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Original Research Article

Severe anemia and adverse pregnancy outcome in a tertiary care hospital in North India

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ABSTRACT

Background: Anaemia is commonest medical disorder in pregnancy with 88% prevalence in India mainly due to ignorance, poverty and gender bias. 40-60% of maternal deaths in developing countries. According to the recent standard laid down by WHO anemia is present when the hemoglobin (Hb) concentration in the peripheral blood is less than 11 gm/dl. The most common cause of anemia in pregnancy is iron deficiency. Anemia is diagnosed by estimating the hemoglobin concentration and examining a peripheral blood smear for the characteristic red blood cell changes. The aim of the study was to determine the association between severe anemia, maternal and perinatal complications.

Methods: Case control study was done in department of Obstetrics and Gynecology, Rajendra Institute of Medical Sciences Ranchi, India from February 2016 to July 2016. 100 pregnant women, admitted for delivery and having severe anemia were studied and compared with 100 non-anaemic women of similar demographic features. Maternal and perinatal complications were observed. Pearson, chi-square and Fischer exact tests were used to calculate significance of results.

Results: Of the severely anaemic mothers, 36% babies were low birth weight ($p=0.042$) and 20% were small for gestational age ($p = 0.026$), as compared to 18% and 10% of controls, respectively.

Conclusions: Severe maternal anemia carries significant risk of hemorrhage and infection in the mother. It is also associated with preterm birth, low birth weight.

Keywords: Severe anemia, Pregnancy outcomes

INTRODUCTION

Anaemia is the most common nutritional deficiency disorder in the world. In India anaemia antedates pregnancy, is aggravated by increased requirements during pregnancy and blood loss at delivery, infections in the antenatal and postnatal periods, and the early advent of next pregnancy perpetuates it.¹ It causes direct as well as indirect deaths from cardiac failure, hemorrhage, infection and preeclampsia.²

Women go through a variety of physiological changes during pregnancy. Changes in the blood circulatory system are particularly notable, permitting normal fetal growth. Even in normal pregnant women, the hemoglobin concentration decreases with dilution according to the increase in the volume of circulating blood. Anemia is commonest medical disorder in pregnancy with 88% prevalence in India mainly due to ignorance, poverty and gender bias. 40-60% of maternal death in developing countries.³

Pregnant women with significant anemia may have an increased risk for poor pregnancy outcomes, particularly if they are anemic in the first trimester.⁴ It carries a lot of threats to the mother as well as baby.⁵

Studies have shown that iron deficiency is the major cause of anaemia followed by folate deficiency. In recent years, the contribution of Vitamin B12 deficiency has been highlighted.⁶ Data are inadequate to determine the extent to which maternal anemia might contribute to maternal mortality.⁷

Anaemia is very often asymptomatic in pregnancy, with the diagnosis being made on routine screening.⁸ It is defined by WHO as hemoglobin level less than 11 grams % in pregnancy. It is divided into three degrees

- Mild degree (9.0-10.9 gm%),
- Moderate degree (7.0-8.9 gm%) and
- Severe degree (<7.0 gm%).

Current knowledge indicates that iron deficiency anemia in pregnancy is a risk factor for preterm delivery and subsequent low birth weight, and possibly for inferior neonatal health.⁹

This deserves further exploration because of the tendency of infants to develop complications. The aim of the study was to determine the association between severe anemia, maternal and perinatal complications.

METHODS

Case-control study was done at Department of Obstetrics and Gynecology, RIMS, Ranchi, India from February 2016 to July 2016. Study population of 200 (100 cases and 100 controls) were taken for the study.

All patients admitted for delivery with hb% <7g/dl were taken as inclusion criteria. Population having mild and moderate anemia (8-10 g/d), K/c/o hemoglobinopathes like thalassemia, antipartum hemorrhage due to placenta previa, hemolytic anemia like SCD were excluded from the study.

100 pregnant women, admitted for delivery, having severe anemia were studied and compared with 100 non-anemic women of similar demographic features.

Detailed clinical history and menstrual history of the entire patient was taken. Thorough general and systemic examination of the patient was recorded.

All the routine investigation along with CBC, S. Ferritin, and Peripheral blood smear examination were done. Follow up of these patients was done for foetomaternal outcome. Maternal and perinatal complications were observed, pearson, chi-square and fischer exact tests were used to calculate significance of results.

RESULTS

There were 3040 deliveries at RIMS Ranchi, India. 2037 (67%) women had anaemia and 107 (3.5%) had severe anemia.

Table 1: Characteristics of cases and controls of patients.

Characteristics	Cases	Controls
Booked	24	64
Unbooked	76	36
Emergency admission	80	52
OPD admission	20	48
<20 years	14	10
>20 years	86	90
Primigravida	34	48
Multigravida	66	52
Gestational age <37 weeks	34	16
Gestational age >37 weeks	66	84
Mean Hb%	6.2±0.6	11.6±0.6
Mean blood loss	427±386	252±128
Blood transfusion <5 points	66	2
Blood transfusion 1-5 points	34	0
No blood transfusion	0	98
Hospitalization <8 days	52	84
Hospitalization >8 days	48	16

In the present study the proportion of cases were more among unbooked women (76%), emergency admission (80%), multigravida (66%). Most of the patients (86%) with anemia belonged to the age group more than 20 years of age. Majority of women (66%) with anemia belonged to gestational age more than 37 weeks. Need of blood transfusion was more among cases as compared to controls. Blood transfusion was done in 100 % cases as compared to only 2% controls needed blood transfusion. The mean hemoglobin in anemic patients was 6.2 g% which was significantly less as compared to the control group that was 11.6 g%. Duration of hospital stay of cases was more than controls. The duration of hospital stay was less than 8 days in 84% controls as compared to 56% cases while hospital stay was more than 8 days in 48% cases as compared to 16% in controls. Blood loss was higher in cases as compared to the controls. Blood loss was 427 ml in cases that was significantly more than that of controls that was 252 ml.

Table 2: Distribution of cases according to PBF examination.

PBF	Cases	Controls
Dimorphic	8%	0
Macrocytic hypochromic	10%	0
Microcytic hypochromic	80%	0
Normocytic normochromic	2%	100%

The most common type of anemia in the cases was microcytic hypochromic (80%) followed by macrocytic

hypochromic anemia (10%). The only type of anemia present in the control group was normocytic normochromic anemia.

Table 3: Maternal complications.

Complications	Cases	%	Controls	%	P-value
Abruption placenta	10	10	6	6	0.712
Wound infection	18	18	2	2	0.02
Preeclampsia	20	20	10	10	0.026
Sepsis	10	10	0	0	0.01
CHF	4	4	0	0	0.036
Post-partum haemorrhage	34	34	4	4	0.001
Maternal morbidity	48	48	10	10	0.024
Maternal death	8	8	0	0	0.126

Placental abruption was more common in patients of anemia (10%) than in controls but that was not statistically significant. Almost all the complications were more common in anemic patients. Post-partum hemorrhage occurred in 34% (34) of cases as compared to 4% (4) of controls ($p=0.001$) and this was statistically significant. Frequency of infection of surgical wound was significantly more in 10% (10) in cases as compared to 2% (2) in controls ($p=0.002$) and this is also statistically significant. Sepsis and CHF were significantly more in cases as compared to controls and were statistically significant. Preeclampsia is more common among anemic patients (20% v/s 10%). Maternal morbidity was 48% (48) that was significantly higher in cases as compared to controls (10%) this is also statistically significant. Maternal mortality was more among cases (8%) but no mortality was observed in controls.

Table 4: Perinatal complications.

Complications	Cases	%	Controls	%	P-value
Low birth weight infant	36	36	18	18	0.042
Preterm birth	34	34	16	16	0.036
IUGR	20	20	10	10	0.026
APGAR score <7	8	8	4	4	0.67
In-utero death	2	2	4	4	1
Perinatal death	4	4	0	0	0.036

Preterm birth was approximately 2 times more common in cases as compared to controls and is statistically significant. Preterm birth was seen in 34% (34) cases and 16% (16) controls ($p=0.036$). Low birth babies and IUGR were 2 times more common in cases as compared to controls and was statistically significant. Of the severely anemic mothers, 36% (36) babies were low birth weight ($p=0.042$) and 20% (20) were IUGR ($p=0.026$), as

compared to 18% and 10% of controls, respectively. Perinatal death was seen in 4% (4) cases and none in controls ($p=0.036$).

DISCUSSION

Levy A et al concluded that the incidence of asphyxia (40%) and intrauterine growth retardation (38%) were significantly higher in anemic group as compared to normal haemoglobin.¹⁰

Kavle JA et al, found strong association of severe anemia with post-partum hemorrhage. Wandabwa J et al has also indicated chronic anemia as a predictor for post-partum hemorrhage.¹¹

Karafahin E, et al studied association between maternal anaemia and perinatal outcome at Gulhane Military Medical Academy, Department of Obstetrics and Gynecology, Ankara.¹²

Ali AAA, et al conducted retrospective case-control study at Kassala hospital, eastern Sudan. pregnant women with severe anemia (Hb) <7 g/dl, n = 303, who delivered from January 2008 to December 2010 with 2.3 times risk of LBW, 3.4 times risk of preterm, 4.3 times risk stillborns, concluded as greater the severity of the anaemia during pregnancy, the greater the risk of preeclampsia, preterm delivery, LBW and stillbirth.¹³

Abdel A et al concluded that the corrected risk for preeclampsia with severe anaemia was more (OR = 3.6, 95% CI: 1.4-9.1, $P=0.007$) as compared with women with no anaemia.¹⁴

Ghimire et al concluded that the frequency of low birth weight and Apgar score <7/10 at birth was more in anemic group and the difference was statistically significant. Preeti J et al found a significant correlation between anaemia and development of preeclampsia, eclampsia, and preterm labour (P value < 0.05).¹⁵

CONCLUSION

Severe maternal anaemia carries significant risk of hemorrhage, infection, morbidity and mortality in mother. It also associated with preterm birth, low birth weight and perinatal mortality.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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