

# Effect of Anemia during Pregnancy and Associated Risk Factors

Paul Sanchita

**Abstract:** ***Introduction:** Anaemia in pregnancy is a public health problem in developing countries. Severe anemia is associated with placental abruption, preterm birth, severe postpartum hemorrhage and fetal malformation, fetal growth restriction and still birth while in mild anemia there is reduced risks of such complications. **Objective:** To study the effect of anemia during pregnancy and assess the association of risk factors with anemia. **Design:** Hospital based cross sectional study done in a primary health centre in a government hospital of Assam from July 2022 to September 2022. **Materials and methods:** 200 pregnant females aged 15-49yrs were included in the study. Hemoglobin concentrations were recorded for each patient and data was analysed using Chi-square test and T test. P value <0.05 was considered significant. **Results:** The prevalence of anemia was found to be 90% among pregnant women. Most of the anemic patients (60%) belong to moderate severity according to the World Health Organisation classification. Gravida and socioeconomic status were significantly associated with prevalence of anemia in pregnancy ( $p < 0.05$ ). **Conclusion:** A high prevalence of anemia was found in pregnant women. Multigravida, low socioeconomic status were associated with anemia in pregnancy.*

**Keywords:** Multigravida, socioeconomic status, gravida

## 1. Introduction

Anemia is the most common nutritional deficiency among pregnant females. It is a public health problem especially in developing countries and is associated with adverse outcomes in pregnancy.<sup>1</sup> The World Health Assembly is aiming for a 50% reduction in anemia prevalence among females of reproductive age by 2025<sup>2</sup>. The WHO recommends the definition of severe, moderate and mid anemia for pregnant woman as hemoglobin concentrations of less than 70g/l, 70 to 99 and 100 to 109g/l respectively<sup>3</sup>. Some guidelines have recommended a hemoglobin cutoff lower than 110g/l to define anemia during pregnancy<sup>4</sup>. The causes of anaemia during pregnancy in developing countries are multifactorial; these include micronutrient deficiencies of iron, folic acid, vitamins A and B12 and anemia due to parasitic infections such as malaria and hookworm or chronic infections like TB and HIV<sup>5-9</sup>. Anaemia during pregnancy is reported to have negative maternal and child health effect and increase the risk of maternal and perinatal mortality.<sup>10-11</sup> The negative health effects for the mother include fatigue, poor work capacity, impaired immune function, increased risk of cardiac diseases and mortality.<sup>1</sup> Some studies have shown that anemia during pregnancy contributes to 23% of indirect causes of maternal deaths in developing countries.<sup>12</sup> According to WHO prevalence of anemia among pregnant women varies from 14% in developed countries to 65%-75% in India.<sup>13</sup> In order to mitigate the high prevalence of anemia among pregnant women, India started the National Nutritional Anemia Prophylaxis Program (NNAPP) to prevent anemia among pregnant women<sup>14</sup> but despite all preventive measures, anemia in pregnant women is highly prevalent in India<sup>14, 15</sup>. The study therefore aims to study the effect of anemia during pregnancy and assess association of risk factors with anemia.

### Materials and Methods

This is a cross sectional study conducted in a rural hospital of Assam for a duration of 2 months.

### Inclusion criteria-

- Pregnant females who filled the consent form having their hemoglobin report.
- Confirmation of pregnancy was done by either urinary pregnancy test and or by pelvic ultrasonography

### Exclusion criteria-

- Unwilling pregnant women and who did not have hemoglobin report with them were excluded from the study.
- Ethical consideration-The study was approved by the institutional ethics committee before commencing the study.

### Data Collection

Data were collected from every participant using a predesigned, pretested semi-structured schedule. Sociodemographic particulars and data regarding reproductive behavior were collected. Socioeconomic status was determined based on Tendulkar's committee poverty line where the income of less than rupee 673 per month was considered as low socio-economic status. Hemoglobin level is also recorded from the available investigation report. All hemoglobin level was estimated by cyanmethemoglobin method.

### Statistical analysis

Chi-square test and 'T' test of significance were used to show any association between risk factors and severity of anemia. A 'P' value <0.05 was considered statistically significant to show an association between the particular risk factor and severity of anemia

## 2. Results and Observations

Distribution of women according to age, religion, socioeconomic status and occupation is shown in table 1, table 2, table 3, table 4

**Table 1**

Age Group (In Years)	Number	Percentage
<20	90	45
20-30	107	53.5
>30	3	1.5

**Table 2**

Religion	Number	Percentage
Hindu	190	95
Muslim	10	5

**Table 3**

Socioeconomic Status	Number	Percentage
Low	114	57
Middle	85	42.5
High	1	0.5

**Table 4**

Occupation	Number	Percentage
No Wage Earner	168	84
Wage Earner	32	16

Among the pregnant women, 90% suffered from anemia; majority had moderate anemia (60%), followed by mild anemia (29%). Only 2 women were suffering from severe anemia while the rest had no anemia [Table 5].

**Table 5: Distribution of Severity of Anemia among Pregnant Women according to who Criteria**

Hb level (g/dl)	Severity of Anemia	Number of Cases	Percentage
<7	Severe	2	1
7-9.9	Moderate	120	60
10-10.9	Mild	56	28
≥11	Normal	22	11

Association of anemia with low socioeconomic status was found to be 63.93%, 51.72% and 35% for severe, moderate, mild and no anemia respectively [Table 6] which was statistically significant [P = 0.03]. However, no significant association of severity of anemia with the educational status of the pregnant women was detected.

**Table 6: Distribution of pregnant women according to socio economic status with respect to severity of anemia (n=200)**

Anemia	Low Socioeconomic Status		Total (%)
	Low (%)	Middle and High (%)	
Severe+Moderate	78 (63.93)	44 (36.07)	122 (100)
Mild	30 (51.72)	28 (48.28)	58 (100)
Normal	7 (35.00)	13 (65.00)	20 (100)
Total	115 (57.5)	85 (42.5)	200 (100)

$\chi^2=7.002$ ,  $P=0.030$  (S). S=Significant

### 3. Discussion

Anemia during pregnancy is a major health issue in India. The reason being multifactorial to mention few are low socioeconomic status, less dietary intake of iron and folic acid, short spacing of multiple pregnancies, excessive bleeding during labor, infections like malaria and hookworm infestations.<sup>16</sup>

In our study the prevalence of anemia among pregnant women of age group 15–49 years is found to be 90% which

is similar to other Indian studies done by Lokare *et al.*, Gautam *et al.*, Toteja *et al.* and ICMR Taskforce Multicenter Study<sup>14, 17, 18, 19</sup> while few recent studies done in African continent found the prevalence of anemia in pregnant women as low as 25.8% to 37.6%.<sup>20, 21</sup> in our study participants are mainly poor with low socioeconomic status, therefore the prevalence of anemia during pregnancy may be remarkably high.

Most of the cases in our study had moderate anemia (60%) while 28% had mild anemia and only 1% had severe anemia which was found to be similar to Mahamud *et al.*, Vindhya *et al.*, Sarala V *et al.*<sup>21, 22, 23</sup>. Lokera et al and Toteja et al showed that severity of anemia decreases with higher per capita income, which is similar to our study.<sup>14, 18</sup> Unlike Viveki *et al.*<sup>24</sup> who found higher maternal anemia for age group above 26 years, in our study there was no association between maternal age group and religion with anemia.

Being multifactorial various beliefs like and socio-cultural problems like taking vegetarian diet, having tea after food, open field defecation predisposing women to hook worm infestation and other associated infections may serve as important factor behind high prevalence of anemia in the pregnant women. Lack of motivation and education towards consumption of iron and folic acid may be the cause to serve high prevalence of anemia apart from other etiologies like hookworm infestations, malarial infection and other infections

### Limitations of the study

Small sample size, single institution study, short duration of study, a longitudinal study rather than a cross-sectional would provide a better association between anemia and its risk factors.

### 4. Conclusion

This study revealed a high prevalence of anemia in pregnancy irrespective of age, religion, education status and occupation. Provision of proper diet enriched with vital nutrients, prevention of certain worm infestations and implementation of new strategies to control and early treatment of anemia can save the society from the morbidity and mortality of maternal anemia

### Conflicts of interest

There are no conflicts of interest.

### References

- [1] Balarajan Y, Ramakrishnan U, Özaltın E, Shankar AH, Subramanian SV. Anaemia in low-income and middle-income countries. *Lancet*.2011; 378 (9809): 2123-2135. doi: 10.1016/S0140-6736 (10) 62304-5
- [2] World Health Organization. Global nutrition monitoring framework: operational guidance for tracking progress in meeting targets for 2025. World Health Organization; 2017. Accessed December 15, 2020.
- [3] World Health Organization. Haemoglobin concentrations for the diagnosis of anaemia and

- assessment of severity. World Health Organization; 2011. Accessed December 19, 2020.
- [4] Pavord S, Daru J, Prasannan N, Robinson S, Stanworth S, Girling J; BSH Committee. UK guidelines on the management of iron deficiency in pregnancy. *Br J Haematol.*2020; 188 (6): 819-830.
- [5] Msuya S. E., Hussein T. H., Uriyo J., Sam N. E., Stray-Pedersen B. Anaemia among pregnant women in northern Tanzania: prevalence, risk factors and effect on perinatal outcomes.2011; 13 (1): 33–39.
- [6] Okube O. T., Mirie W., Odhiambo E., Sabina W., Habtu M. Prevalence and Factors Associated with Anaemia among Pregnant Women Attending Antenatal Clinic in the Second and Third Trimesters at Pumwani Maternity Hospital, Kenya.2016; 06 (01): 16–27.
- [7] Brooker S., Hotez P. J., Bundy D. A. P. Hookworm-related anaemia among pregnant women: a systematic review.2008; 2 (9, article e291)
- [8] McClure E. M., Meshnick S. R., Mungai P., et al. The association of parasitic infections in pregnancy and maternal and fetal anemia: a cohort study in coastal Kenya.2014; 8 (2)
- [9] Ononge S., Campbell O., Mirembe F. Haemoglobin status and predictors of anaemia among pregnant women in Mpigi, Uganda.2014; 7 (1, article no.712)
- [10] Allen L. H. Anemia and iron deficiency: effects on pregnancy outcome.2000; 71 (5): 1280s–1284s.
- [11] Mbule M. A., Byaruhanga Y. B., Kabahenda M., Lubowa A. Determinants of anaemia among pregnant women in rural Uganda.
- [12] Black R. E., Victora C. G., Walker S. P., et al. Maternal and child undernutrition and overweight in low-income and middle-income countries.2013; 382 (9890): 427–451.
- [13] Demayer EM, Tegman A. Prevalence of anemia in the world. *World Health Organ Qlty.*1998; 38: 302–18.
- [14] Lokare PO, Karanjekar VD, Gattani PL, Kulkarni AP. A study of prevalence of anemia and sociodemographic factors associated with anemia among pregnant women in Aurangabad city, India. *Ann Nigerian Med.*2012; 6: 30–4.
- [15] Agarwal KN, Agarwal DK, Sharma A, Sharma K, Prasad K, Kalita MC, et al. Prevalence of anaemia in pregnant and lactating women in India. *Indian J Med Res.*2006; 124: 173–84.
- [16] Tolentino K, Friedman JF. An update on anaemia in less developed countries. *Am J Trop Med Hyg.*2007; 77: 262–7.
- [17] Gautam VP, Bansal Y, Taneja DK, Saha R. Prevalence of anemia amongst pregnant women and its socio-demographic associates in a rural area of Delhi. *Indian J Comm Med.*2002; 27: 157–60.
- [18] Toteja GS, Singh P, Dhillon BS, Saxena BN, Ahmed FU, Singh RP, et al. Prevalence of anemia among pregnant women and adolescent girls in 16 districts of India. *Food Nutr Bull.*2006; 27: 311–5.
- [19] Toteja GS, Singh P, Dhillon BS, Saxena BN. Ansari Nagar, New Delhi: Indian Council of Medical Research; 2001. Micronutrient Deficiency Disorders in 16 Districts of India-Part 1 Report of ICMR Task Force Study. District Nutrition Project.
- [20] Mahamoud NK, Mwambi B, Oyet C, Segujja F, Webbo F, Okiria JC, et al. Prevalence of anemia and its associated socio-demographic factors among pregnant women attending an antenatal care clinic at Kisugu health center IV, Makindye Division, Kampala, Uganda. *J Blood Med.*2020; 11: 13–8
- [21] Omete V, Ukwamedua HA, Bini N, Kashibu E, Ubandoma JR, Ranyang A. Prevalence, severity, and correlates of anaemia in pregnancy among antenatal attendees in Wari, South-Southern Nigeria: A cross-sectional and hospital-based study. *Anemia.*2020: 2020. Article ID 1915231
- [22] Vindhya J, Nath A, Murthy GV, Metgud C, Sheeba B, Shubhashree V, et al. prevalence and its risk factors of anemia among pregnant women attending a public-sector hospital in Bangalore, South India. *J Family Med Prim Care.*2019; 8: 37–43
- [23] Sarala V, Gopalan U. A study on prevalence of anemia in pregnancy in South India. *Int J ReprodContraceptObstetGynaecol.*2020; 9: 34–7.
- [24] Viveki RG, Halappanavar AB, Viveki PR, Halki SB, Maled VS, Deshpande PS. Prevalence of anaemia and its epidemiological determinants in pregnant women. *Al Ameen J Med Sci.*2012; 5: 216–23.