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10.4103/ijh.ijh_13_23

Prevalence of anemia and its associated factors among pregnant women in Yaqshiid district, Somalia

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Abstract:

BACKGROUND: Anemia during pregnancy is a public health issue, particularly in underdeveloped countries, and it is linked to unfavorable maternal and neonatal outcomes. The aim of this study was to investigate the prevalence of anemia among pregnant women undergoing prenatal care in Yaqshiid district, Somalia.

MATERIALS AND METHODS: From September 2022 to January 2023, a hospital-based cross-sectional study was undertaken at Alkeyraat Voluntary Hospital. Blood samples from pregnant women were checked for malaria and parasites as well as hemoglobin (Hb), erythrocytes, hematocrit, mean cell volume, and hematocrit. Structured surveys collected sociodemographic data. SPSS Version 25.0 was used to analyze the gathered data. Crosstab descriptive and binary logistic regression were used for the analysis. $P < 0.05$ was considered statistically significant.

RESULTS: The prevalence of anemia was 26.7% (95% confidence interval [CI] = 0.086–0.692), of which 20.0% were mildly anemic, 3.3% were moderately anemic, and 3.3% were severely anemic, with a mean (\pm standard deviation) Hb of 8.38 (\pm 1.90) g/dL. The following factors were found to be associated with anemia: living in a rural area (odds ratio [OR] = 0.337, 95% CI = 0.155–0.732, $P = 0.05$), having anemia during the second trimester of pregnancy (OR = 0.351, 95% CI = 0.140–0.879, $P = 0.05$), having one or two children (OR = 0.361, 95% CI = 0.150–0.868, $P = 0.05$), history of abortion (OR = 0.337, 95% CI = 0.155–0.732, $P < 0.05$), and history of blood transfusion (OR = 0.169, 95% CI = 0.063–0.456, $P < 0.05$).

CONCLUSION: The prevalence of anemia in the present study was low when compared to earlier studies conducted in Bangladesh, Pakistan, Sudan, and Nigeria, among others. Regular visits to maternity care facilities and health education promotion efforts need to be emphasized more to improve rates of success.

Keywords:

Anemia, erythrocytes, hematocrit, hemoglobin, pregnant

Introduction

Anemia in pregnancy is a public health concern, especially in developing nations, and it is associated with poor mother and newborn outcomes.^[1] All ages are affected, but toddlers and pregnant women are more likely to experience it. Fifty-six million pregnant women are among the 1.62 billion (25%) anemic adults worldwide.^[2]

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Anemia during pregnancy has a terrible impact on a woman's health, as well as her social and economic growth. Anemic pregnant women, particularly those with severe anemia, run the risk of having inadequate physical activity, increased maternal morbidity, and mortality.^[3] A rise in perinatal mortality, low birth weight, stillbirth, and fetal loss is also a result of maternal anemia. Pregnancy-related anemia lowers blood loss tolerance, which impairs function and increases the risk of heart failure.^[4]

How to cite this article: Mude AS, Agena AE. Prevalence of anemia and its associated factors among pregnant women in Yaqshiid district, Somalia. Iraqi J Hematol 2023;12:78-83.

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Submission: 03-02-2023

Revised: 02-04-2023

Accepted: 05-04-2023

Published: 15-05-2023

Each year, complications during childbirth or the early postpartum period are blamed for over 510,000 mother fatalities. Anemia is the primary factor in 20% of these maternal deaths, with the majority taking place in developing countries. Worldwide, it affects 41.8% of expectant mothers, with Africa having the highest prevalence (57.1%, or 17.2 million women).^[5]

Significant maternal and fetal issues have been associated with severe anemia (7 g/L) during pregnancy. Premature birth, low birth weight, intrauterine fetal death, neonatal death, maternal mortality, and consequently infant mortality are all made more likely.^[6]

According to the World Bank's collection of development indicators compiled from reliable sources in 2019, the prevalence of anemia among pregnant women in Somalia was reported to be 48.7%.^[7] Hence, this study was done to determine prevalence of anemia among pregnant women in Yaqshiid district, Somalia, who are getting prenatal care.

Materials and Methods

Study design and time

From September 2022 to January 2023, a hospital-based cross-sectional study was undertaken at Alkeyraat Voluntary Hospital, Yaqshiid district, Somalia.

Study area

Yaqshiid District is one of the largest districts in Mogadishu's Banadir region. It is one of the largest districts in the region, with a population of over 200,000.

Population

Women who were pregnant and received prenatal care at the Alkeyraat Voluntary hospital in the Yaqshiid district of Somalia.

Sample size and sampling technique

Sampling technique was a nonprobability sampling technique and sample size was calculated using Slovin's formula ($n = N / (1 + Ne^2)$) with confidence interval (CI): 95% and e: 5% marginal error.

$$n = 605 / (1 + 605 \times 0.05^2) = 240$$

Inclusion

This study included all pregnant women attending antenatal care (ANC) at Alkeyraat voluntary hospital who agreed to participate.

Exclusion criteria

Pregnant women getting anemia treatment who were too unwell to answer the questionnaire and unwilling to participate were excluded.

Data collection

Sociodemographic information (age, education, occupation, marital status, residence, and others), obstetric and gynecological history (trimester, number of children, and birth interval), dietary factors (iron intake, prenatal multivitamin pills, prenatal folic acid intake, eating habits, and others), (history of abortion, history of blood transfusion, history of chronic disease, etc.), and other factors were collected using a pretested interviewer-administered questionnaire.

Laboratory investigation and sample collection

Each participant had blood into an ethylene diaminetetraacetic acid-containing vacutainer tubes and stool samples were taken. Using a fully automated hematology analyzer, blood is tested for hemoglobin (Hb), red blood cells, hematocrit, and mean cell volume (Mindray BC-3000). A wet-mount light microscope was used to examine for intestinal parasites in stool samples, while some of the blood samples were utilized to detect malaria parasites.

Data analysis

SPSS Version 25.0 (IBM Corp. Released August 08, 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) was used to analyze the gathered data. Crosstab descriptive and binary logistic regression were used for the analysis. $P < 0.05$ was considered statistically significant.

Ethical consideration

After being adequately informed about the study, all patients consented verbally. The study was authorized by the Research Ethics Sub Committee of the University of Simad's School of Medicine and Health Sciences. Compliance with all relevant regulations was a requirement of approval.

Results

Pregnant women's sociodemographic traits and nutritional habits

A total of 240 pregnant women participated in the study, with the largest proportion (44.2%) being between the ages of 15 and 24, followed by the age range (25–34) (20.8%), and finally the age range (35–44) (0%). Among them, 188 (78.3%) had previously been divorced, while only 52 (21.7%) were currently married. One hundred and forty (58.3%) of the study participants were stay-at-home mothers, whereas 100 (41.7%) held full-time jobs. There were 94 people who lived in cities (39.2%) and 146 people who lived in rural areas (60.8%). 60.3%, 73.6%, or 76.0% of women, respectively, did not take iron supplements, prenatal multivitamin pills, or prenatal folic acid consumption. 52.9%, 47.1%, and 77.8% of

Table 1: Pregnant women's sociodemographic traits and nutritional habits

Characteristics	n=240, n (%)	Prevalence of anemia		95% CI for OR	P
		Anemic, n (%)	Nonanemic, n (%)		
Age					
15–24	106 (44.2)	78 (73.6)	28 (26.4)	0.933 (0.282–3.094)	0.910
25–34	98 (40.8)	50 (51.0)	48 (49.0)	2.496 (0.772–8.072)	0.127
35–44	36 (15.0)	26 (72.2)	10 (27.8)	Reference category	
Marital status					
Married	52 (21.7)	18 (34.6)	34 (65.4)	4.940 (1.957–12.468)	0.001
Divorced	188 (78.3)	136 (72.3)	52 (27.7)	Reference category	
Residence					
Rural	146 (60.8)	108 (74.0)	38 (26.0)	0.337 (0.155–0.732)	0.006
Urban	94 (39.2)	46 (48.9)	48 (51.1)	Reference category	
Occupation status					
Employed	100 (41.7)	62 (62.0)	38 (38.0)	1.175 (0.552–2.499)	0.676
Housewife	140 (58.3)	92 (65.7)	48 (34.3)	Reference category	
Iron supplements					
Yes	94 (39.2)	66 (70.2)	28 (29.8)	1.554 (0.711–3.394)	0.269
No	146 (60.8)	88 (60.3)	58 (39.7)	Reference category	
Prenatal multivitamin pills					
Yes	58 (24.2)	20 (34.5)	38 (65.5)	Reference category	
No	182 (75.8)	134 (73.6)	48 (26.4)	0.189 (0.077–0.462)	0.000
Prenatal folic acid intake					
Yes	40 (16.7)	2 (5.0)	38 (95.0)	Reference category	
No	200 (83.3)	152 (76.0)	48 (24.0)	0.017 (0.002–0.131)	0.000
Eating habits					
Red meat/white meat/liver	170 (70.8)	90 (52.9)	80 (47.1)	1.697 (0.481–5.991)	0.411
Eggs	34 (14.2)	16 (47.1)	18 (52.9)	3.937 (0.911–17.014)	0.066
Vegetables/fruits	36 (15.0)	28 (77.8)	8 (22.2)	Reference category	

n=Number of participants, CI=Confidence interval, OR=Odds ratio

pregnant women ate red/white meat/liver, eggs, and vegetables/fruits, respectively, Table 1.

Pregnancy-related medical conditions and obstetric history

Approximately 44.2% of pregnant women were in their third trimester. Eighteen (7.5%) of the pregnant women reported having experienced an abortion in the past. 70.8% of the 170 of the pregnant ladies had one or two children. Sixty-four percent of pregnant women had a birth gap of <1 year. About 46 (19.2%) had received blood transfusions in the past. Thirty-eight (14.8%) pregnant women had a chronic illness. About 32 (13.3%) pregnant women had intestinal parasites, and 30 (12.5%) were infected with plasmodium falciparum; no other plasmodium kinds were identified [Table 2].

Anemia prevalence among pregnant women

In this study, the overall prevalence of anemia was 26.7% [Table 3]. The mean Hb value was 8.38 ± 1.90 [Table 4]. Mild, moderate, and severe anemia were found in 20.0%, 3.3%, and 3.3% of the anemic pregnant women, respectively [Table 3]. The prevalence of anemia was higher (73.6%) in pregnant women aged 15–24 years. Anemia was prevalent in 72.3% of divorced

women. The majority of the study participants (74.0%) were from rural areas. Anemia was prevalent in 65.7% of housewives. Iron supplements, prenatal multivitamin pills, and prenatal folic acid intake were not taken by 60.3%, 73.6%, or 76.0% of women, respectively. In anemia group who consume red/white meat/liver, eggs, and vegetables/fruits were 52.9%, 47.1%, and 77.8%, respectively [Table 1]. The majority of the women were in their second trimester (77.5%). 70.6% of those with one or two children. Those who had an abortion, blood transfusion, or chronic disease in the past were 88.9%, 30.4%, and 68.4%, respectively. There were 68.8% with intestinal parasites and 80.0% with malarial infections, respectively [Table 2].

Mean and standard deviation among pregnant women

The mean Hb value was 8.38 ± 1.90 while erythrocyte, hematocrit, and mean cell volume was 3.49 ± 0.617 , 35.19 ± 5.20 , and 73.35 ± 12.25 respectively [Table 4].

Regression analysis

We used a binary logistic regression model to figure out how age, diet, and factors related to anemia affected pregnant women [Tables 1-3]. There was no statistically significant difference in the risk of anemia between the

Table 2: Pregnancy-related medical conditions and obstetric history

Risk factors	n=240, n (%)	Prevalence of anemia		95% CI for OR	P
		Anemic, n (%)	Nonanemic, n (%)		
Pregnancy (trimester)					
1 st	54 (22.5)	34 (63.0)	20 (37.0)	0.711 (0.275–1.838)	0.481
2 nd	80 (33.3)	62 (77.5)	18 (22.5)	0.351 (0.140–0.879)	0.025
3 rd	106 (44.2)	58 (54.7)	48 (45.3)	Reference category	
Number of children					
No children	14 (5.8)	8 (57.1)	6 (42.9)	0.650 (0.122–3.457)	0.613
1–2 children	170 (70.8)	120 (70.6)	50 (29.4)	0.361 (0.150–0.868)	0.023
>2	56 (23.3)	26 (46.4)	30 (53.6)	Reference category	
Birth interval (year)					
<1	154 (64.2)	100 (64.9)	54 (35.1)	1.350 (0.245–7.429)	0.730
>1	72 (30.0)	44 (61.1)	28 (38.9)	1.591 (0.271–9.354)	0.607
>2	14 (5.8)	10 (71.4)	4 (28.6)	Reference category	
History of abortion					
Yes	18 (7.5)	16 (88.9)	2 (11.1)	0.337 (0.155–0.732)	0.025
No	222 (92.5)	136 (61.3)	86 (38.7)	Reference category	
Past history of blood transfusion					
Yes	46 (19.2)	14 (30.4)	32 (69.6)	0.169 (0.063–0.456)	0.000
No	194 (80.8)	140 (72.2)	54 (27.8)	Reference category	
Chronic disease					
Yes	38 (15.8)	26 (68.4)	12 (31.6)	0.798 (0.280–2.278)	0.674
No	202 (84.2)	128 (63.4)	74 (36.6)	Reference category	
Intestinal parasite					
Yes	32 (13.3)	22 (68.8)	10 (31.3)	0.789 (0.255–2.444)	0.682
No	208 (86.7)	132 (63.5)	76 (36.5)	Reference category	
Malaria infection					
Yes	30 (12.5)	24 (80.0)	6 (20.0)	0.406 (0.108–1.528)	0.183
No	210 (87.5)	130 (61.9)	80 (38.1)	Reference category	

CI=Confidence interval, OR=Odds ratio

Table 3: Anemia prevalence among pregnant women (n=240)

Parameter	Prevalence	
	Anemic, n (%)	Nonanemic, n (%)
Hemoglobin (g/dL)		
Mild (<10)	48 (20.0)	176 (73.3)
Moderate (<8)	8 (3.3)	
Severe (<6)	8 (3.3)	
Total	64 (26.7)	176 (73.3)

age categories of 15–24, 25–34, and 35–44 (odds ratio [OR] = 0.933, 95% CI = 0.282–3.094, $P > 0.05$) and OR = 2.496, 95% CI = 0.772–8.072, $P > 0.05$). (OR = 4.940, 95% CI 1.957–12.468, $P < 0.05$). Married women were 4.94 times more likely to be anemic than divorced women, while rural women were 0.337 times more likely to be anemic than urban women. There was no statistically significant difference between women who worked and women who stayed at home ($P > 0.05$). However, pregnant women in their second trimester were 0.351 times more likely to get anemia (OR = 0.351, 95% CI = 0.140–0.879). Women who were pregnant and had one or two children were 0.361 times more likely to be anemic (95% CI: 0.150–0.868, $P < 0.05$). The number of years between births, the use of iron supplements, eating habits, chronic

diseases, intestinal parasites, and malaria infections were all the same ($P > 0.05$).

Those who don't take prenatal multivitamin pills are 0.189 times more likely to have anemia (OR = 0.189, 95% CI: 0.077–0.462, $P < 0.05$), as are those who don't take prenatal folic acid (OR = 0.017, 95% CI: 0.002–0.131, $P < 0.05$). Women who had an abortion or a blood transfusion before getting pregnant were more likely to get anemia (OR = 0.337, 95% CI = 0.155–0.732, $P < 0.05$) and (OR = 0.169, 95% CI = 0.063–0.456, $P < 0.05$).

Discussion

One of the most susceptible populations to anemia is pregnant women, particularly in underdeveloped nations.^[8] In order to ascertain the prevalence of among expectant mothers receiving prenatal care in Mogadishu, Somalia, this study was carried out. In this study, 26.7% (95% CI = 0.086–0.692) of the participants had anemia, with 20.0% having mild anemia, 3.3% having moderate anemia, and 3.3% having severe anemia, with a mean (\pm standard deviation) Hb concentration of 8.38 (\pm 1.90) g/dL [Table 3]. This percentage is lower than the prevalence of anemia in

Table 4: Mean and standard deviation among pregnant women

Parameters	n=240	Mean±SD	Normal range	95% CI for OR
Hemoglobin	240	8.38±1.904	11.5–15.5 g/dL	0.244 (0.086–0.692)
Erythrocyte		3.4902±0.61728	3.88–4.8×10 ¹² /L	
Hematocrit		35.19±5.20	38%–48%	
Mean cell volume		73.35±12.249	80–100 fL	

SD=Standard deviation, CI=Confidence interval, OR=Odds ratio

pregnant women in Bangladesh, Pakistan, Sudan, and Nigeria, which are 62.5%, 57.7%, 40.8%, 46.2%, and 68.5%, respectively.^[9-13] This study's anemia prevalence estimates of 26.7% were comparable to those of studies conducted in Uganda and Ethiopia, 25.8% and 23.2%, respectively.^[2,14] The current study's low prevalence of anemia among pregnant women could be attributed to the increasing development of ANC services in Mogadishu. In addition, decreased prevalence of anemia is connected with socioeconomic improvement, a greater standard of living, and better utilization of health care facilities.

Pregnant women from rural areas had a 0.337-times higher likelihood of being anemic than pregnant women from urban areas in the current study (OR = 0.337, 95% CI: 0.155–0.732, $P < 0.05$). This could be explained by the fact that pregnant women from rural areas might lack knowledge about the best diet to follow during pregnancy, face financial hardships, and lack access to medical facilities. Pregnant women in the second trimester had a 0.351 times higher risk of developing anemia (OR = 0.351, 95% CI 140–879, $P < 0.05$). The reasons are complicated and numerous, but some of them include the body's challenges with iron absorption and the rise in iron requirements during pregnancy. Due to these factors, second-trimester pregnant women are more prone to experience anemia than those who are further along in their pregnancies. Having one or two children while being pregnant increased the likelihood of becoming anemic by 0.361 times (OR = 0.361, 95% CI: 0.150–0.868, $P < 0.05$). In addition, those who do not take prenatal folic acid (OR = 0.017, 95% CI: 0.002–0.131, $P < 0.05$) are 0.17 times more likely to have anemia than those who do (OR = 0.189, 95% CI: 0.077–0.462, $P < 0.05$). Anemia was more likely to occur in pregnant women who had previously had an abortion or had received blood transfusions (OR = 0.337, 95% CI = 0.155–0.732, $P < 0.05$) and (OR = 0.169, 95% CI = 0.063–0.456, $P < 0.05$). This is due to the possibility that getting blood transfusions may set off an immune reaction that targets the body's own red blood cells, causing a decrease in their number and eventually leading to anemia. This may be a result of pregnant women taking folic acid, multivitamins, and iron supplements, which can help them increase their hemoglobin levels and prevent anemia. This agrees study done by.^[8,15,16]

Conclusion

The prevalence of anemia in the present study was low when compared to earlier studies conducted in Bangladesh, Pakistan, Sudan, and Nigeria, among others. Regular visits to maternity care facilities and health education promotion efforts need to be emphasized more to improve rates of success.

Financial support and sponsorship

Received publication grant from simad University.

Conflicts of interest

There are no conflicts of interest.

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