

Hematological profile of anemic pregnant women attending antenatal hospital

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Abstract: Objective : To study the hematological profile of anemic pregnant women who were attending antenatal hospital.

Material and Methods : Pregnant women who had hemoglobin value of < 11gm were selected. Total 66 anemic pregnant women were enrolled for the study.. Pretested questionnaire was used to collect general information. Blood samples were collected by qualified technician for hematological estimation.

Results : Out of total 66 anemic pregnant women who participated, 11 (16%) belong to age group <20, 36 (54%) belong to 20-25 and 19 (30%) were from > 25 years. Out of 66, 28 (42%) belong to primi gravidae, 26 (39%) multigravidae and 12 (19%) belong to grand multi gravidae. Among 66 participants, 40.92% were mild anemic, 54.54% were moderate and 4.54% were severe anemic. Other hematological parameters like RBC, MCV, HCT, MCHC, MCH were also below the normal range.

Conclusion: There is a need to monitor hematological parameters during pregnancy and thereby improve the outcome of pregnancy.

Key Words : Pregnancy, Hematological parameters, Anemia, gravidae.

I. Introduction:

Anemia is defined as the most common hematological disorder during pregnancy having decreased hemoglobin level or circulating red blood cells. Inadequate intake or absorption of iron in conjunction with blood loss during pregnancy may contribute to anemia¹. Anemia is the most common nutritional deficiency disorder in the world. WHO has estimated that prevalence of anemia in pregnant women was found 14% in developed, 51% in developing countries and 65-75% in India. About one third of the global population (over 2 billion) is anemic. Prevalence of anemia in all the groups is higher in India as compared to other developing countries.²

The World Health Organization (WHO) recommends that hemoglobin ideally should be maintained at or above 11.0 g/dl, and should not be allowed to fall below 10.5 g/dl in the second trimester.³ Anemia contributes to low birth weight and miscarriages and it is also a primary cause of low immunity of both the mother and the child, which make them vulnerable to several infections.⁴

Iron absorption during pregnancy is determined by the amount of iron in diet, its bioavailability (meal composition) and the changes in iron absorption that occurs during pregnancy. Iron requirements are greater in pregnancy than in non-pregnant stage. Although iron requirements are reduced in 1st trimester because of absence of menstruation these raised steadily thereafter as high as ≥ 10 mg/day⁵.

Pregnancy is one of the most and unique periods of women's life cycle. Though it is the most exciting period of expectations and fulfillments, but it is a condition of great stress because many anabolic activities takes place and foetal growth is accomplished extensive changes in maternal body composition and metabolism. Maternal nutrition is the most important determinant influence during the development of foetus. Poor nutritional status during pregnancy is associated with inadequate weight gain, anemia, retarded foetal growth low birth weight, still births, preterm delivery, intrauterine growth retardation, morbidity and mortality rates.⁶ The hematological status in pregnant women can be analyzed by collection of blood samples during each of three trimesters, measuring different variables such as Packed Cell volume (PCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), mean corpuscular volume (MCV), red blood cell (RBC) count, white blood cell (WBC) count, hemoglobin concentration.⁷

The study was aimed to determine the hematological profile of anemic pregnant women who were attending antenatal hospital.

II. Materials and Methods:

A total of 66 anemic pregnant women who were attending antenatal hospital, willing to participate were selected randomly for this study. Prior permission from ethical committee of the hospital was taken. Data was collected through standardized questionnaire. Standardized techniques were used for the biochemical estimations. Blood samples were collected by qualified technician. Venous blood samples were drawn from

mothers for the assessment of hematological parameters. EDTA tubes were used for blood sample collection. RBC count, PCV, hemoglobin concentration and other parameters were assessed by automated counter. The reference values for pregnant women used in this study were hemoglobin: 11g/dl, HCT: 35-49%, MCV: 80-90 fL, MCHC: 31-37%, MCH: 25-35Pg and RBC: 4.0-5.2 million/cmm.

Inclusion Criteria

- Pregnant women age group 18-35 yrs.
- Both vegetarian and non-vegetarian

Exclusion Criteria :

- Obesity
- Diabetes
- Any complication related to pregnancy.

Materials :

- Pretested questionnaire for age, education, trimester, religion.
- Hematological estimation done by autoanalyser.

Test

- Hb (Hemoglobin)
- MCV (Mean corpuscular volume)
- RBC(Red blood cell)
- MCHC (Mean corpuscular hemoglobin concentration)
- MCH(Mean corpuscular hemoglobin)
- HCT(Hematocrit)

III. Collection of sample:

The written consent of pregnant women was obtained prior to collection of blood sample. First the general information was collected through questionnaire, then blood sample was collected through qualified technician. Analysis was done on the same day of blood collection.

IV. Observation and Results:

Table I:

Hematological Profile according to age group

Age group	Number	Mean Hb/g/dl	RBC (10 ⁶ /μl)	HCT (%)	MCV (fl)	MCH (pg)	MCHC (g/dl)
< 20	11 (16%)	8.10 ±0.70	3.52 ±0.33	29.43 ±3.46	77.79 ±2.67	21.17 ±2.58	27.42 ±3.37
20 – 25	36 (54%)	9.56 ±1.12	3.78 ±0.43	31.24 ±3.60	79.49 ±2.99	24.47 ±2.86	27.67 ±2.80
> 25	19 (30%)	7.74 ±0.52	3.56 ±0.47	32.20 ±3.01	76.23 ±2.53	23.03 ±2.96	28.04 ±2.45

Table 2:

Hematological Profile according to Trimester

Trimester	Number	Mean Hb/g/dl	RBC (10 ⁶ /μl)	HCT (%)	MCV (fl)	MCH (pg)	MCHC (g/dl)
2nd Trimester	49 (74%)	7.78 ±0.39	3.56 ±0.47	28.38 ±2.43	77.52 ±4.32	21.32 ±2.50	26.32 ±2.94
3rd Trimester	17 (26%)	8.28 ±0.64	3.63 ±0.38	29.44 ±3.45	78.32 ±4.50	21.53 ±2.63	28.47 ±3.50

Table 3:
Hematological Profile according to Gravidae

Gravidae	Number	Mean Hb/g/dl	RBC (10 ⁶ /μl)	HCT (%)	MCV (fl)	MCH (pg)	MCHC (g/dl)
Primi gravidae	28 (42%)	8.26 ±0.72	3.75 ±0.38	29.43 ±3.46	77.62 ±3.42	21.57 ±2.76	28.48 ±2.32
Multi gravidae	26 (39%)	8.15 ±0.62	3.63 ±0.40	28.39 ±3.42	78.59 ±3.98	21.15 ±2.56	27.62 ±2.84
Grand multi gravidae	12 (19%)	7.88 ±0.49	3.54 ±0.43	28.32 ±2.42	75.43 ±3.53	21.00 ±2.46	26.13 ±3.72

Table 4 :
Hematological Profile according to Religion

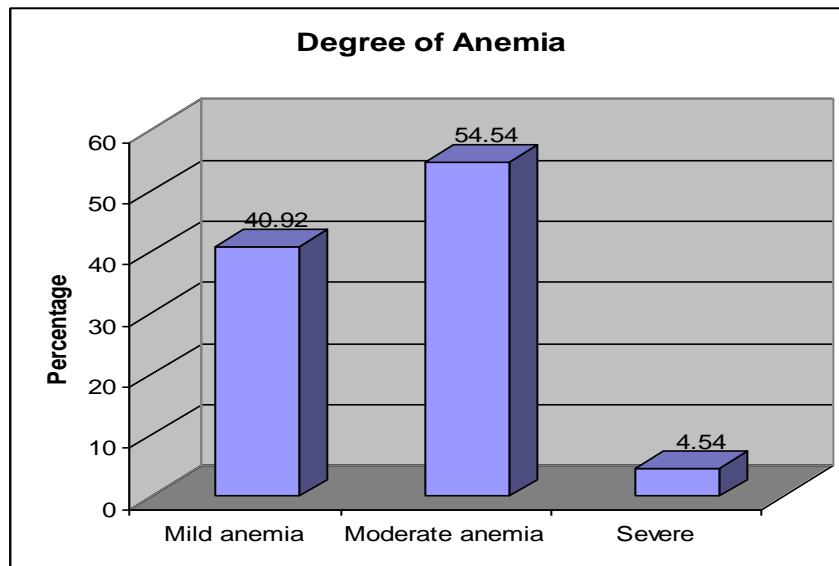
Religion	Number	Mean Hb/g/dl	RBC (10 ⁶ /μl)	HCT (%)	MCV (fl)	MCH (pg)	MCHC (g/dl)
Hindu	40 (60%)	7.62 ±0.67	3.52 ±0.33	28.37 ±3.45	76.72 ±3.73	21.23 ±1.45	27.67 ±2.32
Muslim	26 (40%)	8.15 ±0.72	3.73 ±0.43	29.42 ±2.54	78.23 ±3.43	23.43 ±2.33	28.42 ±2.43

Table 5 :
Hematological Profile according to Educational Level

Education al Level	Number	Mean Hb/g/dl	RBC (10 ⁶ /μl)	HCT (%)	MCV (fl)	MCH (pg)	MCHC (g/dl)
Illiterate	14 (21%)	7.64 ±0.73	3.29 ±0.43	28.23 ±2.47	76.23 ±3.83	22.52 ±2.12	27.32 ±2.52
Literate	9 (13%)	8.17 ±0.74	3.71 ±0.48	28.73 ±2.45	78.93 ±3.43	22.53 ±2.42	28.32 ±3.53
Primary	26 (39%)	8.79 ±0.82	3.73 ±0.44	29.42 ±3.43	77.82 ±2.43	23.54 ±3.42	28.30 ±3.52
High School	10 (15%)	8.93 ±0.91	3.79 ±0.33	29.71 ±3.27	76.91 ±2.52	24.51 ±2.32	29.32 ±2.53
Graduate	7 (12%)	9.12 ±0.94	3.81 ±0.35	30.21 ±4.23	78.24 ±3.52	24.52 ±2.32	29.42 ±3.42

The classification of anemia as per the degree of severity was found to be 40.92% as mild anemic, 54.54% as moderate anemic while 4.54% as severe anemic.

Figure 1. Distribution according to the degree of severity of anemia and the basis of Hb level.



- Table 1 represents the hematological profile of anemic pregnant women according to their age group. Results shows that hemoglobin and other parameters below the normal range in all age groups.
- Table 2 represents the hematological profile of anemic pregnant women according to their trimester. It shows that in 3rd trimester hemoglobin and other parameters were below normal range as compared to 2nd trimester.
- Table 3 represents the hematological profile of anemic pregnant women according to their gravidae. It shows that women who belong to grand multi gravidae reported hemoglobin and other values much lower as compared to women who belong to primi-gravidae.
- Table 4 represents the hematological profile of anemic pregnant women according to their religion. Hindu pregnant women were more anemic as compared to muslim pregnant women.
- Table 5 represents the hematological profile of anemic pregnant women according to their educational level. It shows that women who were illiterate reported hemoglobin and other hematological values below as compared to women who were educated.
- Fig:-1 represents the degree of anemia in pregnant women according to hemoglobin level. It shows that 40.92% women were mild anemic, 54.54% as moderate anemic while 4.54% as severe anemic .

V. Discussion :

In this study out of 66 pregnant women 40.92% were mild anemic, 54.54% were moderate anemic while 4.54% were severe anemic. According to Shah. *et al.* (2012)⁸ out of 51 pregnant anemic women 9 (18%) were mildly anemic, 30 (58%) were moderately anemic while 9 (18%) were severely anemic and 3 (6%) were very severe anemic.

In the present study mean RBC were 3.52, 3.78, 3.56 in the age group <20, 20-25 and >25 respectively. Mean MCV were 77.79, 79.49, 76.23. MCH were 21.17, 24.47, 23.03 and MCHC were 27.42, 27.67, and 28.04 in the above age group. Mean HCT were 29.43, 31.24 and 32.20 in the age group <20, 20-25 and >25 respectively. In another study done by Javed *et al* 2001⁹ overall mean RBC ($10^6/\mu\text{l}$), PCV (%), Hb(g/dl), MCV(fl), MCH(Pg) and MCHC(g/dl) were 4.00, 34.49, 9.69, 90.23, 25.63 and 28.80 observed in pregnant women age group of <25, 26-32 and >33 years.

In the study done by P.U. Okeke (2011)¹⁰ who observed the prevalence of maternal anemia was 38.8%. The mean of hemoglobin in the anemic population was 10.1 gm/dL, HCT 35%, MCV 87.5fL and RDW-CV 13.5%. In another study by Sunitha *et al* (2010), RBC level in anemic pregnant women was observed as 3.70, 3.69 and 3.56 in the age group of 15-24, 25-34 and >35 respectively which was similar to the present study where RBC level were 3.52, 3.78 and 3.56 in the age group of <20, 20-25 and >25. In the present study hemoglobin concentration was 8.10, 9.56 and 7.74 in above age group while in the study of Sunitha *et al* hemoglobin level of pregnant women were 8.27, 8.63 and 9.08 observed in second trimester. MCV level in their study were 80.76, 80.35 and 80.86 in the second trimester of pregnant women in these age groups comparable to present study that were 77.79, 79.49 and 76.23. MCH level in their study were 22.56, 23.60 and 24.41 while in the present study it was 21.17, 24.47 and 23.03 respectively. In the present study level of MCHC were 27.42, 27.67 and 28.04 which was comparable with the study of Sunitha *et al*(2010)¹¹.

VI. Conclusion:

There is a need to monitor these parameters during pregnancy. Anemia is a silent killer. The high prevalence of anemia, despite the availability and easy access to medical care, indicates the level of ignorance and indifference to health needs. There is an urgent need to educate pregnant women and their families about the importance of antenatal care.

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