A PROSPECTIVE STUDY OF MATERNAL ANEMIA AND ITS IMPACT ON PERINATAL OUTCOME

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ABSTRACT

Anemia is one of most prevalent nutritional deficiency problem afflicting pregnant women. In India more than 90% of anemia cases are estimated to be due to iron deficiency[1] because of high iron requirement during pregnancy and are not easily fulfilled by dietary intake especially when bioavailability is poor [2].The extent to which maternal anemia affects maternal and neonatal health is still uncertain. The pattern and widespread existence of maternal anemia appears to be one of the area of public health that requires more attention- hence need for study.

OBJECTIVES OF THE STUDY: To study the effect of Maternal anemia on Anthropometric and hematological profile of neonate and to study the impact of Maternal anemia on perinatal out comes.

METHOD OF STUDY-A Prospective study

RESULTS: The risk of preterm delivery, low birth weight, poor APGAR score and neonatal mortality increases as severity of anemia increases in mother. The anthropometric profile of neonates also negatively affected as severity of anemia increases in mothers. There is no significant association found between hematological profile of neonate and incidence of birth asphyxia in neonates with maternal anemia in our study.

CONCLUSION: Maternal anemia has significant adverse outcome on maturity, birth weight, physical growth of fetus and neonatal mortality.

KEYWORDS- Maternal Anemia, low birth weight, prematurity, poor APGAR score, neonatal mortality.

INTRODUCTION

In any community mothers and children constitute a priority group. In India women of child bearing age (15-45 years) constitute 22.2% of population and together with children of less than 15 years constitute nearly 57.5% of total population. Mothers and children not only constitute large group but they are also a vulnerable or special risk group. The risk is connected with child bearing in case of women and growth, development, survival in case of infants and children. India being developing country has high prevalence of Anemia in children , adolescents and reproductive women[4] due to lack of education poor socio-economic status, poor nutrition and lack of awareness towards health[1].

More than 1 in 10 of worlds babies born in 2010 were born prematurely, making an estimated 15 million preterm births of which more than 1 million died as a result of their prematurity. Prematurity is now second

leading cause of death in children under 5 years and single most common cause of death in critical first month of life.

Every fourth newborn baby in India is LBW baby, and accounting for high load of morbidity and mortality of neonate. Every year 8million LBW babies, 2.7million preterm babies and 1millionVLBW (<1500grams) babies are born in India. [5].

LBW is one of the most serious challenges in child health in both developed and developing countries. LBW is single most important factor in determining the survival chances of child. Many of them die during their first year. The infant mortality rate is around 20 times greater for all LBW babies than for other babies. Lower the birth weight lower the chance of survival. Many of them become victims of protein energy malnutrition and infection. In India, for year 2012 early neonatal mortality 23 per 1000 live births. In Karnataka it is 20 per 1000 live births.

LBW, preterm birth, stillbirth and neonatal mortality have been associated with anemia and its severity during pregnancy. [6, 7-8]

There is conflicting literature regarding the association between anemia and perinatal outcomes. Some studies have demonstrated strong association between maternal anemia and adverse perinatal outcome such as preterm delivery, LBW, and neonatal mortality [8, 9], while some others show no association. [10, 11]. Therefore by this study our aim is to determine the relationship between maternal anemia and adverse perinatal outcome and to emphasize information about overall adverse impact of maternal anemia on neonatal mortality and morbidity.

MATERIALS AND METHODS

SOURCE OF DATA-Labor room and NICU

SAMPLE SIZE-Women getting admitted for deliver during study period, who fulfill the inclusion criteria-, are included in the study. METHOD OF COLLECTION OF DATA

After taking consent of mother, data related to socio-economic profile, obstetric profile of mother and perinatal outcome variables, neonatal anthropometric and hematological profile collected in structured format.

Hemoglobin level of mother done at the time of delivery or third trimester Hb is taken into consideration.

The neonates weighed immediately after birth by electronic weighing machine and gestational age calculated by New Ballards Score system. Socio-economic status grossly divided as APL and BPL on Kuppuswamy Index.

STUDY DESIGN- Prospective study

Inclusion Criteria-Women admitted in labor room for delivery and babies born to them during study period.

Exclusion Criteria-PIH, Pregnancy with DIABETESMELLITUS**,** APH**,** Multiple pregnancy**,** Pregnancy with chronic medical illness**.**HIV/ HBsAg / VDRL positive cases.

These above mentioned conditions might affect the perinatal outcome, thereby leading to bias.

RESULTS

Comparison of Maternal hemoglobin versus birth weight		
Maternal Hb%	Birth weight	P value

Our study includes 265 cases who fulfilled inclusion criteria during study period .Results of our study show positive correlation of maternal anemia with adverse perinatal outcome. The results are analysed as below.

In our study 27.9% women were <20 years of age and 52.8% were 21-25 years. 17.7% were between 26-30 years and 1.5% were >30years of age. 54% cases were above poverty line and 46% cases were below poverty line according to kuppuswamy. 61% of cases were primipara, 28.3% were para 2 and 8.3% were para 3. 52.5% deliveries were preterm, 46.8% were term deliveries and 0.8% were posterm. It is seen from our study that 21.5% were FTND and 64.2% were LSCS, and 14.3% were preterm vaginal delivery.In our study 67.9% were mildly anemic, 13.2% were moderately anemic and 3% were severely anemic and 15.8% were non anemic according to WHO classification.

In our study, we observed the following inferences:

- In non anemic group, mothers gave birth to 21.4% of LBW babies.

- Incidence of LBW is 3.4 times more common in moderate anemia & 3 times more with severe anemia as compared to non anemic group.

- Death of newborn is 25 times more common in severely anemic group than normal.

	Normal	LBW	Died	
Normal (n=42)	33 (78.6)	9 (21.4)	0 (0.0)	<0.001
Mild anemia (n=180)	108 (60.0)	70 (38.9)	2 (1.1)	
Moderate anemia (n=35)	7 (20.0)	26 (74.3)	2 (5.7)	
Severe anemia (n=8)	1 (12.5)	5 (62.5)	2 (25.0)	
Total (N=265)	149 (56.2)	110 (41.5)	6 (2.3)	

- The incidence of IUGR is 2.6 times more common with severe anemia compared to non anemic group.

- As severity of anemia increases, incidence of IUGR increases in babies.

Incidence of birth asphyxia in normal patients was 21.4% and that of severe anemia is 25.0%. which is statistically not significant. In the present study, the patients with severe anemia gave birth to babies of birth weight below 2SD.

Comparison of Maternal hemoglobin versus

presence of Birth asphyxia

Maternal Hb%	Birth asphyxia		
	Normal	Birth asphyxia	Died
Normal (n=42)	33 (78.6)	9 (21.4)	0 (0.0)
Mild anemia (n=180)	139 (77.2)	39 (21.7)	2 (1.1)
Moderate anemia (n=35)	29 (82.9)	4 (11.4)	2 (5.7)
Severe anemia (n=8)	4 (50.0)	2 (25.0)	2 (25.0)
Total (N=265)	205 (77.4)	54 (20.4)	6 (2.3)

Comparison of Maternal hemoglobin versus baby survival

Maternal Hb%	Survival		P value
	Alive	Died	

As the severity anemia increases in the mother, birth weight of baby will be more affected. These differences are statistically significant with p value<0.001. In our study the above data shows the fetal longitudinal growth and head circumference in utero are significantly compromised with severe maternal anemia which is statistically proved by measuring "p value<0.001". In our study it has been seen that as increasing severity of anemia in mother is associated with poor APGAR Score with significant p value. In our study, on analysis of data it has been found that maternal Hb has no significant association on neonatal mean Hb at birth. Perinatal mortality is 25% with severe anemia, 5.7% and 1.1% with moderate and mild anemia respectively. Babies born to non anemic mothers have satisfactory outcome, 66.7%.And 33.3% had no satisfactory outcome in the form of LBW,birth asphyxia,IUGR or neonatal death. Babies born to mild, moderate and severely anemic mothers had 39.4%, 82.9% and 87.5% unsatisfactory outcome respectively which is1.1 times, 2.4, 2.62times more than normal.

DISCUSSION

Anemia is one of most prevalent nutritional deficiency problem afflicting pregnant women.It is estimated that about 7.3 million perinatal deaths occur annually in world, most of these occur in developing countries. [12]

Normal (n=42)	42 (100.0)	0 (0.0)	<0.001
Mild anemia (n=180)	178 (98.9)	2 (1.1)	
Moderate anemia (n=35)	33 (94.3)	2 (5.7)	
Severe anemia (n=8)	6 (75.0)	2 (25.0)	
Total (N=265)	259 (97.7)	6 (2.3)	

Incidence of preterm deliveries in India is 21 %.[13] the risk of infant death among preterm is three fold higher than the risk among term babies. Moreover, late preterms comprised almost ten percent of all the infant death in USA as per 2010 National vital statistics. [14]. by this one could assume many of these deaths could be prevented by correcting maternal anemia.

Iron need of pregnant female increases to 5-6 mg/day as compared to 2mg/day of adult menstruating women.Iron need further increases to women with pre-pregnancy iron deficiency.

In our study, the risk of preterm delivery, LBW babies, IUGR babies and perinatal mortality are more with anemic group and risk increases as severity of anemia increases.

In non anemic group, mothers gave birth to 21.4% of LBW babies.

Incidence of LBW is 3.4 times more common in moderate anemia & 3 times more with severe anemia as compared to non anemic group.Death of newborn is 25 times more common in severely anemic group than normal.

Babies born to non anemic mothers have satisfactory outcome, 66.7%.And 33.3% had no satisfactory outcome in the form of LBW,birth asphyxia,IUGR or neonatal death.

Babies born to mild, moderate and severely anemic mothers had 39.4%, 82.9% and 87.5% unsatisfactory outcome respectively which is1.1 times, 2.4, 2.62times more than normal.

This result is similar to study done by F.W.Lone et al. and even study done by Sangeeta B. et al says that LBW, prematurity, IUD are common in newborn with anemic mothers and severity increases with severity of anemia in mothers. But we did not find any significant association of birth asphyxia with maternal anemia

It is also observed that neonatal hematological profile and incidence of birth asphyxia have no association with maternal anemia. In our study we have also found that poor APGAR score, NICU admissions and early neonatal death were higher in anemic group than in non anemic group which correlates with study done by Xiong X et al.

Prevention of preterm deliveries and LBW needs attention(by correcting maternal anemia which is preventable) because they are associated with increased mortality and morbidity . Longterm complications like malnutrition, recurrent infections, poor memory and low IQ are common with preterm and LBW babies. It results in poor school performance and low productivity of population.

CONCLUSION

Incidence of LBW babies is 3.4times more common with moderate and severe anemia as compared to non anemic group.

Incidence of IUGR is 2.6 times more common with severe anemia as compared to non anemic group and is directly proportional to severity of anemia.

In our study it is also seen that longitudinal length and head circumference of newborn adversely affected by severity of maternal anemia .

In this study we have also seen that increasing severity of anemia in mothers is associated with poor APGAR score in newborn.

It is also proven from our study that- Incidence of premature babies is directly proportional to severity of anemia in mothers.

From this study we have found that perinatal mortality is 25% in severely anemic mothers and 5.7% and 1.1% with moderate and mild anemia in mothers respectively.

In this study overall outcome of babies born to non anemic mothers is satisfactory in 66.7% and 33.3% have no satisfactory outcome in the form of prematurity, LBW, birth asphyxia, IUGR and neonatal death. But babies born to mild ,moderate and severely anemic mothers had 39.4%, 82.9% and 87.5% have unsatisfactory outcome respectively in the form of prematurity, LBW, IUGR and neonatal death which is 1.1 times, 2.4 times and 2.62 times more than babies born to non anemic mothers.

From our study it is found that there is no significant association found between severity of anemia in mothers and hematological profile of new born and there is no association with incidence of birth asphyxia.

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