

# Maternal anaemia and its impact on pregnant females and pregnancy outcomes

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## Abstract

**Background:** Anaemia is the commonest medical disorder associated with pregnancy. Nearly 20% of the maternal deaths and huge number of preterm deliveries and low birth weight babies in India are due to anemia directly or indirectly. Objectives: To study Maternal anemia and its impact on pregnancy and its outcome. Setting- Tertiary care teaching hospital in Maharashtra, India. **Study Design:** Prospective observational study. **Material and Methods:** Study was conducted for a period of two years and five months. Screening of nearly 1650 expecting ladies was performed for evidence of iron deficiency anaemia. Its impact on pregnant women and outcome of the pregnancy with moderate to severe anaemia was analyzed. **Statistical Analysis:** Percentages, Proportions, Mean and Standard deviation (SD), Chi square test were used for analysing the results statistically. **Results:** The mortality and morbidity in babies born to anaemic ladies was quite high. There was no maternal was seen in 4.86%, 25.06% and 19.46 %cases respectively. The incidence of In pregnant ladies, prevalence of anaemia was 49.36%. Severe, moderate and mild degree of anaemia preterm delivery and low birth weight babies was nearly twice of those in ladies with normal haemoglobin valuesmortality in the present study. **Conclusions:** The study revealed that anaemic ladies are more prone for life threatening obstetric and medical complications and preterm labour, while babies born to them are more likely to be of low birth weight babies and have higher morbidity and mortality. So regular antenatal care, early detection of high risk pregnancy, administration of oral and parenteral iron and increasng institutional deliveries can reduce the incidence of anaemia in pregnant ladies and the resultant morbidity and mortality mothers and their babies.

**Key Words:** Anaemia in pregnancy, Maternal morbidity, Maternal mortality, Perinatal outcome.

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## INTRODUCTION

The commonest nutritional deficiency disorder in this world is anemia According to WHO the prevalence of anaemia in expecting mothers in developed countries is 14 % and that in the developing countries 51%. Anaemia is the second most common cause of maternal morbidity

and accounts for 20% of the total maternal deaths in India.<sup>1</sup> According to WHO a lady having Haemoglobin (Hb) less than 11gm% during pregnancy is suffering from anemia. It divides anemia into three degrees-(i) mild (10 -10.99 gm %),(ii) moderate (7.0-9.9 gm %) and (iii)severe degree (<7.0 gm %).<sup>2</sup> In the list of nations with most anaemic ladies and children, India is at the top.<sup>3</sup> Maximum number of studies that have been carried out show strong association between anaemia in pregnant mother and birth of low birth weight babies, preterm delivery in them and intrauterine growth retardation in fetus in them.<sup>4-7</sup> Iron deficiency anaemia is an important public health issue in expecting mothers residing in developing countries, affecting nearly 66% of the pregnant population, contributing to their morbidity and mortality and reduction in birth weight of their babies.<sup>8-9</sup> Iron deficiency (IDA) is the commonest cause of anaemia

here. Prevalence of IDA indicates the nutritional status of a community. IDA is regarded as one of the main health indicators of the society due to its effect on maternal and fetal mortalities directly or indirectly and on child growth and development.<sup>10</sup> IDA during pregnancy is thought to be due to a combination of factors such as underlying poor iron intake, increasing requirements of iron during pregnancy and increase in maternal plasma volume and resultant hemodilution.<sup>11</sup>

## MATERIAL AND METHODS

**Type of study:** Type Prospective Observational Study.

**Site of study:** Tertiary care hospital in Maharashtra.

**Period of study:** Two years and five months.

**Study population:** Expecting mothers coming to antenatal care OPD of a tertiary care hospital.

**Inclusion Criteria:** Ladies in the last trimester of pregnancy with Moderate (Hb: 7 – 9.9 g/dl) to Severe degree (Hb :< 7 g/dl) of anaemia and peripheral smear suggestive of iron deficiency anaemia.

### Exclusion Criteria

- Women with Acute Anaemia.
- Women with Hemolytic anaemia.
- Anaemia cases with associated, medical, surgical and/or obstetrical complications.
- Anaemia cases were lost to follow up and delivered outside.

**Methodology:** Haemoglobin estimation of 1644 women coming to antenatal clinic in last trimester of their pregnancy was done. Those diagnosed to have moderate to severe degree of anaemia in accordance with the WHO criteria in outpatient clinic were advised admission in the antenatal ward for complete evaluation and treatment of anemia. Complete obstetric and medical history was obtained. Estimation of haemoglobin was done by Automated Hematology Analyzer (SYSMEX). Typing of anaemia was done by standard peripheral blood smear examination method. Classified of the patients for degree of anemia was according to WHO criteria ie haemoglobin below 11 g/dl was labeled as anaemia and classified into groups of mild (10-10.9g/dl), moderate (7-9.9g/dl) and severe (<7g/dl) anaemia. Cases fulfilling the selection criteria were inculcated in as the study as subjects. Informed written consent was taken from all the subjects in language local to the area. The data of maternal anemia and their outcome in pregnancy collected and statistically analysed.

## RESULTS

It was observed that out of 1644 women screened, 50.6% i.e.832 ladies had normal haemoglobin level, while 19.46% (320) ladies had mild anaemia, 25.06%(412) ladies had moderate anaemia and 04.86%(80) ladies had

severe anaemia. So, 49.40% of the study population was anemic. Women with mild anemia were given oral iron, while those with moderate and severe anaemia got parenteral iron infusion and blood transfusion respectively. Thankfully, no drug reaction was noted in the group receiving parenteral iron. Blood transfusion was also given to the women with severe anaemia in labour.

**Table 1:** Distribution of cases according to the degree of anemia

Sr. No	Degree of Anaemia	No. of Cases (N=150)
1	Moderate (7 – 9.9 gm/dl)	76 (50.66%)
2	Severe (<7gm/dl)	74(50.54%)

It was observed that in the study population, nearly equal number belonged to moderate (76 cases) and severe (74 cases) degrees of anemia, in total 150 cases.

**Table 2:** Distribution of cases as per indication of caesarean section and instrumental deliveries

Sr. No	Indication for operative deliveries.	LSCS. No (%) (N=27)	Instrumental Delivery No (%) (N=22)
1	Foetal Distress	07 (25.92%)	11 (50.00%)
2	Failed induction	02 (07.40%)	-
3	Arrest of dilatation	02 (07.40%)	-
4	Occipito posterior	02 (07.40%)	01 (04.54%)
5	Malpresentations	02 (07.40%)	-
6	IUGR	04 (14.81%)	02 (09.09%)
7	Cephalo pelvic disproportion	03 (11.11%)	-
8	Maternal exhaustion / Poor maternal bearing down	-	06 (27.27%)
9	Maternal Request	02 (07.40%)	-
10	Previous caesarean section	(11.11%)	01 (04.54%)
11	Rigid perineum / Prolonged second stage	-	01 (04.54%)

Foetal distress, cephalo-pelvic disproportion, intrauterine growth restriction and previous caesarean delivery were common indications for caesarean section, where as fetal distress and maternal exhaustion with resultant poor bearing down were common indications for instrumental deliveries. (Table 2.)

**Table 3:** Distribution of newborn babies as per birth weight

Sr. No	Birth Weight of babies (gms)	Moderate Anaemia (N=76)	Severe Anaemia (N=74)	Total (N=150)
1	< 1000	0	0	0
2	1000 – 1500	08 (10.52%)	13 (17.57%)	21 (14.00%)
3	1501 – 2000	19 (25.00%)	27 (36.48%)	46 (30.66%)
4	2001 – 2500	28 (36.84%)	21 (28.38%)	49 (32.66%)
5	> 2500	21 (27.63%)	13 (17.57%)	34 (22.66%)

On analysing data by Chi square test, we get the value 7.799, p = 0.0124, Significant. 77% babies were low birth weight (below 2500g) and 14% were very low birth weight (below 1500gms). The incidence of reduction in weight increased with the severity of anaemia incre.

Analysing with Chi Square test there is a significant association between birth weight of babies and anaemia ( $p = 0.0124$ ). (Table 3).

**Table 4:** Maternal morbidity in different degrees of anaemia

Sr. No	Morbidity	Moderate Anaemia (N=76)	Severe Anaemia (N=74)	Total (N=150)
1	Intra-partum Maternal exhaustion	16(21.05%)	22 (29.72%)	38 (25.33%)
2	Prolonged 2nd Stage	15(19.73%)	12 (16.21%)	27 (18.00%)
3	PPH requiring blood transfusion	04(05.26%)	05 (06.75%)	09 (06.00%)
4	Puerperal Sepsis /Episiotomy site infection	02(02.63%)	03 (04.05%)	05 (03.33%)
5	Puerperal Febrile illness	08(10.52%)	12 (16.21%)	20 (13.33%)
6	Thromboembolism	0	01 (01.35%)	01 (00.66%)
7	Inadequate Lactation	12(15.78%)	15 (20.27%)	27 (18.00%)
8	Surgical site infection	03(03.94%)	04 (05.40%)	07 (04.66%)
9	Surgical wound dehiscence	05(06.57)	06 (08.10%)	11 (07.33%)

Most common complications during the intra partum period were maternal exhaustion and prolonged second stage of labour, while during postpartum period puerperal febrile illness, inadequate lactation and surgical site infections were on the top of the list of complications.

**Table 5:** Distribution of perinatal deaths in relation to degree of anaemia

Sr. No	Time of Death	Moderate Anaemia (N=76)	Severe Anaemia (N=74)	Total (N=150)
1	Antepartum (IUD)	03 (03.94%)	04 (05.40%)	07 (04.66%)
2	Intrapartum (FSB)	0	1 (01.35%)	01 (00.66%)
3	Neonatal deaths (NND)	02 (02.63%)	04 (05.40%)	06 (04.00%)

There were 14 perinatal deaths in the study group of 150 pregnant anaemic women. Seven babies died in utero during pregnancy resulting in macerated stillbirths, where as there was one intra-partum death and six neonatal deaths due to various reasons.

## DISCUSSION

**Of Delivery:** Out of 150 cases of moderate to severe anaemia in pregnancy, 67.33cases delivered spontaneously by vaginal route, 14.66% by instrumental delivery and 18% by caesarean section. The degree of anaemia had no influence on the mode of delivery in the present study. Common indications for caesarean section were fetal distress (25.92%), Intrauterine growth restriction (14.81%), Previous caesarean section

(11.11%), Cephalo pelvic disproportion (11.11%) and Mal-presentations (07.40%). All caesarean sections were performed for obstetric indications. The common indications for instrumental deliveries were fetal distress and maternal exhaustion causing prolonged second stage. Maternal exhaustion was related to anaemic status of the women. Ventouse deliveries were performed in 11(50%) cases and outlet forceps were performed in 11 cases (50%) for cases of fetal distress.

**Preterm Delivery:** There is an adverse effect it anaemia as per the hospital records while 45.33%, slightly more (50%) in cases of severe anemia.. was s pregnancy on the perinatal outcome. The incidence of premature births in anaemic cases was of maternal anaemia in which was twice the incidence in women without

**Maternal Anemia and Birth Weight:** The incidence of low birth weight babies was 77% while those of very low birth weight babies was 14% respectively. No specific-relationship between severity of degree anaemia and incidence of low birth weight was found in the present study. The overall incidence of low birth weight babies born in the study group was double that of low birth weight babies born to women with normal haemoglobin levels as per hospital records. Other researchers give similar reports. Several other studies report lower birth weight babies in anaemic women.<sup>12-14</sup>. When maternal Hb levels were below 8gm%, a significant fall in birth weight due to increase in prematurity rate and intrauterine growth retardation has been reported.<sup>15-16</sup> Maternal infections – themselves can increase the production of corticotropin-releasing hormone; and, the production of cortisol could have a negative effect on fetal growth, and as we know Iron deficiency itself can lead to an increase in maternal infections<sup>17</sup> Table 3.

**Maternal Morbidity:** Maternal anaemia is considered as one of the serious risk factors during pregnancy. Anaemic women are prone for development of complications during pregnancy, labour and in puerperium. The risk of complications is related to degree of anaemia, more is the degree more is the risk. it was observed that 25.33% women experienced intrapartum exhaustion and 18% had prolonged second stage due to maternal exhaustion and inadequate uterine contractions. Six percent women had atonic postpartum haemorrhage. Morbidity due to pyrexia was noted in 13.33 percent women during early puerperium. Morbidity due to infection was seen in the form of puerperal sepsis and episiotomy site infection in 03.33% and caesarean wound infection and dehiscence in 04.66% and 07.33% respectively. 18% women had reduced lactation, especially seen in women with low body mass index, or those who suffered postpartum haemorrhage mainly after prolonged labour and operative delivery. A case deep vein thrombosis of lower limb was

also encountered. Increased maternal morbidity resulted in increased hospital stay of women following delivery or caesarean section, Luckily there was no maternal mortality due to anaemia in PERINATAL the present study. This could be due to prompt treatment.(Table-4)

**Morbidity and Mortality:** Adverse perinatal outcome has been encountered in moderate to severe degrees of anaemia. There were 14 perinatal deaths among 150 deliveries of which 7 were intrauterine deaths (IUD-Macerated deaths), 1 was intrapartum deaths (Fresh stillbirth) and remaining 6 were neonatal deaths. The number of perinatal deaths among severely anaemic women were two times more than the deaths in women with moderate degree of anaemia. Severe intrauterine growth restriction in resulted in IUD in 5 cases. Two babies had multiple congenital malformations. One intrapartum perinatal death occurred due to severe birth asphyxia. Two deaths occurred in early neonatal period due to complications of very low birth weight with respiratory distress syndrome. One baby each died due to severe birth asphyxia, neonatal sepsis, meconium aspiration and intra-ventricular haemorrhage due to prematurity. In addition to the perinatal mortality, some babies developed complications in the neonatal period. Twenty one percent neonates required admission in neonatal care unit. Hyper-bilirubinaemia was observed in 18% neonates. Respiratory distress syndrome, neonatal sepsis, disseminated intravascular coagulation and neonatal seizures were seen in babies of anaemic mothers. Overall complication rate was proportionate with the degree of anaemia. Severe degree of anaemia in pregnancy results in hampering of oxygen delivery to the foetus thus interfering with normal intrauterine growth, ultimately resulting in intrauterine growth retardation, stillbirth, LBW babies and neonatal deaths. Therefore, maternal anaemia is a major contributor to poor pregnancy outcome in developing countries as it predisposes to premature delivery, increased perinatal mortality and increased risk of death during delivery and postpartum. There are many studies which suggest that maternal haemoglobin below 11.0 g/dl is associated with a significant increase in the perinatal mortality rate.<sup>18-20</sup>. A 2 to 3-fold increase in perinatal mortality rate has been observed when maternal haemoglobin levels are below 8.0 g/dl and 8-10 fold increase when maternal haemoglobin levels are fall below 5.0 g/dl.<sup>15-16</sup>

## CONCLUSION

Anemia during pregnancy is one the major public health issue in the developing and underdeveloped world and has serious consequences on maternal health and pregnancy outcome. Unfortunately or fortunately this is a problem which can be easily treated.

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