



Prevalence and Clinical Outcomes of Anemia and Respiratory Infections Among Pregnant Women in a Tertiary Care Hospital.

Nishat Fatima^{1*}, Manoj Prajapati², Kriti Dwivedi³.

¹Department of obstetrics and gynaecology, GMC, Satna, (MP), India.

²Department of Medicine, GMC, Satna (MP), India.

³Consultant Pulmonologist, Pvt Practicing, Satna (MP), India.



Correspondence:

Nishat Fatima.

Department of obstetrics and gynaecology, GMC, Satna, (MP), India.

Email:

drnishatkhan1@gmail.com

Received: 13-03-2026

Revised: 04-04-2026

Accepted: 28-04-2026

Published: 11-05-2026

Abstract

Background: Anemia and respiratory infections are common complications during pregnancy, contributing significantly to maternal and fetal morbidity, especially in developing countries. **Objective:** To determine the prevalence of anemia and respiratory infections among pregnant women and assess their clinical outcomes. **Materials and methods:** A hospital-based cross-sectional study was conducted over 18 months among 200 pregnant women attending antenatal clinics at a tertiary care hospital. Hemoglobin estimation and clinical evaluation for respiratory infections were performed. Outcomes assessed included maternal complications, preterm delivery, and low birth weight. Statistical analysis was performed using chi-square test. **Result:** The prevalence of anemia was 62%, while respiratory infections were observed in 28% of participants. Mild, moderate, and severe anemia were seen in 30%, 22%, and 10% of cases, respectively. Respiratory infections were significantly higher in anemic women ($p < 0.01$). Adverse outcomes such as preterm delivery (18%), low birth weight (22%), and maternal complications (15%) were more common in women with both anemia and respiratory infections. **Conclusion:** Anemia and respiratory infections are highly prevalent among pregnant women and are associated with adverse maternal and fetal outcomes. Early screening and integrated management are essential to improve pregnancy outcomes.

Keywords: Anemia, Pregnancy, Respiratory infection, Preterm birth, Maternal health.



This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).

INTRODUCTION

Pregnancy is a critical physiological state associated with increased nutritional and immunological demands. Anemia, particularly iron deficiency anemia, is one of the most common conditions affecting pregnant women globally, with a higher burden in low- and middle-income countries. It is associated with adverse maternal outcomes such as fatigue, increased susceptibility to infections, and increased risk of postpartum hemorrhage.

Respiratory infections, including upper respiratory tract infections and pneumonia, are also common during pregnancy due to altered immune responses. These infections may exacerbate maternal morbidity and adversely affect fetal outcomes. The coexistence of anemia and respiratory infections can further compromise maternal health and pregnancy outcomes. However, limited data are available on their combined impact. This study aims to assess the prevalence of anemia and respiratory infections and evaluate their clinical outcomes among pregnant women attending a tertiary care hospital.

MATERIALS AND METHODS

Study Design and Setting

Hospital-based cross-sectional study conducted over 18 months.

Study Population

- Sample size: 200 pregnant women
- Inclusion: All antenatal women attending OPD
- Exclusion: Chronic diseases, hematological disorders

Data Collection

- Hemoglobin estimation (automated analyzer)

Citation: Fatima N, Prajapati M, Dwivedi K. Prevalence and clinical outcomes of anemia and respiratory infections among pregnant women in a tertiary care hospital. *Int. J. Med.*, 2026;8(5):222-226.

- Clinical evaluation for respiratory infections
- Obstetric outcomes recorded

Classification of Anemia (WHO)

- Mild: Hb 10–10.9 g/dL
- Moderate: Hb 7–9.9 g/dL
- Severe: Hb <7 g/dL

Outcome Measures

- Preterm delivery
- Low birth weight
- Maternal complications

Statistical Analysis

- Software: SPSS v25
- Test: Chi-square
- $p < 0.05$ significant.

RESULTS

Table 1 presents the baseline demographic characteristics of the 200 pregnant women included in the study. The mean age of the participants was 26.8 ± 4.5 years, indicating that the majority of women belonged to the young reproductive age group, which is consistent with the typical age distribution of antenatal populations in developing countries.

In terms of obstetric profile, 40% of the women were primigravida (experiencing their first pregnancy), while a higher proportion, 60%, were multigravida, reflecting a predominance of women with previous pregnancy experience. This distribution may have implications for maternal health outcomes, as multiparity is often associated with increased nutritional demands and a higher risk of anemia.

Additionally, 65% of the study population belonged to rural areas, highlighting that the majority of participants were from rural backgrounds. This is an important observation, as rural populations often face challenges such as limited access to healthcare services, lower socioeconomic status, and reduced awareness regarding antenatal care. These factors may contribute to a higher prevalence of anemia and infections observed in such settings.

Overall, the demographic profile suggests that the study population largely comprised young, multiparous women from rural areas, which is reflective of a typical tertiary care hospital catchment population and is relevant for interpreting the study findings in the context of maternal health in resource-limited settings.

Table 1: Demographic Profile of Study Population (n = 200)

Parameter	Value
Mean age	26.8 ± 4.5 years
Primigravida	40%
Multigravida	60%
Rural population	65%

Table 2 shows that anemia was present in the majority (62%) of pregnant women. Among them, mild anemia was the most common (30%), followed by moderate (22%) and severe anemia (10%). Only 38% were non-anemic. This indicates a high burden of anemia in the study population, with most cases falling in the mild to moderate category.

Table 2: Prevalence and Severity of Anemia

Category	Percentage (%)
Non-anemic	38%
Mild anemia	30%
Moderate anemia	22%
Severe anemia	10%

Table 3 indicates that the majority of pregnant women (72%) did not have any respiratory infection, while 28% were affected. This shows that nearly one-third of the study population experienced respiratory infections, highlighting a considerable burden of such conditions during pregnancy.

Table 3: Prevalence of Respiratory Infections

Condition	Percentage (%)
No infection	72%
Respiratory infection	28%

A clear association between anemia status and the prevalence of respiratory infections among the study participants. Among non-anemic women, only 15% had respiratory infections, whereas a significantly higher proportion of anemic women (35%) were affected. This marked difference indicates that pregnant women with anemia are more than twice as likely to develop respiratory infections compared to those with normal hemoglobin levels.

The observed association is statistically significant ($p < 0.01$), suggesting that the relationship is unlikely to be due to chance. This finding can be explained by the impact of anemia on immune function. Iron deficiency and reduced hemoglobin levels can impair cellular immunity and reduce the body's ability to combat infections, thereby increasing susceptibility to respiratory pathogens.

Furthermore, anemia may contribute to reduced oxygen-carrying capacity and overall physiological stress, making pregnant women more vulnerable to complications when infections occur. The higher prevalence of respiratory infections among anemic women highlights the importance of early detection and management of anemia as part of routine antenatal care.

Overall, this table underscores the significant interplay between nutritional status and infection risk, emphasizing the need for integrated maternal health strategies that address both anemia and infectious diseases to improve pregnancy outcomes (Table 4).

Table 4: Association Between Anemia and Respiratory Infection

Group	Respiratory Infection (%)
Non-anemic	15%
Anemic	35%

($p < 0.01$, statistically significant)

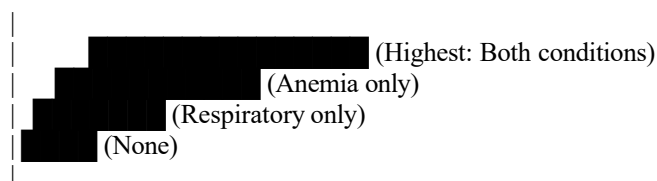
Table 5 shows that adverse outcomes were observed among the study population, with low birth weight being the most common (22%), followed by preterm delivery (18%) and maternal complications (15%). This indicates a notable impact on both maternal and fetal health.

Table 5: Clinical Outcomes

Outcome	Percentage (%)
Preterm delivery	18%
Low birth weight	22%
Maternal complications	15%

Figure 1 illustrates that adverse outcomes were lowest in women with neither anemia nor respiratory infection. The risk increased in those with either condition alone, with anemia showing a slightly greater impact than respiratory infection. The highest proportion of adverse outcomes was observed in women who had both anemia and respiratory infection, indicating a combined or additive effect on poor maternal and fetal outcomes.

Adverse Outcomes (%)



None Resp Anemia Both

Figure 1: Combined Effect of Anemia and Respiratory Infection on Outcomes

DISCUSSION

The present study highlights a high prevalence of anemia (62%) among pregnant women, reflecting a substantial public health burden and aligning with national and global reports from developing countries. The predominance of mild to moderate anemia suggests that while severe cases are fewer, a large proportion of women enter pregnancy or remain during

gestation with suboptimal hemoglobin levels. This has important implications for both maternal well-being and fetal development. The high prevalence observed in this study may be attributed to factors such as nutritional deficiencies, repeated pregnancies, and limited access to quality antenatal care, particularly among rural populations.

Respiratory infections were identified in 28% of the study population, indicating that nearly one-third of pregnant women experienced infectious morbidity during pregnancy. Notably, these infections were significantly more common among anemic women, suggesting a strong association between nutritional status and susceptibility to infections. This relationship can be explained by the role of iron and hemoglobin in maintaining immune function. Iron deficiency is known to impair both cellular and humoral immunity, leading to reduced resistance against infectious agents, particularly those affecting the respiratory tract.

The coexistence of anemia and respiratory infection was found to have a compounding effect on pregnancy outcomes. Women affected by both conditions showed a higher incidence of adverse outcomes such as preterm delivery and low birth weight. This may be due to the combined physiological stress imposed by reduced oxygen-carrying capacity and active infection, which can compromise placental function and fetal growth. Additionally, infections during pregnancy can trigger inflammatory responses and uterine activity, further increasing the risk of preterm labor.

These findings underscore the importance of early identification and comprehensive management of anemia and infections during pregnancy. Routine antenatal screening should include hemoglobin estimation and prompt evaluation of symptoms suggestive of respiratory infections. Nutritional interventions, including iron and folic acid supplementation, along with timely treatment of infections, are essential components of maternal healthcare.

Overall, the study emphasizes the need for integrated antenatal care strategies that address both nutritional deficiencies and infectious diseases. Strengthening public health programs, especially in resource-limited settings, can significantly reduce the burden of anemia and associated complications, ultimately improving maternal and neonatal outcomes.

CONCLUSION

Anemia and respiratory infections are highly prevalent among pregnant women and demonstrate a significant association with adverse maternal and fetal outcomes. The coexistence of these conditions contributes to increased risks of complications such as preterm delivery, low birth weight, and maternal morbidity. These findings underscore the importance of comprehensive antenatal care strategies that incorporate routine screening for anemia, timely identification and management of infections, and appropriate nutritional supplementation. Strengthening these interventions, particularly in resource-limited settings, is essential for improving overall pregnancy outcomes and reducing the burden of preventable maternal and neonatal complications.

LIMITATIONS

- Single-center study
- Moderate sample size
- No microbiological confirmation of infections
- Lack of longitudinal follow-up.

REFERENCES

1. World Health Organization. Anaemia in pregnancy: impact on maternal and child health. Geneva: World Health Organization; 2020. Available from: <https://www.who.int>
2. World Health Organization. Maternal mortality and maternal health report. Geneva: World Health Organization; 2019.
3. Centers for Disease Control and Prevention (CDC). Guidelines for infections during pregnancy. Atlanta: CDC; 2021.
4. Stevens GA, Finucane MM, De-Regil LM, Paciorek CJ, Flaxman SR, Branca F, et al. Global, regional, and national trends in haemoglobin concentration and prevalence of anemia in women. *Lancet Glob Health*. 2013;1(1):e16–e25.
5. Balarajan Y, Ramakrishnan U, Özaltin E, Shankar AH, Subramanian SV. Anaemia in low-income and middle-income countries. *Lancet*. 2011;378(9809):2123–2135.
6. Rasmussen KM. Is there a causal relationship between iron deficiency anemia and poor pregnancy outcome? *J Nutr*. 2001;131(2):590S–603S.
7. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, de Onis M, et al. Maternal and child undernutrition and overweight in low-income countries. *Lancet*. 2013;382(9890):427–451.
8. Scholl TO. Iron status during pregnancy: setting the stage for mother and infant. *Am J Clin Nutr*. 2005;81(5):1218S–1222S.
9. Allen LH. Anemia and iron deficiency: effects on pregnancy outcome. *J Nutr*. 2000;130(2):443S–447S.
10. Villar J, Belizán JM. The relative contribution of prematurity and fetal growth retardation to low birth weight. *Am J Obstet Gynecol*. 1982;143(7):793–798.

11. Jain S. Respiratory infections during pregnancy: clinical considerations. *Indian J Chest Dis Allied Sci.* 2015;57(2):91–97.
12. Madinger NE, Greenspoon JS, Ellrodt AG. Pneumonia during pregnancy: has modern technology improved maternal and fetal outcome? *Am J Obstet Gynecol.* 1989;161(3):657–662.
13. Goodnight WH, Soper DE. Pneumonia in pregnancy. *Crit Care Med.* 2005;33(10 Suppl):S390–S397.
14. Centers for Disease Control and Prevention (CDC). Influenza vaccination during pregnancy. Atlanta: CDC; 2020.
15. World Health Organization. Guideline: daily iron and folic acid supplementation in pregnant women. Geneva: WHO; 2012.
16. Kumar KJ, Asha N, Murthy DS, Sujatha MS, Manjunath VG. Maternal anemia in various trimesters and its effect on newborn weight. *Int J Prev Med.* 2013;4(2):193–199.
17. Singh MB, Fotedar R, Lakshminarayana J, Anand PK. Studies on the nutritional status of pregnant women in rural India. *Indian J Public Health.* 2000;44(2):61–66.
18. Patel A, Prakash AA, Das PK, Gupta S, Pusdekar YV, Hibberd PL. Maternal anemia and pregnancy outcomes: a prospective cohort study. *PLoS One.* 2018;13(2):e0192547.
19. Sharma P, Mehta S, Nagar R. Maternal health indicators and anemia prevalence in India. *J Obstet Gynecol India.* 2016;66(5):S121–S127.
20. Gupta R, Singh S, Shukla A. Respiratory infections in pregnancy and associated maternal outcomes. *Int J Med Res Rev.* 2017;5(4):345–350.
21. Mehta S. Nutritional anemia in pregnancy: prevalence and determinants. *Indian J Nutr.* 2014;1(1):1–5.
22. Titaley CR, Dibley MJ, Roberts CL. Factors associated with adverse birth outcomes in Indonesia. *BMC Public Health.* 2010;10:593.