International Journal of Research in Medical Sciences
Upadhayay P. Int J Res Med Sci. 2025 Dec;13(12):5143-5149
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20253933

Original Research Article

Prevalence of anemia in pregnant women and its association with birth outcomes in Bhimpur block, Betul district, Madhya Pradesh

Pranjal Upadhayay*

District Immunization Officer (Betul), National Medical College and Teaching Hospital, Birgunj, Nepal

Received: 26 September 2025
Revised: 04 November 2025
Accepted: 10 November 2025

***Correspondence:**
Dr. Pranjal Upadhayay,
E-mail: pranjalupadhayay94@gmail.com

ABSTRACT

Background: Anemia Pregnant is an important and widely public health issue in the world and a leading cause of maternal morbidity and poor birth outcomes especially in low resources and tribal nations.
Methods: The sampling was done in the Bhimpur block of Betul district, Madhya Pradesh wherein 300 pregnant women were selected, and the study was conducted to estimate the prevalence and severity of anemia as well as its relationship with low birth weight (LBW) and preterm birth as adverse pregnancy outcomes.
Results: The hemoglobin level was measured with the help of hemoglobin meter, and anemia was determined according to WHO classification. It has been found that anemia was prevalent (64.7%), and most of the cases were mild (38.3%), moderate (24.7%), and only a small proportion of severe cases was observed (1.7%). LBW was found (27.5%) in a higher rate of 39.2% in anemic mothers and 11.8% in non-anemic mothers ($p < 0.001$). Anemia also revealed a dose-response relationship, with the higher the anemia, the higher the number of preterm births ($p = 0.004$), i.e., it is also found to be significant between the anemic and non-anemic women, with preterm births being higher in the former.
Conclusions: The results indicate that a continuously high prevalence of anemia in tribal pregnant women and its close relationship with unfavorable perinatal outcomes. Enhancement of culturally sensitive nutrition education, antenatal care and program execution through such initiative as Anemia Mukt Bharat is essential in the enhancement of maternal and new-born health.

Keywords: Anemia, Bhimpur Betul, Low birth weight, Pregnancy, Preterm birth, Tribal health

INTRODUCTION

Anemia is a common societal health issue which is linked with higher chances of morbidity and mortality particularly among pregnant women and young children. The social and economic development of countries with anemia is also adversely affected by anemia.[1] Overall, 50 % of anemia instances are assumed to be Iron deficiency.[2] Iron deficiency anemia (IDA) is ranked among the ten leading causes of burden of disease in the world.[3]

Another great health concern within the globe is pregnancy whereby anemia has been a great health concern within the low-income and middle-income nations. It is defined by the World Health Organization (WHO) as lower hemoglobin level less than 11 g/dl and it is reported to be one of the most widespread nutritional disorders on the planet.[4] The pregnant women are particularly susceptible because the iron requirements are higher to the development of the fetus, the growth of maternal blood volume, and the nutritional needs.[5,6] When unattended, anemia may lead to severe outcomes such as maternal death, intrauterine growth restriction, and low birth weight (LBW), preterm childbirth, and perinatal mortality.[7]

Anaemia has long been a significant contributor to maternal health issues in India. According to the National Family Health Survey-5 (NFHS-5, 2019-21), about half of all pregnant women are affected by anaemia.[8] This situation persists despite older initiatives like "the National Nutritional Anemia Prophylaxis Program and Iron and Folic Acid (IFA) supplementation", as well as newer efforts such as the Anemia Mukt Bharat campaign.[9] The ongoing high rates of anaemia highlight a considerable gap between policy and ground-level implementation.[10] Factors like poor adherence to IFA due to side effects, irregular antenatal care visits, delayed initiation of treatment, and frequent shortages of supplements all contribute to the ineffectiveness of these programs. Moreover, a lack of awareness, cultural food restrictions, and socio-economic challenges further hinder the success of these interventions, which is why anaemia remains a pressing maternal health issue in India.[11]

Due to the combination of several co-morbid factors, tribal populations are especially vulnerable: low dietary diversity, lack of access to quality healthcare services, lack of regular antenatal care (ANC) visits, cultural food taboos, and increased susceptibility to parasitic infections.[12] Madhya Pradesh, being a state with high number of tribes has always reported a greater number of maternal anemias than the national average.[13] Betul district is a highly tribal area in the state, and women and children have increased health risks due to socio-economic weaknesses.

The findings of maternal anemia on the negative pregnancy outcomes particularly low birth weights and preterm births specifically is well established in past studies in central India although covered in fewer blocks such as Bhimpur which is tribal-dominated.[14] Cultural practice, dietary restrictions in case of pregnancy, and overall ignorance regarding maternal nutrition are some of the contributors of anemia in such communities.[15] Also, physical distances between healthcare centers and poor access to health services can frequently impair the provision of critical care during antepartum such as routine hemoglobin tests and iron folic acid tablets.[16-18] Socioeconomic factors that contribute to this situation are poverty, low literacy levels, and gender disparities, which affect the health-seeking behaviors and nutritional patterns. These context-specific determinants are important to understand as they can be used to design effective interventions that are culturally sensitive to decrease maternal anemia and improve "the maternal and neonatal health outcomes during national efforts like Anemia Mukt Bharat".[19-21]

The research was therefore aimed at achieving two main objectives: (1) measuring the prevalence and severity of anemia in pregnant women in Bhimpur block of Betul district and (2) its relationship with adverse birth outcomes in terms of LBW and preterm birth. This study will be used to inform the public health approach based on the unique needs of tribal groups by producing the locally relevant evidence.

METHODS

Study design and setting

In the Bhimpur block of the Betul district, which is mostly tribal in Madhya Pradesh (poor socioeconomic level), a community-based cross-sectional design was used for research, low access to healthcare facilities, and traditional beliefs that affect maternal health). The research was conducted over six months (January-June 2023) and it was done in District- Betul, Block-Bhimpur, both rural and tribal hamlets that were under the jurisdiction of the local primary health centers.

Study population

The research involved a group of pregnant women who were in their second and third trimesters, all residing in the Bhimpur block. To find eligible participants, we relied on antenatal care records maintained by the Accredited Social Health Activists (ASHAs) and Anganwadi workers.

Inclusion criteria

Inclusion criteria were the pregnant women residing in Bhimpur block for at least one year. Women in their second or third trimester who consented to participate.

Exclusion criteria

Exclusion criteria were women with chronic illnesses such as renal disease, diabetes, or hemoglobinopathies. Women unwilling to provide informed consent.

Sample size calculation

$n^0 = (Z^2 \times p \times (1 - p))/d^2$

Where:

Z = 1.96 for 95% CI {confidence interval};
p = 0.52(national prevalence of anemia among pregnant women, NFHS-5);
d = 0.7 absolute precision (0.05 for ±5%).

$n^0 = [1.96^]2 \times 0.52 \times \{1-0.52\}/0.07^2$

$= \underline{272.2 \approx 272}$

300 women was the final sample size after accounting for a 10% non-response rate.

Data collection

Hemoglobin estimation: Done via hemoglobin meter

Classification of anemia: WHO criteria: Mild (10–10.9 g/dL), Moderate (7–9.9 g/dL), Severe (<7 g/dL).

Birth outcomes: Recorded at delivery (weight using electronic scale, gestational age by LMP/clinical records).

Data were collected through structured interviews using a pre-tested questionnaire and by reviewing antenatal records. Information on socio-demographic characteristics, obstetric history, dietary practices, and antenatal care utilization was obtained.

Hemoglobin estimation was carried out using hemoglobin meter, a commonly used method in yield settings. Based on WHO classification, anemia was categorized as: a) Mild: 10–10.9 g/dl; b) Moderate: 7–9.9 g/dl, and c) Severe: <7 g/dl.

Birth outcomes such as "birth weight and gestational age at delivery" were recorded from hospital delivery records or, in home deliveries, assessed with assistance from skilled birth attendants.

Statistical analysis

The data was input and examined with the help of SPSS version 25.0. The results were summarized using descriptive statistics, which include mean, percentage, and proportion. We used the chi-square test to look for links between maternal anemia and the outcomes of the birth, which included low birth weight and premature delivery. "A statistically significant result was defined as a p-value less than 0.05"

Ethical considerations

CMHO granted ethical permission for the project. Before any data was collected, each participant gave their written informed permission. Throughout the research, anonymity and confidentiality were maintained.

RESULTS

Sociodemographic characteristics

Three hundred pregnant ladies in all were registered. Tribal communities comprised the majority. The majority (68%) were between the ages of 20 and 29, followed by adolescents (<20 years, 21%) and ≥30 years (11%). About 72% resided in rural hamlets, and over half (54%) were from lower socio-economic backgrounds.

Prevalence and severity of anemia

Out of 300 women, 194 (64.7%) were anemic, while 106 (35.3%) had normal hemoglobin levels. The distribution of anemia severity is shown in Table 1.

Table 1: Distribution of anemia among pregnant women (n=300).

Anemia status	Frequency (N)	Percentage (%)
No Anemia	106	35.3
Mild (10-10.9 g/dl)	115	38.3
Moderate (7-9.9 g/dl)	74	24.7
Severe (<7 g/dl)	5	1.7
Total	300	100

According to the data presented in Table 1, it is evident that anemia is very prevalent among the pregnant women under study with 64.7% having it at different degrees of intensity. Most of them involve mild anemia (38.3%), then moderate anemia (24.7%) and severe anemia is not very common (1.7%). Only a third (35.3) of the women was found to have normal hemoglobin levels and was not anemic. These results underscore the fact that severe anemia is rare but the effect of mild to moderate anemia is high and therefore there is a need to strengthen nutritional programs, early detection and adequate antenatal care to avoid developing severe type of anemia during pregnancy.

Birth outcomes

Of the 300 live births, 83 (27.5%) were low birth weight (LBW) and 217 (72.5%) had normal birth weight. Preterm deliveries accounted for 15.9% (n=48), while 84.1% (n=252) were term births (Table 2).

Table 2: Distribution of birth outcomes (n=300).

Outcome	Frequency (N)	Percentage (%)
Low birth weight (<2.5kg)	83	27.5
Normal birth weight (≥2.5kg)	217	72.5
Preterm (<37 weeks)	48	15.9
Term (≥37 weeks)	252	84.1

Table 2 reveals that most of the new-borns had positive outcomes with the 72.5% having a normal birth weight (2.5 kg) and 84.1% of the new-borns having a normal term delivery (37 weeks). Nevertheless, there were also a significant number of negative consequences since 27.5% of new-borns had a low birth weight and 15.9%were preterm. These outcomes indicate that even though the majority of pregnancies were delivered normally with a term, the high rates of cases of low birth weight and preterm births indicate the persistent maternal and fatal health issues that could be explained by the lack of nutrients, anemia, or insufficient antenatal care and required specific measures to resolve maternal and neonatal outcomes.

Association between anemia and birth outcomes

A significant association was observed between maternal anemia and adverse birth outcomes.

Low birth weight: Among anemic women, 39.2% (76/194) delivered LBW babies, compared to only 6.6% (7/106) among non-anemic women (p<0.001).

Preterm birth: Preterm birth occurred in 20.1% of anemic mothers (39/194).

Versus 8.5% in non-anemic mothers (9/106) (p=0.004).

Table 3 shows a specific relationship between low birth weight (LBW) of new-born children and maternal anemia. Out of the anemic mothers (n=194), 39.2% of the new-borns weighed below the normal weight, contrary to 11.8% of the non-anemic mothers (n=106). Overall, 27.5%of total births were LBW though disproportionately large prevalence was in the anemic group meaning that the maternal anemia is a significant risk factor of delivering a low weight baby. The observation provides the significance of prevention and control of anemia during pregnancy to improve better birth outcomes and prevent neonatal complications.

Table 3: Association between anemia and low birth weight.

Anemia status	LBW (<2.5 kg)	Normal (≥2.5 kg)	Total	% LBW
Anemic (n=194)	76	118	194	39.2
Non-anemic (n=106)	7	99	106	11.8
Total	83	217	300	27.5

Table 4: Association between anemia and preterm birth.

Anemia status	Preterm (<37 weeks)	Term (≥37 weeks)	Total	% Preterm
Anemic (n=194)	39	155	194	20.1
Non-anemic (n=106)	7	99	106	6.7
Total	48	254	300	15.9

Table 5: Severity of anemia and birth outcomes (n=194 anemic mothers).

Severity of anemia	LBW (N, %)	Preterm (N, %)	Normal outcomes (N, %)
Mild (n=115)	34 (29.6)	16 (13.9)	65 (56.5)
Moderate (n=74)	38 (51.4)	20 (27.0)	16 (21.6)
Severe (n=5)	4 (80.0)	3 (60.0)	1 (20.0)
Total (194)	76 (39.2)	39 (20.1)	82 (42.3)

As shown in the table 4, maternal anemia and preterm births have a significant relationship. In anemic women (n=194) 20.1% of anemic women delivered preterm compared to those of the non-anemic group (n=106) of 6.7%. The preterm birth rate constituted 15.9%of the total births although it was very high among women who are anaemic. These results imply that anemia in pregnancy is a significant risk factor of preterm birth and therefore early diagnosis, nutritional supplementation and proper management of anemia is important to minimize poor perinatal outcome.

Table 5 shows the effect of the severity of anemia on births when using anemic mothers (n=194). There is a distinct pattern in the data, as the severity of the anemia disease rises, the probability of adverse outcomes (low birth weight (LBW)) and premature birth increases, whereas the probability of normal outcomes decreases. In mild cases of anemia, 29.6% of the infants were LBW and 13.9% were preterm with a majority (56.5) having normal outcomes. Nevertheless, in moderate anemia, LBW (51.4%) and preterm births (27.0) percentage went up steeply and the normal births declined to 21.6%. The most obvious ones were the group of severely anemic mothers where 80% of infants were LBW and 60% were preterm with just 20% of the outcomes being normal. These results are positive indicators of the presence of the dose-response relationship that exists between the anemia severity and negative birth outcomes that can help in preventing anemia in pregnancy to decrease the likelihood of the adverse impacts of this condition both to the mother and the child.

DISCUSSION

The current research established that anaemia is very high among pregnant women in the tribal dominated Bhimpur block of Betul district, Madhya Pradesh, at 64.7% which is quite high in comparison to the national average of anaemia in pregnant women at 52.2% and the state average of 54.7%. This high prevalence indicates the ongoing rate of maternal anaemia amongst tribal and underserved groups. This steadily increases the levels that are disproportionately large in tribal settings, even with national programmes, which are a weakness of structure and context. To illustrate, an analysis of data on national surveys conducted recently discovered that the tribal/non-tribal disparity in anaemia among women had not been resolved over decades, with much of the variation deemed

to be due in part to micronutrient deficiency and dietary diversity and absorption problems.[22]

In this study the severe anaemia (1.7%) was not that common; however mild (38.3 %) and moderate anaemia (24.7%) was found to be at the majority. This is consistent with other results: in a local tribal pregnant women study in India, most anaemia cases were moderate and not severe.[23] The dominance of mild/moderate anaemia makes the differences in the urgent but specific interventions as these conditions can be under-diagnosed and lead to negative outcomes.

In terms of birth-outcomes, this study results of LBW occurrence among anemic mothers (39.2%vs 11.8%, p = 0.001) and preterm birth rates (20.1% vs 6.7%, p = 0.004) between anemic and non-anemic mothers, respectively are supportive of a strong and clinically significant relationship between maternal anaemia and negative perinatal outcomes. A plausible causal relationship is further reinforced by the general trend of the dose-response: with more severe anaemia, worse results were obtained. This is in line with the available literature. Indicatively, on a facility-based study in Jharkhand, India, maternal anaemia among 78.45 was found to be adjusted by preterm birth (34.75%) and LBW (32.81%).[24] Another West Bengal retrospective cohort observed an augmentation of maternal anaemia in LBW.[25] Such comparisons demonstrate that study results overlap and expand current evidence because of the focus on a tribal population.

There are several plausible mechanisms that can be attributed to this association. Anaemia has the potential to compromise placenta oxygen and nutrient supply, thereby causing intrauterine growth retardation and LBW. It can also place them at risk of maternal infection, systemic inflammation or uteroplacental insufficiency which may raise the chances of preterm labour. These pathways may be worsened by the tribal setting through poor intake of iron/folate, food taboos (e.g., meat or green leafy vegetables during pregnancy), poor access to antenatal care, and increased parasitic infection (malaria, helminths) or chronic sub-clinical inflammation burden. Such contextual factors are likely the background of the elevated rates of anaemia and its negative effects on the birth outcomes in this study setting.

This study prevalence and outcome results, compared to other research in tribal and rural India, do confirm the overall trend of inequity. As an example, a tribal tertiary-care study in Maharashtra observed that low haemoglobin, fewer than four ANC visits, inadequate IFA consumption was great predictors of LBW.[26] But most of these studies are prevalence rates in the 60-70% range in tribal women - so 64.7% rate is within the range of distribution which is expected to be higher.

Regarding the prevalence of anaemia, the fact that national initiatives like Anemia Mukt Bharat, IFA supplementation and strengthened ANC services have failed to reduce prevalence means that there are significant gaps in implementation, particularly in tribal areas, in a public-health perspective. The possible gaps are poor adherence to IFA, deficient micronutrient counselling, food insecurity, cultural eating limit, and poor screening or follow-ups. Since we have proven that LBW and preterm birth have definite connections, they require specific strategies: educational efforts about nutrition, strict adherence to IFA, regular haemoglobin monitoring during pregnancy particularly in tribal women and treating underlying infections and other pathologies. Most likely, they are not enough, and it is necessary that specific interventions take into consideration tribal-specific barriers.

This study has few limitations. This study's community-based approach and emphasis on a tribally dominated block, which provide locally relevant findings, are among its merits. However, the study had certain limitations: it was conducted in a single block, limiting generalizability, and hemoglobin was assessed only once, not allowing assessment of anemia trends during gestation. Additionally, potential confounding factors such as maternal nutrition and infection status were not fully explored.

CONCLUSION

The results indicate that a continuously high prevalence of anemia in tribal pregnant women and its close relationship with unfavorable perinatal outcomes. Enhancement of culturally sensitive nutrition education, antenatal care and program execution through such initiative as Anemia Mukt Bharat is essential in the enhancement of maternal and new-born health.

Recommendations

To effectively combat maternal anemia in tribal areas, it is essential to adopt a comprehensive and community-centered approach. Strengthening antenatal care (ANC) services should be a priority, ensuring that routine hemoglobin screening is conducted for all pregnant women, with timely referral and appropriate management of anemia. Improving compliance with iron-folic acid (IFA) supplementation is equally important, which can be achieved by engaging Accredited Social Health Activists (ASHAs) and community groups to enhance awareness, promote adherence, and provide follow-up support. Culturally appropriate nutrition education should also be emphasized through behavior change communication that addresses food taboos and encourages the consumption of iron-rich foods such as green leafy vegetables, pulses, and locally available sources of meat and fish. Additionally, anemia management must be integrated with the control of infections like malaria, helminthiasis, and reproductive tract infections, which often exacerbate anemia among pregnant women. Finally, fostering community participation by empowering local women’s groups, tribal

leaders, and self-help groups can greatly enhance awareness and ensure the sustainability of maternal health interventions in these regions.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Thanh HD. Worldwide prevalence of anemia in pre-school aged children, pregnant women and non-pregnant women of reproductive age. 2007.
2. Rasheed P, Koura MR, Al-Dabal BK, Makki SM. Anemia in pregnancy: A study among attendees of primary health care centers. Ann Saudi Medi. 2008;28(6):449-52.
3. World Health Organization and Centers for Disease Control and Prevention. The global prevalence of anaemia in 2011, WHO, Geneva, Switzerland, 2015. Available at: http://www.who.int/nutrition/publications/micronutrients/global prevalence anaemia2011/en/. Accessed on 01 June 2025.
4. GBD 2021 Hemoglobinopathies and Hemolytic Anemias Collaborators, Ojo TT, Amegbor PM, Islam F, Gyamfi J, Mai A, et al. Burden of hemoglobinopathies and hemolytic anemias in the World Health Organization African region, 2000–2021: Findings from the Global Burden of Disease 2021 study. PLOS Global Public Health. 2025;5(9):e0005197.
5. Kalaivani K. Prevalence & consequences of anaemia in pregnancy. Indian J Med Res. 2009;130(5):627-33.
6. Toteja GS. Micronutrient profile of Indian population. Indian Council of Medical Research; 2004.
7. Scholl TO, Hediger ML. Anemia and iron-deficiency anemia: compilation of data on pregnancy outcome. Am J Clin Nutrit. 1994;59(2):492S-501S.
8. Wendt AS, Stephenson R, Young MF, Verma P, Srikantiah S, Webb-Girard A, et al. Identifying bottlenecks in the iron and folic acid supply chain in Bihar, India: a mixed-methods study. BMC Heal Servi Res. 2018;18(1):281.
9. Williams PA, Poehlman J, Moran K, Siddiqui M, Kataria I, Rego AM, et al. Strategies to address anaemia among pregnant and lactating women in India: a formative research study. Public Health Nutrition. 2020;23(5):795-805.
10. Rai RK, Fawzi WW, Barik A, Chowdhury A. The burden of iron-de<iciency anaemia among women in India: how have iron and folic acid interventions fared? WHO South-East Asia. J Publ Heal. 2018;7(1):18-23.
11. Smitha MV, Indumathi P, Parichha S, Kullu S, Roy S, Gurjar S, Meena S. Compliance with Iron-Folic Acid supplementation, associated factors, and barriers among postpartum women in Eastern India. Human Nutrit Metabol. 2024;35:200237.
12. Bentley ME, Griffiths PL. The burden of anemia among women in India. Euro J Clin Nutrit. 2003;57(1):52-60.
13. Singh RK, Patra S. Extent of anaemia among preschool children in EAG States, India: a challenge to policy makers. Anemia. 2014;2014(1):868752.
14. Balarajan Y, Ramakrishnan U, Onzaltin E, Shankar AH, Subramanian SV. Anaemia in low- income and middle-income countries. Lancet. 2011;378(9809):2123-35.
15. Bora R, Sable C, Wolfson J, Boro K, Rao R. Prevalence of anemia in pregnant women and its effect on neonatal outcomes in Northeast India. J Mat-Fet Neonat Medi. 2014;27(9):887-91.
16. Montgomery AL, Ram U, Kumar R, Jha P, Million Death Study Collaborators. Maternal mortality in India: causes and healthcare service use based on a nationally representative survey. PloS one. 2014;9(1):e83331.
17. Bharti R, Bharti SS, Pal R. Maternal and neonatal outcomes among anaemic pregnant women in rural India: a prospective study. J Obstet Gynaecol India. 2019;69(1):39-44.
18. Dunn JT, Lesyna K, Zaret A. The role of human rights litigation in improving access to reproductive health care and achieving reductions in maternal mortality. BMC Pregn Childb. 2017;17(Suppl 2):367.
19. Getachew M, Yewhalaw D, Tafess K, Getachew Y, Zeynudin A. Anaemia and associated risk factors among pregnant women in Gilgel Gibe dam area, Southwest Ethiopia. Parasit Vectors. 2012;5:296
20. Obse N, Mossie A, Gobena T. Magnitude of anemia and associated risk factors among pregnant women attending antenatal care in Shalla Woreda, West Arsi Zone, Oromia Region, Ethiopia. Ethio J Health Sci. 2013;23(2):165-73.
21. Chowdhury HA, Ahmed KR, Jebunessa F, Akter J, Hossain S, Shahjahan M. Factors associated with maternal anaemia among pregnant women in Dhaka city. BMC Womens Health. 2015;15:77.
22. Ghosal J, Bal M, Ranjit M, Das A, Behera MR, Satpathy SK, et al. To what extent classic socio-economic determinants explain trends of anaemia in tribal and non-tribal women of reproductive age in India? Findings from four National Family Heath Surveys (1998-2021). BMC Publ Heal. 2023;23(1):856.
23. Chhabra S, Rathod V. Burden of anemia, perinatal outcome community based study among rural tribal pregnant women in an extremely low resource region. J ISSN. 2021;2766:2276.
24. Kumari S, Garg N, Kumar A, Guru PK, Ansari S, Anwar S, et al. Maternal and severe anaemia in delivering women is associated with risk of preterm and low birth weight: A cross sectional study from Jharkhand, India. One Health. 2019;8:100098.
25. Biswas P, Samsuzzaman M, Chakraborty A, Das DK. Maternal anemia and low birth weight in a community development block of Purba Bardhaman, West

Bengal: a retrospective cohort analysis. Int J Commu Medi Publ Heal. 2019;6(12):5250-5.
26. Dey S, Mondal N, Bose K. Factors associated with low birth weight among tribal and non-tribal population in India: Evidence from National Family Health Survey-4 (2015-2016). Anthropological Revi. 2022;85(3):107-124.

Cite this article as: Upadhayay P. Prevalence of anemia in pregnant women and its association with birth outcomes in Bhimpur block, Betul district, Madhya Pradesh. Int J Res Med Sci 2025;13:5143-9.