# **Original Research Article**

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# Study of iron deficiency anemia in pregnant women attending antenatal care clinic in tertiary care hospital in northern India

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### **ABSTRACT**

**Background:** Anemia is major health problem in developing countries with many underlying etiologies, particularly nutritional deficiencies. Pregnant women are prone to become anemic, and anemia leads to increased morbidity and mortality in mother along with poor pregnancy outcome. This study focused on evaluation of anemia in pregnant women attending antenatal clinic in northern India.

**Methods:** Total 1000 pregnant women attended antenatal clinic were enrolled and were evaluated for anemia, and various red blood cell indices were studied.

**Results:** Prevalance of anemia in this study population was 80%, while relative prevalance of mild, moderate and severe anemia was 33.5%, 48.5% and 20% respectively. Majority of cases were because of iron deficiency anemia.

**Conclusions:** Prevalance of anemia is very high in pregnant women which is a major cause for poor pregnancy outcome. Measures need to be taken at various level to improve nutritional status of pregnant women.

**Keywords:** Anemia, Nutritional, Pregnant women

## INTRODUCTION

Anemia is cited as a major public health issue, which requires urgent attention, in United Nation declaration (1997). 30% of the world population is suffering from anemia, which primarily affecting developing countries. According to The World Health Organization (WHO) more than 40% of non-pregnant and over 50% of pregnant women in developing world are anemic. 2

Globally, anemia is most common complication in pregnancy worldwide, which is also true for our country as anemia is a major obstetric and non-obstetric problem, as most of low income group is nutritionally deprived. In an estimate, approximate 40-90% of pregnant women are

anemic in India.<sup>2</sup> According to ICMR, as per severity of anemia, the relative prevalence of mild, moderate, and severe anemia in India is 13%, 57% and 12% respectively.<sup>3,4</sup>

In India, nutritional deprivation in early childhood, leads to worsening of anemic status when puberty is reached and menstruation starts. More so ever, early age of marriages, which is common in India, witness anemic and nutritionally deprived young primigravida mothers below the age of 20 years.<sup>5</sup>

Furthermore, majority of population (>60%) is India, is living in rural areas, where health infrastructure and public awareness for health problems is lacking, while

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poverty is prevailing, anemia in general population and pregnant woman is common.<sup>6</sup>

So, anemia is a endemic problem and unless steps are taken to improve nutritional standards, the gravity of anemia during pregnancy and after pregnancy will remain, irrespective of the improvement in therapy.<sup>7</sup>

And so this present study was designed and undertaken to know the prevalence of anemia, so that it can be treated, to decrease the further inadvertent outcomes.

#### **METHODS**

In this prospective observational study a total of 1000 cases were studied from those attending tertiary level Hospital in Northern India and antenatal cases were consecutively selected from 1st September 2015 to 31st August 2016. All antenatal women attending OPD of our hospital irrespective of their age were included in study. Pregnant women with history of any bleeding disorder, antepartum hemorrhage, chronic illness, hemolytic anemia were exluded from study. Sample size was calculated considering following assumptions 95% confidence interval, 3% allowable error and 51% anemia prevalance in preganancy.

All the record of patients including clinical history and demogarphic profile were recorded. Complete blood count (including Haemoglobin) was done on 5 part cell counter based on Coulter's principle of electrical impedence. Peripheral smear was studied after staining with Leishmann's stain. The morphology of red blood cells (for its abnormal shape and size, target cells, malarial parasites, polychromatic cells etc.) was studied in detail. After all the clinical history, examination and investigations, patients with anemia were given the appropriate treatment. Proper written consent in the vernacular language was taken.

Anemia was calssified based on hemoglobin value in mild (hemoglobin: 9-11 gm/dl), moderate (hemoglobin: 7-9 gm/dl) and severe (hemoglobin: <7 gm/dl) category as per WHO.<sup>8</sup> Anemia was classified morphologically based on peripheral smear, classified as microcytic, normocytic and macrocytic.

All patient data was recorded in excel sheet and statistical Analysis was performed by mean and standard deviation. Qualitative data was expressed as proportion/percentage. Quantitative data was expressed as mean and standard deviation.

#### **RESULTS**

Total 1000 women, who attended antenatal clinic at tertiary care level hospital in Northern India, were studied for their hematological profile. Prevalance of anemia in this study was 80%. Baseline characteristics of anemic pregnant is described in Table 1.

Table 1: Baseline characteristics of anemic pregnant women.

Baseline characteristics		Number (Total = 800)	Percent (%)
Age	18-22	142	17.75
	23-26	320	40
	27-30	243	30.37
	>30	95	11.87
Parity	Primigravida	200	25
	Gravida 2	240	30
	Gravida >2	360	45

Prevalance of anemia in this study was 80%. Out of which relative prevalance for mild, moderate and severe anemia was 33.5%, 46.5% and 20% respectively (Table 2).

Table 2: Distribution of cases according to severity of anemia.

Anemia (haemoglobin)		No. of females	%
No anemia (>11)		200	20
Anemia (<	:11)	800	80
Anemia	Mild anemia (9-11)	268	33.5
(<11)	Moderate anemia (7-9)	372	46.5
(Total: 800)	Severe anemia ( <7)	160	20

According to morphology, most of cases (68%) had microcytic picture in peripheral smear, followed by normocytic morphology in 31% cases (Table III).

Table 3: Morphological types of anemia in peripheral smear.

Characteristic	Number	Percentage
Microcytic hypochromic	544	68
Normocytic normochromic	248	31
Macrocytic	8	1
Total	800	100%

Table 4: Red blood cell indices.

RBC indices	Mean±SD
Hemoglobin (gm/dl)	8.2±1.57
RBC count (*10 <sup>6</sup> /ul)	3.92±0.70
Hematocrit (%)	27±4.88
Mean corpuscular volume (fl)	70±10.27
Mean corpuscular hemoglobin (pg)	29.8±1.57
Mean corpuscular hemoglobin concentration (gm/dl)	29.8±1.57
Red cell distribution weidth (fl)	$18.4 \pm 3.88$
Mentzer index	$19.05 \pm 7.12$

Mean hemoglobin in anemic pregnant women was 8.2 gm/dl, while mean corpuscular volume was 70 fl.

Mentzer index in study population was 19.05. Other various red blood cell indices are dipicted in Table 4.

#### DISCUSSION

Although, anemia is very common in the developing countries, but still it is most preventable problem. However, multiple treatment and prevention strategies to combat anemia especially for iron deficiency in pregnant women are applied, yet they have met with little success. Studies have indicated poor pregnancy outcomes among anemic mothers. While major reason behind anemia in developing world is nutrition, pregnancy itself exaggerated existing nutritional deficiencies and thus, uncover any latent deficiency states. 11,12

The conventional approach to diagnose anemia is to estimate hemoglobin, haematocrit, mean corpuscular volume, erythrocyte count and other red blood cell indices, peripheral blood smear, and iron studies like total serum iron, ferritin level and total iron binding capacity.

In present study, 1000 women who attended antenatal clinic at tertiary care level hospital, were enrolled and out of these pregnant women, 80% were anemic. Majority of women were between age of 23 to 30 years. According to severity, moderate anemia was most common and affected 46.5% pregnant women while relative prevalence for mild and severe anemia was 33.5% and 20% respectively. Similar result were found in study by Sharma et al and Rohila et al, where combined prevalence of mild and moderate anemia was 80% and 79% in respective study, while prevalence for severe anemia was 20% and 17.6% in respective study.<sup>13</sup>

In present study, analysis of various red blood cell indices and peripheral blood smear indicates iron deficiency anemia as most prevalent cause of anemia in pregnant women as evidenced by low mean corpuscular volume, mentzer index >13, and predominant microcytic picture in peripheral blood smear. Anemia is preventable health problem which can be eradicate by cumulative efforts taken at individual and community levels such as health education regarding anemia and its complication, to child bearing women and adolescent girls.<sup>14</sup>

Improving quality of locally available food in regard to dietary intake of protein, iron and other micronutrients like food fortification, incorporating nutritional education, adequate iron supplements and ensuring maximum compliance, deworming and hygiene practice, universal antenatal care to pregnant women, and management of chronic infections like malaria are promising interventions combating this serious problem.<sup>15</sup>

Similarly, health policies formulated on the level of government, non-government agencies and the community are required, to formulate long term and effective plans like eradicating anemia in children and adolescent girls.

Our study had some limitations like only single regional data was collected and small sample size was taken.

#### CONCLUSION

From the above study, it is evident that anemia is a major health problem during pregnancy and is a major factor for morbidity and mortality. Though it is a preventable condition, it still remains a challenging health issue. Adequate antenatal care and suitable therapy can reduce the maternal mortality.

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Institutional Ethics Committee

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