INTRODUCTION

Anemia is the most common pregnancy complication noted on a daily basis, in India. The complications of anemia may result in adverse pregnancy outcomes ranging from mild to severe forms.

In India the prevalence of anemia among pregnant women ranges from 65% to 75%, according to the WHO. As many as 4 to 16% of maternal deaths are due to anemia, in India. A haemoglobin concentration below 11 g/dL or packed cell volume of less than 33% is considered as anemia during pregnancy by WHO.

According to centre for Disease Control and Prevention, it is defined as haemoglobin or haematocrit value less than fifth percentile of distribution of haemoglobin or haematocrit in a healthy reference population of pregnant women.

Expert group on Indian Council of Medical Research has concluded that anaemia in pregnancy can be classified into mild anaemia 10-10.9 g/dL, moderate anaemia 7-9.9 g/dL, severe 4-6.9 g/dL and very severe <4 g/dL.

In developing countries, the prevalence of anaemia among pregnant women averages 60% (in India) ranging...
between 35% to 100% among different regions of the world resulting in varying levels of adverse pregnancy outcomes. It occurs in 40% to 80% of pregnant woman. Iron and folic acid deficiency, malaria, intestinal parasitic infections and haemoglobinopathies are the principal causes of anaemia in pregnancy. Iron requirements increase during pregnancy and if it is not maintained, may result in adverse maternal and fetal outcomes.

The aim of this study is to study the prevalence of anemia in pregnant mothers, study the clinical patterns of anemia in pregnancy and to study the histopathological patterns of anemia during pregnancy.

METHODS

This study is a prospective study done over a period of one year from February 2018 to January 2019, done in department of obstetrics and gynecology, Raja Rajeswari Medical College and Hospital, Bangalore, Karnataka, India.

Inclusion criteria

- This study was conducted on 60 pregnant women whose hemoglobin level is less than 10g/dL.

Exclusion criteria

- Multi fetal gestation, previous correction of anemia including recent blood transfusion history.

Complete clinical and obstetric history was recorded. Socio economic status and routine diet was noted. Peripheral blood smear was prepared from patient’s blood sample and stained by Leishman’s stain, fixed with fixative and observed under low power of microscope and findings noted. Sickle cell test was done by using freshly prepared 2% sodium metabisulphite solution and RBCs observed under both low and high-power microscope for evidence of sickle shaped cells. Samples obtained from clinically diagnosed Thalassemia patients were sent for hemoglobin electrophoresis for confirmatory diagnosis of Thalassemia.

RESULTS

Table 1: Age distribution.

| Age in years | Number of patients | % |
|-------------|--------------------|---|
| 18-20       | 4                  | 6.7% |
| 21-25       | 22                 | 36.7% |
| 26-30       | 29                 | 48.3% |
| 31-35       | 5                  | 8.3% |
| Total       | 60                 | 100% |

Total 60 cases were studied. Maximum number of cases were seen in the age group of 26 to 30 years of age (Table 1).

Most of the patients presenting with anemia were lower middle- and lower-class population in our study population (Table 2).

Table 2: Socioeconomic distribution.

| Socioeconomic status | Number of patients | % |
|----------------------|--------------------|---|
| Upper class          | 6                  | 10% |
| Upper middle class   | 9                  | 15% |
| Lower middle class   | 19                 | 31.6% |
| Upper lower class    | 15                 | 25% |
| Lower class          | 11                 | 18.3% |
| Total                | 60                 | 100% |

Out of 60 cases, 40 percent were found to have dimorphic anemia, 30 percent microscopic hypochromic anemia, 20 percent normocytic normochromic anemia, 8.3 percent were thalassaemia cases and 1.7 percent sickle-cell anemia (Table 3).

Table 3: Distribution based on red cell morphology.

| Peripheral smear | Number of patients | % |
|------------------|--------------------|---|
| Dimorphic anemia | 24                 | 40% |
| Microcytic hypochromic anemia | 18 | 30% |
| Normocytic normochromic anemia | 12 | 20% |
| Thalassemia      | 5                  | 8.3% |
| Sickle cell anemia | 1               | 1.7% |
| Total            | 60                 | 100% |

Table 4: Distribution based on obstetric score.

| Obstetric index | Number of patients | % |
|-----------------|--------------------|---|
| Gravida I       | 27                 | 45% |
| II              | 24                 | 40% |
| III             | 6                  | 10% |
| IV              | 3                  | 5%  |
| Total           | 60                 | 100% |

A total 27 cases were primigravidae and remaining cases were multigravida (Table 4). 9 cases were diagnosed in the first trimester, 18 cases noted in second trimester and 33 cases in the last trimester (Table 5).

Table 5: Trimester wise distribution.

| Trimester | Number of patients | % |
|-----------|--------------------|---|
| I         | 9                  | 15% |
| II        | 18                 | 30% |
| III       | 33                 | 55% |
| Total     | 60                 | 100% |

A total 15% of cases had mild anemia, whereas 55% of cases had moderate anemia and 30% had severe anemia (Table 6).
DISCUSSION

In the past few decades, in all developing countries anemia in pregnancy constitutes a major public health problem.4,5 Prichard and Scott who measured the hemoglobin and hematocrit concentration in a large group of healthy young women found that there is a 5% fall of hematocrit for every pregnancy which starts at 8 to 10 weeks and reaches a maximum during the second trimester. This is mainly due to intravascular volume expansion. Nearly 50% of the pregnant women in the world are said to be anemic, compared to 23% in industrialized countries.6,7 The prevalence of anemia is higher in pregnancy due to an increase of almost 50% of blood volume.7

Table 6: Grading of anemia based on ICMR classification.

| Grade of Anemia (ICMR classification) | Number of patients | % |
|--------------------------------------|--------------------|---|
| Very severe <4g/dL                    | -                  | - |
| Severe (4.6-9 g/dL)                   | 9                  | 15% |
| Moderate (7.9-9.9g/dL)                | 33                 | 55% |
| Mild (1--10.9g/dL)                    | 18                 | 30% |
| Total                                | 60                 | 100% |

Table 7: Comparison of age distribution.

| Authors       | 18-20 | 21-25 | 26-30 | 31-35 |
|---------------|-------|-------|-------|-------|
| Ahmed L et al | 45.8% | 30.9% | 20.9% | 2.36% |
| Haniff J et al| 4.29% | 53.6% | 37.9% | 4.2%  |
| Present study | 6.7%  | 36.7% | 48.3% | 8.3%  |

Table 8: Comparison of trimester wise distribution.

| Authors  | I trimester | II trimester | III trimester |
|----------|-------------|--------------|---------------|
| Rasheed P et al | 27.7% | 37.3% | 50.2% |
| Present study | 15% | 30% | 55% |

Table 9: Comparison of obstetric score.

| Authors   | G1 | G2-G3 | G4 |
|-----------|----|-------|----|
| Haniff J et al | 27.42% | 62.77% | 9.79% |
| Present study | 45% | 50% | 5% |

The common symptoms presented by pregnant women with anemia were fatigue, pallor, dyspnea, paresthesia and bilateral pedal edema. Among these majority of the cases hand pallor on examination followed by fatigue and dyspnea. Some cases present and with pre-eclampsia and previous history of abortions. A few cases of beta thalassemia diagnosed clinically for the first time in pregnancy were noted and suitable blood tests were done to confirm the diagnosis, whereas other cases of thalassemia were diagnosed prior to conception and treated accordingly.

The commonest red blood cell pictures among the patients studied were dimorphic anemia and a microcytic hypochromic anemia (Table 3). The most common duration of anemia was in the third trimester (Table 5) and the most common clinical type of anemia was iron deficiency anemia. After the first trimester of pregnancy there is an increase in the demand by the fetus and it is combined with the hemodilution effect of pregnancy resulting in anemia in the third trimester. In India, being a tropical country iron is lost through sweat and also by infestation by parasites. Other factors such as adequacy of vitamin B12 and folic acid also influence the hematopoietic status of an individual as proved in dimorphic blood picture.

CONCLUSION

Anemia in pregnancy is highly prevalent in India and the commonest morphological patterns of anemia in this study are dimorphic anemia, mostly noted in the lower socioeconomic groups, multiparous women with poor diet and inadequate antenatal check-ups. Thus, the necessity of necessity of implementation of nationwide nutritional welfare programs, pre-conceptional counselling, early ante-natal diagnosis of the patient are important factors in preventing anemia in pregnancy and more importantly its maternal and fetal adverse effects.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Ahmad N, Kalakoti P, Bano R, Arif SMM. The prevalence of anemia and associated factors in pregnant women in a rural Indian community. Aus Med J. 2010;3(5):276-80.
2. Sidhu GS, Sood SK, Swami RV. Anemia of pregnancy in northern India, Delhi area. Indian J Med. 1988;55(6):449-57.
3. Bivalkar NY, Wingkar KC, Joshi AG, Jagtap S. Study of anemia and its epidemiological determinants in pregnant women. Inter J Healthcare Biomed Res. 2015;3(2):140-5.
4. Haniff J, Das A, Onn LT, Sun CW, Nordin NM, Rampal S, et al. Anemia in pregnancy in Malaysia: a cross sectional survey. Asia Pac J Clin Nutr. 2007;16(3):527-36.
5. Yalwagwarzo M, Guwahati EA. The pattern of anemia in northern Nigerian pregnant women. J Med Med Sci. 2013;4(8):319-23.
6. Koura MR, Makki SM. Anemia in pregnancy. A study among attendees of PHC. Ann Saudi Med. 2008;28(6):449-52.
7. Anjum A, Manzoor N, Shakir HA. Prevalence of anemia during pregnancy in district Faisalabad, Pakistan. University J Zool. 2015;30(1):15-20.

Cite this article as: Sarojamma C, Atchutha S. Clinicopathological study of anemia during pregnancy. Int J Reprod Contracept Obstet Gynecol 2020;9:1545-8.