

Hematological study of iron deficiency anemia in pregnancy in Central Gujarat

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Abstract

Introduction: Prevalence of anemia in pregnant women is most common in India and the prevalence averages 56%. Iron Deficiency Anemia has been claimed to be predominant cause of anemia in pregnant women. This study was intended to study iron deficiency anemia in pregnant women whose hemoglobin level is less than 10gm%.

Methods: 100 cases of pregnant women with hemoglobin less than 10gm% were included. All the hematological parameters including RDW were obtained through analyzer. Peripheral smear stained with field stain was evaluated for morphology. Serum ferritin was done for confirmation of Iron deficiency anemia.

Results: Out of 100 cases of suspected anemia, 65 cases (65%) were diagnosed as iron deficient. Most of the cases were in the age group of 18-25 years.

Conclusion: In conclusion, with increasing severity, MCV and serum ferritin decreases and it is sensitive enough to diagnose Iron Deficiency Anemia. We have found that there is statistically significant association between RDW and Serum Ferritin in diagnosing Iron Deficiency Anemia

Keywords: Iron deficiency anemia, RDW, MCV, Serum ferritin.

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1. Introduction

“Anemia is defined as level of hemoglobin in the blood is below the lower extreme of the normal range for the age and sex of the individual”. [1]

The importance of anemia as a major public health problem throughout the world is widely recognized.

Apart from the threat to the mother, it is also liable for augmented incidence of low birth weight babies, premature births and high pre-natal death.[2]

In pregnant women WHO defined Anemia as a reduction in Hemoglobin level <11g/dl. It arises in 40-80% of the pregnant women. Folic acid deficiencies and Iron, malaria, intestinal parasitic infections & hemoglobinopathies are the major causes of anemia in gestation. [3]

Anemia is responsible for 20% maternal deaths in the third world countries.[4]

Anemia due to IDA is the commonest malnutrition syndrome seen in India and throughout the world.

The single most important cause for the Iron deficiency anemia in our country is inadequate iron intake in the habitual diets compared with the poor bioavailability of dietary iron. [5]

However, risk factors such as Anemia in pregnancy can be controlled and monitored by good antenatal care and appropriate action including referral, in accordance to the level of severity of the anemia.[6]

Morphological typing of anemia is based on RBC indices – MCV, MCH and PCV. The manual methods of measuring RBC indices are tedious and show large coefficient of variation. The automated haematology analysers give more accurate and <1% coefficient of variation for the RBC indices and hence have replaced the manual methods. [7]

2. Material & Method

- The study comprised all the pregnant women coming to Obstetrics and Gynaecology Department including OPD of Dhiraj General Hospital, Smt. B.K. Shah Medical Collage, Piparia, Baroda.
- After obtaining consent a detailed history including age, socio economic status, menstrual history, past obstetric history and complaints such as generalized weakness and easy fatigability etc., was noted.
- A detailed general physical examination including pallor in the skin, conjunctiva, nails etc., was noted.
- 4ml of blood is collected from the patient using sterile aseptic methods in an EDTA and plain vacutainer. Hematological investigations was performed on Automated hematology analyser Sysmex KX-21 like CBC, MCV, MCH, MCHC, PCV, RDW, WBC and Platelet count. With the remaining blood peripheral smears were made which were subjected to field staining.
- The smears were evaluated and the RBC morphology, differential count of WBCs and platelet counts were done.
- Serum ferritin level was done in patient with microcytic hypochromic anemia. Informed consent of the patient for the present study is duly enclosed.

Investigations:

- CBC (Complete blood count) 2. Peripheral blood smear 3. Serum ferritin

Table 3: Correlation of severity of anemia with Type of anemia

Grade of Anemia	Microcytic Heterogeneous	Microcytic Homogenous	Normocytic Heterogenous	Normocytic Homogenous	Thalassemia Trait
Severe Anemia	7(87.5%)	0	0	0	1 (12.5%)
Moderate Anemia	26(72.2%)	3(8.3%)	3(8.3%)	1(2.9%)	3(8.3%)
Mild Anemia	32(57.1%)	10(17.8%)	3(5.4%)	5(8.9%)	6(10.8%)

After correlation of age with type of anemia we found 7 cases (87.5%) as microcytic heterogeneous (iron deficiency), 0 cases (%) as microcytic homogenous (Heterozygous thalassemia or chronic disease), 0 case (%) as normocytic heterogeneous (Mixed deficiency) 0 cases (%) as normocytic homogenous (chronic disease) and 1 case (12.5%) as thalassemia trait in the category of severe anemia.

26 cases (72.2%) as microcytic heterogeneous (iron deficiency), 3 cases (8.3%) as microcytic homogenous (Heterozygous thalassemia or chronic disease), 3 case (8.3%) as normocytic heterogeneous (Mixed deficiency), 1 cases (2.9%) as normocytic homogenous (chronic disease) and 3 cases (8.3%) as thalassemia trait in the category of moderate anemia.

32 cases (57.1%) as microcytic heterogeneous (iron deficiency), 10 case (17.8) as microcytic homogenous (Heterozygous thalassemia or chronic disease), 3 cases (5.4%) as normocytic heterogeneous (Mixed deficiency), 5

3. Results

Prospective clinical non –controlled study with 100 pregnant women is undertaken over a period of one and half years from May 2015 to October 2016 in the department of pathology, Dhiraj General Hospital and S.B.K.S M.I & R.C, Sumandeep Vidyapeeth, Pipariya, Vadodara attending OPD and IPD in the department of OB & GY, Dhiraj General Hospital to study the iron deficiency anemia in pregnant women.

Table 1: Age distribution of patients studied

Age in years	Number of patients	Percentage
18-20	24	24
21-25	64	64
26-30	12	12
Total	100	100.0

In age distribution of anemic cases in pregnancy in the age group 18-20 years 24 cases (24%) were anemic. In the age group 21-25 years 64 cases (64%) were anemic. In the age group 26-30 years 12 cases (12%) were anemic. Maximum numbers of cases were found in the age group of 18-25 years 88 (88%).

Table 2: Severity of anemia

Grade of anemia	Number of patients	Percentage
Severe anemia	12	12
Moderate anemia	57	57.0
Mild anemia	31	31.0
Total	100	100.0

Severities of anemia as studied in 100 cases were as follows. Mild anemia was seen in 12 cases (12%), Moderate anemia was seen in 57 cases (57%) and severe anemia was seen in 31 cases (31%).

cases (8.9%) as normocytic homogenous (chronic disease) and 6 cases (10.8%) as thalassemia trait in the category of mild anemia.

4. Discussion

The prevalence of anemia in pregnancy in developing countries is still high. Nearly half the pregnant women in the world are estimated to be anemic, 52% compared to 23% in industrialized countries. ⁸

Table 4: Showing Age Distribution of Anemic Cases in comparison with other studies

Authors	18-20 Yrs	21-25 Yrs	26-30 Yrs
Ahmad N[9]	45.8%	30.9%	20.9%
Pai PM [10]	25%	48%	14%
Haniff J <i>et al</i> [8]	4.29%	53.6%	37.9%
Present Study	25%	63%	12%

In the present study, the age wise distribution of anemia, maximum numbers of cases were observed between 18-25 years accounting for 63%. The present study correlate closely to observations by Ahmad N [9] (76.7%), Pai PM [10] (73%), Haniff J *et al* [8] (57.8%).

Table 5: Percentage distribution of Type of Anemia in comparison with other studies

Authors	Iron Deficiency	Thalassemia Trait	Chronic Disease	Megaloblastic Anemia	Dimorphic Anemia
Bansal A[11]	71.4%	NIL	19%	NIL	9.6%
Singh M[12]	65%	5.8%	5.8%	5%	18.3%
Zeben D[14]	66%	10%	21%	NIL	NIL
Present study	65%	10%	13%	NIL	6%

The cases of iron deficiency anemia in our study correlate with Bansal A [11], Singh M [12] and Zeben D [14]. The percentages of thalassemia trait cases are also similar to Zeben D [14].

Table 12: Showing percentage distribution of Serum Ferritin in Iron deficiency anemia in comparison with other studies

Authors	Serum Ferritin (<15µg/l)
Thoradeniya T [13]	74.2%
Zeben VD [14]	90%
Mast AE [15]	73%
Alper BS [16]	54%
Present study	65%

In our present study serum Ferritin levels were <15 µg/l in 65% cases. So our study correlates with Zeben VD [14] (90%), Thoradeniya T [13] (74.2%), Mast AE [15] (73%), Alper BS [16] (54%). The above studies done by various authors, have considered serum Ferritin levels <30 µg/l to be indicative of iron deficiency anemia. Other studies also showed that serum Ferritin levels are useful in determining iron deficiency cases.

5. Conclusion

- Anemia is common in the age group between 18-25 years due to early marriages and short interval of pregnancies.
- RDW has been useful but of limited value in diagnosing Iron deficiency anemia. So further studies are indicated.
- Automated hematology analyzer was simple, economical, cheap, reliable instrument used during this study period.

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