

## Anemia in Pregnancy and its Effect on Fetal Outcome

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### Abstract

**Introduction:** Anemia is a very common problem in both non pregnant and pregnant women and its association with adverse pregnancy outcomes is an important issue. Adverse perinatal outcomes include intrauterine growth retardation, prematurity, birth weight and significant mortality risks associated with anemia particularly in the developing countries. **Aim:** To know the effect of anemia in pregnancy on neonatal outcome. **Materials and Methods:** This was a retrospective study conducted at Jhalawar medical college, Jhalawar, for a period of one year. A total of 9430 pregnant women were delivered during study period. Out of those 336 were excluded (pregnancy induced hypertension, medical disease etc) and 9004 patient's (5404 were anemic and 3600 were non anemic) data were recorded and perinatal outcome (live birth, still birth, intrauterine death (IUD), low birth weight and preterm delivery) were analyzed. **Results:** Most common age group of pregnant patient was 20-25 year in both anemic and non anemic patients. Number of cesarean section were higher in anemic group (27.9% v/s 27%) Out of 3600 patients in non anemic group 972 (27%) but this difference was statistically not significant ( $p > 0.05$ ). There was significant high chances of preterm delivery, low birth weight and Perinatal death in anemic

mother as compare to non anemic mother (14.2% v/s 11.4%, 23.7% v/s 16.3% and 4.4% v/s 2.3% respectively) ( $P < 0.05$ ). **Conclusion:** Anemia during pregnancy significantly associated with adverse perinatal outcome. Efforts must be made through strategies such as fortification and periodic supplementation and counseling of women of the risks of anemia during pregnancy.

**Keywords:** Maternal Anemia; Perinatal; Fetal; Low Birth Weight; Preterm.

### Introduction

Anemia is a very common problem in both non pregnant and pregnant women. WHO has recommended a cut off value of 11.0 g/dl for hemoglobin to define anemia at any time during pregnancy [1]. Nearly 50% of pregnant women experience anemia in the world [2-5]. Some of the increase in anemia and iron deficiency anemia (IDA) with gestation is a consequence of the normal physiological changes of pregnancy [6].

Gestational age at which anemia is diagnosed and its association with adverse pregnancy outcomes is an important issue [7-8]. Many studies have shown that preterm delivery, small for gestational age and low birth weight are increased for women with anemia during pregnancy and risk depends on the severity of the anemia [8-12]. Adverse perinatal outcomes include intrauterine growth retardation, prematurity, low birth weight and significant mortality risks associated with anemia particularly in the developing countries [13-15].

Severe anemia is also associated with adverse maternal outcome and may

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contribute directly or indirectly to a significant proportion of maternal cardiac failure, hemorrhage, and infection. They also have an increased risk of developing perinatal infection, pre-eclampsia and bleeding. Post-partum cognitive impairment and behavioral difficulties were also reported [16-18].

## Materials and Methods

Present study was conducted at tertiary care center, Jhalawar medical college, Jhalawar, Rajasthan in department of Obstetrics and Gynaecology and Pediatrics. This was a retrospective study for a period of one year (January 2017 to December 2017).

### Inclusion Criteria

Pregnant women with hemoglobin level less than 11 gm/dl at the time of admission.

### Exclusion Criteria

Pregnant women who are having other risk factor (Pregnancy induced hypertension, Eclampsia, Gestational diabetes mellitus, cardiovascular disease and other medical disease). The pregnant women who fulfilled the inclusion criteria, their data were recorded in pretested proforma. All the relevant detail like age, religion, parity, mode of delivery and hemoglobin level was recorded. Patient's medical condition and other associated complications were recorded. Perinatal outcome (live birth, still birth, intrauterine death (IUD), low birth weight and

preterm delivery) were analyzed. Preterm delivery was defined as delivery after 24 and before 37 completed weeks of gestation. The weight of newborns less than or equal to 2499 gram were classified as low birth weight.

Data were analyzed using chi square test and p values were calculated. Relative risk were calculated using standard statistically methods.

A total of 9430 pregnant women were delivered during study period. Out of those 336 were excluded (pregnancy induced hypertension, medical disease etc). Total of 9004 patient's data were recorded and analyzed. Out of 9004 patients, 3600 patient had normal hemoglobin (>11gm/dl) and 5404 patient had anemia (hemoglobin<11gm/dl).

## Results

A total of 9004 patients were included in study, out of which 3600 were having normal hemoglobin and 5404 patients were anemic.

Base line characteristics parameter of anemic and non anemic patient were comparable (Table1).

Most common age group of pregnant patient was 20-25 year in both anemic and non anemic patients (61% v/s 60%). Out of 5404 anemic patient, 540 (10%) were below 20 year of age.

In non anemic group 2160 (60%) were Hindu and 1440 (40%) were Muslim patients while in anemic group 3512 (65%) were Hindu and 1892 (35%) were Muslim.

Ratio of nulliparous and multiparous patients were almost same in both anemic and non anemic group.

**Table 1:** Base line characteristic of non anemic and anemic mothers

Parameter	Non anemic (3600) n (%)	Anemic (5404) n (%)	P value
<b>Age</b>			
<20 years	432 (12%)	540(10%)	
20-25 years	2160(60%)	3296(61%)	
25-30 years	792(22%)	1242(23%)	
>30 years	216(6%)	326(6%)	
<b>Religion</b>			
Hindu	2160(60%)	3512(65%)	
Muslim	1440(40%)	1892(35%)	
<b>Parity</b>			
Nulliparous	1764(49%)	2692(49.8%)	
Multiparous	1800(50%)	2648(49%)	
Not known	36(1%)	64(1.2%)	
<b>Mode of delivery</b>			
Normal vaginal delivery	2620(72.8%)	3885(71.9%)	
Lower segment caesarean section	972(27%)	1508(27.9%)	0.34
NVD with forceps	8(0.2%)	11(0.2%)	

Out of 3600 patients in non anemic group 2620 (72.8%) patient delivered by normal vaginal delivery and 972 (27%) patient were delivered by lower segment cesarean section while in anemic group 3885 (71.9%) were normal vaginal delivery and 1508 (27.9 %) were delivered by lower segment cesarean section. So there is slight increase chances of lower segment cesarean section in anemic pregnant women as compared to non anemic patient but this difference was statistically not significant ( $p > 0.05$ ) (Table 2).

Data of Perinatal outcome in both the group (anemic v/s non anemic) were analyzed. Out of 3600 patients in non anemic group 412 (11.4%) delivered preterm babies while 768 (14.2%) baby were delivered pre term babies in anemic group and this difference was statistically significant ( $p < 0.05$ ) (RR 0.8, 95% CI 0.7-0.9).

Out of 3600 patients in non anemic group 587 (16.3%) gave birth of low birth weight babies while in anemic group 1279 (23.7%) pregnant women gave birth of low birth weight babies. So there were high risk of delivering of low birth weight babies in anemic mother as compare to non anemic mother and this difference was statistically significant ( $p < 0.05$ ) (RR 0.6, 95% CI 0.6-0.7).

Perinatal death was also high in anemic group as compare to non anemic group (4.4% v/s 2.3%) with a significant statistically difference ( $p < 0.05$ ), (RR 0.5, 95% CI 0.4-0.6).

## Discussion

A large proportion of women in both Industrialized and developing countries become anemic during pregnancy. Estimates from the WHO report that from 40 to 75% (56% on average) of pregnant women in developing countries was anemic [19-20].

Allen et al and Cutner et al in their studies observed high incidence of preterm delivery, LBW, IUD and perinatal mortality in anemic pregnant patient. Prematurity was the leading cause of perinatal death. Similar results were also found in other studies [21-22].

In our study there was significant higher rate of preterm birth and low birth weight in anemic pregnant mother. There are several studies showing association between maternal anemia and low birth weight in babies. Meta analysis of few studies showed that neonates born to women with anemia during pregnancy had significantly reduced birth weights with an average of 303.73 gm than those born to women without anemia (95% CI: 19.20-588.26;  $p = 0.04$ ) [23-26].

Perinatal mortality also associated with anemia in pregnancy. In our study perinatal mortality was significantly high in anemic mother as compared to non anemic mothers. Studies done in Pakistan and Assam (India) also observed increase risk of still birth and intrauterine death [9,27].

Limitation of our study was that this was a retrospective study based on record from the hospital. Most of files did not have records of hemoglobin level at different gestational period. Another thing is that high number of missing data in case record sheet.

## Conclusion

Anemia during pregnancy significantly associated with adverse perinatal outcome (preterm birth, low birth weight and perinatal mortality). Poor socio-economic status contributes to all aspects of these inter-linked problems that are more commonly encountered in the developing world. Health education and adequate prenatal

**Table 2:** Neonatal outcome among anemic and non anemic mothers

Neonatal complication	Non Anemic (n=3600)	anemic (n=5404)	Total (n=9004)	Relative risk	95% CI	P value
<b>Preterm birth</b>						
Yes	412 (11.4%)	768(14.2%)	1180(13%)	0.8	0.7-0.9	0.002
No	3188(89.6%)	4636(85.6%)	7824(87%)			
<b>Low birth weight</b>						
Yes	587(16.3%)	1279(23.7%)	1866(20.7%)	0.6	0.6-0.7	0.001
No	3013(83.7%)	4125(76.3%)	7138(79.3%)			
<b>Perinatal death</b>						
Yes	83(2.3%)	239(4.4%)	322(3.6%)	0.5	0.4-0.6	0.001
No	3517(97.7%)	5165(93.6%)	8682(96.4%)			

care of the expecting mother and proper antenatal visits is important in potentially reducing the risks associated with anemia during pregnancy. Efforts must be made through strategies such as fortification and periodic supplementation and counseling of women of the risks of anemia during pregnancy. This may help to reduce the manifestation of anemia and thus reduce maternal and neonatal morbidity and mortality.

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