



PREVALENCE OF ANAEMIA AMONG PREGNANT WOMEN AND ITS ASSOCIATED FACTORS: A CROSS-SECTIONAL STUDY AT A TERTIARY CARE HOSPITAL

Dr. Dunga Harshavalli^{1*}, Dr. Swarnalatha Modugavalsa²

^{1*} Assistant Professor, Department of Obstetrics and Gynecology, Great Eastern Medical School and Hospital (GEMS&H), Ragolu, Srikakulam, Andhra Pradesh, India – 532484.

² Assistant Professor, Department of Obstetrics and Gynecology, Great Eastern Medical School and Hospital (GEMS&H), Ragolu, Srikakulam, Andhra Pradesh, India – 532484, Mail id: drharshavallidung@gmail.com

Abstract

Background: Anaemia during pregnancy remains an important public health problem, particularly in low- and middle-income countries. Increased physiological requirements for iron and other micronutrients, inadequate dietary intake, poor adherence to supplementation, repeated pregnancies and socioeconomic constraints may contribute to maternal anaemia.

Aim: To determine the prevalence of anaemia among pregnant women and assess selected factors associated with anaemia.

Materials and Methods: A cross-sectional study was conducted among 150 pregnant women at Great Eastern Medical School and Hospital (GEMS&H) from July 2014 to June 2015. Socio-demographic, obstetric, dietary and iron-folic acid supplementation information was collected using a structured questionnaire, while haemoglobin values were obtained from antenatal laboratory records. Data were analysed using descriptive statistics and the Chi-square test.

Results: Anaemia was present in 85/150 participants (56.7%). Mild, moderate and severe anaemia accounted for 30.0%, 22.0% and 4.7%, respectively. Significant associations were observed with socioeconomic status ($\chi^2=18.6$, $p=0.001$), iron-folic acid supplementation ($\chi^2=9.84$, $p=0.002$), and parity ($\chi^2=5.62$, $p=0.017$).

Conclusion: Anaemia affected more than half of the pregnant women studied. Strengthening antenatal screening, improving adherence to iron-folic acid supplementation and promoting maternal nutrition may help reduce the burden of anaemia.

Keywords: Anaemia; pregnancy; haemoglobin; iron-folic acid; antenatal care; maternal health; prevalence.

Introduction

Anaemia is one of the most common nutritional and public health problems affecting women during pregnancy. The World Health Organization defines anaemia in pregnant women as a haemoglobin concentration below 110 g/L (11.0 g/dL) at sea level, with interpretation also influenced by factors such as trimester, altitude and smoking.¹ Pregnancy is accompanied by physiological expansion of maternal blood volume and increased requirements for iron and other micronutrients. When dietary intake and body stores are insufficient to meet these demands, haemoglobin concentration may decline. Iron deficiency is considered an important cause of anaemia, although nutritional and non-nutritional causes may coexist.²

Maternal anaemia has important implications for pregnancy and neonatal outcomes. Anaemia, particularly when severe, has been associated with adverse reproductive outcomes including preterm delivery and low birth weight.³ Early identification through antenatal care and appropriate nutritional and therapeutic interventions therefore remains important.

In India, maternal anaemia continues to represent a major public health concern. NFHS-5 (2019–21) reported that 52.2% of pregnant women aged 15–49 years were anaemic nationally; the reported prevalence in Andhra Pradesh was 53.7%.⁴

The present study was therefore undertaken to estimate the prevalence of anaemia among pregnant women and assess selected associated factors among women studied at GEMS&H. The aim of the present study was to determine the prevalence of anaemia among pregnant women and identify selected socio-demographic, nutritional, and obstetric factors associated with anaemia. The objectives were to determine the prevalence of anaemia among pregnant women, classify anaemia according to haemoglobin concentration, assess the association between socio-demographic characteristics and anaemia, determine the association between iron-folic acid supplementation and anaemia, and assess the relationship between parity and maternal anaemia.

Materials And Methods

Study design and setting

A cross-sectional study was conducted at Great Eastern Medical School and Hospital (GEMS&H), India, from July 2014 to June 2015.

Study population and sample size

A total of 150 pregnant women were included in the study.

Inclusion and exclusion criteria

Inclusion criteria:

- Pregnant women residing in the study area.
- Women in any trimester of pregnancy.
- Women who provided informed consent.

Exclusion criteria:

- Pregnant women with known haematological disorders.
- Women who declined participation.

Data collection

Data were collected using a pre-tested structured questionnaire covering socio-demographic characteristics, obstetric history, dietary practices, iron-folic acid supplementation and antenatal care utilization. Haemoglobin values were obtained from antenatal laboratory records.

Assessment of anaemia

For the study dataset, participants were categorized as normal (≥ 11 g/dL), mild anaemia (10–10.9 g/dL), moderate anaemia (7–9.9 g/dL), and severe anaemia (< 7 g/dL). The principal population-level WHO threshold for anaemia in pregnancy is < 11.0 g/dL.¹

Statistical analysis

Data were entered into Microsoft Excel and analysed using SPSS. Categorical variables were summarized as frequencies and percentages. Associations between anaemia and categorical variables were assessed using the Chi-square test. A p-value < 0.05 was considered statistically significant.

Results

A total of 150 pregnant women were included. Overall, 85 participants (56.7%) were anaemic and 65 (43.3%) were non-anaemic.

Table 1. Age distribution of study participants (n=150)

Age group (years)	Number	Percentage
<20	18	12.0
20–24	52	34.7
25–29	46	30.7
30–34	24	16.0
≥ 35	10	6.7
Total	150	100.0

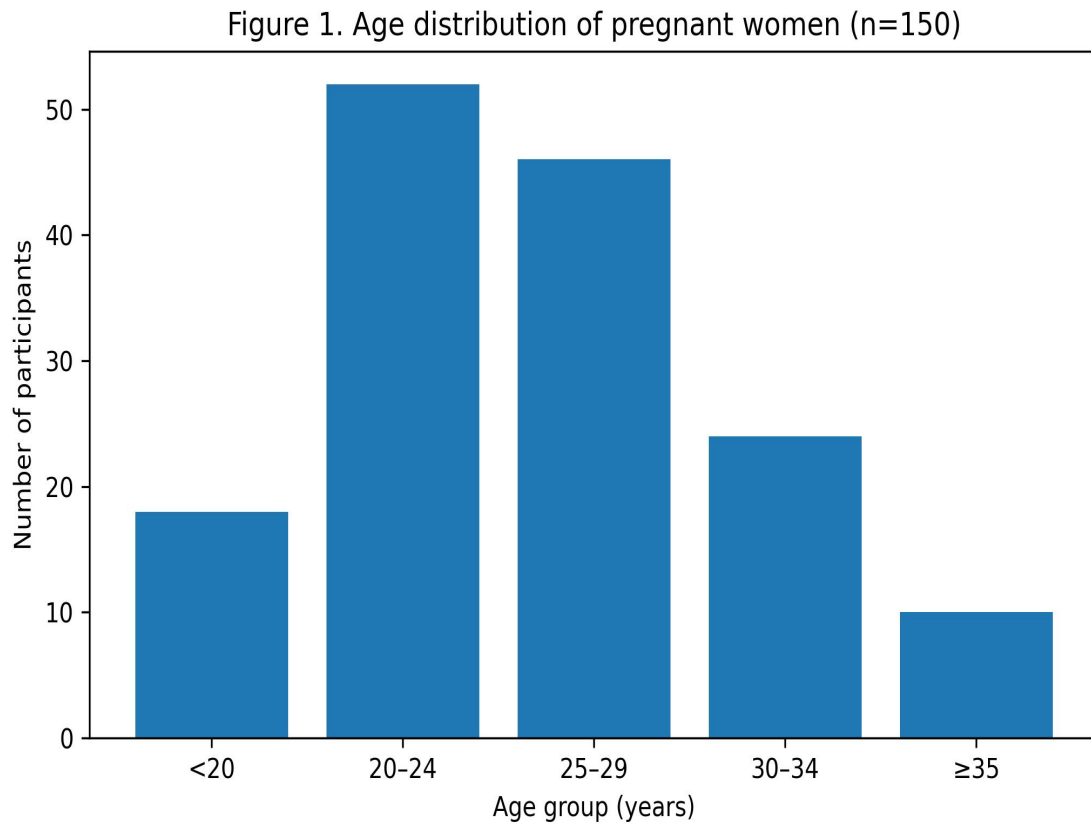


Figure 1. Age distribution of pregnant women (n=150)

The largest proportion of participants belonged to the 20–24-year age group (34.7%), followed by 25–29 years (30.7%).

Table 2. Distribution of participants according to haemoglobin status

Haemoglobin level	Classification	Number	Percentage
≥11 g/dL	Normal	65	43.3
10–10.9 g/dL	Mild anaemia	45	30.0
7–9.9 g/dL	Moderate anaemia	33	22.0
<7 g/dL	Severe anaemia	7	4.7
Total		150	100.0

Figure 2. Distribution of participants according to haemoglobin status

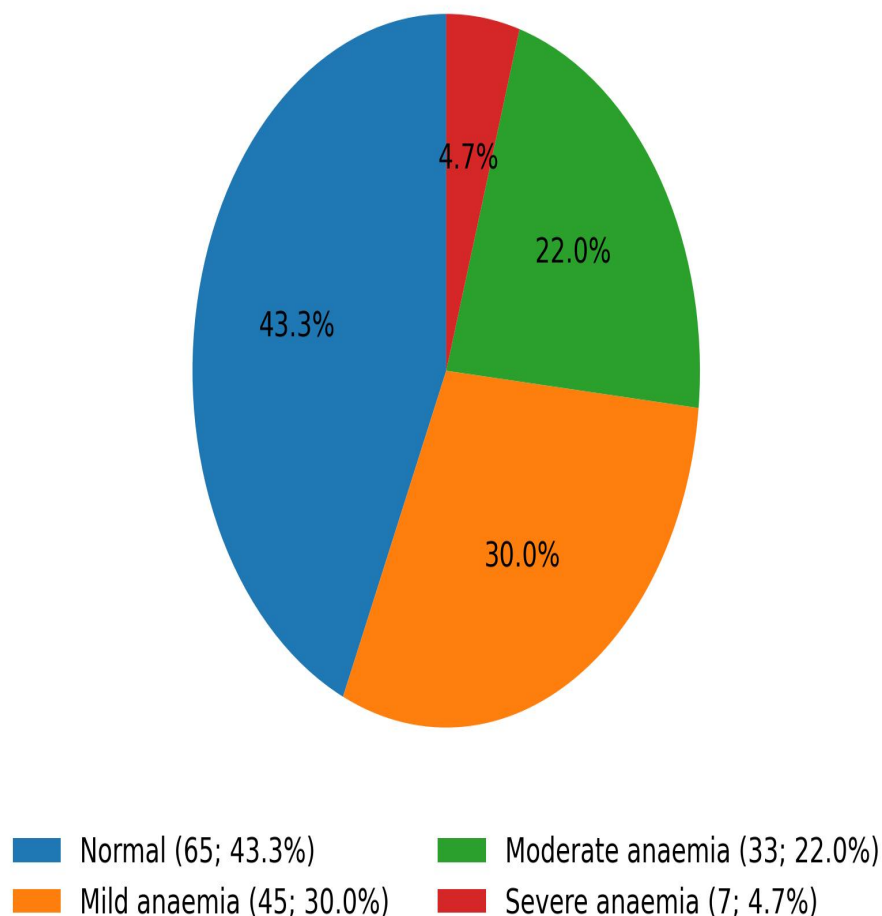


Figure 2. Distribution of participants according to haemoglobin status

Anaemia was present in 56.7% of participants. Mild anaemia was the most frequent category (30.0%), followed by moderate anaemia (22.0%) and severe anaemia (4.7%).

Table 3. Association between socioeconomic status and anaemia

Socioeconomic status	Anaemic	Non-anaemic	Total
Low	48	12	60
Middle	30	28	58
High	7	25	32
Total	85	65	150

A statistically significant association was observed between socioeconomic status and anaemia ($\chi^2=18.6$, $p=0.001$).

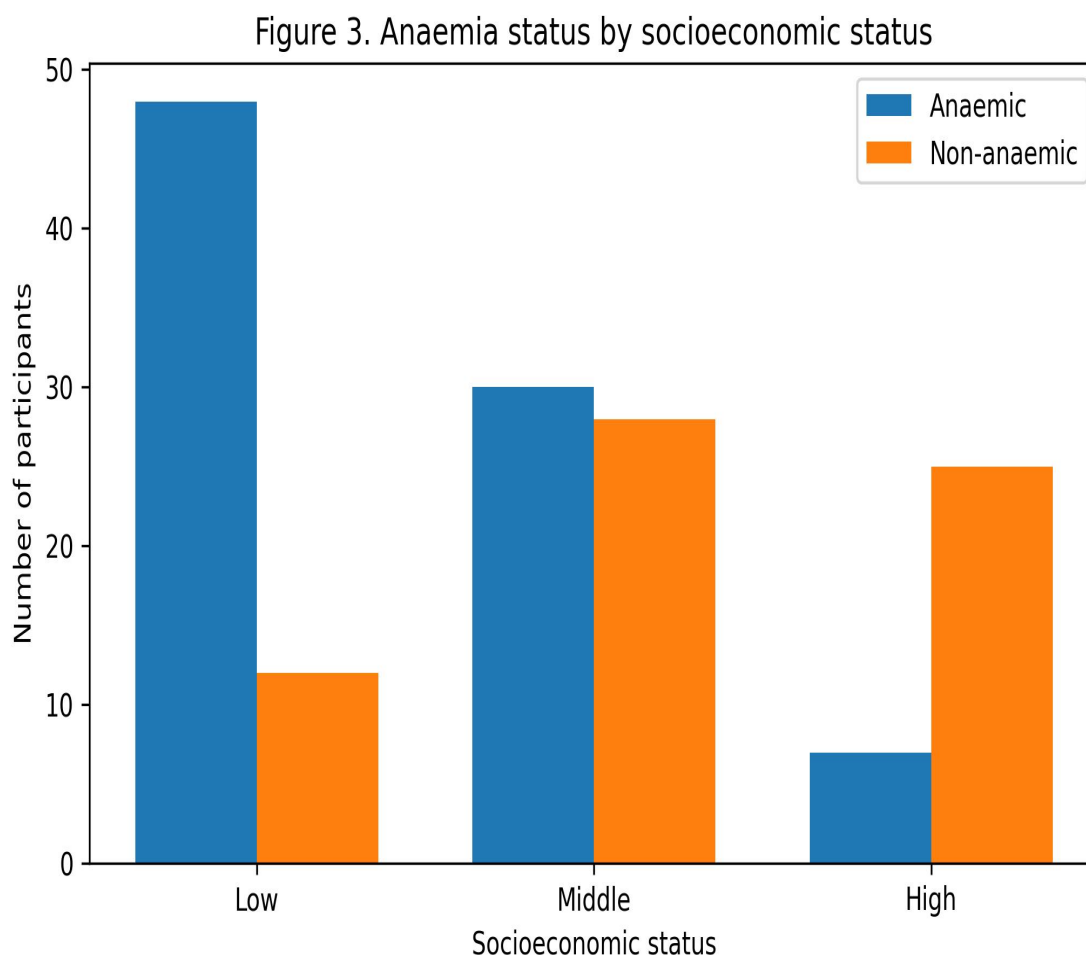


Figure 3. Anaemia status by socioeconomic status

Table 4. Association between iron-folic acid supplementation and anaemia

Supplementation	Anaemic	Non-anaemic	Total
Regular	32	40	72
Irregular	53	25	78
Total	85	65	150

Anaemia was significantly more common among women reporting irregular iron-folic acid supplementation ($\chi^2=9.84$, $p=0.002$).

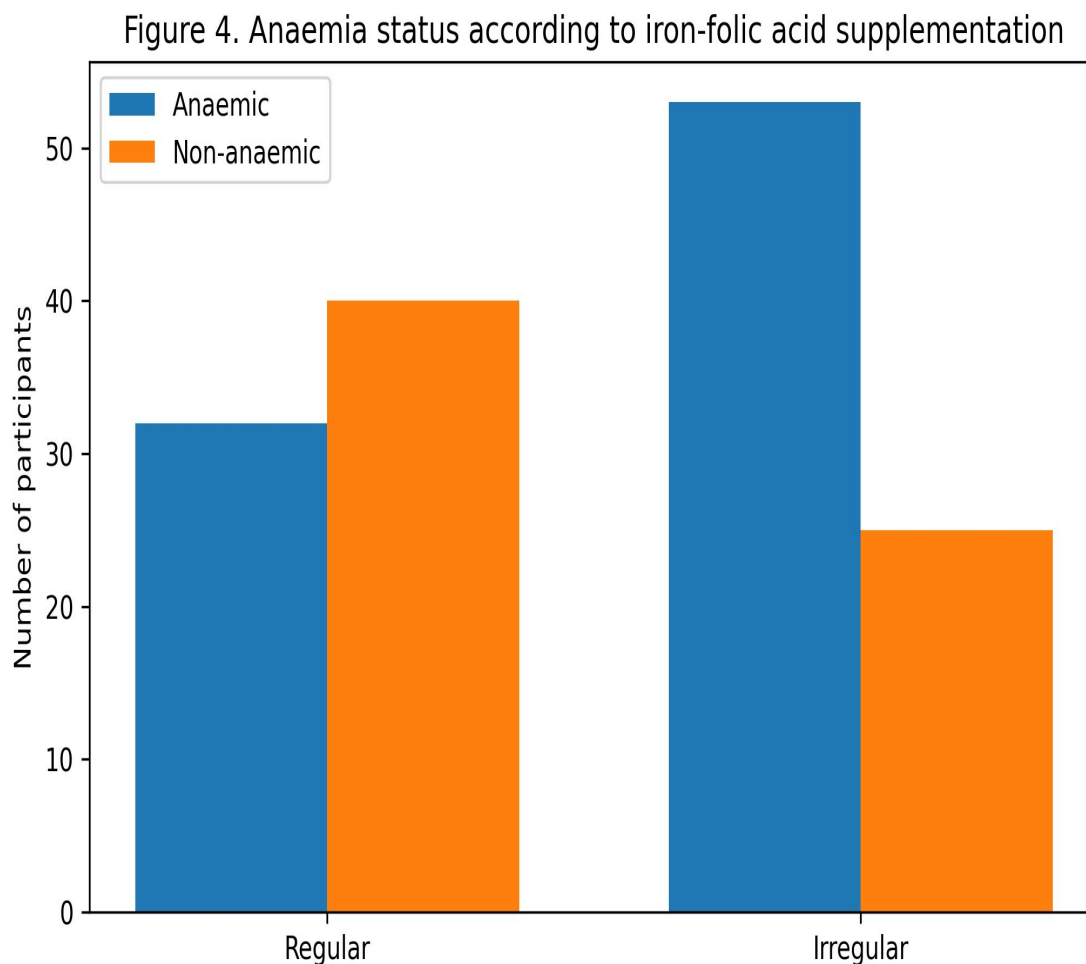


Figure 4. Anaemia status according to iron-folic acid supplementation

Table 5. Association between parity and anaemia

Parity	Anaemic	Non-anaemic	Total
Primigravida	30	32	62
Multigravida	55	33	88
Total	85	65	150

Multigravida women had a higher proportion of anaemia than primigravida women, and the association was statistically significant ($\chi^2=5.62$, $p=0.017$).

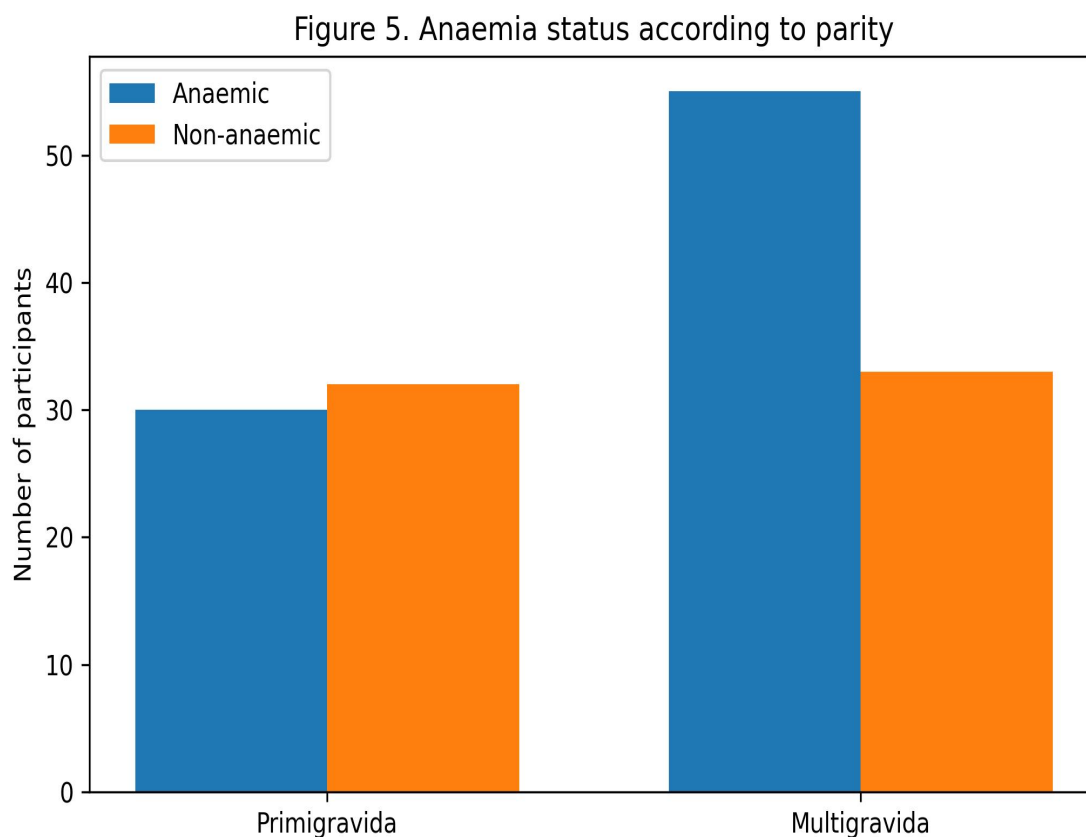


Figure 5. Anaemia status according to parity

Discussion

The present hospital-based cross-sectional study found an anaemia prevalence of 56.7% among 150 pregnant women. This indicates a substantial burden in the study population and is broadly comparable with the 52.2% prevalence reported among pregnant women in India in NFHS-5 (2019–21).⁴ The Government of India report based on NFHS-5 also reported a prevalence of 53.7% in Andhra Pradesh.⁴ In the present study, mild anaemia was the most frequent category, followed by moderate and severe anaemia. Early identification of anaemia during antenatal care is important because haemoglobin assessment is a key component of anaemia evaluation and can be integrated with routine antenatal services.¹

Socioeconomic status was significantly associated with anaemia. Women in the low socioeconomic group had a greater proportion of anaemia than women in the middle and high groups. This finding is consistent with previous studies describing socioeconomic and dietary factors among determinants of maternal anaemia.^{5,6}

A significant association was also observed between iron-folic acid supplementation and anaemia. Women reporting irregular supplementation had a higher proportion of anaemia. WHO recommends daily oral iron and folic acid supplementation during pregnancy as an antenatal intervention to reduce maternal anaemia and related risks.⁹

Parity was significantly associated with anaemia, with a greater proportion of anaemia among multigravida women. Similar associations have been reported in observational studies, where repeated pregnancies and inadequate recovery between pregnancies have been considered potential contributors to maternal nutrient depletion.^{7,8}

The findings should be interpreted in light of the study design and sample size. Because the study is cross-sectional, the observed associations do not establish causality. The results are most appropriately interpreted as associations within the studied population.

Conclusion

Anaemia was prevalent among more than half of the pregnant women included in this hospital-based study. Mild and moderate anaemia constituted the majority of cases. Lower socioeconomic status, irregular iron-folic acid supplementation and multigravidity were significantly associated with anaemia. Strengthening antenatal screening, improving adherence to iron-folic acid supplementation, promoting adequate maternal nutrition and ensuring timely evaluation and management may contribute to reducing the burden of maternal anaemia.

Declarations

Ethics approval: To be completed with the name/number of the approving Ethics Committee before submission.

Informed consent: Written informed consent was obtained from participating women, as reported in the study protocol/manuscript basis.

Funding: Nil.

Conflict of interest: The authors declare no conflict of interest.

References

1. World Health Organization. Guideline on haemoglobin cutoffs to define anaemia in individuals and populations. Geneva: World Health Organization; 2024.
2. Balarajan Y, Ramakrishnan U, Özaltın E, Shankar AH, Subramanian SV. Anaemia in low-income and middle-income countries. *Lancet*. 2011;378:2123–2135.
3. Kozuki N, Lee AC, Katz J. Moderate to severe maternal anemia and risk of low birth weight. *Am J Clin Nutr*. 2012;95(2):564–571.
4. International Institute for Population Sciences (IIPS), Ministry of Health and Family Welfare. National Family Health Survey (NFHS-5), 2019–21: India Report. Mumbai: IIPS; 2021.
5. Noronha JA, Bhaduri A, Bhat HV, Kamath A. Prevalence of anemia among pregnant women and its associated factors in coastal Karnataka. *J Health Popul Nutr*. 2012;30(4):421–427.
6. Taye B, Abeje G, Mekonen A. Factors associated with anemia among pregnant women attending antenatal care clinic in Northwest Ethiopia. *BMC Res Notes*. 2015;8:1–8.
7. Gebreweld A, Tsegaye A. Prevalence and factors associated with anemia among pregnant women attending antenatal clinic. *PLoS One*. 2018;13(11):e0206888.

8. Lee AI, Okam MM. Anemia in pregnancy. *Hematol Oncol Clin North Am.* 2011;25(2):241–259.
9. Peña-Rosas JP, De-Regil LM, Garcia-Casal MN, Dowswell T. Daily oral iron supplementation during pregnancy. *Cochrane Database Syst Rev.* 2015;7:CD004736.