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Research Article

Prevalence of Anemia Among Pregnant Women Attending ANC in Leku General Hospital, Sidama, Ethiopia

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Abstract

Introduction: Anemia is a global public health issue that affects people of all ages, although pregnant women and children under the age of five are the most vulnerable. During pregnancy, iron deficiency is associated with multiple adverse outcomes for both mothers and infants in developing countries. Nutritional anemia is also the most prevalent type of anemia in the world. This study's objective was to determine how common anemia was among pregnant women attending antenatal care at Leku General Hospital. *Method*: A cross-sectional study was conducted from July 25-August 15, 2022, on 284 pregnant women attending in Leku General Hospital. Pretested questionnaires based on interviews were used to collect socio-demographic information and related data. Hemoglobin concentration was determined using Beckman Coulter DxH 800 analyzer and hemoglobin concentration <11 g/dl was classified as anemic. Bivariate and multiple logistic regression analysis was used to determine the predictor's value for anemia. P<0.05 was considered statistically significant. *Result*: The prevalence of anemia among pregnant women was found to be 21.7% (95% CI: 16.7%-26.8%). Women who live in rural areas were revealed to be factors affecting pregnant women's anemia (AOR = 4.2, 95% CI: 1.97-9.10). Approximately half of the anemic pregnant women surveyed were found to have moderate anemia (Hb 7- 9.9 g/dl) with 55% and 7% severely anemic. The most important clinically relevant finding was that (65%) of anemic pregnant women were found to have microcytic and hypochromic anemia which is the most common type in pregnancy that occurs mostly due to iron deficiency. *Conclusion*: Compared to the national pooled data, this study finds anemia has a moderate impact on local public health. The related factors should be considered for improving rural community-based anemia management for pregnant women.

Keywords

Anemia, Pregnant Women, Southern Ethiopia

1. Introduction

Anemia is a condition characterized by a decrease in the number of RBCS and/or hemoglobin (HGB), resulting in a lower ability for the blood to carry oxygen to body's physiologic needs [1]. Around 2 billion individuals around the

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world suffer from anemia. Women of reproductive age, especially pregnant women, about 38% had anemia. The frequency approaches 49% of those in sub-Saharan Africa pregnant women [2].

Anemia is a serious concern during pregnancy in Ethiopia. According to the EDHS 2016: In the Ethiopian Demographic Health Survey (EDHS), approximately 40% of pregnant women had anemia. The prevalence of mild anemia was 18%, moderate anemia was 20%, and severe anemia was 3%. [3]. Anemia is linked to higher rates of morbidity and mortality in both women and children, poor birth outcomes, poorer productivity in the workplace for adults, and delays in children's cognitive and behavioral development. It is well investigated that women of reproductive age and preschoolers are severely impacted [4-6].

Anemia during pregnancy is caused by a variety of factors in developing countries like Ethiopia, including dietary deficits in iron, folate, and vitamin B12 as well as parasite illnesses like malaria and hookworm [7]. However, the main cause of anemia during pregnancy is iron deficiency due to inadequate dietary intake, aggravated by the fact of increased demand of the fetus and maternal blood volume expansion. Another cause is genetic predisposition and poor hygiene, which might lead to infections during pregnancy in addition to depleted iron stores from too early, too many, and too frequent pregnancies [6-9].

Anemia increases the risk for maternal and child mortality and has negative consequences on the cognitive and physical development of children, and on work productivity in adults [10]. Clinical signs of anemia include breathlessness, dizziness, and perceived paleness or change of skin color [4]. Because of the economic, social, and other negative consequences, anemia is a priority nutritional problem in most of the developing world [10, 11]. Determinations of HGB level and hematocrit value are the most common method of diagnosis anemia. The RBC morphology assessment is also used to determine the type of anemia [12].

According to the results of the systematic review, the overall prevalence of anemia in pregnant women is about 37%. The highest prevalence of anemia is mild at 70. In general, the prevalence of anemia is 18% in developed countries, whereas it is between 35-75% in developing countries due to pregnancy's economic, sociological, and health factors. In comparison, the third trimester was higher than in the first and second trimester [13, 14].

The availability of local information on the magnitude and related risk factors has a major role in the management and control of anemia in pregnancy. Hence, the main aim of the study is to determine the prevalence and associated risk factors of anemia among pregnant women who attend at one of the general hospitals in Southern Ethiopia.

2. Methods and Materials

2.1. Study Design

Institution based cross-sectional study was conducted in Leku General Hospital in Leku town from March 22-September 5, 2022. Leku town is one of the reform towns in one of the 12 Ethiopian regions, Sidama Region, which was established in 1888 E. C. It is located 27 Kilometers from Hawassa, which is the capital city of Sidama region, 299 Km from Addis Ababa. The altitude of the town is 1700 meters above sea level and the topography is plane type. The climatic condition of the town is "woina dega" with an annual environmental temperature range of 16–28 degrees Celsius. The town has five kebeles with a total population of around 42,000. The town has only one governmental hospital and there are a few private clinics.

Leku General Hospital provides care for millions of neighbors. The obstetrics and gynecology department is one of the hospital's primary departments. The hospital contains other departments as well. This division provides ANC, delivery, postpartum care, and problem diagnosis and management associated with pregnancy.

Pregnant women who visited Leku General Hospital were a source of population. The study population consisted of all expectant mothers who visited Leku General Hospital for their ANC during the study period as well as all expectant mothers who met the inclusion criteria and were available during the data collecting period. Pregnant women who visited the hospital's antenatal clinic during the study period were all included in the study; those who were seriously ill and therefore unable to respond to the questionnaire were excluded.

2.2. Sample Size Determination and Sampling Procedure

The sample size was calculated by using a single population proportion formula (n = (Z α /2) 2, p (1-p)/d2), considering the following assumptions: Zα/2 (significance level) at 0.05 = 1.96, d (margin of error) = 5%, and P proportion of (anemia) among pregnant women in central Ethiopia =21.3% [15]. After adding a 10% nonresponse rate, the final sample size becomes 284. Finally, the study participants were selected using a systematic sampling method from pregnant women who visited ANC during the study period.

2.3. Data Collection

Data was collected using an interviewer-administered structured questionnaire, physical examination, and laboratory investigation. Trained data collectors intended for this study interviewed the pregnant women and entered the data according to the pretested structured questionnaire at Leku General Hospital. The questionnaire focused on; so-

cio-demographic factors, obstetric related factors, and anemia related factors. Then, 3 ml blood through venipuncture and put into EDTA tube for CBC analysis to test hemoglobin level and to identify the type of anemia. CBC analyses were done using Beckman Coulter DxH 800 Analyzer. In this study, we used the HEMOGLOBIN levels of the cut-off values to classify anemia [16]. Hence, anemia in pregnancy is defined as a hemoglobin level below 11 g/dl during the first and third trimester and 10.5 g/dl during the second trimester of pregnancy. Mild anemia is defined as a hemoglobin level from 10 to 10.9 g/dl. moderate anemia is defined as a hemoglobin level from 7 to 9.9 g/dl, and severe anemia was defined as a hemoglobin level of < 7 g/dl based on WHO recommendation. After the test, pregnant women who were anemic were linked with their respective physician for the suitable management of anemia that includes giving iron supplements, health education, and treatment.

2.4. Data Analysis

To investigate the association between the outcome variable and the independent variables, bivariate and multivariable logistic regression was applied. The multivariable logistic regression used variables from the bivariate analysis that had a p-value of less than 0.25. The factors OR and 95% CI were considered significant for those with p values less than 0.05.

2.5. Ethical Consideration

Before any attempt to collect data, the protocol was approved by the Department of Medical Laboratory Sciences, College of Medicine and Health Science, Hawassa University. Official permission was also obtained from Leku General Hospital. Each participant was notified about the purpose of the study, the right to refuse or participate in the study, privacy, and confidentiality of the information gathered. They were assured that they would not be penalized for not participating if they wished not to participate, and that their responses to the questions had no effect on their care. The participant's result was communicated to the concerning physician or care giver.

3. Result

3.1. Socio Demographic Characteristics of the Study Participants

A total of 276 pregnant women were involved in the study. Majority of the study participants 64 (23.2%) were at age below 25 years. the mean + SD age of the participants was 27.67 + 5.85 years. Most of the study participants were rural residents 178 (64.5) and most are illiterate 146 (52.9%). Out of 276 pregnant women, majority of them 86% were married and most of them are housewives 100 (36.23%). From the total 276 pregnant women, 104 (37.68%) were at the third trimester and 109 (39.49%) had inter-pregnancy interval of 9-17 months. About 262 (94.93%) had normal weight, 190 (68.84%) had ANC follow-up and most of them have taken Iron supplement (Table 1).

Table 1. Socio demographic characteristics and its association factors with anemia among pregnant women attending ANC in Leku General Hospital, Sidama, Ethiopia, from July 25-August 15, 2022.

	Frequency	Percentage (%)
Age in years		
<25	64	23.2
25- 34	169	61.2
>35	43	15.6
Mean + SD	27.67+ 5.85 years	
Residence		
Urban	98	35.5
Rural	178	64.5
Marital status		
Married	238	86.23
Single	38	13.77
Educational status		
Unable to read and write	146	52.9
Read and write only	75	27.2

	Frequency	Percentage (%)
Primary school	34	12.3
Secondary school	15	5.5
College and above	6	2.2
Family size		
<5	96	34.8
>5	180	65.2
Occupation		
Housewife	79	28.6
Employed	197	71.4
Gestational age		
First trimester	96	34.8
Second trimester	76	27.5
Third trimester	104	37.7
ANC follow up		
Yes	184	66.7
No	92	33.3
Please of last delivery		
Health institution	190	68.8
At home	86	31.2
Birth interval in years		
< 2 years		
> 2 years		
Iron supplement		
Yes	174	63
No	102	37
BMI		
Underweight	8	2.9
Normal weight	262	94.9
Overweight	6	2.2

3.2. Prevalence, Severity, and Type of Anemia Among Study Participants

The overall prevalence of anemia among pregnant women was found to be 21.7% (60/276) (95% CI: 16.7%-26.8%) with the mean (±SD) Hb concentration of 9.16 (±1.31) g/ dL. Among them, severe anemia was 7% (4/60), moderate anemia was 55% (33/60), and mild anemia was 38% (23/60). Regarding the type of anemic, 39 (65%) of the pregnant women had microcytic hypochromic anemia, 18 (30%) normocytic normochromic, and, the remaining 3 (5%) were macrocytic anemia type. The overall mean (±SD) Hb concentration of all subjects was 12.4 (±2.4) g/dL. Approximately half of anemic pregnant women surveyed were found to have moderate anemia (Hb 7- 9.9 g/dl) (Table 2).

Table 2. Prevalence and severity of anemia among pregnant women.

Anemia status	Frequency (%)	Severity (%)		
		Mild (Hb 10-10.9 g/dl)	Moderate (Hb 7- 9.9 g/dl)	Severe (Hb <7 g/dl)
Anemic	60 (21.7)	23 (38)	33 (55)	4 (7)
Non-anemic	216 (78.3)			

3.3. Factors Associated with Anemia

Multivariate logistic regression analysis revealed that only residence of pregnant women was significantly associated with anaemia. However, in the bivariate logistic regression, Iron supplement and frequency of ANC follow-up have shown a significant association (Table 3).

Table 3. The prevalence and associated factors of anemia among pregnant women attending ANC in Leku General Hospital, Sidama, Ethiopia, from July 25-August 15, 2022.

Characteristics	Anemic No. (%)	Non-Anemic No. (%)	COR (95% CI)	AOR 95% CI
Age in years				
<25	17 (26.6)	47 (73.4)	0.63 (0.25-1.62)	
25- 34	35 (20.7)	134 (79.3)	0.88 (0.37-2.05)	
>35	8 (18.6)	35 (81.4)	1	
Residence				
Urban	10 (10.2)	88 (89.8)	1	1
Rural	50 (28.1)	128 (71.9)	3.44 (1.66-7.14)	4.2 (1.97-9.10)
Educational status				
Unable to read and write	40 (27.4)	106 (72.6)	0.53 (0.06-4.77)	
Read and write only	11 (14.7)	64 (85.3)	1.16 (0.12-10.9)	
Primary school	7 (20.6)	27 (79.4)	0.77 (0.76-7.71)	
Secondary school	1 (6.7)	14 (93.3)	2.8 (0.15-53.7)	
College and above	1 (6.7)	14 (93.3)	1	
Family size				
<5	16 (16.7)	80 (83.3)	1	
>5	44 (24.4)	136 (75.6)	0.68 (0.32-1.16)	
Occupation				
Housewife	17 (21.5)	62 (88.5)	1.02 (0.54-1.92)	
Employed	43 (21.8)	154 (88.2)	1	
ANC visits				
Yes	30 (16.3)	154 (83.7)	1	1
No	30 (32.6)	62 (67.4)	2.48 (1.38-4.46)	0.32 (0.17-0.60)
Birth interval (in years)				
< 2 years	29 (25.7)	84 (74.3)	1	

Characteristics	Anemic No. (%)	Non-Anemic No. (%)	COR (95% CI)	AOR 95% CI)
> 2 years	31 (19.0)	132 (81.0)	0.68 (0.38-1.21)	
Iron supplement				
Yes	31 (17.8)	143 (82.2)	1	1
No	29 (28.4)	73 (71.6)	1.61 (1.85-3.27)	0.49 (0.36-0.91)
BMI				
Underweight	4 (50.0)	4 (50.0)	0.50 (0.06-4.47)	
Normal weight	54 (20.6)	208 (79.4)	1.92 (0.34-10.8)	
Overweight	2 (33.3)	4 (66.7)	1	

4. Discussion

The overall prevalence of anemia in the present study was 21.74. This result is comparable with the results from Gonder (22.2%) [17] and East Hararge, Ethiopia (20.8%) [18]. But our finding was higher compared to studies in Tikur Anbessa Specialized Hospital (TASH), Ethiopia 4.8% [19], Dire Dewa, Ethiopia (15.3%) [20], Tigray, Ethiopia 16.8% [21] and lower than the pooled prevalence of anemia among pregnant women in Ethiopia 26.4 [22], the 2016 Ethiopian Demographic Health Survey (EDHS) estimate 41% [3], the study reported from North West Ethiopia (30.5%) [23] and, the report from southern Ethiopia 53.9% [24]. The geographic variance of factors, such as the prevalence of malaria, socioeconomic conditions, and other baseline traits of the study participants like health seeking behavior, as well as altitudinal differences, may have contributed to the discrepancy.

Residence was significantly associated with anemia. Pregnant women who reside in rural areas are 4.2 times more likely to get anemia than those who live in urban areas. Anemia has also been linked to living in the rural in previous studies [24-28]. Clearly, it is due to lack of knowledge about proper nutrition during pregnancy, economic factors, and difficulty accessing healthcare facilities, pregnant women from rural areas had a greater frequency of anemia.

It was expected that anemia in pregnancy would tend to increase with the rising number of children owing to repeated drains on the iron reserves. In fact, multiparty especially when the pregnancies have occurred in quick succession, is traditionally regarded as a cause of anemia in pregnancy. However, this study found no consistent relationship between the rising number of children and the incidence of anemia. Perhaps, following the experience gained from the first pregnancy and the consequent increased awareness and good diet, as well as increased interaction with other pregnant women at the antenatal clinic, might neutralize its effect. This study also failed to observe any relationship between prevalence of anemia and increasing gestational age, im-

plying that all pregnant women were prone to anemia throughout the gestational period, thus early booking for antenatal care would serve as an important preventive measure in pregnancy. Even though there are a lot of previous reports regarding the association of gestational age, age, educational status, occupation, family size, history of abortion, birth interval, and body mass index with anemia [29-31], the current study has no association.

Approximately half of anemic pregnant women surveyed were found to have moderate anemia (Hb 7- 9.9 g/dl) with 55% and 7% are severe anemic. The most important clinically relevant finding was that (65%) of anemic pregnant women were found to had Microcytic& Hypochromic anemia which is the most common type in pregnancy that occurs mostly due to iron deficiency.

5. Conclusion

The prevalence of anemia among pregnant women attending the Leku General Hospital was a moderate public health problem. Pregnant women residing in a rural areas were the factor that predicted anemia. Therefore, it is advised that rural women undergo proper early screening and management of anemia. In order to ascertain the frequency and predictors of anemia in the general population of pregnant women, an additional extensive community-based investigation is required.

6. Limitations of the Study

One of the limitations of this study is the nature of the study design itself, being as a cross-sectional study design, it does not show which preceded anemia or risk factors.

Due to the constraint of time and resource, stool concentration, technique, and parasite density were not done, so this study could not assess the impact of parasite load on the severity of anemia.

Abbreviations

HGB   Hemoglobin
ANC   Antenatal Care
RBC   Red Blood Cell
CBC   Complete Blood Count
WHO   World Health Organization

Funding

Data Availability Statement

All necessary data will be shared upon request from the principal investigator.

Conflicts of Interest

The authors declare no conflicts of interest.

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