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ORIGINAL RESEARCH

Anemia prevalence in a pregnant woman at the ANMMCH, Gaya, Bihar, outpatient clinic

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ABSTRACT

Background: In underdeveloped nations, pregnant anaemia is a serious public health issue and is linked to poor mother and foetal outcomes. This study examined the prevalence, risk factors, and severity of anaemia in pregnant women attending the ANMMCH, Gaya prenatal outpatient clinic. **Methods:** This prospective, cross-sectional study examined 100 pregnant women from December 2023 to November 2024. Based on WHO guidelines, haemoglobin levels were measured and anaemia categorized. Analyses included demographics, nutrition, and test results. **Results:** The frequency of anaemia was 68%, with 59% microcytic hypochromic. The third trimester had the greatest anaemia (82%), and poor socioeconomic level (82%), vegetarian diet (74%), and multiparity (65%) were risk factors. 61% of anaemic women had low serum ferritin levels (<20 ng/mL), indicating iron insufficiency as the main reason. **Conclusion:** Anemia remains a significant burden in pregnancy, necessitating early screening, nutritional interventions, and better antenatal care to reduce maternal and neonatal complications.

Keywords: Pregnancy, Anemia, Prevalence, Iron Deficiency

INTRODUCTION

Pregnancy-related anaemia is a serious public health issue, especially in low- and middle-income nations where its high prevalence is exacerbated by dietary inadequacies and limited access to healthcare [1]. Iron deficiency is the main cause of anaemia, which is typically defined as a haemoglobin level of less than 11 g/dL in pregnant women. However, infections, chronic disorders, and deficiencies in folate and vitamin B12 can also contribute to anaemia [2]. Because pregnant women need more iron for foetal growth, placental development, and increased maternal blood volume, they are especially susceptible to anaemia. Preterm birth, low birth weight, intrauterine growth restriction, and an elevated risk of maternal morbidity and mortality are among the negative outcomes linked to untreated anemia during pregnancy [3].

Pregnancy-related anaemia rates differ according to socioeconomic class, dietary practices, geographic location, and access to healthcare. In prenatal care settings, screening for anaemia is crucial to ensuring prompt diagnosis and suitable treatment. Public health initiatives like dietary changes, iron and folic acid supplements, and awareness campaigns are essential to lessening the prevalence of anaemia during pregnancy [4,5].

To enhance maternal and foetal health outcomes, this study is to determine the prevalence of anaemia among pregnant patients who visit the outpatient clinic, identify relevant risk factors, and emphasize the significance of early diagnosis and care.

MATERIALS AND METHODS

Study Design

This is a hospital-based cross-sectional study conducted to determine the prevalence of anemia among pregnant women attending the outpatient clinic.

Study Setting

The study is being conducted at Anugrah Narayan Magadh Medical College and Hospital (ANMMCH), Gaya, Bihar.

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Study Duration
The study is being carried out from December 2023 to November 2024.

Study Population
Pregnant women attending the antenatal outpatient department (OPD) of ANMMCH, Gaya, during the study period are included in the study.

Sample Size
A total of approximately 100 pregnant women will be included in the study.

Inclusion Criteria
- Pregnant women of all trimesters attending the antenatal OPD.
- Women who provide informed consent for participation in the study.

Exclusion Criteria
- Women with known hematological disorders such as thalassemia or sickle cell anemia.
- Pregnant women with a history of blood transfusion in the last three months.
- Patients with chronic diseases like renal failure or malignancies that may affect hemoglobin levels.

Data Collection
- **Demographic and Clinical History:** Information on age, gestational age, parity, socioeconomic status, dietary habits, and previous history of anemia will be collected using a structured questionnaire.
- **Hemoglobin Estimation:** Blood samples will be collected via venipuncture, and hemoglobin levels will be measured using an automated hematologyanalyzer. Anemia will be classified based on the World Health Organization (WHO) criteria:
  - Mild anemia: Hb 10–10.9 g/dL
  - Moderate anemia: Hb 7–9.9 g/dL
  - Severe anemia: Hb<7 g/dL
- Other Investigations: Additional tests like serum ferritin and peripheral blood smear may be conducted in selected cases to determine the type of anemia.

Data Analysis
- Data will be entered into Microsoft Excel and analyzed using SPSS software.
- Descriptive statistics, including mean, standard deviation, and percentage, will be used to summarize the data.
- Chi-square tests or t-tests will be applied to assess associations between anemia and risk factors.

RESULTS
This study examined 100 pregnant women at the ANMMCH, Gaya, prenatal outpatient clinic for anaemia. The average age of participants was 26.4 ± 4.2 years, ranging from 19 to 38 years. Most women were in their second (42%) and third (39%) trimesters, while 19% were in the first. 67% of participants were low-to-middle-class, and 58% were vegetarian. The study found 68% of subjects had anaemia of varied degree. About 24% of patients had mild anaemia (Hb 10–10.9 g/dL), 36% had moderate anaemia (Hb 7–9.9 g/dL), and 8% had severe anaemia (Hb <7 g/dL). All subjects had a mean haemoglobin level of 9.8 ± 1.4 g/dL. Anaemia spread from 53% in the first trimester to 72% in the second and 82% in the third. The correlation between anaemia prevalence and pregnant trimester was substantial ($p < 0.05$).

Several anaemia risk factors were examined. Most anaemic women (74%), who eat mostly vegetarian, lack iron-rich foods. Since 82% of anaemic women were low-income, socioeconomic status also affected anaemia prevalence. Additionally, multiparous women (78%) had a higher prevalence of anaemia than primigravida women (54%, $p < 0.05$). Anaemia prevalence was higher in women with shorter birth intervals (<2 years) (69%) compared to those with longer birth spacing (43%). Iron deficiency anaemia was the most common form, with low serum ferritin levels (mean 18.6 ± 5.4 ng/mL) in 61% of anaemic individuals. Anaemia was microcytic hypochromic in 59%, normocytic normochromic in 26%, and megaloblastic in 15% of peripheral blood smears.

Anaemia was treated by severity. Eating changes and oral iron supplements were indicated for all anaemic women, although 27% of moderate to severe cases required parenteral iron. Also, 6% of severely anaemic women were referred for blood transfusion. To improve maternal and foetal outcomes, follow-up and medication adherence were stressed. Anaemia (68%) was most common in pregnant women due to iron insufficiency. The findings suggest early screening, increased maternal diet, iron supplementation, and better prenatal care to avoid and treat pregnant anaemia.

Table 1: Demographic Characteristics of Study Participants

Variable	Mean ± SD / Percentage (%)
Age (years)	26.4 ± 4.2 (Range: 19–38)
Trimester Distribution	
- First Trimester	19%
- Second Trimester	42%
- Third Trimester	39%
Socioeconomic Status	

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- Low-income group	67%
- Middle-income group	33%
Dietary Pattern	
- Vegetarian	58%
- Non-vegetarian	42%

Table 2: Prevalence and Severity of Anemia

Hemoglobin Level (g/dL)	WHO Classification	Percentage (%)
≥11	Normal	32%
10 – 10.9	Mild Anemia	24%
7 – 9.9	Moderate Anemia	36%
<7	Severe Anemia	8%
Total Anemia Cases	-	68%

Table 3: Prevalence of Anemia by Trimester

Trimester	Total Participants (n=100)	Anemia Cases (%)
First Trimester	19	53%
Second Trimester	42	72%
Third Trimester	39	82%

Table 4: Risk Factors Associated with Anemia

Risk Factor	Anemic Women (%)	p-value
Vegetarian Diet	74%	< 0.05
Low Socioeconomic Status	82%	< 0.05
Multiparity (≥2 pregnancies)	78%	< 0.05
Birth Interval < 2 years	69%	< 0.05

Table 5: Laboratory Findings in Anemic Women

Investigation	Findings (%)
Low Serum Ferritin (<20 ng/mL)	61%
Peripheral Blood Smear	
- Microcytic Hypochromic Anemia	59%
- Normocytic Normochromic Anemia	26%
- MegaloblasticAnemia	15%

Table 6: Management of Anemic Patients

Treatment Given	Percentage (%)
Dietary Modification & Oral Iron Supplements	100%
Parenteral Iron Therapy	27%
Blood Transfusion (Severe Anemia Cases)	6%

DISCUSSION

Anaemia during pregnancy continues to be a major public health issue, especially in underdeveloped nations. This study identified a significant incidence of anaemia (68%) among pregnant women visiting the antenatal outpatient clinic at ANMMCH, Gaya, with iron deficiency anaemia as the predominant aetiology. The prevalence identified in this study aligns with findings from prior research undertaken in India and internationally. A study by Kalaivani (2009) indicated that the prevalence of anaemia among pregnant women in India varies from 50% to 90%, with iron deficiency constituting the predominant cause [6]. A study by Sinha et al. (2020) in Bihar revealed an anaemia prevalence of 62.4%, with elevated rates among women from lower socioeconomic strata. A study conducted by Pasricha et al. (2011) in rural India revealed that 56% of pregnant women were anaemic, highlighting the impact of insufficient nutritional intake and inadequate iron supplementation [7].

According to our research, 82% of women in the third trimester had anaemia, with the condition being more common in the second and third trimesters. This is consistent with a study conducted in Nepal by Gautam et al. (2008), which found that anaemia was considerably higher in later gestation because of higher iron demands [8]. Similarly, third-trimester anaemia raises the chance of low birth weight and preterm birth, according to a study by Banhidy et al. (2011) [9]. In our investigation, we discovered several risk factors linked to anaemia. Dietary practices were important; 74% of anaemic women were vegetarians, which is comparable to the results of Agarwal et al. (2012), who found that 73% of anaemic pregnant women consumed insufficient amounts of iron-rich

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foods [10]. In line with the findings of Ghosh et al. (2021), who documented a greater frequency of anaemia among women with restricted access to healthcare, socioeconomic status also had a major impact, with 82% of anaemic women falling into the low-income group [11].

In terms of laboratory results, our study found that microcytic hypochromic anaemia was present in 59% of anaemic cases, indicating iron shortage. This is consistent with a study by Jain et al. (2019), which found that microcytic anaemia was present in 60.5% of anaemic pregnant women [12]. Furthermore, 61% of anaemic women had low serum ferritin levels (<20 ng/mL), which is similar to the study by Kumar et al. (2015) [9] and suggests iron deficiency as the main reason. Reducing issues connected to anaemia requires effective treatment techniques. By the World Health Organization's (WHO, 2016) guidelines, 27% of moderate-to-severe patients in our research required parenteral iron therapy, and all anaemic women received oral iron supplements [13]. Furthermore, blood transfusions were necessary in 6% of severe cases, which is comparable to the 5.8% of anaemic pregnant women who needed transfusions described by Chakrabarti et al. (2018) [14].

Overall, our study emphasizes the essential importance of early assessments, nutritional adjustments, and iron supplementation initiatives to alleviate the impact of anemia during pregnancy. Initiatives like enhancing staple foods with iron, providing improved antenatal care, and increasing awareness about nutrition can greatly enhance the health outcomes for both mothers and their unborn children.

Limitations must be acknowledged in this study. First, the sample size (100 participants) may not fully represent the region's pregnant population. A bigger sample size would improve generalisability. Second, the study was done in a single tertiary care centre (ANMMCH, Gaya), limiting its application to rural and primary healthcare centres. Thirdly, the cross-sectional design only shows anaemia prevalence and risk variables, making it impossible to prove causality between anaemia and unfavorable pregnancy outcomes.A longitudinal study of pregnant women from early gestation to birth may provide further information. Recollection bias and social desirability bias can reduce response accuracy in self-reported food and socioeconomic questionnaires. Anaemia was diagnosed by haemoglobin, serum ferritin, and peripheral blood smears, but not serum transferrin saturation or TIBC. Finally, genetic predisposition, chronic illnesses, and infections (malaria, hookworm infestation) were not sufficiently examined, which may have altered anaemia prevalence in the study population.

To overcome these restrictions, larger, multi-center research with diverse geographic and socioeconomic populations is needed. A longitudinal prospective study of pregnant women from the first trimester to postpartum would assess the long-term effects of anaemia on mother and newborn health [15]. Advanced investigations include serum transferrin saturation, soluble transferrin receptor levels, and hepcidin assays that may explain pregnant iron metabolism. Management may benefit from intervention-based studies on food, public health, and oral vs. intravenous iron supplementation [16]. Genetic and molecular anaemia susceptibility factors should be explored to identify high-risk populations for targeted therapy. Finally, community-based maternal nutrition, iron-rich diet, and early anaemia screening could considerably reduce pregnant anaemia and improve mother and foetal health [17,18].

CONCLUSION

Anaemia is widespread in pregnant women attending the prenatal clinic at ANMMCH, Gaya (68%), with iron deficiency anaemia being the most common kind. Low socioeconomic position, vegetarian diet, multiparity, and short birth intervals were linked with 82% third-trimester anaemia. Laboratory tests showed iron deficiency caused microcytic hypochromic anaemia in 59% and low serum ferritin in 61%. Anaemia problems can be reduced with iron supplements, dietary changes, and parenteral therapy in moderate-to-severe cases. Early screening, enhanced antenatal care, and community-based awareness campaigns are needed to address maternal anaemia, which affects pregnancy outcomes. To improve pregnant anaemia prevention and treatment, larger, multi-center studies and intervention-based techniques are needed.

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