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Original Research Article

Maternaland Perinatal Outcome of Pregnancy with Severe Anaemia

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Abstract

Anemia is the most preventable cause of maternal and perinatal mortality and morbidity. This study was carried out to evaluate the maternal and perinatal outcome in pregnancy with severe anaemia.This hospitalized based study was carried out in randomly selected 260 pregnant women in labour. Patient were divided into Group – A (Haemoglobin<7.0gm/dl, n=130 women) and Group – B (Haemoglobin ≥ 11 gm/dl, n=130 women). Their maternal and perinatal outcome, mode of delivery, duration of labour and postpartum complications were noted and analyzed. The maternal and perinatal complications were 31% significantly more in Group – A than in Group – B , Preterm labour (42.31% v/s 15.38%), Preeclampsia (22.31% v/s 3.08%), Sepsis (10% v/s 0%), CHF (6.15% v/s 0%), Low birth weight(47.69% v/s 14.62%), Still birth (4.62% v/s 0%), IUGR (11.54% v/s 2.31%), Birth Asphxia (12.31% v/s 0%) and Admission in NICU (43.08 % v/s 12.31%). There was no significant difference in maternal mortality and early neonatal death among both groups. Severe anaemia was associated with significantly more maternal and perinatal complications which mandate screening for nutritional deficiency anaemia in pregnant women and also to treat those cases to improve maternal and perinatal outcome.

Keywords: Anemia, Haemoglobin, Maternal outcome, Perinatal outcome

1.Introduction

Anaemia is the most common nutritional deficiency disorder in the world. [1] WHO has estimated that prevalence of anaemia in pregnant women is 14% in developed and 51% in developing countries and 65 – 75 % in India. [2]

In India anaemia antedates pregnancy, is aggravated by increased requirements during pregnancy and blood loss at delivery, infections in the antenatal and postnatal periods, and the early advent of next pregnancy perpetuates it.[1]

Studies have shown that iron deficiency is the major cause of anaemia followed by folate deficiency.[3] In recent years, the contribution of Vitamin B12 deficiency has been highlighted. [3]

Anaemia is very often asymptomatic in pregnancy, with the diagnosis being made on routine screening. [4]

It is regarded as the most important preventable cause of maternal and perinatal complications. Studies to define the effect of anaemia during pregnancy on the maternal and foetal outcome indicate that different types of decompensation occur with varying degrees of anaemia. Most of the studies suggest that a fall in maternal Hb below 11.0gm/dl is associated with a significant rise in poor maternal and perinatal outcomes such as preterm labour, preeclampsia, sepsis, PPH, maternal mortality, low birth weight, birth asphyxia, apgar score < 7 and early neonatal death.[5]

Aim & Objective: This study focuses on maternal and perinatal outcome in varying degree of anaemia.

2. Material and Methods

This prospective hospital based comparative study was conducted on 260 pregnant patient in labour attending Department of Obstetrics and Gynaecology, SMS Medical College, Jaipurfor delivery from February 2013 to September 2014. Pregnant women in labour presenting with severe anaemia (n=130) and with normal Haemoglobin (Hb)

(n=130) were included in the study. Women having multiple pregnancies, associated illness other than anaemia, past history of preterm delivery and IUFD were excluded from the study.

Detailed clinical history and menstrual history of the entire patient was taken. Thorough general and systemic examination of the patient was recorded.

All the routine investigation along with CBC, S. Ferritin, and Peripheral blood smear examination were done.

Follow up of these patients was done for foetomaternal outcome.

2.1 Statistical Analyses

Statistical analyses were done using computer software (SPSS version 20 and primer). The qualitative data were expressed in proportions and percentages and the quantitative data expressed as mean and standard deviations. The differences in proportions were analyzed by using chi square test and the differences in means were analyzed by using student T test. Significance level for tests were determined as 95% (P<0.05).

3. Result

In our study the proportions of the women in Group – A in <20 and >30 years age group were significantly more as compared to Group – B that is 14.62 % v/s 3.08% and 8.46% v/s 2.31% respectively. Proportions of women from rural area, illiterate women, women from lower socioeconomic status and unbooked women were more in Group – A as compared to Group –B : 69.23 % v/s 36.15% , 52.31 % v/s 20.0%, 53.85% v/s 23.85% and 71.54 % v/s 30.77% respectively(Table – 1).

Table 1:Distribution of cases according to baseline characteristics

S.No	Characteristics		Group –A	Group- B
1.	Age (in years)	<20	19 (14.62%)	4 (3.08%)
		21 – 25	65 (50 %)	62 (47.69%)
		26 – 30	35 (26.92%)	61(46.92%)
		>30	11 (8.46%)	3 (2.31%)
	Mean Age (in years)Mean± SD		24.48 ± 3.66	25.13 ± 2.98
2.	Residence	Rural	90 (69.23%)	47 (36.15%)
		Urban	40 (30.77%)	83 (63.85%)
3.	Literacy	Illiterate	68 (52.31%)	26(20%)
		Literate	62 (47.69%)	104 (80%)
4.	Socioeconomic Status	Lower	70 (53.85%)	31(23.85%)
		Middle	50 (38.46%)	70(53.85%)
		Upper	10 (7.69%)	29(22.31%)
5.	Booking Status	Booked Cases	37 (28.46%)	90 (69.23%)
		Unbooked Cases	93 (71.54%)	40 (30.77%)

As shown in Table – 2 Proportionof women with higherparity were significantly more in Group – A (18.46%) as compared to Group – B (4.62%). Majority of the women in Group – A belonged to 33 – 36 weeks gestationperiod (53.08%) whereas in Group – B belonged to 37 – 40 weeks gestation period (84.62%). Proportion of women who had LSCS was more in Group – A42.31% compared to 13.85% in Group – B.

Table - 2:Distribution of cases according to Parity Status, Gestational Age and Mode of Delivery

S.No			Group- A	Group– B
1.	Parity	P1	37(28.46%)	29 (22.31%)
		P2-3	69 (53.08%)	95 (73.08%)
		≥P4	24 (18.46%)	6 (4.62%)
	Mean parity		2.39±1.32	2.17±0.87
2.	Gestational age (in weeks)Mean± SD	28-32	21 (16.15%)	3 (2.31%)
		33-36	69 (53.08%)	17 (13.08%)
		37-40	40 (30.77%)	110 (84.62%)
	Mean gestational age (in weeks) Mean ±SD		35.27±2.51	37.58±1.83
3.	Mode Of Delivery	LSCS	55(42.31%)	18 (13.85%)
		Normal delivery	75 (57.69%)	112(86.15%)

In Group – A the proportion of microcytic hypochromic anaemia (79.23%), macrocytic hypochromic anaemia (10.0%) and dimorphic anaemia (7.69%) was more as compared to Group – B (0.0 %) as shown in Table – 3 .

Table 3: Distribution of cases according to P.B.F Examination

S.No	P.B.F	Group– A	Group - B	Total
1.	Dimorphic	10 (7.69%)	0	10
2.	Macrocytic Hypochromic	13 (10%)	0	13
3.	Microcytic Hypochromic	103 (79.23%)	0	103
4.	Normocytic Normochromic	4 (3.08%)	130 (100%)	134
5.	Mean Maternal Haemoglobin(gm/dl)	5.64±0.96	12.03±0.63	
6.	Mean Serum Ferritin (ng/ml)	5.86±1.23	44.31±19.30	

Maternal complications: preterm labour (42.31% v/s 15.38%), Preeclampsia (22.31% v/s 3.08%), sepsis (10.0% v/s 0.0 %), CHF (6.15% v/s 0.0%) and third stage complications : PPH and retained placenta (10.77% v/s 1.54 %) were significantly more in Group – Aas seen in Table – 4.

Table 4:Distribution of cases according to maternal outcome

S. No	Maternal outcome	Group A	Group B	Total	P value LS
1.	Preterm labour	55(42.31%)	20(15.38%)	75	<0.001S
2.	Preeclampsia	29(22.31%)	4 (3.08%)	33	<0.001S
3.	Sepsis	13 (10 %)	0	13	<0.001S8
4.	CHF	8 (6.15%)	0	8	0.012S
5.	Third Stage Complications (PPH/ Retained Placenta)	14(10.77%)	2 (1.54%)	16	0.005S
6.	Maternal Mortality	4 (3.08%)	0	4	0.131 NS
7.	Blood Transfusion	130 (100%)	2(1.53%)	132	<0.001S
	Mean Blood Transfusion (units)	2.89±0.71	0.02±0.12		

Perinatal complications were more in anaemic Group – A compared to non – anaemic group B: low birth weight (47.69% v/s 14.62%), Apgar score < 7/10 (20.77% v/s 2.31 %), neonatal Hb<14.0gm/dl (68.46% v/s 2.31%), still birth (4.62 % v/s 0.0%), IUGR (11.54 % v/s 2.31%), birth asphyxia (12.31% v/s 0.00%) and admission NICU (43.08% v/s 12.31%). However there was no significant difference in early neonatal death among the both groups (Table – 5).

Table 5:Distribution of cases according to perinatal outcome

S. No	Perinatal outcome	Group A	Group B	Total	P value LS
1.	Birth weight (<2.5 kg)	62 (47.69%)	19 (14.62%)	81	<0.001S
	Mean Birth Weight	2.49±0.56	2.93±0.33		
2.	APGAR Score (<7/10)	27 (20.77%)	3 (2.31%)	30	<0.001S
3.	Neonatal Hemoglobin (<14gm/dl)	89 (68.46%)	3 (2.31%)	92	<0.001S
4.	Still Birth	6 (4.62%)	0	6	0.039S
5.	IUGR	15 (11.54%)	3 (2.31%)	18	0.007S
6.	Birth Asphyxia	16 (12.31%)	0	16	<0.001S
7.	Early Neonatal Death	7 (5.38%)	1 (0.77%)	8	0.073NS
8.	Admission in NICU	56 (43.08%)	16 (12.31%)	72	<0.001S

4. Discussion

The majority of women in both groups belonged to 21 – 25 years age group, 50% in Group – A and 47.69% in Group – B. In severe anaemia Group –A proportion of younger <20 years (14.62% v/s 3.08%) and older >30 (8.46% v/s 2.31%) years was more compared to group – B, difference was statistically significant. Mean age group of Group – A was 24.48 ± 3.66 and Group – B 25.13 ±2.98; difference was statistically not significant.

Verheff *et al* (1999)[6] and Owais *et al* (2011) [7] concluded in their study that age was no longer associated with increased risk of anaemia when adjusted with gravidity.

In severe anaemia Group – A proportion of patient from rural area (69.23%), unbooked patient (71.54%) was more compared to Group – B (36.15%& 30.77% respectively). The difference was statistically significant. It indicates that there is less awareness regarding anaemia and less utilization of antenatal care among the women in rural areas.

Virendra P. *et al* (2012)in his study found that prevalence of anaemia among women of rural area of Delhi was 96.5% and it was concluded significantly higher as compared to urbanarea. [8]

According to religion no significant difference was observed in both groups.

Proportion of illiterate (52.31%) and low socioeconomic status (53.85%) women was significantly more in Group – A as compared to Group – B (20.0 % and 23.85% respectively) , indicating less awareness about anaemia , hospital facility and proper antenatal checkup , lack of funds among the illiterate and lower socioeconomic class.

As seen in Table – 2 Proportionof women with higher parity were more in Group – A (18.46%) as compared to Group – B (4.62%).

Mean parity was 2.39 ±1.32 in Group – A and 2.17± 0.87 in Group – B. No significant difference was observed.

The mean gestational age was significantly lower in Group – A (35.27 ± 2.51 weeks) than Group – B (37.58 ±1.83 weeks) Proportion of women was more in 33 – 36 weeks of gestation in Group – A(53.08%) as compared to Group – B (13.08%) and the difference was statistically significant . Maternal anaemia was found as an independent risk factor for preterm delivery.

Majority of women in both groups had vaginal delivery: 57.69% in Group – A and 86.15% in Group – B. Proportion of women who had LSCS was significantly more in Group – A(42.31%) as compared to Group – B (13.85%).

Similar results were obtained by Umber BJ *et al* (2005) in which it was concluded that rate of caesarean section was found more in anaemic group as compared to normal hemoglobin group. Preterm delivery was significantly higher in anaemic group. [9]

On examination of P.B.F maximum women in Group – A had Microcytic hypochromic Anaemia (79.23%), Macrocytic Hypochromic Anaemia (10.0%), Dimorphic Anaemia (7.69%). In Group – B all women were normocytic normochromic. The difference was statistically significant.

Rangnekar *et al* (1993) revealed that microcytic hypochromic anaemia was more prevalent suggesting nutritional inadequacy as a cause of anaemia.[10]

Mean maternal hemoglobin of women in Group – A was 5.64 ± 0.96gm/dl and in Group – B was 12.03 ± 0.63gm/dl.

Mean maternal serum Ferritin in Group – A was 5.86 ± 1.23ng/ml and in Group – B was 44.31 ± 19.30ng/ml. The difference in mean hemoglobin and serum ferritin was statistically significant.

Result of our study was comparable with study done by Riffat *et al* (2008)where it was concluded that mean hemoglobin in severe anaemia was 6.1± 0.16gm/dl and in normal Hb group was 11.6 ± 0.6gm/dl and the difference was statistically significant. [11]

As shown in Table – 4 maternal complications : preterm labour (42.31% v/s 15.38%), Preeclampsia (22.31% v/s 3.08%) , sepsis (10.0% v/s 0.0 %), CHF (6.15% v/s 0.0%) and third stage complications : PPH and retained placenta (10.77% v/s 1.54 %) were significantly more in Group – A as compared to Group – B and the difference was statistically significant . However there was no significant difference in maternal mortality among the study group (3.08% v/s 0.0%).

Mean duration of labour in women of group – A (9.03 ± 3.51) was more as compared to Group – B (7.98 ± 2.82) and the difference was statistically significant.

Abdel A *et al* (2011) concluded that the corrected risk for preeclampsia with severe anaemia was more (OR = 3.6,95% CI:1.4 – 9.1 , P = 0.007) as compared with women with no anaemia .[12]

Result of our study was comparable with the study performed by Ghimire *et al* (2013)in which it was concluded that anaemic women had an increased risk of pregnancy induced hypertension (odds ratio of 5.06) , preterm labour , postpartum haemorrhage and sepsis . However there was no difference in maternal mortality among study groups.[13]

Jain Preeti *et al* (2013) found a significant correlation between anaemia and development of preeclampsia, eclampsia, and preterm labour (P value <0.05).[14]

Naushaba *et al* (2013) concluded that anaemic group preterm delivery was in 56.25%, Retained Placenta in 1.3%, PPH in 4.1% and Sepsis was noted in18.2%. Maternal death occurred in 0.9%. All these were significantly higher in women of anaemia group as compared to the normal haemoglobin group.[15]

All women in Group – A with severe anaemia received Blood transfusion. In Group – B only two women received blood transfusion to recover the blood loss in traumatic PPH.

Mean Blood transfusion in Group – A was 2.89±0.71 as compared to Group – B was 0.02 ±0.12.

As shown in Table – 5perinatal complications were more in anaemic Group – A compared to non – anaemic Group – B : low birth weight (47.69% v/s 14.62%), Apgar score < 7/10 (20.77% v/s 2.31 %) , neonatal Hb<14.0gm/dl (68.46% v/s 2.31%) , still birth (4.62 % v/s 0.0%) , IUGR (11.54 % v/s 2.31%) , birth asphyxia (12.31% v/s 0.00%) and admission NICU (43.08% v/s 12.31%) and the difference were statistically significant. However there was no significant difference in early neonatal death amongboth the groups (5.38% v/s 0.77%). The mean birth weight was 2.49±0.56 kg in Group – A lower than 2.93±0.33

in Group – B; difference was statistically significant (P< 0.001S).

Ghimire *et al* (2013) concluded that the frequency of low birth weight and Apgar score <7/10 at birth was more in anaemic group and the difference was statistically significant. [12]

Colomer *et al* (1990) analyzed the relation between the hemoglobin concentration of pregnant women and the risk of anaemia in their infants at 12 months of age. Infants born to anaemic mothers were more likely to become anaemic themselves. [16]

Levy A *et al* (2004) concluded that the incidence of asphyxia (40%), intrauterine growth retardation (40%) and intrauterine growth retardation (38%) were significantly higher in anemic group as compared to normal haemoglobin.[17]

Nadia Mudher *et al* (2010) concluded that foetal hemoglobin decreases significantly with decreasing maternal hemoglobin. There is a linear relationship between maternal and cord blood hemoglobin. There was significant increase in number of newborn developing anaemia in severely anaemic mothers.[18]

Result of our study was comparable to study of Naushaba *et al* (2013) who concluded that perinatal mortality was seen in 2.3% and intrauterine death in 8.9%, which were significantly more as compared to the non anaemic group.[15]

Similar results were seen in study of Sangeeta V.B. *et al* (2014) who concluded that the newborns of anaemic mothers had 1.6 times increased risk of having an Apgar score of < 5 at 1 min. The risk of IUGR was two times higher among the anaemic group as compared to the normal haemoglobin group. Women in anaemic group also had more risk of still birth. [19]

5. Conclusion

Nutritional deficiency anaemia during pregnancy continues to be a major health problem in India. Our study supports screening for nutritional deficiency anaemia in pregnant women and also to treat those cases to improve maternal and perinatal outcome.

To eradicate the nutritional deficiency anaemia certain steps can be taken at individual and community level, in which women should be educated regarding anaemia, its causes and health implications. Imparting nutritional education, with special emphasis on strategies based on locally available food stuffs to improve the dietary intake of proteins and iron, ensuring maximum compliance, deworming, treatment of chronic disease like malaria and universal antenatal care to pregnant women will help in combating this serious problem.

Long term policies by government, non – government agencies and the community can be directed to formulate effective plans like eradicating anaemia in adolescent girls. Education should be provided regarding harmful impact of adolescent pregnancies, marriage before 18 should be discouraged.

Pregnant women should be counselled regarding the risks of adverse pregnancy outcomes with anaemia. Regular antenatal care from first trimester has a vital role in assessing and managing anaemia timely, and it directly affects the maternal and perinatal outcome.

We therefore propose that routine iron supplementation should be given during pregnancy and postpartum to cover losses during delivery and lactation. Iron supplementation may improve lymphocyte stimulation and thus decrease the risk of intrapartum and postpartum infection.

Severe anaemia was associated with significantly more maternal and perinatal complications which mandate screening for nutritional deficiency in pregnant women and also to treat those cases to improve maternal and perinatal outcome.

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