

STUDY OF HAEMATOLOGICAL PARAMETERS IN ANEMIC PREGNANT WOMEN.

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Abstract: Background: Anemia is characterised by decrease in RBC count or Hb concentration and is very common during pregnancy. If not diagnosed early, anemia can lead to increased morbidity and mortality of mother as well as fetus. **Objectives:** To study different haematological parameters in anemic pregnant women and analyse type of anemia based on haematological parameters. **Methods:** After permission from ethical committee, cross sectional study was conducted among pregnant women attending antenatal clinic at Vadilal Sarabhai General Hospital. After confirmation of pregnancy, blood sample was collected as per routine and results analysed. **Results and interpretation:** 58.33% were found to be anaemic. Mean Hb concentration in anemic women was 10.19gm%, RBC count was 3.5 millions/cu mm, MCV was 77.11 fl, MCH 26.62 pg, MCHC 32.92 and hematocrit (HCT) 32.14%. All these parameters were below their normal values. Mean red cell distribution width coefficient of variation (RDW CV) in our study was 15.70+1.92%. **Conclusion:** Analysis of parameters showed that iron deficiency anemia was most common cause of anemia in pregnant women. Early detection, treatment and prevention of anemia in pregnancy can improve maternal as well as child outcome.

Keywords: anemia, pregnancy, haematological parameters.

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Introduction:

Many changes occur in women during pregnancy involving all systems of the body. There are profound changes in hematological parameters too. Anaemia is defined as decreased oxygen carrying capacity of blood, which may be due to decreased RBC count or decrease in hemoglobin. Anaemia can be caused due to deficiency of iron, folate, vitamin B12; chronic inflammation, inherited disorders, parasitic infections etc., many of these causes can coexist. Anaemia can lead to fatigue, weakness, dizziness, and drowsiness. According to WHO, two billion people in world suffer from anemia and most common cause of anaemia is iron deficiency anaemia¹. Pregnant women and children are particularly vulnerable as they have increased requirement of iron. In India, the estimated prevalence of anaemia is 42% in women of 15-59 age group¹. Iron deficiency anaemia during pregnancy is associated with maternal mortality, low birth weight, infant mortality². Hemoglobin estimation is considered to be most reliable indicator of anaemia and it can be used to classify individuals living at sea level as anemic. According to WHO, if the hemoglobin level is below 11gm/dl in pregnant women, it is considered to be anaemic³. Anemia in pregnancy is a serious problem in all developing countries including India. 40% of all perinatal maternal deaths are directly or

indirectly related to anemia. Infants of anemic mothers have less than one and half of normal iron reserves⁴. Children having iron deficiency anemia have impaired immunity, cognitive as well as motor development⁵. If detected in time, anemia is treatable and preventable. Aim of our study was analysis of various hematological parameters in anemic pregnant women attending tertiary care hospital and the results maybe used for prevention or treatment of anemic pregnant women.

Materials and methods:

Permission from the institutional review board was taken before the commencement of the study. It was a cross sectional study done among the pregnant women attending the antenatal clinic in the Vadilal Sarabhai government hospital during the first trimester of pregnancy based on the records of screening program for thalassemia in the thalassemia prevention centre of the Indian red cross society (IRCS). Pregnant ladies with history of fever in last one month, bleeding disorders, recent history of worms, taking iron and folic acid, were excluded from the study. After history of the patient and confirmation of pregnancy, blood sample was taken as a part of the routine procedure and sent to IRCS for examination. The blood reports from IRCS including the following parameters were collected and analysed: RBC count, Mean corpuscular volume (MCV), Mean

corpuscular haemoglobin (MCH), Mean corpuscular haemoglobin concentration (MCHC), hematocrit, haemoglobin (Hb) concentration, RDW-CV, sickle cell trait, and thalassemia trait. The data was then analysed.

Results:

Out of the 120 women in the study population, 70 (58.33%) were found to be anaemic i.e. they had haemoglobin concentration less than 11g%. 42% of these were primi gravida. Among the anaemic women, 67% belong to the age group of 20-22 years

	Hb (gm%)	HCT (%)	RBC (millions/cu mm)	RDW-CV (%)
Mean + SD	10.19 + 0.9	32.14 + 2.76	3.5 + 0.58	15.70 + 1.92
Normal	11	37	4	11.6-14.6

Table 1: Hematological parameters in anemic women.

According to table 1, mean Hb concentration in anemic women was 10.19gm%, mean RBC count was 3.5 millions/cu mm, and mean hematocrit (HCT) 32.14%. All these parameters were below their normal values. Mean red cell distribution width coefficient of variation (RDW CV) in our study was 15.70+1.92%

Incidentally thalassemia trait was positive in 7 cases and 3 patients were found to have the sickle cell trait.

Table 2: Values of blood indices.

	MCV (fl)	MCH (pg)	MCHC
Mean + SD	77.11 + 10.3	26.62 + 4.01	32.92 + 2.00
Normal	80-96	27-33	33-36

According to table 2, Mean value of MCV was 77.11 fl, mean MCH was 26.62 pg, mean MCHC was 32.92.

Table 3: Percentage distribution of RBC count.

RBC count	%
Normal (4 millions / cu mm)	41.7
Below normal	44.4
Above normal	13.9

The RBC count was below normal in 44.4% cases, normal in 41.7% cases and rest 13.9% had above normal RBC count

Table 4: Percentage distribution of types of anemia according to WHO³.

Type of anemia (based on Hb concentration)	%
Mild (10-10.9 gm%)	57
Moderate(7-9.9 gm%)	40
Severe (<7 gm%)	3

The severity of anemia as classified by the WHO³ showed that 57% had mild anemia and 40% suffered from moderate anemia, and the rest 3% had severe anemia.

Discussion:

In the present study, out of 70 cases of pregnant anaemic women, 7 were less than 20 years of age, 30 women had age between 20-25 and women in age group 26-30 were 33. 58.33% were found to be anaemic³ with hemoglobin less than 11gm%. The severity of anaemia as classified by the WHO showed that 57% had mild anaemia and 40% suffered from moderate anaemia, and the rest 3% had severe anaemia. In a study by Srinivas Rao⁶, prevalence of anemia was 93.26% in Andhra Pradesh, which is very high compared to our study. Also, prevalence of anemia in Urban slum community in Delhi was 29.9% in a study by Umesh Kapil et al⁷. According to WHO, prevalence of anemia can determine category of public health significance: if prevalence of anemia is 40% or more, it indicates severe public health significance³, which is the case in our study.

Hematocrit value in anemic patients in our study was 32.14%, which is lower, compared to normal value. According to a study by Swapan Das⁸ and Imam TS⁹, there was a statistical difference in the haemoglobin concentration and hematocrit of pregnant women compared with the control, which is similar to our study. During pregnancy, plasma volume increases by 25-80%, leading to hemodilution. Increased plasma volume may be due to hormonal changes leading to fluid retention. Also, there is increased demand for iron as pregnancy progresses, leading to decrease in Hb. In the present study, all blood indices were below normal limits, however MCV was too low compared to other blood indices, suggestive of iron deficiency anemia. Iron deficiency anemia is the commonest

type of anemia during pregnancy¹⁰. Large amounts of iron is required during pregnancy, if diet cannot provide extra iron, it leads to iron deficiency anemia. Nynke R¹¹ noted that out of the 150 anaemic women, 23% were iron deficient with no evidence of folate and vitamin B12 deficiency, 32% were deficient in iron and one or more of the other micronutrients; 26% were not iron deficient but had anemia. This indicates that most common of anemia during pregnancy is iron deficiency anaemia, confirmed by a study by Singh K¹². In our study RDW CV was 15.70%, high, compared to normal range of 11.6-14.6%. Red cell distribution width (RDW) is a hematological parameter which measures the variation in red blood cell size or red blood cell volume. In our study, RDW was reported statistically as coefficient of variation (CV). RDW CD is mathematically derived from MCV, hence it is affected by the average RBC size. Increased RDW CV and low MCV in our study can be due to iron deficiency anemia. Similar study by Singh et al also has concluded that increased RDW CV with low MCV confirms iron deficiency anemia or thalassemia minor¹³.

Conclusion:

The haematological parameters can aid in early recognition of type and cause of anaemia during pregnancy and thereby improve the outcome of pregnancy. The study confirms that iron deficiency anaemia is the most common cause of anaemia in pregnancy and is a major health problem in developing and developed countries. Early detection, treatment and prevention of anemia in pregnancy can improve maternal as well as child outcome.

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