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RESEARCH ARTICLE

CORRELATION OF DEGREE OF MATERNAL ANAEMIA WITH NEONATAL IRON INDICES

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ABSTRACT

Background: Severe maternal anaemia is associated with negative impact on the iron indices of the newborn besides complications like growth retardation or fetal distress. **Objectives:** To correlate the degree of maternal anaemia with iron indices of the newborn. **Method:**The descriptive type of observational study was done at a tertiary care centre . Anaemic and non anaemic pregnant women admitted in labor room after 24 weeks gestation for delivery were selected. Delivery was conducted and cord blood sample of the neonate was taken for iron indices study. **Results:** Mean haemoglobin was 17.8 gm% in neonates of non-anaemic mothers whereas it was 14.1 gm% in neonates of severely anaemic mother's. Neonatal serum total iron and ferritin levels decreased and total iron binding capacity increased with increasing severity of maternal anaemia. The associations were statistically highlysignificant (p value-0.05). **Conclusion:** Newborns of anaemic mothers also should also be screened for anaemia and timely interventions taken so as to decrease under five mortality and morbidity.

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INTRODUCTION

Among pregnant women, worldwide prevalence of anaemia is 41.8% and in India it is as high as 60-80% (Goswami, 2014). Severe anaemia is associated with negative impacts on both the mother and the newborn. Maternal anaemia is related to premature births, small for gestational age babies, stillbirths and neonatal deaths. The objective of the study was to correlate the degree of maternal anaemia with the neonatal iron indices-Haemoglobin (Hb),Serum Total Iron, Serum Ferritin, Total Iron Binding Capacity (TIBC).

METHODS

This hospital based descriptive type of observational study was conducted in a tertiary hospital from June 2018 till May 2019.Based on study of (Behal et al)[2] ,sample size was calculated at 80% study power and alpha error of 0.05, minimum 35 participants were required in each of the four groups (non anaemic,mild,moderate and severe maternal anaemia) to assess correlation of maternal Hb with neonatal iron indices. Institutional Ethical committee Clearance was taken prior to the study.

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Primigravida, singleton women, aged 18-35years admitted after 24 weeks of gestation for delivery were included in the study. Women with history of blood transfusion or parenteral iron infusion, chronic illness, antepartum haemorrhage or a neonate with any birth defect were excluded.After written informed consent, detailed history,examination and investigations were done. Cord blood was saved and estimation of haemoglobin and iron indices of the newborn.was done All data was recorded in a prestructured proforma and statistical analysis done.P value < 0.05 was taken as significant.

RESULTS

It was observed that except five (3.57 %),all other neonates of anaemic and non-anaemic women had Hb levels in normal range (13.4-19.9 gm %) yet the difference between mean Hb of neonates of non-anaemic (17.8±1.2gm %) and severely anaemic (14.1±0.68gm%) women was statistically significant. Table 1. Neonates born to non-anaemic mothers had the highest serum iron values. These were low in newborns of severely anaemic women. This difference in mean serum total iron of neonates of non-anaemic and severely anaemic women was statistically significant Table 2. The mean neonatal serum ferritin was also highest (148.74±37.81 µg/dl) in the neonates of non-anaemic mothers and lowest (13.08±2.85 µg/dl) in neonates of mothers with severe anaemia. This decrease in serum ferritin was statistically highly significant

Table 1. Correlation of Maternal Hb and Neonatal Hb

	Neonatal Hb (gm %)				
	<13.4	13.4-19.9	>19.9	Mean	SD
Non anaemic	0	33(94.28%)	2(5.72%)	17.8	±1.2
Mild	1(2.85%)	34(97.14%)	0	17.0	±1.3
Moderate	0	35(100%)	0	15.9	±2.0
Severe	4(11.42%)	31(88.58%)	0	14.1	±0.68
Total	5	133	2		

Chi-square =15.35 p-value=0.017**(S)**

Table 2. Correlation of Maternal Hb and Neonatal Serum Total Iron

	Neonatal serum Total iron(µg/dl)				
	<60	60-170	>170	Mean	SD
Non anaemic	0	32(91.42%)	3(8.5%)	137.12	±37.81
Mild	0	33(94.29%)	2(5.71%)	91.80	±37.25
Moderate	11(31.42%)	15(42.85%)	9(25.71%)	104.92	±34.38
Severe	31(88.57%)	4(11.4%)	0	91.42	±9.63
Total	42	84	14		

f-value=37.22 p-value=0.001**(HS)**

Table 3. Correlation of Maternal Hb and Neonatal Serum Ferritin

	Neonatal Serum Ferritin (µg/dl)			
	<15	15-300	Mean	SD
Non anaemic	0	35(100%)	148.74	±37.81
Mild	4(11.42%)	31(88.57%)	48.66	±48.69
Moderate	14(40%)	21(60%)	104.92	±59.91
Severe	26(74.28%)	9(25.71%)	13.08	±2.85
Total	44	96		

f-value=25.25 p-value=0.001(HS)

Table 4.Correlation of Maternal Hb and Neonatal Total Iron Binding Capacity

	Neonatal TIBC(µg/dl)				
	<250	250-400	>400	Mean	SD
Non anaemic	4(11.42%)	30(85.7%)	1(2.85%)	281.25	±173.67
Mild	3(8.57%)	21(60%)	11(31.42%)	379.77	±139.05
Moderate	5(14.28%)	12(34.28%)	18(51.42%)	395.12	±122.93
Severe	0	2(5.71%)	33(94.28%)	588.48	±51.78
Total	12	65	63		

f-value=31.30 p-value=0.001(HS)

(p value=0.001). 31.42% of the neonates had serum ferritin less than the normal and all were born to the mothers with anaemia. Table 3. It was observed that as the severity of maternal anaemia increased, the mean TIBC of neonates also increased. The mean TIBC in neonates of non-anaemic mothers was 281.25±173.67 µg/dl and that severely anaemic group was 588.48±51.78 µg/dl. The difference was high statistically significant correlation (p value=0.001) Table 4

DISCUSSION

Similar to Aarti Sareen et al. (2013) and Kheir et al[4] ,in our study also though all newborns had Hb levels in normal range ,mean Hb varied between 17.8±1.2gm%, in neonates of non-anaemic mothers to 14.1± 0.68gm% in those of severe anaemia.There was no effect on cord blood haemoglobin if the mother was only mild to moderately anaemic (Najeeba, 2015). Iron supply to the placenta and the foetus was affected due to maternal anaemia and thus the foetal iron was in direct proportion to the maternal iron This resulted in reduced cord haemoglobin only in babies born to severely anaemic mothers (Sareen, 2013). However, in mild anaemia, foetus usually used the available maternal iron .Chronic hypoxemia due to caused chronic anaemia also leads to increased erythropoietin production resulting in normal Hb of the neonate.

Decrease in neonatal serum iron and serum ferritin was seen in newborns of severely anaemic mothers as was also reported by Betelihem Terefe et al. (2015). During pregnancy, the competing demands of mother and foetus disturbs the normal maternal-foetal iron homeostasis, With increase in severity of anaemia, maternal iron stores decrease leading to lower serum total iron values. Placental iron transport mechanisms do not work at higher degrees of anaemia thus leading to a fall in cord blood serum iron (Terefe, 2015). Similar to our study, Akhter S et al in 2014 and Shukla et al (2019) also found that severe maternal anaemia significantly correlated with low cord ferritin, but in mild and moderate anaemia, there was no significant association between maternal haemoglobin concentration and cord blood serum ferritin concentrations (Sowmya, 2017).

As the serum iron level falls, the total iron binding capacity rises which is a reflection of the amount of unbound transferrin[11]. In the iron deficiency state, there is up regulation of iron transport proteins in the placenta thus ensuring an adequate iron supply to the growing foetus in the anaemic mother.This was observed in our study and those of others (Sowmya, 2017; Pagadpally Srinivas, 2016), that as the severity of maternal anaemia increased, the mean TIBC of neonates increased.

Conclusion

Mean iron indices of the newborns (Hb, serum iron, ferritin and TIBC) deteriorate with increasing severity of the anaemia. Besides screening every pregnant woman for anaemia, screening should also be undertaken for newborns of anaemic mothers so that timely interventions to correct their anaemia could be done.

Key Points

- Improving the nutritional status of pregnant women would have a positive impact on improving the iron status of the mothers and also their newborns. Anaemia control measures should start periconceptionally so that women enter the state of pregnancy with adequate iron reserves.
- Health education should be provided to mothers on the need for medical evaluation before pregnancy.
- Since maternal anaemia affects neonates, early screening of the neonates of anaemic mothers should be done so that timely interventions are taken to prevent further deterioration of their health.

Conflict of Interest –None

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REFERENCES

Abdalla SE., Abdelgade EA., Diab TA., Omer IM., Kordofani A. 2013. Iron Deficiency Anaemia In Oregnanacy And The Newborn Child. Merit Res. J. Microbiol. Biol. Sci.Vol. 1(2) pp. 021-029, December.

Akhtar S., Momen MA., Rahman MM., et al., 2010. Effect of maternal anaemia on fetal outcome. *Mymensingh Med J.,* 19:391–8.

Behal M, Vinayak R, Sharma A. 2018. Maternal anaemia and its effects on neonatal anthropometric parameters in patients attending a tertiary care Institute of Solan,Himachal Pradesh, India. *Int J Reprod Contracept Obstet Gynecol*. Feb;7(2):552-60.

Goswami TM, Patel VN, Pandya NH, Mevada AK , Deasi K, Solanki KB. 2014. Maternal anaemia during pregnancy and its impact on perinatal outcome. IJBAR.,5(2):99-102.

Kheir A.M., Ali Reem BA., Musa EA. 2016. Maternal Anaemia And Neonatal Outcome In A Tertiary Care Hospital In Sudan ; Jodagh, 7(4): 169-173.

Najeeba C.M., Anitha S. Prabhu, Prakash R.M. 2015. Saldanha; Maternal Anaemia and Its Effect on Cord Blood Hemoglobin And Newborn Birth Weight. IOSR Journal of Dental and Medical Sciences, .Volume 14, Issue 7 Ver. II (July.), PP 30-32.

Pagadpally Srinivas, Srinivasan P, Rajalakshmi L. 2016. Impact of maternal anaemia at term on neonatal hemoglobin, sr.iron and total iron binding capacity. *International Journal of Contemporary Medical Research.*, 3(1):160-162.

Sareen A., Mahajan K., Singh S. 2013. Maternal Anaemia And Its Effect On Cord Hemoglobin. Indian Medical Gazette. May.

Shukla AK., Srivastava S., Verma G. 2019. Effect of maternal anaemia on the status of iron stores in infants: A cohort study. *J Fam Community Med.,* 26:118-22.

Sowmya Sri K. 2017. Pramod Kumar Korani Ratnam. Effect of maternal anaemia on placental and fetal outcome. MedPulse – *International Medical Journal*. October 4(10): 965-968.

Terefe B., Birhanu A., Nigussie P., Tsegaye A. 2015. Effect of maternal iron deficiency anaemia on the iron store of newborns in Ethiopia. *Anaemia.*,2015:808204.

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