Original Research Article

Study of Anaemia in Third Trimester of Pregnancy and Its Correlation with Maternal and Foetal Outcome

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ABSTRACT

Introduction: Anemia is one of the most common nutritional deficiency conditions affecting pregnant women, prevalence is 14% in developed countries, 51% in poor countries, and 65 to 75 %present in India. Anemia is the second leading cause of maternal death in India, accounting for nearly 80% of anemia-related maternal fatalities in Southeast Asia. Because of disparities in socioeconomic situations, lifestyles and health-seeking habits among countries, the prevalence of anemia in pregnancy varies significantly.

Aim: To study occurrence of anemia in third trimester of pregnancy with its various causes and its impact on maternal and fetal outcome.

Objectives:
- To study various etiological factors associated with anemia in third trimester of pregnancy.
- To study the outcome of mother and neonate born to them.

Material & Methods: Present study was conducted in the Department of Pathology at Krishna Medical Research Center on blood samples received from 200 patients with anemia in the third trimester of pregnancy. Hematological (CBC, Peripheral smear, Reticulocyte count, Bone marrow aspiration, HPLC) and biochemical (Serum ferritin, Serum iron, TIBC, Vitamin B12) investigations were done. Data so collected was tabulated in an excel sheet and was analysed.

Results: Out of 200 subjects, maximum cases were having age of 19-30 years (84%). 43% (86/200) had mild anemia, 48.5% (97/200) had moderate anemia and 8.5% (17/200) had severe anemia.63.5% (127/200) cases were unbooked and 36.5% (73/200) were booked under antenatal care in department of Obstetric and Gynecology of our tertiary care centre. In our study, 98% (196/200) of the cases were from rural areas. 55% (110/200) cases were from illiterate group and 45% (90/200) cases were from literate group. Majority of cases i.e. 43% (86/200) belonged to lower socioeconomic class (V). Maximum number of cases i.e. 78.5% (157/200) in this study were >37 weeks of gestation. Maximum number of cases in this study were primigravida. Iron deficiency is the most common cause of maternal anemia.

Conclusion: The result from this study shows that the commonest cause of maternal anemia in pregnancy was iron deficiency followed by vitamin B12/folate deficiency, comprising of majority of cases i.e. 98.5%. These are nutritional deficiencies which can be prevented and treated. From this study it can be concluded that the outcome of anemia in pregnancy depends upon the cause and the degree or severity of anemia. Hb estimation and peripheral smear examination can help to assess the severity of the anemia in pregnancy and thus can reduce both the maternal and fetal complications if detected and treated early. It is highly recommended that more effective guidelines regarding educating girl child, regular antenatal check ups, free provision and regular intake of iron-folic acid tablets, should start at grass-root levels to get safe motherhood.

Keywords: Anemia, Pregnant women, Third trimester, CBC

INTRODUCTION

Anemia is classified as mild (9–10.9 g/dl), moderate (7-9 g/dl), severe (7 g/dl), or extremely severe (4 g/dl) by the World Health Organization[1]. Anemia has long been thought to be damaging to fetal growth and outcome in pregnant women. A considerable increase in the risk of preterm birth has been reported in the case of second trimester anemia. This could be explained by a state of chronic hypoxia caused by anemia, which can trigger a stress response and lead to the generation of corticotropin releasing hormone (CRH), which has been linked to an increased risk of premature birth. Furthermore, oxidative damage to erythrocytes and the fetoplacental unit may raise the risk of premature birth[2].Hb levels in the third trimester are crucial in predicting birth weight. The third trimester is recognized for the rapid growth of the fetus. The same trimester also sees the highest demand for iron and other micronutrients. This could explain the link between Hb in the third trimester and low birth weight[3].The third trimester sees an increase in fetal iron requirements as well as fetal growth. Fetal development retardation due to insufficient circulation and oxygenation is conceivable in the context of maternal iron deficiency anemia in the early third trimester. As a result, the last trimester of pregnancy is when the fetus gains the most weight and stores the most iron. As a result, we must detect anemia during pregnancy, which will aid in prevention, early diagnosis, and will show favorable prognosis for both mother and child[4].

MATERIALS & METHOD

The study is a prospective study and was carried out in department of pathology of a tertiary care center. All pregnant women in the third trimester with anemia were studied during the period of January 2020 to May 2021. Criterion for selection of cases was based on Hemoglobin concentration given by W.H.O. for anemia during pregnancy.

Inclusion criteria:

All women attending OPD and IPD of tertiary care centre in third trimester of pregnancy with hemoglobin levels of <11gm/dl.

Exclusion criteria:

All pregnant women whose hemoglobin was >11gm/dL

RESULT

- Majority of cases i.e 87% (168/200) belonged to age group of 19-30 years. The mean age of cases in this study was 25 $\pm$4.3 years. The youngest patient was 19 years old and the oldest patient was 42 years old.

Table 1: Age distribution of the study subjects

Age Group (in years)	N=200	%
19-30	168	84
31-40	30	15
>40	2	1
Mean±SD	25.77±4.30	

- Out of 200 cases 43 % (86/200) had mild anemia, 48.5% (97/200) had moderate anemia and 8.5% (17/200) had severe anemia.

Table 2: Distribution of patients into mild, moderate and severe anemia

Degree of anemia	N	%
Mild(10-10.9 gm/dL)	86	43
Moderate(7-9.9 gm/dL)	97	48.5
Severe(<7 gm/dL)	17	8.5
Total	200	100

- In our study 63.5% (127/200) cases were unbooked and 36.5% (73/200) were booked under antenatal care.

Table 4: ANC status of the study subjects

ANC	N=200	%
Booked	73	36.5
Unbooked	127	63.5
Total	200	100

- In our study, 98% (196/200) cases lived in rural area. 55% (110/200) cases were from illiterate group and 45% (90/200) cases were from literate group.

Table 5: Area and Literacy Status of the study subjects

Variables	N=200	%
Area		
Rural	196	98
Urban	4	2
Literacy Status		
Illiterate	110	55
Literate	90	45

- According to Kuppuswamy Socioeconomic Status Score, majority of cases i.e. 43% (86/200) belonged to lower class (V). 39% (78/200) cases belonged to upper lower class (IV) and 18% (32/200) belonged to lower middle class (III).

Table 6: Socioeconomic status of the study subjects

Socioeconomic status	N	%
Upper (I)	02	01%
Upper Middle (II)	02	01%
Lower Middle (III)	32	16%
Upper lower (IV)	78	39%
Lower (V)	86	43%

- In this study iron deficiency was the most common cause of maternal anemia i.e. 87% (174/200) cases (table 10, figure 18).Other causes included vit B12/folate deficiency in 11.5% (23/200) cases and thalassemia trait in 1.5% (3/200) cases. No case of maternal anemia due to parasitic infestations was noted.

Table 10: Distribution of cases of anemia in pregnancy according to etiological factors

Factors	N=200	%
Iron deficiency	174	87
Vitamin B12/Folate deficiency	23	11.5
Parasitic infestations/Infections	00	00
B Thalassemia trait	03	1.7

MATERNAL OUTCOME -

- Mean Hb was compared between cases with PPH and cases without PPH and it was found to be statistically significant as p<0.05. In cases with PPH mean Hb was 7.2gm/dL and in cases without PPH mean Hb was 9.2gm/dL.
- Mean Hb was compared between cases with pre-term labor and cases with term labor and it was found to be statistically significant as p<0.05. In cases with pre-term labor mean Hb was 8.3gm/dL and in cases with term labor mean Hb was 9.2gm/dL

FETAL OUTCOME –

- Mean Hb was compared between mothers who had low birth weight babies and mothers who had babies with birth weight within normal limits and it was found to be statistically significant as p<0.05. In mothers who had normal birth weight babies, mean Hb was 9.0gm/dL and in mothers who had babies within normal limits, mean Hb was 9.5gm/dL.
- Mean Hb was compared between mothers of IUGR babies with mothers of babies not having IUGR and it was found to be statistically significant as p<0.05. In mothers of IUGR babies, mean Hb was 7.6gm/dL and in mothers of babies not having IUGR, mean Hb was 9.3gm/dL.

DISCUSSION

Anemia is a frequent health problem that affects women all over the world during pregnancy. Anemia affects more than half of pregnant women, according to the WHO, which estimates that over 2 billion individuals, or over 30% of the world's population, are anemic. The purpose of this study was to look at a number of etiological factors linked to anemia in the third trimester of pregnancy, as well as the mother's and neonate's outcomes[5].

Maternal Anemia

- Out of 200 cases 43% (86/200) cases had mild anemia, 48.5% (97/200)cases had moderate anemia and 8.5% (17/200) cases had severe anemia in our study.
- Kalaivani K(2018)[6] studied maternal cases of anemia among which 41.39 % were mildly anemic, 52.5% were moderately anemic and 6.05 % were severely anemic which was concordant to our study.

Maternal Age

- Out of 200 subjects, most of the subjects were having age of 19-30 years (84%).

The youngest patient was 19 years old and the oldest patient was 42 years old.

- In a study by Rema V Nair et al (2019)[7], mean age of the study participants was 26.69 years with a standard deviation of 4.065 which was concordant to our study.

- Suryanarayana R et al (2017)[8] found that the average age of pregnant women was 22.4 years, with the majority of subjects being between the ages of 21 and 30 which was concordant with our study.

ANC Status

- In our study 127 (63.5%) cases were unbooked and 73 (36.5%) cases were booked under antenatal care in department of obstetrics and gynecology in our tertiary care center.

- According to the Nigar A. et al (2020)[9] study, women booked in the third trimester (75.3 percent) had a greater proportion of anemia than women booked in the second trimester (16.5 percent). Pregnant ladies in their first trimester had the lowest percentage of anemic women (8.2 percent) which was concordant to our study.

Area And Literacy Rate

- In our study 98% (196/200) of the cases were from rural areas.
- 55% (110/200) cases were from illiterate group and 45% (90/200) cases were from literate group
- In a study conducted in Bangladesh by Chowdhury et al (2015)[10], women's education was found to be strongly associated with anemia during pregnancy, whereas Singh et al. (2015)[11] discovered no significant association between anemia and gravida[58].
- Our findings were in concordance with H. K. Cheema et al[12] (2016) and Lokare PO et al (2012)[13] who showed that anemia increased with a decrease in the level of education.
- According to a study by Nigar A et al (2020)[9], female educational status plays a significant impact in the incidence of

anemia, which is estimated to be higher among illiterate women living in rural areas.

Socioeconomic Status

- According to Kuppuswamy Socioeconomic Status Score, in our study majority of cases 43% (86/200) belonged to lower class (V) which was concordant to study conducted by Dr. Dharmendra K. Gahwaiand Dr. Y.D. Badgaiyan (2016)[14].
- Sharma P et al (2013)[15] have found that socio economic status is a major explanation for the women having anemia in pregnancy.

Etiology Of Maternal Anemia in Pregnancy –

- In this study iron deficiency was the most common cause of maternal anemia i.e87%   (173/200) cases. There was not a single case of maternal anemia due to any parasitic infestations or chronic infections.
- Other studies done by K Jagdish et al (2013)[16], R Suryanarayan et al (2017)[08], H Cheema et al (2016)[12] showed iron deficiency being the most common cause of gestational anemia.

Maternal Outcome
PPH

- When comparing cases with PPH to cases without PPH, the mean Hb was lower among cases having PPH. The difference was found to be statistically significant as p<0.05.
- Suryanarayana R et al (2017)[08] discovered that PPH was frequent in anemic pregnant women in their study.
- In a similar study, Rohini Sehgal et al (2016)[17] discovered that women with anemia in the prenatal trimester were more likely to develop PPH.

Preterm Labor –

- When mean Hb was compared in cases with preterm labor and cases with term

labor using t test, it was found to be statistically significant as p<0.05.

- Suryanarayana R et al (2017)[08] in their study too revealed that preterm labour was commonly seen among anemic pregnant women.

Fetal Outcome
Low Birth Weight

Mean Hb was lower in mothers with low birth weight babies as compared to mothers with babies of birth weight within normal limits. When mean Hb was compared it was found to be statistically significant as p<0.05.

- In a study by Rema V Nair et al (2019)[07], 29 babies were born with low birth weight and 18 were born with normal birth weight, and there was a statistically significant link between low birth weight and anemia (p0.05).

- According to Suryanarayana R et al (2017)[08], approximately 25% of women gave birth to low-birth-weight babies, with the bulk of them (57%) being among women with anemia. These findings are comparable to those of our research.

- A study by Sangeetha (2014)[18] in Bangalore reported highest (63%) prevalence of LBW among pregnant women, whereas Marahatta (2007)[02] observed least (16.6%)[10].

- Similarly, K Jagadish Kumar et al (2013)[19] reported that the average birth weight of kids born to anemic women was somewhat lower than that of newborns born to nonanemic moms in their study. This was a statistically significant difference.

IUGR

- Mean Hb was lower in mothers with IUGR as compared to mothers not having IUGR and it was found to be statistically significant as p<0.05.

- Rohini Sehgal et al (2016)[17] in their study revealed incidence of IUGR as 6.7% with no statistically significant

association with anemia which is in-contrast to our study.

- Study by S Ganju et al (2020)[20] showed statistically significance between gestational anemia and IUGR which is concordant to our study.

It appears that maintaining normal Hb levels throughout pregnancy will result in the best neonatal outcome in terms of preterm and low birth weight. This raises the possibility of reconsidering the policy of iron supplementation for mothers. Based on the foregoing findings, we believe that an earlier iron supplementation policy in the second and third trimesters should be explored.

CONCLUSION

From this study it can be concluded that the outcome of anemia in pregnancy depends upon the cause and the degree or severity of anemia. Hb estimation and peripheral smear examination can help to assess the severity of the anemia in pregnancy and thus can reduce both the maternal and fetal complications if detected and treated early. It is highly recommended that more effective guidelines regarding educating girl child, regular antenatal checkups, free provision and regular intake of iron-folic acid tablets, should start at grass-root levels to get safe motherhood. Primary health care be reinforced in order to improve maternal and fetal outcomes, with a high priority placed on anemia prevention, early detection, and treatment.

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