

RESEARCH

HEMATOLOGICAL PARAMETERS IN ANAEMIC PREGNANT WOMEN ATTENDING THE ANTENATAL CLINIC OF RURAL TEACHING HOSPITAL

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ABSTRACT

Background: Anaemia is the most common disorder of the blood. Anaemia during pregnancy can lead to morbidity and mortality in mother as well as foetus. As such the anaemia can be diagnosed based on clinical picture, blood test is a definitive evidence of anaemia in pregnancy. Current study was designed to determine the variation in haematological parameters in anaemic pregnant women. **Aims and Objectives:** 1) To study the profile of anaemic pregnant women. 2) To grade the severity of anaemia in the pregnant women. 3) To assess the level of various blood parameters in the study population. **Materials and Methods:** A cross sectional study was done among the anaemic pregnant women attending the gynaecology and obstetrics outpatient department of Shree Krishna hospital, Karamsad. Socio demographic informations were collected and the blood samples were collected. The parameters studied were haemoglobin concentration (Hb), total leucocyte count (TLC), differential leucocyte count (DLC), and platelet count, blood indices, haematocrit (HCT). **Results:** Pregnant women having hemoglobin value of <11gm% were selected. Total 51 pregnant anaemic women have participated. Among them 17(33.4%) women belonged to the age group 20-25 years. 45.1% were primi gravida. Out of 51, 30(59%) were having moderate anemia while 3(6%) women were having very severe anemia. Red blood cells counts were within normal limit in 21(41.3%) women. Women in whom low normal level of MCV, MCH and MCHC was recorded were 72.6%, 70.6% and 58.9% respectively. In 70.5 % of women low level of Vitamin B12 was found. Abnormal value of serum ferritin was noticed in 60.8% of women. **Conclusion:** The haematological parameters can aid in early recognition of type of anaemia during pregnancy and thereby improve the out come of pregnancy.

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INTRODUCTION

Anaemia is defined as decreased haemoglobin level, or circulating red blood cells and it is the most common haematological disorder during pregnancy. Inadequate intake or absorption of iron is associated with increased risks of maternal mortality and morbidity. In pregnancy, anaemia has a significant impact on the health of the foetus as well as that of the mother. Foetuses are at risk of preterm deliveries, low birth weights, morbidity and perinatal mortality due to the impairment of oxygen delivery to placenta and foetus. Thus, routine screening tests for anaemia are recommended in pregnant women. [1][2]

Anaemia is the most common nutritional deficiency disorder in the world. WHO has estimated that prevalence of anaemia in pregnant women as 14% in developed and 51% in developing countries and 65-75% in

India. About one third of the global population (over 2 billion) is anaemic. Prevalence of anaemia in all the groups is higher in India as compared to other developing countries. [3] In most developing countries, anaemia in pregnancy makes an important contribution to maternal mortality and morbidity. A haemoglobin concentration ([Hb]) of < 11.0 g/dl is commonly taken as indicator of anaemia in pregnancy. [4]

Anaemia is the most common disorder of the blood. There are several types of anaemia, produced by a variety of underlying causes. Anaemia can be classified in a variety of ways, based on the morphology of RBCs, underlying etiologic mechanisms, and discernible clinical spectra. The diagnosis of anaemia in pregnancy is difficult to establish based on clinical picture alone, yet it is important that treatment be initiated early because of the high mortality

associated with anaemia during pregnancy. Blood test is a definitive evidence of anaemia in pregnancy. However it has got its limitation like types of anaemia is not ruled out. Keeping all these facts in view, the current study was designed to determine the variation in haematological parameters in anaemic pregnant women.

MATERIALS AND METHODS

Present study was conducted by pathology department of one of the teaching hospitals of Gujarat. A total of 51 anaemic pregnant women, attending to gynaecology and obstetrics outpatient department were studied. Prior permission form ethical committee of the hospital was taken. In all cases, patient age, weight, clinical history and other laboratory investigations were recorded in proforma. Inclusion criteria: Anaemic pregnant women were selected, whose haemoglobin level were below 11g/dl. Complete confidentiality regarding the identity of the individual was maintained and therefore, only hospital number is provided in the study. Written consent was taken from every patient. The samples were collected in an ethylenediaminetetraacetic acid (EDTA) vacutte and plain vacutte by the technician and sent along with the requisition form to the pathology lab.

The parameters studied were haemoglobin concentration (Hb), total leucocyte count (TLC), differential leucocyte count (DLC), and platelet count, blood indices, haematocrit (HCT).

Hematocrit, Total leucocyte counts, blood indices, platelet count and haemoglobin concentration (Hb) of blood samples were estimated by automated blood cell counter (Sysmex KX21). Vitamin B12 & Serum ferritin was estimated by abbot AXSYM system.

Normal value:

Parameters	Normal Value
Haemoglobin concentration (Hb)	12-16g/dl
Total white blood cells (WBCs) count	4.0 - 10.0×10 ³ /μl
Total red blood cells (RBCs) count	4.0-5.2 mlion/cmm
Total platelet count	150-410×10 ³ /μl
Haematocrit (HCT)	36-49%
MCV	80-100fl
MCH	25-35pg
MCHC	31-37g%

RESULTS

This study was carried out on a total 51 cases of anaemic pregnant women (haemoglobin level below 11g/dl), attending to gynaecology and obstetrics outpatient department of a rural based tertiary care hospital.

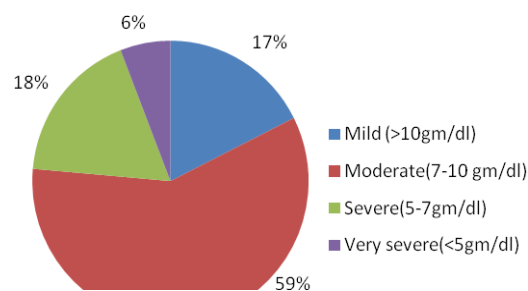
Out of 51 cases of pregnant anaemic women, 17(33.4%) women belonged to the age group 20-25 years.45.1% were primi gravida and 54.9% were multi gravida. Among them, 10(19.7%) women were in first trimester while 20(39.2%) and 21(41.1%) were in second and third trimester respectively.(Table I)

Table I: Profile of anemic pregnant women

Age group	Number	Percentage
<20	2	3.9
20-25	26	51
26-30	17	33.4
30-35	5	9.8
>35	1	1.9
Gravida		
Primi gravida	23	45.1
Multi gravida	28	54.9
Trimester		
First	10	19.7
Second	20	39.2
Third	21	41.1
Total	51	100

On classifying the anemia as per the degree of severity, it was found that 30(59%) were having moderate anemia while 3(6%) women were having very severe anemia i.e. Hb level below 5 gm/dl. (figure 1)

Figure 1: Distribution according to the degree of severity of anaemia on the basis of Hemoglobin concentration



The degree of severity was classified on the basis of WHO classification. Out of 51 pregnant anaemic women, Red blood cells counts were within normal limit in 21(41.3%) women while 29(56.8%) had RBC count below normal range.(Table II)

Table II: Distribution according to Red blood cell count (million/cmm)

RBC Count	Frequency	Percentage
<4 million/cmm	29	56.8
4.0-5.2 million/cmm	21	41.3
>5.2 million/cmm	1	1.9
Total	51	100.0

Levels of MCV, MCH and MCHC were assessed in all the anemic pregnant women. Women in whom below normal level of MCV, MCH and MCHC was recorded were 72.6%, 70.6% and 58.9% respectively. (Table III)

Table III: Distribution according to blood indices

Total cases=51	Below normal range	normal
MCV (fl)	37(72.6%)	14(27.4%)
MCH (pg)	36(70.6%)	15(29.4%)
MCHC (g%)	30(58.9%)	21(41.1%)

In 70.5 % of women, low level of Vitamin B12 was found. Abnormal value of serum ferritin was noticed in 60.8% of women. (Table IV)

Table IV: Distribution according to the level of vitamin B12 & Serum ferritin

Total cases=51	Normal	Below normal range
Vitamin B12 (pmol/L)	15(29.5%)	36(70.5%)
Serum ferritin (ng/ml)	20(39.2%)	31(60.8%)

DISCUSSION

Anaemia is reduction in the number or volume of circulating red blood cells (erythrocytes) or an alteration in haemoglobin level. Technically, anaemia is not a disease but a symptom of any number of disorders. There are many types of anaemia, but many of them are rare. Even more startling is the fact that, presently, more than half of the world's population will experience some form of anaemia in their lifetime. This is responsible for considerable morbidity and mortality. The provision of iron supplements to pregnant women is one of the most widely practiced public health measures. A number of diagnostic tests are currently available in assessing a anaemia in pregnant women e.g.:- haemoglobin concentration (Hb), total leucocyte count (TLC), differential leucocyte count (DLC), platelet count, blood indices, haematocrit (HCT) peripheral blood smear, reticulocyte count also perform some biochemical tests like Vitamin B12 & Serum ferritin which have important diagnostic role.

The present study was carried out on 51 anaemic pregnant women. Out of the total 51 cases, 10(19.7%) cases belonged to the category of 1st trimester, 20(39.2%) cases were in 2nd trimester, whereas 21(41.1%) belonged to the category of 3rd trimester.

According to present study out of 51 pregnant anaemic women 9(18%) were mildly anaemic, 30(58%) were moderately anaemic, 9(18%) were severely anaemic, and 3(6%) were very severe anaemic. The degree of severity was classified on the basis of WHO classification. Umesh Kapil et al^[5], found that 78.8% pregnant women were suffering from anemia as defined by their hemoglobin levels. The percentages of mild, moderate and severe anemia in pregnant women were 29%, 48%, and 2%, respectively.

In the present study, out in 51 cases of pregnant anaemic women, 2(3.9%) were at age >20, while 26(51%) women were of the age between 20-25. Women in age group 26-30 were 17(33.1%). In the study of Sharda Patra et al^[6], the mean age of the women with severe anaemia was 27.5 ± 4.5 years. The majority were of age between 20 and 24 in their study. A significant number (12%) were teenagers. Half of the study population had been younger than 18 when they married.

Similar to present study, Uttam J. Sonkamble et al^[7] has done study on anaemia among pregnant women aged 15-44 years in different states and union territories. In most of the states, the prevalence of any anaemia among pregnant women is over 90%. However, in Jammu and Kashmir and in many north-eastern states (other than Assam) its prevalence is substantially low (30-60%). Wider state-level differentials are seen when the percentages of women having either moderate or severe anaemia are examined. The highest prevalence of either moderate or severe anaemia is found in Assam (66%), followed by Chhattisgarh (61%). In south India and West Bengal the combined prevalence of moderate and severe anaemia is lower than 40%. In Kerala, it is only 5 %.

Blood indices

The haematocrit value (the percentage of red blood cells relative to plasma volume) in non-pregnant women ranges from 38 to 45%. However, in pregnant women because of hemodilution normal values can be much lower, e.g. 34% in single and 30% in twin or multiple pregnancy even with normal stores of iron, folic acid and vitamin B12. This lower range simply reflects "the physiologic hemodilution of pregnancy" and does not indicate a decrease in oxygen carrying capacity or true anaemia. Iron deficiency is responsible for 95% of anaemia of pregnancy.

In the present study out of 51 cases, abnormally low MCV value was reported in 37(72.6%) women, MCH was below normal range in 36(70.6%) while MCHC was below normal level in 29(58.9%) pregnant women.

Serum ferritin

The serum ferritin (SF) is the most important biochemical test in iron deficiency anaemia as it correlates with relative total body iron stores. A low serum ferritin level reflects depleted iron stores and hence is a precondition for iron deficiency in the absence of infection. The generally accepted cut-off for serum ferritin, below which iron stores are considered to be depleted, is <15 g/l. Pregnant women usually have serum ferritin values near or in the range reflective of depletion; however, a low level per se does not imply functional iron deficiency. Only when

the iron supply for physiological function is inadequate, presence of iron deficiency can be considered. Serum ferritin measurement is the preferred test for detecting depleted iron stores (WHO 2001).^[8]

In present study serum ferritin was normal in 20 (39.2%) women while 31(60.8%) had below normal range. The prevalence of iron deficiency in a study on pregnant women in south Malawi was between 44% and 61%; also 88% of cases of anaemia in pregnant women in the plains of Nepal were associated with iron deficiency.^[9]

Vitamin B12

Pernicious anaemia is a form of megaloblastic anaemia due to vitamin B12 deficiency, caused by impaired absorption of vitamin B12 due to the absence of intrinsic factor in the setting of atrophic gastritis, and more specifically of loss of gastric parietal cells. The loss of ability to absorb vitamin B12 is the most common cause of adult vitamin B12 deficiency. Women who are vegetarians are most likely to develop Vitamin B12 deficiency.

In the present study out of 51 pregnant anaemic women, Vitamin B12 was normal in 15 women while 36 women were below normal range. In the study carried out by Martí-Carvajal et al, 23% had cobalamin deficiency anaemia during pregnancy in rural antenatal visit in the tertiary care hospital at Rawalpindi.^[10] Nynke R 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 evidence of one of the other micronutrient deficiencies.^[11]

CONCLUSIONS

To conclude, it can be said that the haematological parameters are easily performed and when properly interpreted along with their cut off values, as suggested in this study, it can aid in early recognition of type of anaemia during pregnancy. In essence, while individual parameters have their limitation, a combination of different parameters certainly improves their usefulness.

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