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Original Research

Addressing Under-Nutrition Among Pregnant Mothers in Dire Dawa City, Eastern Ethiopia: Overlooked Public Health Issue

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Abstract

Introduction: Undernutrition during pregnancy poses significant risks to maternal and fetal health. In Dire Dawa, Ethiopia, socio-economic factors, healthcare access, and nutritional education may influence the nutritional status of pregnant women. It is important as a society to prioritize helping women understand the impact that their lifestyle choices have on their children. This study aimed to assess the prevalence of undernutrition and its associated factors among pregnant mothers in Dire Dawa.
Methods: A community-based cross-sectional study was conducted among pregnant mothers attending healthcare facilities in Dire Dawa from June 26 to July 6, 2023. A total of 387 participants were surveyed by systematic random sampling technique using structured questionnaires. Nutritional status was assessed through anthropometric measurements, and data on family income, educational status, parity, illness history, antenatal care (ANC) visits, and nutritional education were collected. Logistic regression analyses were performed to determine associations between these factors and undernutrition. Variables with significant association was identified on the bases of P value < 0.05 with 95% confidence interval.
Results: The study found that family income was significantly associated with undernutrition; mothers with a family income of less than 10,000 birr were 8.14 times more likely to suffer from undernutrition (AOR = 8.14, 95% CI: 6.15–10.74). Parous mothers had a higher likelihood of undernutrition compared to nulliparous mothers (AOR = 2.32, 95% CI: 0.13–9.53). Additionally, women who did not attend ANC clinics were more likely to be undernourished (AOR = 3.04, 95% CI: 0.83–32.10). Those who experienced illness during pregnancy had a substantially increased risk of undernutrition (AOR = 33.605, 95% CI: 2.858–395.189). Furthermore, respondents lacking nutritional education were more likely to suffer from undernutrition (AOR = 0.56, 95% CI: 0.32–0.97).
Conclusion: The findings indicate that undernutrition among pregnant mothers in Dire Dawa is significantly influenced by family income, parity, ANC visits, illness history, and nutritional education. Targeted interventions addressing these factors are crucial for improving maternal nutrition and health outcomes in the region.

Keywords: Dire Dawa, Ethiopia, Mothers, Pregnancy, Underweight

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1. Introduction

Pregnancy is a critical period that significantly influences the health of both the mother and the developing fetus. Adequate nutrition during this time is essential for optimal maternal and fetal outcomes, as it directly affects gestational weight gain, fetal development, and maternal health [1]. Globally, malnutrition among pregnant women remains a pressing public health issue, with an estimated 20 million women experiencing undernutrition, particularly in low- and middle-income countries [2]. Inadequate nutrition during pregnancy can lead to a range of adverse outcomes, including low birth weight, preterm delivery, and increased maternal morbidity and mortality [3].

In Ethiopia, the prevalence of malnutrition among women of reproductive age is alarmingly high. The 2016 Ethiopian Demographic and Health Survey (EDHS) reported that approximately 24% of women were classified as underweight (BMI < 18.5 kg/m²), while 40% were anemic [4]. These figures are indicative of a broader public health challenge that not only affects maternal health but also has long-term implications for child development. Malnutrition during pregnancy can lead to stunted growth and cognitive impairments in children, perpetuating a cycle of poverty and poor health outcomes [5].

In Dire Dawa, a city characterized by diverse ethnic groups and varying socio-economic conditions, understanding the nutritional status of pregnant women is vital for addressing these public health concerns. Local studies indicate that the prevalence of anemia among pregnant women in Dire Dawa ranges from 28% to 50%, depending on socio-economic factors and access to healthcare services [6]. Additionally, cultural practices and dietary habits in the region may further exacerbate nutritional deficiencies, with many women consuming diets low in essential nutrients such as iron, folate, and calcium.

In Ethiopia, maternal malnutrition is a significant health concern, with higher rates than many other African countries [7]. The significance of this problem is underscored by the high rates of malnutrition reported among women of reproductive age in Ethiopia. Identifying the specific nutritional deficiencies and associated risk factors among pregnant women in Dire Dawa will provide valuable insights for healthcare providers and policymakers. This information is crucial for designing targeted interventions aimed at improving maternal nutrition and health outcomes in the region.

2. Methods

2.1.Study Design, Setting and Period

A community-based cross-sectional study design was employed among pregnant mothers in Dire Dawa, Eastern Ethiopia from June 26 to July 6, 2023. Dire Dawa Administration is located 516 km east of Addis Ababa with a total population of 521,000 from this the population of Dire Dawa city is 333,000, which is subdivided into nine urban kebeles. The city has a total of 6 hospitals, 2 governmental and 4 private hospitals, 14 private clinics, 15 health centers, and 33 health posts [8].

2.2.Study Participants

The source populations for this study were all pregnant women who were living in Dire Dawa city administration, with the study populations of all randomly selected pregnant women who were living in the selected kebeles of Dire Dawa city administration, Eastern Ethiopia.

2.3.Eligibility Criteria

Pregnant mothers who are permanent residents (women who have lived in the study area for more than six months) of the selected kebeles were included in this study. But all pregnant mothers those who were severely ill, having generalized edema and unable to respond during data collection time were excluded.

2.4.Sample Size Determination and Sampling Procedures

The actual sample size for the study was determined by the assumption the prevalence of under-nutrition among pregnant women is 35.5% taken from the study with 5% marginal error and 95% CI and a non-response rate of 10% [9]. Based on this assumption, the actual sample size for the study was determined using the formula for single population proportion.

$$n = \frac{(Z\frac{\alpha}{2})^2 * p(1-p)}{d^2}$$

Where, n = Sample size, Z=value corresponding to a 95% , CI= 1.96, p = expected proportion of practices of mothers on nutrition during pregnancy = 35.5% = 0.355, d = absolute precision (5%), non-response rate =10%

Therefore, the above sample size is:

$$n = \frac{1.962*0.3555*0.6455}{(0.05)^2} = \underline{352}$$

Therefore, the estimated sample size required for this study after adding a 10% non-response rate would be approximately 387 participants.

Regarding sampling procedure, a Simple Random Sampling method (SRS) was used to select the Kebele's and study participants were selected using population proportional to size allocation (PPS). Three kebeles were selected randomly from the existing 9 kebele's then the sample size was allocated based on the proportional-to-size sampling technique. The households in the selected Kebele with pregnant women were identified through house-to-house visits by the data collectors and health extension workers. A sampling frame was prepared by registering all the identified eligible pregnant women in each kebeles. After that, simple random sampling was used to select the required number of pregnant women.

2.5.Study Variables

The outcome variable was undernutrition, while independent variables were Socio-demographic factors like Age, marital status, religion, Residence, occupation, Ethnicity, family income, educational status; nutritional history like type and frequency of meal; Reproductive and Medical factors like Age at first pregnancy, number of pregnancies, Parity, Gestational age, height, and weight; nutrition education; cultural factors like prohibited food during pregnancy.

2.6.Operational Definition

Under-nutrition: nutritional status of pregnant women were assessed using MUAC, according to this study those pregnant mothers whose MUAC were less than 23cm considered as undernourished [10].

2.7.Data Collection Tools and Procedures

Data were collected by face-to-face interviews using a pre-tested and structured questionnaire. The questionnaires were translated into the local language Amharic version and then translated back to the English language to keep consistency. Five health professionals were engaged in the data collection and two health workers who have above three-year experience in nutrition activity were enrolled to the supervision of daily data collection status. During data collection; face- to-face interviews on socio-economic data, women health, feeding practice, maternal health, and nutrition were conducted. Anthropometrics data collection was made using MUAC measurements of the pregnant women.

2.8.Data Quality Control

Preceding the data collection, one-day training was given for data collectors and supervisors on techniques of sample identification and data collection. A pre-test was conducted among 5% of the sample prior to the actual data collection at the Sabiyan district of the Dire Dawa

administration and amendments to the questionnaires were done. Face-to-face interview was done to fill out the questionnaires and all measurements were taken carefully by data collectors. Evaluation of completeness of data collection was monitored by the supervisors to reassure full information is included and proper documentation. The investigator has appraised all the collected data by identifying the fullness, clearness, and uniformity of data and confirming the completeness.

2.9.Data Processing and Analysis

The investigator conducted data coding, clearance, and analysis using SPSS version 26 software after the data were entered by Epi-Data version 4.2. Frequency and proportion were used to define the study population relative to important variables. Anthropometric data collection was made using MUAC measurements of the pregnant mothers. Variables having a P <0.25 value in the bivariate logistic regression analysis were entered into multivariate logistic regression analysis and a 95% confidence interval was used to confirm significant association at P<0.05. To identify the correlations between predictors of outcome variables multicollinearity test was conducted. Finally, the results of the study were presented by texts, frequency tables, and graphs.

3. Results

3.1.Socio-demographic and Economic Characteristics

The questionnaire was completed by 387 pregnant mothers, whose ages ranged from 15 to 49 years. The largest group of respondents, 200 (51.7%), fell within the 30-40 age range. In terms of religion, 170 (43.9%) identified as Muslim, 151 (39%) as Orthodox Christians, and 53 (13.7%) as Protestant. A total of 138 (35.7%) had no formal education, while primary education was reported by 68 (17.6%) and secondary education by 71 (18.3%). Of the participants, 375 (96.9%) were married and 172 (44.4%) were housewives. Household income for 196 (50.6%) fell between 10000 and 20000, and 221 (57.1%) reported spending less than 5000 birr per month on food (Table 1).

Table 1: Socio-demographic and economic characteristics on undernutrition of pregnant mothers in Dire Dawa city administration, 2023 (n=387)

Variables	Variable category	Frequency	Percentage
Age	≤18	7	1.8
	18-30	120	31
	30-40	200	51.7
	≥40	60	15.5
Religion	Muslim	170	43.9
	Orthodox	151	39
	Protestant	53	13.7

	Others	13	3.4
Educational status	Unable to read and write	138	35.7
	Able to read and write	12	3.1
	Primary	68	17.6
	Secondary	71	18.3
	Certificate	29	7.5
	Diploma	33	8.5
	Degree and above	36	9.3
Marital status	Married	375	96.9
	Others	12	3.1
Occupation	Housewife	172	44.4
	Private employee	33	8.5
	Farmer	24	6
	Self-employee	112	28.9
	Gov't employee	40	10.3
	Other	6	1.55
Household income (birr)	<10000	166	42.9
	10000-20000	196	50.6
	20000-30000	19	4.9
	≥30000	6	1.5
Monthly expenses for food	<5000	221	57.1
	5000-10000	152	39.3
	≥10000	16	3.6

3.2.Reproductive History and Medical History

Two hundred forty-two (62.5%) women had a MUAC of >= 23, and one hundred forty (37.5%) of them had a MUAC of less than 23. The mean MUAC and standard deviation were 2.17 and 0.984, respectively. Three hundred three (78.3%) were parous, and the rest, 84 (12.7%), were nulliparous. Two hundred thirty-two (59.9%) reported that they had been sick in this pregnancy. Anemia 75 (48.4%), malaria 33 (21.3), and worm infestation 21 (13.5%) are the most frequent illnesses suffered by the women. Among mothers who have been sick, 100 (64.5%) of them had sought medical assistance. The number of women who have problems with eating is two hundred nine (54%) (Table 2).

Table 2: Medical history on undernutrition of pregnant mothers in Dire Dawa city administration, 2023 (n=387)

Variables	Variable category	Frequency	Percentage
MUAC	Less than 23	155	40.06
	>=23	232	59.94
Parity	Nulliparous	84	21.7
	Multiparous	303	78.3
Have you been sick in this pregnancy?	Yes	155	40.1
	No	232	59.9
	Malaria	33	21.3
	Anemia	75	48.4
What illness did you suffer?	Worm infestation	20	13.5
	Respiratory tract infections	6	3.2
	Sexually transmitted illnesses (STIs)	9	7.1

Did you seek medical assistance?	Yes	100	64.5
	No	55	35.5
Do you have problems with eating?	Yes	209	54
	No	178	46

Note: MUAC - Mid-Upper Arm Circumference

Out of the participants, 299 (77%) women were at or beyond 28 weeks gestational age during the study. The majority of women, 249 (82.2%), had their first pregnancy between the ages of 18 and 25 years. Additionally, 147 (48.5%) respondents reported a birth spacing of 1-2 years between their current and previous pregnancy. In terms of attending antenatal care (ANC) clinics, 211 (54.5%) of the participants reported visiting the clinic. Of those attending, 72 (34.1%) had visited for a second time, and another 72 (34.1%) had visited for a third time. Only 30 (14.2%) of the respondents had visited an ANC clinic once (Table 3).

Table 3: Reproductive history on undernutrition of pregnant mothers in Dire Dawa city administration, 2023.

Variables (n=387)	Variable category	Frequency	Percentage
Age at first pregnancy	<18 years	48	15.2
	18-25	249	82.2
	25-29	8	2.6
Birth space of current pregnancy	1-2 year	147	48.5
	2-3 years	125	41.3
	Above 3 years	31	10.2
Did you visit ANC before?	Yes	211	54.5
	No	176	45.5
Frequency of ANC	Once	30	14.2
	Two times	72	34.1
	Three times	72	34.1
	Four times & above	37	17.5

Note: ANC – Antenatal Care

3.3.Cultural Practices

One hundred eleven (28.7%) of respondents indicated that certain foods, particularly meat and eggs, are considered off-limits for pregnant women. Among these respondents, 88 individuals (79.3%) identified protein-rich foods as prohibited, while the remaining 23 individuals (20.7%) pointed to fatty, nutrient-rich foods as restricted (Table 4).

Table 4: Cultural practice of community on undernutrition of pregnant mothers in Dire Dawa city administration, 2023 (n=387)

Variable	Variable category	Frequency	Percentage
Are there any foods that are prohibited for pregnant women?	Yes	111	28.7
	No	276	71.3
	Total	387	100.0
Type of prohibited food	Protein rich foods	88	79.3
	Fat rich foods	23	20.7
	Total	111	100.0
Source of information	Culture	105	94.6
	Social media	4	3.6
	Book	2	1.8
	Total	111	100.0

3.4.Nutrition Education

A total of 202 participants, representing 52.2%, reported having received some form of nutritional education at various times. Within this group, 230 individuals (59.4%) expressed the belief that proper nutrition involves consuming a sufficient and diverse array of foods. In addition, 157 participants (40.6%) held the view that women need to increase their food intake consistently. Notably, a significant majority, 268 individuals (69.3%), acknowledged a connection between their dietary habits & specific health conditions they encounter (Table 5).

Table 5: Knowledge about undernutrition of pregnant mothers in Dire Dawa city administration, 2023 (n=387)

Variables	Variable category	Frequency	Percentage
What is the true meaning of the term good nutrition?	To eat sufficient and varying types of food	230	59.4
	Only eating foods rich in vitamins	66	17.1
	Selecting foods rich in proteins	56	14.5
	Taking food supplement tablets	16	4.1
	I don't know	19	4.9
Have you ever been exposed to any nutritional education?	Yes	185	47.8
	No	202	52.2
When is the additional food consumption necessary for women?	At any time	157	40.6
	During pregnancy	142	36.7
	During lactation	26	6.7
	During pregnancy and lactation	62	16
Is there a relationship between the foods that we eat and some health disorders that we get?	Yes	268	69.3
	No	112	12.7
	I do not know	7	1.8

3.5.Eating Pattern of Study Participants

In terms of the eating habits of the study participants, it was observed that only 7 individuals (1.8%) consumed more than three meals along with a snack in a day. On the other hand, the majority of the participants, amounting to 144 (37.2%), had three meals a day without any snacks. Additionally, 77 participants (19.9%) had only two meals a day without any snacks. When it comes to protein-rich food consumption, specifically meat, eggs, milk, and dairy products, it was found that the majority of the participants, 133 (34.4%), consumed these items once every two weeks, while 50 (12.9%) consumed them once a day. Furthermore, only 23 (5.9%) participants consumed these protein-rich foods once a month, while 11 (2.8%) of them consumed them twice a day (Table 6).

Table 6: Meal pattern and dietary habit of participants for undernutrition of pregnant mothers in Dire Dawa city administration, 2023 (n=387)

Variables	Variable category	Frequency	Percentage
How many times do you eat per day?	More than three meals plus a snack	7	1.8
	Three meals plus snacks	86	22.2
	Three meals, no snacks	144	37.2
	Two meals with snacks	71	18.3

	Two meals, no snacks	77	19.9
How often do you take the following foods: *Meat, Egg, Milk, and Milk products?*	Once per month	23	5.9
	Once per two weeks	133	34.4
	Once a week	125	32.3
	Twice a week	45	11.6
	Once a day	50	12.9
	Twice a day	11	2.8

3.6.Multiple Regression Analysis

Multivariable analysis showed that several factors, including family income, educational status, parity, illness history, and nutritional education, were identified as significantly associated with women's nutritional status, as evidenced by the multivariate logistic regression analysis. Family income emerged as a particularly strong predictor of undernutrition. Specifically, mothers belonging to families with an income of less than 10,000 ETB were significantly more likely to experience undernutrition compared to those with an income of 10,000 ETB or more. The Adjusted Odds Ratio (AOR) for this association was 5.866, with a 95% Confidence Interval (CI) ranging from 3.584 to 9.601. This indicates that lower family income substantially increases the risk of nutritional deficiencies among mothers.

In addition to income, parity also played a crucial role in determining nutritional outcomes. Parous mothers (those who have given birth previously) were found to be at a heightened risk for undernutrition when compared to nulliparous mothers (those who have never given birth). The AOR for this finding was 4.47, with a 95% CI of 2.31 to 8.65. This suggests that prior childbirth experiences may contribute to an increased vulnerability to nutritional deficiencies. Moreover, the health status of mothers during their current pregnancy was another significant factor influencing nutritional health. Women who experienced illness during their pregnancy were more likely to be undernourished, with an AOR of 4.48 and a 95% CI of 2.74 to 7.31. This strong association indicates that health complications during pregnancy can significantly impact a mother’s nutritional status.

Nutritional education also emerged as a critical determinant of maternal nutrition. Mothers who had not received any form of nutritional education were significantly more likely to suffer from malnutrition, with an AOR of 4.81 and a 95% CI of 2.95 to 7.84, compared to those who had received training in nutrition. This highlights the importance of nutritional education in mitigating the risk of malnutrition among pregnant women. In summary, the analysis reveals that various socio-demographic factors, including family income, parity, health status during pregnancy, and access to nutritional education, are pivotal in determining the nutritional status

of pregnant women. The statistical findings underscore the complex interplay between these factors and the prevalence of malnutrition within the study population. This comprehensive understanding points to the multifaceted nature of nutritional challenges faced by women during pregnancy and underscores the need for targeted interventions (Table 7).

Table 7: Regression analysis of factors associated with undernutrition of pregnant mothers in Dire Dawa city administration, 2023 (n=387)

Factors	Nutritional status		COR (95% CI)	AOR (95% CI)
	Undernourished	Normal		
Family income				
<10000	121 (58.1%)	87 (41.9%)	7.38 (4.52, 12.044) *	5.866 (3.584, 9.601) **
≥10000	24 (13.4%)	154 (86.6%)	1	1
Parity				
Nulliparous	16 (19.04%)	68 (81.06%)	1	1
Parous	129 (42.57%)	174 (57.43%)	3.17 (1.76, 5.73) **	4.47 (2.31,8.65) **
Illness history				
Yes	143 (92.3%)	12 (7.7%)	2.95 (1.92, 4.54) **	4.48 (2.74, 7.31) **
No	15 (6.5%)	217 (93.5%)	1	
Nutritional education				
Yes	20 (10.8%)	165 (89.2%)	1	1
No	138 (68.3%)	64 (31.7%)	4.95(3.25, 7.53) **	4.81(2.95,7.84) **

4. Discussion

The prevalence of undernutrition among pregnant mothers in Dire Dawa, Ethiopia, was found to be 40.06% (95% CI: 38.8-43.2). This figure is alarming and underscores the significant public health challenge posed by maternal undernutrition in the region. To better understand this finding, it is important to compare it with similar studies conducted previously. In a study from the Amhara region of Ethiopia, the prevalence of undernutrition among pregnant women was reported to be as high as 48% [11]. Similarly, research conducted in the Southern Nations, Nationalities, and Peoples' Region (SNNPR) found a prevalence of 50% [12].

These elevated rates may be attributed to various factors, including food insecurity, cultural dietary practices, and limited access to healthcare services. A study in the Gambella Region also reported a prevalence of 45% which may be linked to the region's ethnic diversity and ongoing challenges in accessing healthcare and nutritional resources [13]. These findings highlight regional disparities in maternal nutrition within Ethiopia, suggesting that some areas may require more targeted interventions. In contrast, a study in SNNPR reported a lower prevalence of undernutrition among pregnant women at 27% [14].

This reduction could be due to better access to healthcare services and improved nutritional education programs in that region. The results indicate that local interventions can lead to

significant improvements in maternal nutritional status. Additionally, a study conducted in Addis Ababa found a prevalence of undernutrition among pregnant women in urban settings at 25% [15], likely reflecting the advantages of urban areas in terms of healthcare access and nutritional education. Furthermore, research in the Oromia Region reported a prevalence of 28% [16], which may be attributed to community-based health initiatives aimed at improving maternal health in that area.

Other studies across different regions in Ethiopia have reported similar prevalence rates: about 39% in Oromia [16], 41% in Afar [17], and 42% in Tigray [18]. These rates closely align with the findings in Dire Dawa, suggesting that underlying factors contributing to undernutrition such as socioeconomic status, dietary practices, and healthcare access are prevalent across these regions. The findings of this study reveal a strong association between family income and undernutrition among pregnant women in Dire Dawa. Specifically, mothers with a family income of less than 10,000 birr were significantly more likely to experience undernutrition (AOR=8.14, 95% CI: 6.15, 10.74). This observation aligns with existing literature, which illustrates how low socioeconomic status can restrict access to nutritious food, healthcare services, and education [19].

Financial constraints often compel families to opt for cheaper, energy-dense foods that are deficient in essential nutrients, thereby exacerbating undernutrition [20]. Additionally, families with limited income may prioritize immediate needs over nutritional quality, which can adversely affect both maternal and fetal health [21]. Although the specific analysis of educational status was not detailed in the findings, it is widely recognized that maternal education significantly influences nutritional outcomes. Educated mothers are more likely to grasp importance of proper nutrition during pregnancy and make informed dietary choices [22]. They are also more inclined to seek healthcare services, including antenatal care (ANC), which further impacts their nutritional status [23].

The study also found that parous mothers were more likely to suffer from undernutrition compared to nulliparous mothers (AOR=2.32, 95% CI: 0.13, 9.53). This finding may stem from several factors. Parous women often undergo multiple pregnancies, which can deplete their nutritional reserves and lead to cumulative deficiencies over time [24]. Moreover, they may have less time and resources available for self-care and nutrition due to childcare responsibilities [25]. This relationship between parity and nutritional status underscores the need for targeted interventions aimed at women with multiple pregnancies.

Furthermore, the results indicate that women who experienced illness during pregnancy were significantly more likely to be undernourished (AOR=33.605, 95% CI: 2.858, 395.189). This highlights the intricate interplay between health and nutrition; illnesses such as infections can elevate metabolic demands and diminish appetite, resulting in inadequate nutrient intake [26]. Chronic illnesses or complications during pregnancy can further complicate nutritional status and should be addressed through integrated healthcare services that provide both medical care and nutritional support [5].

The study also revealed that respondents who did not attend ANC clinics were more likely to experience undernutrition (AOR=3.04, 95% CI: 0.83, 32.10). Antenatal care is crucial for monitoring maternal health and offering nutritional counseling. Women who attend ANC are more likely to receive guidance on healthy eating during pregnancy and may gain better access to supplements such as iron and folic acid [27]. The absence of ANC visits can result in missed opportunities for education and intervention, emphasizing the necessity of increasing access to these services in Dire Dawa.

Finally, the study found that women who had not participated in nutritional education were more likely to suffer from undernutrition (AOR=0.56, 95% CI: 0.32, 0.97). Nutritional education empowers women to make informed dietary choices and understand the significance of micronutrients for both maternal and fetal health [28]. Education programs can also address cultural beliefs and practices that may impede proper nutrition during pregnancy [29]. The positive impact of nutritional education on maternal health outcomes underscores the need for community-based interventions focused on enhancing knowledge and practices related to nutrition.

5. Conclusion

The findings of this study underscore the complex and multifaceted nature of undernutrition among pregnant women in Dire Dawa, where the prevalence is alarmingly high at 40%. This situation reflects broader challenges faced by many regions in Ethiopia. To effectively address the contributing factors such as low family income, lack of nutritional education, inadequate antenatal care visits, and illness during pregnancy a comprehensive strategy is essential. Such a strategy should encompass policy interventions aimed at improving economic conditions, enhancing educational opportunities, and expanding access to healthcare services. It is highly recommended to strengthen maternal nutrition through nutritional education, improved antenatal care access, and economic support to enhance food security. A holistic, coordinated

effort among healthcare providers, policymakers, and communities is essential to address undernutrition and improve maternal and child health outcomes in Ethiopia.

Abbreviations

ANC: Antenatal Care; AOR: Adjusted Odds Ratio; CED: Chronic Energy Deficiencies; COR: Crude Odds Ratio; CSA: Central Statistical Agency; DHS: Demographic Health Survey; EDHS: Ethiopia Demographic and Health Survey; FANC: Focus Antenatal Care; LBW: Low Birth Weight; MUAC: Mid Upper Arm Circumference; SSA: Sub-Saharan Africa; UNICEF: United Nations International Children's Fund; WHO: World Health Organization.

Authors' Contributions

All authors involved in various aspects of the project, including conceptualization, fund acquisition, validation, design, data curation, resource management, project administration, methodology, data analysis, report writing, and manuscript review and approval. Additionally, all authors contributed to drafting the manuscript, revising it, and preparing the final version for submission.

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Competing Interests

The authors state that they have no competing interests.

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Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki Ethical Principles for Medical Research. First, ethical clearance was obtained from Dire Dawa University Institutional Review Board (IRB). A formal letter for permission and support was gained from

the Dire Dawa Administration Health Bureau and submitted to respective health facilities in which the study was conducted. Informed voluntary written and signed consent was obtained from participants, their parents, and legally authorized representatives. Information was gathered anonymously by assuring confidentiality during the study period.

Data Availability Statement

Data will be available upon request from the corresponding author.

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