once per week (Table 4).

Table 4: Bivariable and multivariable logistic regression analysis of stunting among under-five-aged children of the displaced family in North Gondar zone, 2023

Variables	Wasting		COR,95% CI	P value	AOR, 95% CI	P value
	Wasted	Not Wasted				
Age group						
<2 year	52(37.7)	86(62.3)	4.89 (0.4- 5.88)	0.018	3.54 (0.2- 3.54)	0.03
2-4 year	34(25.2)	101(74.8)	3.13 (0.2-2.87)	0.023	0.08 (0.1-2.8)	0.04
4-5 year	15(13.4)	97(86.6)	1			
Sex						
male	61(25.4)	179(74.6)	3.45 (1.86- 11.2)	0.007	1.51 (1.5- 8.3)	0. 42
female	40(27.6)	105(72.4)	1		1	
Place of residence						
urban	58(23.9)	185(76.1)	1.96 (0.74- 3.68)	0.34		
rural	43(30.3)	99(69.7)	1			
Family education level						
Illiterate	58(31.4)	127(68.6)	3.53 (1.21-5.86)	0.005	1.89 (1.1- 4.3)	0. 23
Read and write	20(23.5)	65(76.5)	1.87 (0.72- 2.82)	0.002	1.25(0.8- 2. 9)	0. 63
Primary education	14(20.9)	53(79.1)	1.23 (0.25- 2.22)	0.013	0.43 (0.4- 2.3)	0. 78
Secondary education	7(19.4)	29(80.6)	1.01 (0.18- 2.03)	0.024	0.21 (0.1- 2.1)	0. 91
College & university	2 (16.7)	10(83.3)	1		1	
Family occupation						
Daily laborer	21(26.6)	58(73.4)	2.9 (1.25- 6.3)	0.43		
merchant	29(23.6)	94(76.4)	1.65 (1.01- 4.87)	0.31		
Farmer	43(28.9)	106(71.1)	0.73 (0.86- 2.33)	0.26		
Civil servant	8(23.5)	26(76.5)	1			

Monthly family income						
<1000 birr	18(39.1)	28(60.9)	5.32 (2.5- 15.88)	0.001	3.6 (1.3- 7.6)	0.003
1000-3000 birr	68(34.3)	130(65.7)	2.8 (1.53-11.79)	0.025	1.4 (0.8-5.3)	0.034
>3000 birr	15(10.6)	126(89.4)			1	
Number of meals eaten per day						
Two times	60(44.1)	76(55.9)	4.65 (1.83- 8.25)	0.001	2.8(1.02- 6.2)	0.003
Three times and above	41(16.5)	208(83.5)	1		1	
Illness reported in the last one month						
Yes	13(28.9)	32(71.1)	1.54(0.89-3.2)	0.43		
No	93(27.4)	247(72.6)	1			
Eating vegetables /fruits						
Yes	14(22.2)	39(61.9)	1			
No	87(27.1)	225(69.9)	1.08 (0.56-1.75)	0.38		
Eating animal products at least once per week						
Yes	6(15.4)	33(84.6)	1			
No	95(27.5)	251(72.5)	1.89 (1.15- 2.53)	0.002	2.2(0.5- 1.61)	0.004
Nutrition and health information					1	
Yes	14(13.7)	88(86.3)	1			
No	87(30.7)	196(69.3)	1.35 (0.94- 1.87)	0.67		

Factors Associated with Wasting

Bivariate analysis revealed that age, gender, family education level, family monthly income, the number of meals eaten per day, and not eating animal products at least once per week were significantly related to wasting. However, the results of the multivariate analysis showed that only age, family monthly income, and the number of meals eaten per day were significant predictors of wasting among under-five-aged children ($p<0.05$). The odds of wasting were 2.5 times higher in children aged less than two years (AOR = 2.5; 95% CI: 0.18–4.23) as compared to children in the age group of 4-5 years. Children with a family monthly income of less than 1000 birr had 3.6 times the odds of wasting (AOR = 3.6; 95% CI: 1.45–6.72) than children with a family monthly income of more than 3000 birr. Under-five-aged children who ate meals two times per day had 3.4 times higher odds of wasting (AOR = 3.4; 95% CI: 1.12–8.32) as compared to children who ate meals more than three times per day (Table 5).

Table 5: Bivariable and multivariable logistic regression analysis of wasting among under-five-aged children of the displaced family in North Gondar zone, 2023

Variables	Stunting		COR,95% CI	P value	AOR, 95% CI	P value
	Stunted	Not stunted				
Age group						
<2 year	35(25.4)	103(74.6)	3.42 (0.23- 4.87)	0.032	2.5 (0.18- 4.23)	0.06
2-4 year	26(19.3)	109(80.7)	2.89 (0.3-3.23)	0.045	0.6 (0.11-2.45)	0.12
4-5 year	11(9.82)	101(90.2)	1			
Sex						
male	47 (19.6)	193(80.4)	2.21 (0.79- 8.71)	0.06	1.4 (0.81- 6.89)	0. 57
female	25 (17.2)	120(82.8)	1		1	
Place of residence						
urban	43(17.7)	200(82.3)	2.31 (0.48- 2.89)	0.48		
rural	29(20.4)	113(79.6)	1			
Family education level						
Illiterate	33(17.8)	152(82.2)	3.41 (0.56-4.72)	0.008	1.11 (0.36- 5.21)	0. 21
Read and write	14(16.5)	71(83.5)	1.68 (0.52- 2.46)	0.013	1.21(0.4- 2.42)	0. 46
Primary education	17(25.4)	50(74.6)	1.27 (0.27- 2.89)	0.048	0.24 (0.23- 2.15)	0. 67
Secondary education	7(19.4)	29(80.6)	0.54 (0.03- 1.87)	0.069	0.12 (0.01- 1.7)	0. 78
College & university	1 (8.3)	11(91.7)	1		1	
Family occupation						
Daily laborer	14(17.7)	65(82.3)	2.2 (1.75- 4.6)	0.56		
merchant	23(18.7)	100(81.3)	1.23 (0.02- 2.57)	0.48		
Farmer	30(20.1)	119(79.9)	0.45 (0.12- 2.11)	0.19		
Civil servant	5(14.7)	29(85.3)	1			
Monthly family income						
<1000 birr	11(23.9)	35(76.1)	4.87 (1.6- 11.84)	0.001	3.6 (1.45- 6.82)	0.01
1000-3000 birr	52(26.3)	146(73.7)	3.1 (1.05-8.75)	0.022	1.3 (0.52-5.14)	0.05
>3000 birr	9(6.4)	132(93.6)			1	
Number of meals eaten per day						
Two times	46(33.8)	90(66.2)	5.23 (1.34- 10.1)	0.001	3.4(1.12- 8.32)	0.023
Three times and above	26(10.4)	223(89.6)	1		1	
Illness reported in the last one month						
Yes	11(24.4)	34(75.6)	1.39(0.74-2.5)	0.72		
No	61(17.9)	279(82.1)	1			

Eating vegetables /fruits						
Yes	8(12.7)	55(87.3)	1			
No	64(19.9)	258(80.1)	1.58 (0.43-3.78)	0.52		
Eating animal products at least once per week						
Yes	6(15.4)	33(84.6)	1			
No	66(19.1)	280(80.9)	3.21 (1.45- 7.15)	0.008	2.1(0.3- 3.56)	0.056
Nutrition and health information					1	
Yes	12(11.8)	90(88.2)	1			
No	60(21.2)	223(78.8)	1.24 (0.35- 2.46)	0.58		

Discussion

Undernutrition among children is still a major public health problem in developing countries, including Ethiopia. Alleviating this major issue is everyone's concern for promoting normal child development at all ages. In line with this idea, this study was aimed at assessing the prevalence and determinants of stunting and wasting among under-five-aged children in the North Gondar Zone, Northern Ethiopia. The prevalence of stunting among under-five-year-old children in this study (26.2%) was comparable with the results of other studies conducted in Hawassa Zuria District, Southern Ethiopia (26.6%) [21], the urban-rural gradient in Eastern Ethiopia (26.9%) [22], Tigray, northern Ethiopia (28.5%) [10], and in Sri Lanka (26.9%) [12]. However, the findings in the current study were lower than those in a study conducted in Gondar town, northwest Ethiopia (46.1) [3] and Durbete town, northwest Ethiopia (42.7%) [4], Arba Minch, Southern Ethiopia (41.9%) [23], Dale woreda, Southern Ethiopia (35.9%) [24], Cambodia (40.4%) [8], New Guinea (38.9%) [25], Bangladesh (60%) (26) and the Volta region of Ghana (50.3%) [27]. This can explain the variations between the different parts of the country, and this may be due to the different types of the interventions particularly by nongovernmental organizations and the agricultural activities, child-feeding practice, and the difference in socioeconomic activities.

In the other way, the present finding was higher than studies done in Addis Ababa, Ethiopia (19.6%) [21], Gondar town, northwest Ethiopia (23%) [28], Jima Zone, Southwest Ethiopia (24.1%) [29], Sodo Zuria District in South Ethiopia (24.9%) [30], Adwa Town of North Ethiopia (12.2%) [31], Kenya (24.5%) [32], and India (18.5%) [33]. The high prevalence of stunting in the current study was due to the low monthly income of the families, who were unable to feed nutritionists food for their children more than three times per day and animal products at least once a week. It also might be due to the variability of risk factors in different geographic regions, the socioeconomic status and dietary diversity of under-five-year-old children, and the difference in population of the study.

The prevalence of wasting (18.7%) among under-five-year-old children in this study was comparable with the results of studies done among schoolchildren in Fogera and Libo Kemkem districts, northwest Ethiopia (20.8%) [6], and Volta region of Ghana (19.4%) [27]. However, the finding in the current study was lower than (80.8%) the study conducted in the Jimma Zone [34] and (24.5%) a study done in Adwa Town, North Ethiopia [35], and (26.1%) done in Wukro District [35]. This difference might be due to time-gap variation, as nowadays knowledge of parents' undernutrition and its consequences is improving. Additionally, the disparity between the studies could be attributed to differences in socioeconomic background, cultural differences in dietary habits, or meal types.

On the other hand, the prevalence of wasting in this study was higher than a study done in Gondar town, northwest Ethiopia (9%)

[3], in Arba Minch (8.0%) [23], New Guinea (8.3%) [25], south-eastern Iran (8.8%) [36], and 16.9% in a study done in Finote Selam town, northwest Ethiopia [37]. The high prevalence of wasting in the current study might be due to the due to the low monthly income of the families, who are unable to feed their children nutritionist food more than three times per day and animal products at least once a week. It might also be the difference in study population, socio-economic differences, and the variability of risk factors across different geographic settings.

The odds of stunting and wasting were higher in children aged less than two years. This association was supported by other studies in the north and northwest of Ethiopia [38]. This might be due to the nutritional status of the mother, since stunting has a chronic and cyclic nature, poor dietary practice, lower and inappropriate breasts, and complementary feeding practices. The other possible explanation for the increased risk of stunting and wasting in younger children may be due to the unhygienic preparation of complementary foods, which exposes children to recurrent infections. Furthermore, a child being female sex was shorter than males for their age, similarly reported from Rwanda and Sodo Zuria District, South Ethiopia [30]. This may be due to cultural issues, gender preference, and discrimination during the feed of their children. Despite having the above result, the study from Tigray Region, Northern Ethiopia, reported being a male sex child who was shorter than females for their age [39]. This difference may be due to the difference in socioeconomic and cultural acceptance of the gender in the community and maternal education, and the urban population may also have better exposure to mass media and have better information about gender equality.

A child from poor wealth status and severely food insecure households was stunted and wasted compared with their counterparts, similarly reported from Arba Minch, Southern Ethiopia [40], Dabat, Ethiopia, and Boricha District, Southern Ethiopia [41]. This can be explained that children who were born in poor wealth status and severely food insecure household were facing a challenge to get food due to the number of the priorities to feed all under-five children and competition with elder children, and in low-income households, that may lead to low access to adequate dietary intake in kinds and the amounts. A child who had less than three meal frequencies was more likely stunted and wasted than those who had three and more than three meal frequencies which agree with Sodo Zuria District, South Ethiopia [30], and Northeast Ethiopia [42]. This may be due to that low food and nutrition intake leads to undernutrition and stunting.

Conclusion and Recommendation

This study showed that the prevalence of stunting and wasting among under-five-aged children was high in the study area. The study also identified the major risk factors for stunting and wasting. Age, family monthly income, eating only two meals per day, and not eating farm animal products were important risk factors associated with stunting. In the other way, age, family monthly income, and eating only two meals per day were significant predictors of wasting. The finding showed that the prevalence is severe in the study area. Therefore, the government should work on children under two years of age, take action to solve the nutritional issues, and encourage families with low monthly incomes to eat animal products at least once a week and nutritious food at least three times a day.

Ethical Approval

Ethical clearance was obtained from the Debark University Research and Ethical Review Committee and permission was obtained from the North Gondar Zone Health and Education Offices. Parents were notified, and necessary explanations were also given about the purposes, procedure, and ethical issues of the study. The written informed consent was obtained from the parents of study subjects. Participation in the study was voluntary, and study subjects were free to withdraw from the study

Availability of Data

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper

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Author Contribution

GA conceived and designed the study, extracted and analyzed data, interpreted results, and drafted the manuscript. ST was involved in study selection, quality assessment, interpretation of results, and review of the manuscript.

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