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"Effect of Maternal Anaemia on Cord Haemoglobin And Birth Weight of Newborns"

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Abstract:
Background: *Maternal anaemia is a common problem in pregnancy, particularly in developing countries. Iron requirements increase during pregnancy, and a failure to maintain sufficient levels of iron may result in adverse maternal-fetal outcome.*
Aim Of Study: *To determine the effect of maternal anaemia on haemoglobin level and birth weight of the new borns*
Study Place And Duration: *Study conducted at Regional institute of medical sciences(RIMS), Imphal, Deptt. Of Physiology in collaboration with Obstetrics & Gynaecology Department from November 2014 to April 2015.*
Study Design: *Cross sectional study.*
Methods: *The study included 100 term pregnant women and their babies born by normal vaginal route. A total of 55 women were found to be anaemic with a haemoglobin level of <11g/dl, while remaining 45 women had normal level of haemoglobin. After delivery of baby, the cord blood samples were taken in EDTA vials and analyzed in "Automated haematoanalyzer" in Physiology Department. The newborns were weighed immediately and the results were compared between two groups.*
Results: *Cord blood haemoglobin and newborns weight were lower in anaemic women compared to that of non-anaemic women.*
Conclusion: *(a) There is a positive relation between maternal haemoglobin and fetal haemoglobin.*
(b) There is also relationship between maternal anaemia and newborn weight.
Recommendations: *Optimization of maternal haemoglobin with good nutrition, iron supplementation and good spacing between pregnancies will decrease the incidence of such negative outcomes on newborns of maternal anaemia.*
key word: *cord blood haemoglobin, maternal anaemia.*

I. Introduction

"Newborn Haematology" recently represented as an area of study that focused in study of umbilical cord blood and its elements in general[1]. At birth, the umbilical cord blood haemoglobin is an important haematological parameter in newborn[2]. Haemoglobin and haematocrit values have been used frequently in the diagnosis and followup of the neonatal anemia[3]. White blood cell(WBC) and platelet counts also proven to be helpful in the assessment of neonatal sepsis and the haemostatic status of infant[13].

Anaemia is the commonest medical disorder and around 30-50% of women become anaemic during pregnancy, with iron deficiency being responsible in more than 90% of cases. The incidence of folate deficiency is around 5% and this is almost always the cause of megaloblastic anaemia in pregnancy, with vitamin B12 deficiency being rare[4]. In developing countries upto 50% of children become anaemic by 12 month of age. Iron defeciency anaemia is the most common nutritional disorder worldwide.

Maternal anaemia has several deleterious effects on the health of the mother and fetus. The cord blood shows a linear relationship with maternal haemoglobin and mothers who had anaemia were more likely to deliver anaemic babies. Umbilical cord blood count at birth shows an increased in haemoglobin(Hb), haematocrit(Hct), mean corpuscular volume(MCV), leucocyte count, reticulocyte count and nucleated red blood cell with presence of associated immature white blood cells[1].

The haematologocal values of newborns depend on several factors including ethnic group, maternal factors, gestational age, mode of delivery, maternal age, parity, and fetal infections.

Causes of anaemia during pregnancy in developing countries are multifactoral[12]. Most common causes of anaemia in developing countries are: nutritional, hookworms infestations, repeated pregnancies and

hemorrhages. Preterm labour, low birth weight infants and postpartum infection are associated with anaemia during pregnancy. several studies shows maternal anaemia is associated with neonatal anaemia and poor survival rate. Newborns of hypertensive mothers have a significantly higher incidence of somatic growth retardation, thrombocytopenia, leucopenia, neutropenia, low apgar scores, delayed adptation, patent ductus arteriosus and gastrointestinal hypomotility. Apgar scores, platelet count, white blood cell count, neutrophil count and weight percentile correlate with the severity of maternal platelet and enzyme abnormalities[1o]

According to WHO, haemoglobin level below 11gm/dl in pregnant women constitutes anaemia and haemoglobin below 8gm/dl is severe anaemia. The centre for disease control and prevention defines anaemia as less than 11gm/dl in first and third trimester and less than 10.5gm/dl in second trimester. Serum ferritin of 15 micro gm/L is associated with iron deficiency anaemia[15].

This study was aiimed to assess the effect of maternal anemia on cord blood hemoglobin of the newborns which is an important indicator of anaemia in newborns at birth.

Aims And Objectives

To determine the effect of maternal anaemia and its effect on birth weight.of the newborns.

II. Materials And Methods

1. **Study Design**: Cross Sectional Study.
2. **Type Of Data**: Quantitative Data.
3. **Type Of Tools**: Automated Haematoanalyzer.
4. **Anticoagulant:** Edta
5. **Study Area**: Hospital Based.
6. **Collection Of Data:**

Sample size: A total of 100 cases were included in this study.
Duration: 5 months.

Setting: Department of Physiology in collaboration with Department of OBSTETRICS AND GYNAECOLOGY. Regional Institute of Medical Sciences(RIMS).IMPHAL.

6.Inclusion Criteria:

1. 1.Full term neonates (37-41weeks).
2. 2.Babies born to Normal vaginal deliveries .
3. 3.Women with Singleton pregnancies.
4. 4.Primi or multi parity.
5. 5.Pregnant mothers aged 18-45years.
6. 6.Babies with birth weight of 2.5-4 kg.

7. Exclusion Criteria:

1. Multiple Pregnancies (e.g.TWIN)
2. Newborns with congenital malformations.
3. Newborns born to mother complicating with antepartum hemorrhage, eclampsia.
4. 4.Chronic diseases e.g- diabetes mellitus, heart disease, kidney disease, lung disease, HTN etc.
5. Cesarean section deliveries.
6. Birth asphyxia.
7. HIV infection .

- **Statistical analysis**
  Statistical analysis was performed using SPSS 21. Students 't' test and pearson's correlation were used. $P<0.05$ taken as significant.

- **Ethical Issues:**

Approval taken from institutional Ethics Commitee, RIMS. Informed consent was taken from all the participants. Confidenciality was maintained.

III. Results

Table-1: Cord Blood Haemoglobin Levels Of Newborns In Women With Anaemia

Maternal Haemoglobin (gm/dl)	Number of Patients	Cord blood Haemoglobin (gm/dl)	P Value
10-10.9	37	14.79±1.36	0.000
8-9.9	13	13.89±0.9	0.000
7	5	12.1±1.04	0.02
11 (normal)	45	16.75±1.17	

Table-2: Relation Of Maternal Haemoglobin With Bith Weight Of Newborns.

Maternal Haemoglobin (gm/dl)	Number of patients	Neonatal birth weight(Kg)	P Value
10-10.9	37	3.1±0.35	0.01
8-9.9	13	2.7±0.35	0.002
7	5	2.2±0.25	0.01
11 (normal)	45	3.3±0.40	

IV. Discussion

It's obvious from table 1 that out of 100, 55 (37 mild, 13 moderate and 5 severe) were anaemic,and 45 were non-anaemic mothers (cord Hb 16.75 gm/dl) . We find a linear relationship between maternal and fetal haemoglobin levels, similar to study done by Adem I. et al[14].

Birth weight of babies born to severe anaemic mothers were found to be significant and directly proportional to lower birth weight compared to the babies born to mild and moderate anaemic mothers. Singla et.al. reported that newborn's birth weight was not significantly changing in mild and moderate anaemic mothers but was lower than that of the newborns of non-anaemic mothers[15].

V. Conclusion

Our study shows that maternal anaemia effects both haemoglobin and birth weight of neonates. We have found a linear relationship between maternal haemoglobin, cord blood haemoglobin and birth weight of the newborns.Maternal anaemia is a common and important complication of pregnancy that can be detected by simple and low cost screening test. Maternal and fetal complications of anaemia can be prevented by adequate measures and prophylaxis during pregnancy.

Further studies are needed to determine the relation of maternal iron to the fetal iron and ferritin levels.

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