

MATERNAL ANAEMIA AND NEWBORN MORBIDITY IN A TERTIARY HOSPITALGaruda Rama¹, Rajesh Kumar Sethi², DVRB Raju³¹Professor, Department of Paediatrics, Konaseema Institution of Medical Sciences and Research Foundation, Amalapuram.²Assistant Professor, Department of Paediatrics, Konaseema Institution of Medical Sciences and Research Foundation, Amalapuram.³Junior Resident, Department of Paediatrics, Konaseema Institution of Medical Sciences and Research Foundation, Amalapuram.**ABSTRACT****BACKGROUND**

Anaemia is the commonest nutritional deficiency disorder in the world and in India prevalence in pregnancy is 50-80%. It is a risk factor for preterm delivery, low birth weight, stillbirth and foetal anaemia.

The aim of the study is to find out correlation between maternal and cord haemoglobin and birth weight of newborn.

MATERIALS AND METHODS

Prospective observational study of 150 pregnant women delivering in KIMS from December 2014 to June 2016 for antenatal and newborn haemoglobin and newborn weight.

RESULTS

Of 150 mothers, 89.33% are anaemic (24% mild, 44% moderate and 21.3% severe). The incidence of low birth weight and low cord haemoglobin varied directly with severity of anaemia. Out of 150 babies, 119 (79.3%) of babies had anaemia in our study. The mean haemoglobin among babies was 12.9 g/dL with a S.D. of 2.01.

CONCLUSION

A significant positive correlation with maternal haemoglobin and newborn weight and cord haemoglobin. Recommendation- Antenatal prophylaxis with iron and folic acid to prevent anaemia and incidence of low birth weight and infantile anaemia.

KEYWORDS

Maternal Anaemia, Low Birth Weight, Cord Blood.

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BACKGROUND

Anaemia is the most common nutritional deficiency disorder in the world. About one third of the global population (over 2 billion) are anaemic. Prevalence of anaemia in all the age groups is higher in India as compared to other developing countries. According to WHO, the prevalence of anaemia in pregnancy in South East Asia is around 56%. In India, incidence of anaemia in pregnancy has been noted as high as 50-80%.^{1,2}

The normal Haemoglobin (Hb) in adult females is 12-14 g/dL. In pregnancy, plasma volume progressively increases by 50% in midtrimester, red cell mass increases up to 25% and there is a consequent fall in Hb concentration, haematocrit and red cell count resulting in significant hemodilution called physiological anaemia of pregnancy.¹ This helps improve circulation in placenta. WHO has accepted up to 11 g percent as the normal haemoglobin level

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Corresponding Author:

Dr. Garuda Rama,

Professor, Department of Paediatrics,

Konaseema Institution of Medical Sciences and Research Foundation, Amalapuram.

E-mail: garuda.rama2@gmail.com

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in pregnancy. Therefore, any haemoglobin level below 11 g in pregnancy should be considered as anaemia. According to WHO, anaemia in pregnancy is when Hb <11 g/dL.³ It is classified as mild (9-10.9 g/dL), moderate (7-8.9 g/dL) and severe (<7 g/dL). However, in India and most of the other developing countries, the lower limit is often accepted as 10 g percent.

Maternal anaemia is a risk factor with deleterious effects on foetus resulting in prematurity, stillbirth and low birth weight.^{4,5,6} Mothers with anaemia delivering babies are at higher risk of having a low birth weight and foetal growth restrictions than babies born to non-anaemic mothers.

In Pakistan, it was found by Farah et al that the risk of preterm delivery and LBW was 4 and 1.9 times higher among anaemic women, respectively.⁷ Newborns of anaemic mothers had 1.8 times increased risk of having an Apgar score of <5 at 1 min. and the risk of IUD was 3.7 times higher for anaemic women. Low maternal haemoglobin levels are associated with increased risk of preterm delivery, LBW babies, APGAR score <5 at 1 min. Severe anaemia (<8 g/dL) is associated with birth weight values that are 200-400 g lower than in women with higher (>10 g/dL) haemoglobin values, but these researchers generally have not excluded other factors that might also have contributed to both LBW and the severity of anaemia. In a large study from the UK, the highest birth weight was associated with haemoglobin

values between 8.6 and 9.5 g.⁴ The same study showed that the risk of preterm delivery was lowest among women with haemoglobin levels between 9.6 and 10.5 g. Several large studies have reported a U-shaped association between haemoglobin concentration and adverse pregnancy outcomes with the lowest prevalence of low birth weight and preterm birth in the group of women who had haemoglobin values in pregnancy between 9.5 to 10.5 g/dL.

The foetus obtains the iron from maternal transferrin. The placenta traps maternal transferrin, removes the iron and actively transports it to the foetus mainly in the last four weeks of pregnancy. When maternal iron stores are depleted the foetus cannot accumulate as much iron and there is a decrease in foetal iron stores. This may have an important bearing on iron stores and low birth weight as well as the development of anaemia in the first year of life.^{8,9}

AIM AND OBJECTIVES

To determine the effect of maternal anaemia on newborn weight and cord Hb%.

MATERIALS AND METHODS

Study Design- Prospective observational study in a tertiary care hospital.

Study Setting- This study was done in Department of Paediatrics and Neonatology, Konaseema Institute of Medical Sciences and RF, Amalapuram - 533201, Andhra Pradesh, India.

Sample Size- 150 term and live born babies delivered in the institute were included in the study.

Study Period- Study was conducted between December 2014 to June 2016.

Method of Collection- Pregnant women who visited twice at least for antenatal checkups and tested for haemoglobin at 20th week of gestation and just before delivery by cyanmethaemoglobin method. At birth, baby’s weights were recorded by electronic weighing machine and cord blood was sent for haemoglobin.

Inclusion Criteria

1. Babies born at 37 to 42 weeks of gestation.
2. Singleton babies.

Exclusion Criteria

1. Maternal chronic illness.
2. Any major congenital anomalies.
3. Birth asphyxia.
4. Chronic intrauterine infections.

Statistical Analysis- Frequencies/Descriptive and Pearson’s correlation with $p < 0.05$ considered as significant.

Ethics clearance and informed consent. The study was approved by the ethical committee of KIMS Hospital and RF, Amalapuram.

RESULTS

Age Wise Distribution of Mothers

150 mothers were selected of which 83.4% were in age group of 21-35 yrs. corresponding to study conducted by Khandait et al.¹⁰

Age Group	Frequency	Percent
<20	17	11.3
21-25	82	54.7
26-30	47	31.3
31-35	4	2.7
Total	150	100

Table 1. Age Wise Distribution of Mothers

Distribution of Mothers Based on Parity

Out of 150 mothers, 59 mothers (39.4%) were primiparous and 91 (60.6%) were multiparous.

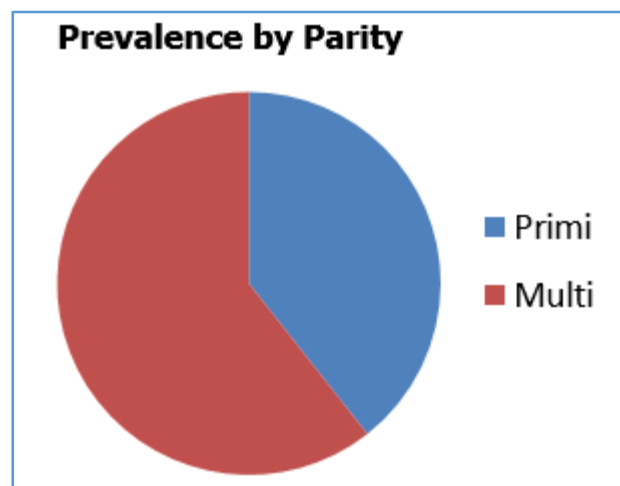


Figure 1. Prevalence by Parity

Assessment of Maternal Hb%

Out of 150 mothers, 89.33% were anaemic (24% mild, 44% moderate and 21.3% severe) corresponding to study conducted by Jagadish Kumar et al.¹

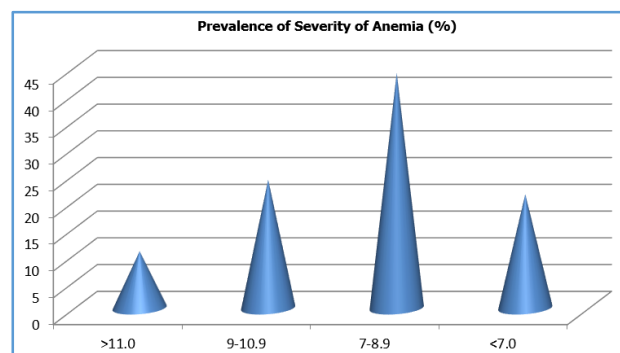


Figure 2. Prevalence of Severity of Anaemia (%)

Description of Pregnancy Outcome Characteristics

Gestational Age (wks.)	Number of Patients	Percentage
37	1	0.6
38-39	123	82
>39	26	17.4
Total	150	100

Table 2. Distribution Based on Gestational Age

Type of Delivery	Number of Patients	Percent
Vaginal	115	76.66
LSCS	35	23.33

Table 3. Distribution Based on Type of Delivery

Correlation between Maternal Anaemia and Baby Birth Weight

There is a positive correlation between maternal haemoglobin and birth weight of newborn. Birth weight was less in mothers with severe anaemia corresponding to many studies.^{1,2,3,4,6,7,8} Here, the incidence of LBW was 37.5%, 18.18% and 16.16% in severe, moderate and mild anaemic mothers, respectively. Only 9% were LBW in normal mothers.

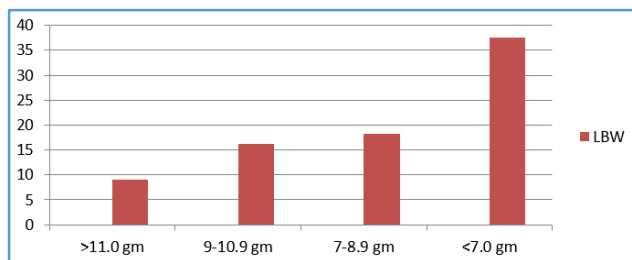


Figure 3. Relationship of Maternal Haemoglobin with Baby Birth Weight

Correlation of Maternal Hb% with Cord Haemoglobin

There is a significant correlation between degree of maternal Hb levels and cord Hb. Out of 150 babies, 119 (79.3%) of term babies had anaemia in our study. The mean haemoglobin among babies was 12.9 g/dL with a S.D. of 2.01. Babies of severe anaemic mothers have low haemoglobin correlating with other studies by Rumi et al⁸ and Adam et al.¹¹

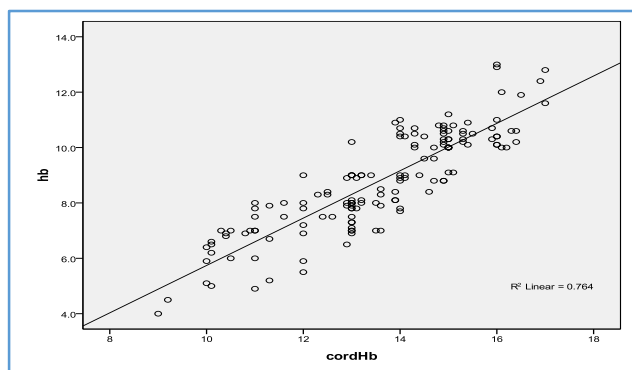


Figure 4. Correlation of Maternal Hb% with Cord Haemoglobin

DISCUSSION

Anaemia is a health problem of global dimension, more so in reproductive women in India. It manifests during pregnancy when the demand for nutritional requirement increases. Foetal growth depends on duration of gestation and uptake of nutrients from mother through placenta. Maternal anaemia is a risk factor with deleterious effects on foetus resulting in prematurity, stillbirth and low birth weight.^{4,5,6} Mothers with anaemia delivering babies are at higher risk of having a low birth weight and foetal growth restrictions than babies born to non-anaemic mothers.

Majority of study subjects in the present study belonged to age group of 21-30 yrs. (83.4%) comparable to the study conducted by Khandait WD et al.¹⁰

The prevalence of anaemia in South East Asia was 50-80%. In this study, 89.33% of women are anaemic comparable to study conducted by Jagadish Kumar et al in which 87% are anaemic.¹ The high incidence maybe due to the women belonging to low socioeconomic status from rural areas.

Maternal anaemia is a risk factor with deleterious effects on foetus resulting in prematurity, stillbirth and low birth weight.^{4,5,6} Mothers with anaemia delivering babies are at higher risk of having a low birth weight and foetal growth restrictions than babies born to non-anaemic mothers. In a study by Farah et al that the risk of preterm delivery and LBW was 4 and 1.9 times higher among anaemic women, respectively.⁷ Newborns of anaemic mothers had 1.8 times increased risk of having an Apgar score of <5 at 1 min. and the risk of IUD was 3.7 times higher for anaemic women. There is a direct relationship between maternal haemoglobin and birth weight. In this study, the incidence of LBW was 37.5%, 18.18% and 16.16% in severe, moderate and mild anaemic mothers, respectively. Only 9% babies were LBW born to mothers with normal haemoglobin. However, the relationship between haemoglobin in each trimester and the birth weight could not be assessed due to lack of data.

Maternal anaemia is a significantly risk factor for foetal anaemia. The foetus obtains the iron from maternal transferrin. When maternal iron stores are depleted, the foetus cannot accumulate as much iron and there is a decrease in foetal iron stores. This may have an important bearing on iron stores and low birth weight as well as the development of anaemia in the first year of life. In a study conducted by Nadia Mudher et al, maternal anaemia can be associated with adverse foetal and perinatal outcomes.¹² Cord blood haemoglobin decreases significantly with decreasing maternal haemoglobin. There is a linear relationship between maternal and cord blood haemoglobin. The newborn can develop anaemia in severely anaemic mothers. In this study, there is a significant positive correlation between different degrees of maternal haemoglobin levels and cord Hb% similar to study by Rumi et al and Adam et al.^{8,11}

CONCLUSION

There is significant correlation between maternal anaemia and neonatal birth weight. Cord blood haemoglobin

percentage is less in babies born to anaemic mothers. Iron and folic acid deficiency are the common causes of maternal anaemia. Maternal anaemia is a significant contributor of foetal wastage, premature births, low birth weight and infantile anaemia.

RECOMMENDATIONS

Antenatal iron and folate supplementation is a simple and essential step for curbing the grave issue of low birth weight and infantile anaemia in our country.

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