



Estimation of Hemoglobin and Hematocrit in Pregnant Women in a Rural Tertiary Care Hospital

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Abstract

The hematological system undergoes significant physiological adaptive variations in pregnancy which otherwise may appear abnormal in non-pregnant state. The objective of the study is to estimate the values of hemoglobin and hematocrit in pregnant women in third trimester. Blood samples of 49 pregnant women were utilized for the present study, out of the 250 cases which were followed up. The blood samples collected were analyzed using a fully automated 3-part hematology analyzer and the parameters namely hemoglobin and hematocrit are taken for the study. Out of 49 cases, 21 cases [43%] had lower hemoglobin levels and 20 cases [41%] had lower hematocrit levels.

Keywords: Pregnant women, hemoglobin, hematocrit.

Introduction

Pregnancy is a normal physiological process that leads to variety of disturbances in hematological parameters. The changes in these parameters are attributed to preparation for fetal hematopoiesis and also against expected blood loss at childbirth.^{9,15} According to the standard laid down by WHO, anemia in pregnancy is present when the hemoglobin concentration in the peripheral blood is 11 gm / dl or less^{12,13,14} The aim of the present study was to find out the impact of pregnancy on hemoglobin and hematocrit. 49 pregnant women who came to the hospital were

taken up for study. Their blood samples were taken and the above said hematological parameters were estimated.

Materials and Methods

The present study was done at Rajah Muthiah Medical College Hospital, Annamalai Nagar, Tamil Nadu. 250 pregnant women were followed up from first trimester itself during the period of September 2018 to March 2019. Inclusion criteria include pregnant women who are primi and are followed up till 3rd trimester, age- 18 to 35 years, who are taking iron and folic acid supplements.

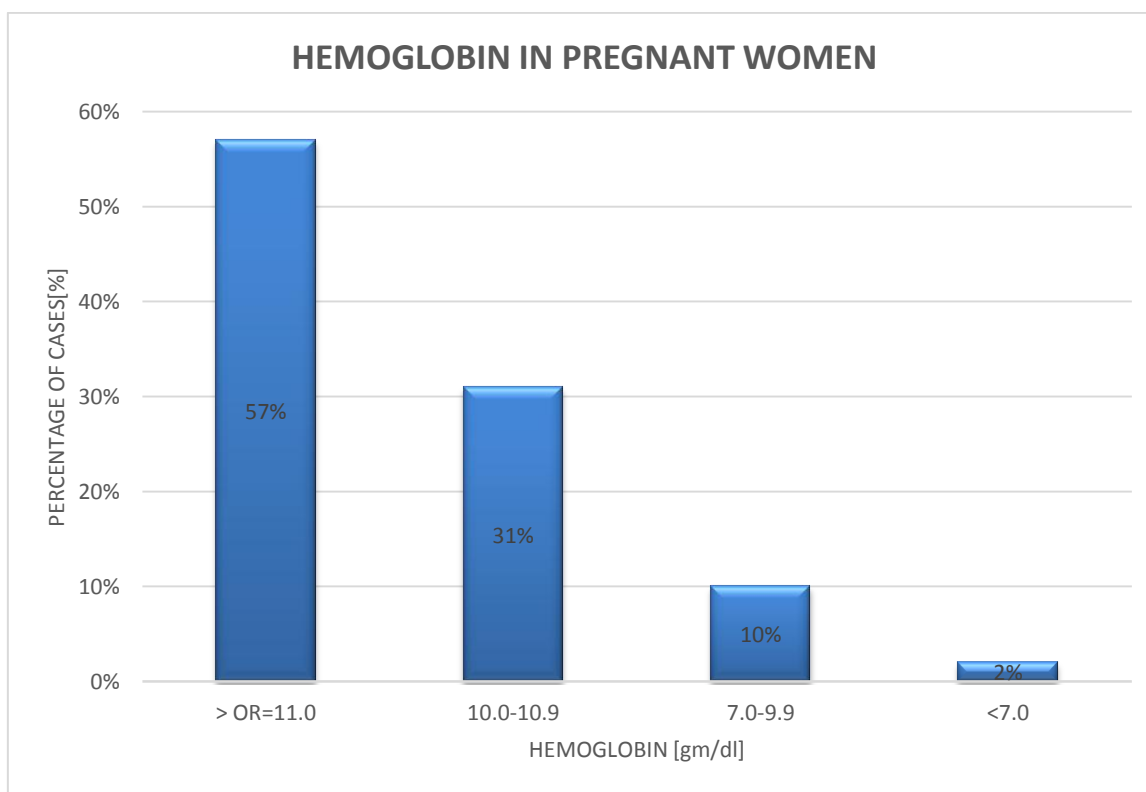
Pregnant women who had major hematological disorders and who received recent blood transfusion were excluded. Based on the above inclusion and exclusion criteria, 49 blood samples of pregnant women were chosen after they fulfil the criteria during their third trimester, among the 250 cases. The blood samples were collected in their OPD and were processed in the hematology laboratory. A fully automated 3- part hematology analyzer which was calibrated before the study, was used to estimate hemoglobin and hematocrit. WHO grading of anemia based on hemoglobin and hematocrit values was used to categorize the results.¹⁴

Observation and Results

Blood samples of the above chosen 49 pregnant women were analyzed for hemoglobin and hematocrit values.

Table: Distribution of Cases by Hemoglobin Value

Hemoglobin [gm/dl]	No. of cases[total cases =49]	% of cases
>or=11.0[normal]	28	57%
10.0- 10.9[mild]	15	31%
7.0- 9.9[moderate}	5	10%
<7.0[severe]	1	2%

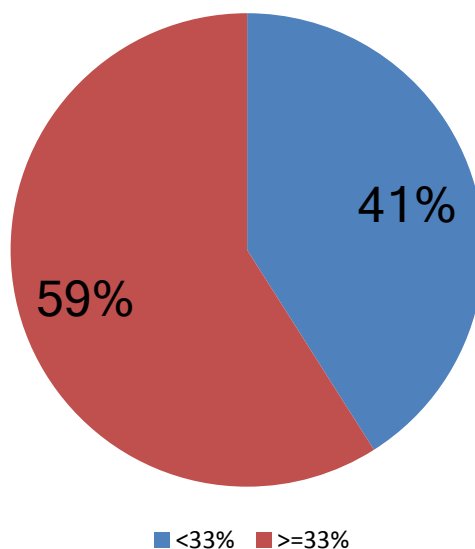


According to WHO classification of anemia, 21[43%] cases were diagnosed to be anemic in the present study. Out of the 21[43%] anemic cases, 15[31%] cases had mild degree of anemia, 5[10%] cases had moderate degree of anemia and 1[2%] cases had severe degree of anemia. 28[57%] cases had hemoglobin levels equal to or greater than 11g/dl.

Table 2: Distribution of Cases by Hematocrit Value

Hematocrit	No. of cases	% of cases
<33	20	41%
>or =33	29	59%

HEMATOCRIT IN PREGNANT WOMEN



In the current study, the corresponding hematocrit values were less than 33% in 20[41%] cases. 29[59%] cases had hematocrit values greater than or equal to 33%.

Discussion

In a study conducted by Indian Council of Medical Research, it was found out that 70% of pregnant women were anemic in India.¹⁷

In a study conducted by Ravishankar Suryanarayana et al in Karnataka among pregnant women who came to 3 primary health centres in Kolar, it was found out that the prevalence of anemia was 63% in pregnant women.¹⁸

In the current study which was done in a tertiary care hospital, the prevalence of anemia in the chosen 49 samples after using inclusion and exclusion criteria as described above was 43% which is slightly less than the above two studies.

Hematological variations that happen during pregnancy are mostly physiological. Those variations are due to hormones namely estrogen and progesterone secreted by the placenta.¹ As early as sixth week of gestation, we can expect 10-15% increase in plasma volume.^{2,3} The hormones in pregnancy stimulate renin secretion which in turn increases erythropoietin in blood. The increase in red cell mass due to erythropoietin

is less compared to increase in plasma volume which leads to a condition called dilutional anemia.⁴ The increase in plasma volume is maximum in second trimester and therefore hemoglobin and hematocrit drops maximum in this trimester. Both these values tend to stabilize by third trimester.^{5,6,7} Anemia is the most common hematological problem in pregnancy, followed by thrombocytopenia.⁹ The duration of normal human pregnancy is about 40 weeks which is 280 days having huge effect on the health of a woman even without any underlying medical disorder at the same time makes the fetus vulnerable to the change in the mother's internal and external physiological status. Both mother and the fetus are major consideration in the management of pregnancy.^{10,16} The daily requirement of iron is 3.4 mg during pregnancy that is 1000 mg throughout the entire pregnancy out of which 250 mg will be accumulated by the fetus via the placenta. Along with this, increased iron requirement due to increased maternal blood volume and iron loss during parturition should be considered. Thus, pregnancy without iron supplementation will exhaust iron stores to the maximum.¹¹

Hematological abnormalities, especially anemia, may have adverse impact on pregnancy outcome

and in most developing countries makes an important contribution to maternal mortality and morbidity. Significant effort is therefore given to monitoring and responding to hematological parameters.^{7,8}

Conclusion

This study concluded that there is significant reduction in hemoglobin and hematocrit values during pregnancy even with iron and folic acid supplementation which is made mandatory in all levels of health care for pregnant women in India, when the above study was done using blood samples of primi pregnant woman in third trimester, who came to Rajah Muthiah Medical College Hospital, Annamalai Nagar, Chidambaram. Early screening of anemia and adequate management is crucial during pregnancy. Other causes of anemia in pregnancy excluding physiological and nutritional anemia should also be kept in mind and corresponding investigations should be carried out for accurate diagnosis and better management.

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