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## Original Research Article

## Prevalence of anemia in pregnant women attending out-patient clinic: A cross-sectional study

Ishita Pathak<sup>1\*</sup>, Monika Pathak<sup>2</sup>, Anant Patil<sup>3</sup><sup>1</sup>Dr DY Patil Medical College, Navi Mumbai, Maharashtra, India<sup>2</sup>Sai Sushrushta Hospital, Raipur, Chhattisgarh, India<sup>3</sup>Dept. of Pharmacology, Dr. DY Patil Medical College, Navi Mumbai, Maharashtra, India

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## ABSTRACT

**Background:** Anemia is a very common condition in pregnancy. It represents one of the most common risk factors for maternal as well as fetal complications. Its early identification, treatment and prevention is necessary to avoid these complications.

**Objective:** The objective of this study was to evaluate prevalence of anemia in pregnant women attending outpatient department.

**Materials and Methods:** In this single center retrospective clinic-based study carried pregnant women attending for their regular ante-natal checkup were included. Demographic details, hemoglobin level and prior obstetric related history was noted. Prevalence of anemia was estimated based on the hemoglobin level. The severity of anemia was categorized as mild (Hb level 10 g/dL to 10.9 g/dL), moderate (Hb level 7 g/dL to 9.99 g/dL), severe (Hb level <7 g/dL). Correlates of anemia were examined based on the demographic parameters.

**Results:** The study included 199 pregnant females with mean (SD) age was 29.6 (4.1) years. Mean (SD) hemoglobin of the study population was 10.6 (1.4) gm. A total of 174 (87.44%) females were house-makers and 165 (82.9%) were from the urban area. Anemia was observed in 76 (38.2%) pregnant females. Mild, moderate and severe anemia was observed in 32 (42.11%), 43 (56.58%) and 1 (1.3%) female respectively. Out of 76 pregnant females with anemia, 66 (86.8%) were housemakers. No significant difference was observed in the mean age ( $p=0.34$ ) and body weight ( $p=0.69$ ) of pregnant females with or without anemia. There was no significant difference in the anemia prevalence in rural versus urban pregnant females ( $p=0.33$ ).

**Conclusion:** Prevalence of anemia in pregnant women was 38.2%. Moderate anemia was more common than mild and severe anemia. There was no significant difference in the mean age or residence of pregnant females with anemia versus without anemia.

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## 1. Introduction

Anemia is the most common hematological disorder in pregnancy and it's a global health concern.<sup>1-3</sup> It is defined as decrease in circulating red blood cell mass or their reduced carrying capacity for oxygen insufficient to meet

physiological demands.<sup>4,5</sup> The condition is characterized by decrease in hemoglobin concentration or red blood cell count below normal for the patient's age, sex and altitude of residence.<sup>6</sup> Anemia is common in both genders. However, the prevalence of anemia is more in females as compared to males.<sup>4</sup>

Due to increased demand, pregnancy is one of the high-risk populations for the development of anemia. Anemia

\* Corresponding author.

E-mail address: [pathakishita8@gmail.com](mailto:pathakishita8@gmail.com) (I. Pathak).

in pregnancy is defined as hemoglobin concentration in the peripheral blood 11g/dL or less.<sup>7</sup> During pregnancy, expansion of plasma volume causes hemoglobin dilution. The incidence of anemia in pregnancy ranges from 40 to 80% in the tropics compared to 10 to 20% in the developed countries. India is the major contributor to all global maternal deaths due to anemia in South Asian countries and also globally.<sup>8</sup> The etiology of the anemia is multi-factorial.<sup>7</sup> Iron deficiency represents the common cause of anemia in general population.<sup>9</sup> The other common risk factors for anemia include dietary deficiency, parasitic infestations and chronic diseases. In addition to this, physician needs to understand the ecological or structural risk factors of regional interest which may include sociodemographic characteristics, obstetric factors, mental health and nutritional status reflected by the body mass index (BMI).<sup>10</sup>

Early diagnosis, prevention and treatment of anemia in pregnancy is critical considering potential complications arising which can affect maternal as well as fetal health.<sup>11,12</sup> Maternal complications due to anemia in pregnancy include pre-eclampsia, preterm labor, heart failure. The complications during labor are uterine inertia, postpartum hemorrhage, shock, during puerperium are puerperal sepsis, poor lactation, puerperal venous thrombosis. The effects in infant because of anemia during pregnancy include increased incidence of low birth weight and intrauterine death.<sup>13</sup> The government of India has been consistently working to address the problem of anemia through the national program.<sup>7</sup>

The objectives of this study were to evaluate prevalence of anemia in pregnancy and to understand correlates of anemia.

## 2. Materials and Methods

This retrospective study carried out in a clinical outpatient setting included pregnant women attending for their regular ante-natal checkup. The study included participants by the convenience sampling method.

Demographic details, hemoglobin level and prior obstetric related history was noted. Prevalence of anemia was estimated based on the hemoglobin level. The severity of anemia was categorized as mild (Hb level 10 g/dL to 10.9 g/dL), moderate (Hb level 7 g/dL to 9.99 g/dL), severe (Hb level <7 g/dL).<sup>14</sup> Demographic correlates of anemia were examined. The study was approved by institutional ethics committee.

### 2.1. Statistical analysis

Categorical variables are presented as frequency and percentages. Continuous variables are presented as mean and standard deviation. Continuous data were tested for the difference using paired t test in the same group and unpaired

t test between the groups. Association between correlates and prevalence of anemia was estimated using chi-square test. P value less than 0.05 was considered as statistically significant.

## 3. Results

In this study, we included 199 pregnant females attending outpatients presenting for usual antenatal visits. Table 1 shows baseline characteristics of the study population. Mean (SD) age of the females was 29.6 (4.1) years. Mean (SD) body weight and mean (SD) BMI was 79 (11) kg and 30.3 (5) kg/m<sup>2</sup> respectively (Table 1). Mean (SD) hemoglobin of the study population was 10.6 (1.4) gm.

A total 29 (14.5%) pregnant females in this study had history of abortion. Out of 29 females of abortion, 25 (86.21%) whereas 4 (13.79%) females had history of two abortions.

**Table 1:** Baseline characteristics

Parameter	Results
Mean (SD) age in years	29.6 (4.1)
Mean (SD) weight in kg	79 (11)
Mean (SD) height in cm	161.9 (8.9)
Mean (SD) BMI kg/m <sup>2</sup>	30.3 (5)
Mean (SD) Hb level in gm	10.6 (1.4)
No of females with history of abortions n (%)	29 (14.5%)
<b>Total number of abortions</b>	
0	170 (85.42%)
1	25 (12.56%)
2	4 (2.02%)
<b>Profession</b>	
House-maker	174 (87.44%)
Others	25 (12.56%)
<b>Residence n (%)</b>	
Urban	165 (82.9%)
Rural	34 (17.1%)
<b>Anemia n (%)</b>	
Yes	76 (38.2%)
No	123 (61.8%)

In our study, 174 (87.44%) females were house-makers whereas 25 (12.56%) were professionals. Out of the total study population 165 (82.9%) were from the urban area whereas other 34 (17.1%) were from the rural areas. Anemia was observed in 76 (38.2%) pregnant females in the study.

**Table 2:** Severity of anemia

	Overall population (n=199)	Anemia (n=76)
Mild	32 (16.08%)	32 (42.11%)
Moderate	43 (21.61%)	43 (56.58%)
Severe	1 (0.50%)	1 (1.3%)

Out of the total study population, anemia was of mild severity in 32 (16.08%) pregnant females whereas 43

(21.61%) females had moderate anemia. Only one (0.50%) female had severe anemia. When severity was graded in patients with anemia, mild, moderate and severe anemia was observed in 32 (42.11%), 43 (56.58%) and 1 (1.3%) female respectively (Table 2).

Out of 76 pregnant females with anemia, 66 (86.8%) were housemakers and 10 (13.2%) were professionals. Out 29 females with history of abortion, 11 (37.93%) had anemia whereas 18 (62.06%) had no anemia. Out of 11 females' history of anemia, seven (63.6%) had history of one abortion whereas four (36.3%) had history two abortions. All females with history of abortion but no anemia (n=18) had history of one miscarriage.

There was no significant difference in the mean age (p=0.34) and body weight (p=0.69) of pregnant females with or without anemia. Mean BMI of pregnant females with anemia was significantly more than those without anemia (Table 3). The mean hemoglobin level was significantly lower in patients with anemia than those without anemia (p<0.001). There was no significant difference in the anemia prevalence in rural versus urban pregnant females (p=0.33).

**Table 3:** Comparison of demographics in pregnant females with anemia or without non-anemia

Parameter	Anemia (n=76)	Non-anemia (n=123)	P value
Mean (SD) age in years	29.97 (4.25)	29 (3.99)	0.34
Mean (SD) weight in kg	79.4 (12.54)	79 (9.97)	0.69
Mean (SD) BMI kg/m <sup>2</sup>	31.16 (5.80)	30 (4.27)	0.05
Mean (SD) Hb level g/dL	9.17 (1.12)	11 (0.66)	<0.001
Residence			
Urban	59 (77.63%)	106 (86.18%)	0.33
Rural	17 (22.37%)	17 (13.82%)	

#### 4. Discussion

Anemia during pregnancy is one of the major concerns for maternal and fetal complications in developing countries. Several studies have been conducted to estimate prevalence of anemia during pregnancy with reporting variable rates. A recently published (2021) systematic review by A Dutta reported 51% prevalence of anemia in pregnant females in India.<sup>13</sup> In our study, prevalence of anemia in pregnancy was observed in 38.2%. A study by Debnath et al. reported 60% prevalence of anemia.<sup>10</sup> Another study by Grover et al. reported a very high prevalence of anemia i.e. 85.3% pregnant women from urban area of Haryana.<sup>6,15</sup>

The mean Hb level in anemic pregnant females versus those without anemia reported by Bansal et al. is 9.06 g/dl

vs 11.86 g/dl.<sup>16</sup> In our study also, it was almost similar.

Mean age of the patients in a study by Kaushal et al. was 26.20 years whereas in our study it was 29.6 years.<sup>17</sup> In a study by Debnath et al. majority (69.5%) females were <25 years of age.<sup>10</sup> BMI of the study population was also more in our study compared to that by Kaushal et al. (25.6 vs 30.3 kg/m<sup>2</sup>).<sup>17</sup>

We did not find significant difference in the age group of pregnant females with anemia versus those without anemia. Debnath et al. compared the difference in the age group (<25, 25-30 and >30 years of age), and did not find significant difference in terms of prevalence of anemia in these age groups.<sup>10</sup>

In our study, prevalence of moderate anemia was more common than mild anemia. In terms of the severity of anemia in pregnancy, our study findings are similar to other studies.<sup>6,18,19</sup> However another study by Mangla and Singla from rural part of India reported higher prevalence of mild anemia than moderate anemia.<sup>8</sup> Similarly, a study by Nair et al. reported higher prevalence of mild anemia compared to moderate and severe anemia.<sup>15</sup>

Several factors have been shown to be associated with pregnancy. These factors include residence in rural area, age of the pregnant women, education level of the pregnant women and their socio-economic profile.<sup>13</sup>

In our study, there was no significant difference in the prevalence of anemia in rural and urban population. Another study by Debnath et al. also did not find significant difference in the prevalence of anemia in urban versus rural area.<sup>10</sup>

Similarly, we did not observe difference in the age and weight of the pregnant women with or without anemia. However, we observed significant difference in mean BMI patients with and without anemia. Mean BMI of the women with anemia was found to be significantly more than those without anemia.

In a cross-sectional study among pregnant women attending out patient department in a tertiary care hospital from Himachal Pradesh showed mean hemoglobin level of 8.87 g/dl.<sup>17</sup> In our study, the mean hemoglobin level was 10.6 gm. The lower level of hemoglobin in the study may be due to the type of hospital, tertiary hospital. Secondly, our study had predominant population from the urban area unlike the study by Kaushal, et al which had population mainly from the rural area. Most patients in both the studies were homemakers. Number of females with history of abortion in overall study population was 11.63% vs 14.58% in our study. The striking difference in our study was our population was mainly from the urban area and that of the study in Kaushal et al. study was from the rural area. In terms of the profession, both studies have almost similar profile.<sup>17</sup>

Our study has some limitations. Firstly, it was a single center study with limited study population. Secondly,

we mainly examined the prevalence of anemia and its demographic correlates. We did not look at the morphological classification of anemia or other blood parameters in the study population. Larger studies are necessary to confirm our study findings.

## 5. Conclusion

Prevalence of anemia in pregnant women in our study was 38.2%. The prevalence of anemia was common in rural as well as urban population. Collaborative efforts are necessary to prevent anemia in pregnancy and its related maternal and fetal complications.

## 6. Source of Funding

None.

## 7. Conflict of Interest

None.

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## Author biography

**Ishita Pathak**, Final MBBS Student

**Monika Pathak**, Consultant

**Anant Patil**, Associate Professor

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