



Comparasion of neonatal outcome in varying degrees of maternal Anaemia

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Abstract

Severe maternal anaemia is associated with negative impact on the outcome of the newborn. The objective was to correlate the degree of maternal anaemia with outcome of the neonate. Anaemic and non anaemic pregnant women admitted in labor room after 24 weeks gestation for delivery were selected. Delivery was conducted and assessment of the neonate was carefully done and recorded. Mean Apgar score, gestational age at delivery and birth weight were lower in neonates of severely anaemic women. They had higher admission rate in neonatal intensive care unit. The associations were statistically highly significant (p value-0.05). Thus, newborns of severely anaemic mothers should also be carefully assessed. Greater care of these new-borns is required and hence higher NICU admissions rate.

Keywords: Anaemia, birth weight neonatal outcome

1. Introduction

Severe anaemia is associated with negative impact on both the mother and the newborn. The adverse effects may depend upon the severity of anaemia and the period of gestation. Anaemia may be responsible for complications like infections, heart failure premature births, small for gestational age babies, stillbirths and neonatal deaths. The relationship of maternal anaemia and adverse outcome of pregnancy with regard to neonatal parameters is not well established. There is lack of information in literature about the influence of maternal anaemia on the newborn. The high prevalence of iron deficiency stresses the extreme importance of this issue and the impact it may have on the economic expansion of developing countries^[1].

Hence, the study was undertaken to see the effect of degree of anaemia in pregnancy on neonatal outcome.

2. Materials and Methods

This was a descriptive study. Minimum 35 participants were recruited in the four groups of non-anaemic, mild, moderate and severe anaemia each. Institutional Research Review Board Clearance was taken prior to the study. Primigravidae aged 18-35 year, who gave singleton live birth after 24 weeks of gestation were included. Women with antepartum haemorrhage and mothers of neonates with birth defects were excluded. Written informed consent was taken. Detailed history, examination and investigations were done. Assessment of the newborn. Was done All data was recorded and statistical analysis done. P value < 0.05 was taken as significant.

3. Results and Discussion

The relationship of maternal anaemia and neonatal outcome was evaluated. Neonates born to mothers with anaemia had lower Apgar score as compared to neonates born to mothers with no anaemia and this difference was statistically

significant. Lower APGAR score were seen as the severity of anaemia increased, poorer score in those of severely anaemic mothers. Table 1.

The newborns delivered of anaemic mothers have a significantly lower concentration of haemoglobin than newborns from non-anaemic mothers. Low Hb level during labor is associated with poor Apgar scores and subsequently increased risk of birth asphyxia and child's disabilities. Rani *et al.* KU^[2], Kheir *et al.*^[3] and Nair A *et al.*^[4] also observed that anaemia in pregnancy had a significant association with poor neonatal outcome. Nurjannah *et al.*^[5] reported that pregnant women with anaemia had a higher risk to deliver baby with neonatal asphyxia than those with no anaemia. According to Lone F W *et al.*^[6] and Mohamad I., *et al.*^[7] newborns of anaemic mothers had 1.8 times increased risk of having an APGAR score of <5 at 1 min. Miglani U *et al.*^[8] and Gitanjali K, Nighat F^[9] also concluded that the risk of Apgar score <7 increased with severity of anaemia.

Mean gestational age at delivery was 38.1±0.4 weeks in non-anaemic women and 36.3±0.4 week in anaemic women. There was no statistical difference (p-value 0.07) between gestational age of delivery in women with or without anaemia. 30 women had delivery between 28-34 weeks, of whom all were anaemic and 45.71% had moderate anaemia. Table 2.

Various authors^[3, 9, 10] found a positive correlation between maternal anaemia and preterm delivery. The risk of premature delivery in anaemic group increased significantly as compared with the non-anaemic group. Rahmati *et al.*^[11] also showed that anaemia in the first trimester increased the risk of pre-term births Qiaoyi Zhang *et al.*^[12] found that anaemia in early pregnancy was associated with increased risk for preterm premature rupture of membranes, whereas in late pregnancy was associated with lesser risk for spontaneous preterm labour.

Preterm birth may occur through multiple pathways, with maternal infection, hypoxia and oxidative stress being the three major postulated biological mechanisms. Iron deficiency may increase the risk of maternal infections. An activated immune system in the presence of infections and inflammation and corticotrophin-releasing hormone or cortisol released following a stress responses, can activate the maternal or foetal hypothalamic–pituitary–adrenal axis. This can initiate labour and eventually result in preterm parturition. Low-grade chronic hypoxia may be caused by impaired transport of haemoglobin which induces maternal and foetal stress. Finally, iron deficiency may also increase oxidative stress resulting in damage to erythrocytes and the foeto-placental unit [12]

The mean neonatal body weight was higher in neonates of non-anaemic mothers as compared to those of severely anaemic mothers. Neonatal body weight decreased progressively with increasing severity of maternal anaemia showing a statistically significant correlation (p value=0.001). Table 2.

Many authors [3, 6, 8, 10] found the strongest effect on birth weight independent of gestational age was only with severe maternal anaemia. Rahmati *et al.* [11] study showed that haemoglobin below 11g/dl in the first trimester increased the risk of low birth weight and that this relationship was observed more in developing countries. Nair M. *et al.* [13] from his study observed that mothers with haemoglobin below 10 g/dl at any time during pregnancy had 4.3 times higher risk of giving birth to low birth weight babies compared to mothers with haemoglobin more than 10g/dl.

Maximum weight gain, fat and glycogen deposition of foetus occurs in the third trimester. Iron and other micronutrient accretion rates are the highest in the same trimester as well. This physiology explains the association

of third trimester maternal Hb and low birth weight in newborns of anaemic mothers. Insults occurring in the early phase of pregnancy tend to affect cell hyperplasia and Type 1 IUGR. It is irreversible. Insult occurring 27th week onwards affect cell hypertrophy, resulting in Type 2 IUGR and is reversible [14].

In our study, 13.5% (19) of the newborns were admitted in neonatal intensive care unit (NICU), of which only one neonate each was of the non-anaemic and mildly anaemic mother, both were admitted in NICU due to meconium aspiration syndrome (MAS).34.28% of the newborns of severely anaemic mothers as compared to only 14.28% of the moderately anaemic and 2.85% of mildly anaemic mothers were admitted in NICU. Thus, a highly significant correlation with p value 0.001 was seen between NICU admissions of the newborns and degree of maternal anaemia. Table 3.

Miglani U *et al.* [8] and Gitanjali K, Nighat F [9] also observed that admission rate to NICU was more in babies of subjects with anaemia than without anaemia. Mohamad Ihab, *et al.* [7] and Rani KU *et al* [2] also showed a significant causal relationship between maternal severe iron deficiency anaemia and increased incidence of neonatal ICU admissions.

Low birth weight and birth asphyxia were the main causes of NICU admissions in our study Table 4.

Foetal morbidity is increased due to low birth weight and respiratory distress. Type 2 IUGR babies (low PI or disproportional growth) are more at risk of obtaining low 1st minute APGAR scores and exhibit signs and symptoms of metabolic disturbances in the hours following delivery. Foetuses are compromised and hence are born with low Apgar score and hence need NICU care. [14]

Table 1: Maternal Anaemia and Apgar score

	<4	4-7	>7	Mean	SD
Non anaemic	0	1(2.85%)	34(97.14%)	9\10	±0.11
Mild	0	9(25.71%)	26(74.28%)	9\10	±0.18
Moderate	2(5.71%)	19(54.28%)	14(40%)	7\10	±0.25
Severe	5(14.28%)	25(71.4%)	5(14.28%)	6\10	±0.32
Total	7	55	78		

Chi-square=57.41 p-value=0.001 (HS)

Table 2: Maternal Hb and Gestational Age at Birth and Birth Weight of Neonates

	Non anaemic	Mild	Moderate	Severe
Period of Gestation at Delivery in weeks	38.1±0.4	37.8±0.2	37.1±1.6	35.3±2.4
Mean Birth weight in grams SD	2926.62±384.04	2576.68±353.96	2381.35±351.56	2001.38±402.93

Table 3: Maternal Anaemia and NICU Admissions

	Non anaemic	Mild anaemia	Moderate anaemia	Severe anaemia	Total
No. of admissions	1 (5.26%)	1 (5.26%)	5 (26.31%)	12 (63.15%)	19

Table 4: Reasons for NICU Admissions in Neonates of Anaemic Women

Cause	Number of admissions
Low birth weight	8 (44.44%)
Birth asphyxia	8 (44.44%)
Others	2 (11.11%)

4. Conclusion

Newborns of anaemic mothers also should also be carefully assessed. Birth asphyxia and respiratory distress syndrome

are significantly more in new-borns of severely anaemic mothers. Greater care of these new-borns is required and hence higher NICU admissions rate.

5. References

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