

## Impact of Maternal Anaemia on Perinatal Outcome

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### Abstract

To evaluate the impact of maternal anaemia on perinatal outcome. A cross-sectional study. Department of Obstetrics and Gynaecology, Government Lalla Ded Hospital of Government Medical College, Srinagar. The study included 1000 singleton pregnant, Rh positive Kashmiri women between 18 to 35 years with <5 parity, presenting at term or at the time of delivery. Women with medical/surgical illness (except anaemia), previous preterm delivery/Intrauterine growth restriction(IUGR)/still birth etc. Subjects underwent haemoglobin estimation and other investigations. Patients were categorized according to their Hb level as non-anaemic (>11 g/dL), mild (9-10.9 g/dL), moderate (7-8.9 g/dL) and severe anaemic (<7 g/dL). Perinatal outcome was assessed in relation to haemoglobin level. Prevalence of anaemia among patients at term or at the time of delivery was 92% with mild 30%, moderate 50% and severe 12%. It was high in rural patients. Risks of preterm delivery, low birth weight, Apgar score <7 at 5 minutes, perinatal mortality, IUGR and NICU admissions increased significantly with severity of anaemia. Anaemia in pregnancy is a major health problem in Kashmir valley that leads to adverse perinatal outcome.

### Keywords

Maternal anaemia, Perinatal outcome, Kashmir valley.

### Introduction

Anaemia during pregnancy is a major public health problem in our country as 87% of the Indian pregnant women are anaemic (1,2). Foetuses of anaemic mothers are at risk of preterm deliveries, low birth weights, morbidity and perinatal mortality due to the impairment of oxygen delivery to placenta and foetus (3-6).

WHO uses the following hemoglobin cut offs to define anaemia in pregnant women: 9 -10.9 gm/dl for mild anaemia, 7 to 8.9 gm/dl for moderate and less than 7 gm/dl for severe anaemia (6,7).

Anaemia begins in childhood, worsens during adolescence in girls and gets aggravated during pregnancy. Studies carried out in India and elsewhere have shown that iron deficiency is the major cause of anaemia followed by folate deficiency. Moreover, the contribution of B12 deficiency has been highlighted (8,9). There is conflicting literature regarding the association between anaemia and adverse perinatal outcome. Some studies (4, 10-14) have demonstrated a strong association between anaemia and adverse perinatal outcome such

as preterm delivery and LBW, while other studies found no association (15,16). Since there is insufficient information to conclusively assess the effect of maternal anaemia on perinatal outcome, an endeavor had been made in the present study to evaluate the impact of maternal anaemia on perinatal outcome in Srinagar, the summer capital of J&K.

### Materials and Methods

This cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, Government Lalla Ded Hospital of Government Medical College, Srinagar over a period of one year. The study included 1000 singleton pregnant, Rh positive Kashmiri women between 18 to 35 years with <5 parity, presenting at term or at the time of delivery. Women with medical/surgical illness (except anaemia), previous preterm delivery/IUGR/still birth, associated obstetric complications were excluded from the study.

After taking consent from eligible patients, a detailed history like socio-demographic characteristics, previous

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medical records were reviewed and a thorough general physical, systemic and obstetric examination was performed. Subjects underwent haemoglobin estimation by the Automated Haematology Analyzer (Photoelectric Colorimetric Method) in hospital laboratory and other investigations like TLC ,DLC, PBF,Iron studies, stool,urine examination etc.

Patients were then categorized according to their Hb level as non-anaemic (>11 g/dL), mild (9-10.9 g/dL), moderate (7-8.9 g/dL) and severe anaemic (<7 g/dL) as per WHO standards.

Perinatal outcome assessed in relation to haemoglobin level were LBW (birth weight <2500g), Apgar score <7 at 5 minutes, prematurity (birth of baby before 37 weeks of gestation), IUGR (fetal weight <10th percentile of the same gestational age), perinatal mortality (deaths among foetuses after 24 weeks of gestation before or during delivery or within first 7 days of delivery) and neonatal intensive care unit (NICU) admission.

### Results

Prevalence of anaemia among patients at term or at the time of delivery was 92% with non-anaemic 8%, mild 30% , moderate 50% and severely anaemic 12%. Mean Hb level in non-anaemic patients was 11.78g%, followed by 9.62g% in mild, 8.10g% in moderate and 5.93g% in severely anaemic patients.

94.7% rural patients were anaemic as compared to 64.9% patients from urban area, the difference being highly significant (p<0.001). Among housewives the prevalence of anaemia was significantly high ((p<0.001) as compared to the other groups. The salaried women were mostly non-anaemic. Significantly (p<0.001) higher number of women with severe anaemia had lower level of education. Also, significantly (p<0.001) higher number of women with severe anaemia were from lower socioeconomic class.

Perinatal outcome in anaemic as well as non-anaemic patients is shown in Table 1.

Analysis of impact of severity of maternal anaemia on perinatal outcome using non-anaemic as reference group is shown in Table 2. The overall risk of IUGR significantly increased in patients with severe anaemia with odd's ratio of 8.7 (p=0.017). The overall risk of low birth weight significantly increased in patients with moderate and severe anaemia with odd's ratio of 4.6 (p=0.001) and 8.1 (p=0.0001) respectively. The overall risk of preterm births was significantly increased in

women with moderate and severe anaemia with odd's ratio of 4.1 (p=0.007) and 6.9 (p = 0.001) respectively. The overall risk of Apgar score <7 at 5 minutes was significantly increased in women with severe anaemia with odd's ratio of 5.2 (p=0.001).

The overall risk of NICU admission was significantly increased in women with severe anaemia with odd's ratio of 7.4 (p<0.0001). The overall risk of perinatal mortality was significantly increased in women with severe anaemia with odd's ratio of 13.9 (p=0.001).

### Discussion

In this cross-sectional study prevalence of anaemia among patients attending Lalla Ded Hospital at term or at the time of delivery was 92% with mild (30%), moderate (50%) and severe anaemia (12%). This finding is in correlation with the study by Kalaivani K(2) who

**Table 1. Distribution of perinatal outcomes in anaemic patients**

Perinatal outcome	Non-anaemic (n=80) No. (%)	Anaemic groups			Total (n=1000) No. (%)
		Mild (n=300) No. (%)	Moderate (n=500) No. (%)	Severe (n=120) No. (%)	
IUGR	1 (1.25)	6 (2.00)	24 (4.80)	12 (10.00)	43 (4.30)
Birth weight <2.5kg	4 (5.00)	33 (11.00)	90 (18.00)	36 (30.00)	231 (23.10)
Preterm delivery	4 (5.00)	30 (10.00)	90 (18.00)	32 (26.70)	156 (15.60)
Apgar score <7	4 (5.00)	15 (6.00)	54 (10.80)	26 (21.60)	270 (27.00)
NICU admission	3 (3.75)	22 (7.30)	51 (10.20)	27 (22.50)	238 (23.80)
Perinatal mortality	1 (1.25)	4 (1.30)	18 (3.60)	18 (15.00)	77 (7.70)

**Table 2. Analysis of impact of severity of maternal anaemia on perinatal outcomes using non-anaemic as reference group**

Perinatal outcome	Non-anaemic	Anaemic groups								
		Mild			Moderate			Severe		
		OR	95% CI	P value	OR	95% CI	P value	OR	95% CI	P value
IUGR	OR = 1	1.6	0.19-13.5	1.0	3.9	0.5-29.8	0.232	8.7	1.11-68.9	0.017
LBW		2.3	0.8-6.8	0.137	4.6	1.6-12.8	0.001	8.1	2.7-23.9	0.0001
Preterm		2.1	0.7-6.1	0.173	4.1	1.4-11.6	0.007	6.9	2.3-20.4	0.001
Apgar score <7 at 5 minutes		1.0	0.32-3.1	1.0	2.3	0.8-6.5	0.157	5.2	1.7-15.9	0.001
NICU Admission		2.0	0.5-6.9	0.317	2.9	0.8-9.5	0.094	7.4	2.1-25.5	<0.001
Perinatal Mortality		1.0	0.1-9.6	1.0	2.9	0.3-22.4	0.496	13.9	1.8-106.6	0.001

found prevalence of anaemia in Indian pregnant women as 87%.

Among rural patients (n=909), 94.7% were anaemic, where as among urban patients (n=91), only 64.8% were anaemic. The high prevalence of anaemia among rural patients is attributed to their poor economic condition, illiteracy, lack of health seeking behavior, repeated pregnancies, gender bias, worm infestations and faulty dietary habits.

In the present study, the prevalence of anaemia was significantly high among housewives (96.6%). This is in accordance with the study conducted by Kidanto et al. (10). This can be attributed to the dependence of the housewives on other family members and lack of health seeking behaviour.

The prevalence of anaemia was significantly high among the illiterate (100%) women. This is in accordance with the study conducted by Ali et al. (17). This can be attributed to the lack of health consciousness, lack of awareness of proper antenatal checkups and faulty dietary habits.

The prevalence of anaemia was significantly high among patients belonging to lower socioeconomic class. This can be attributed to the fact that the pregnant women belonging to lower socioeconomic class have not proper nutrition, antenatal care and medication .

The present study evaluated the impact of maternal anaemia on perinatal outcome the results of which are as follows:

" Risk of IUGR increased significantly with the severity of anaemia with odd's ratio of 1.6, 3.9 and 8.7 with mild, moderate and severe anaemia respectively compared with women with normal Hb levels. Bakhtiar et al. (18) and Lone et al. (19) also observed 1.7 times and 1.9 times greater risk of IUGR respectively in anaemic group as compared to non-anaemic group.

" Risk of low birth weight increased significantly with severity of anaemia with odd's ratio of 2.3, 4.6 and 8.1 for women with mild, moderate and severe anaemia. Ali et al. (17) also observed the risk of low birth weight which was 2.5 times higher in women with mild/moderate anaemia and 8 times higher in women with severe anaemia. However, Kidanto et al. (10) reported increased risk of low birth weight with odd's ratio of 1.2, 1.7 and 3.8 with mild, moderate and severe anaemia respectively ." Risk of having premature birth increased significantly with severity of anaemia with odd's ratio of

2.1, 4.1, 6.9 for women with mild, moderate and severe anaemia respectively. Similarly Ali et al. (17) observed that risk of preterm delivery increased significantly with severity of anaemia (odd's ratio 3.2 for women with mild/moderate anaemia and odd's ratio 6.6 for women with severe anaemia). Similar finding was observed by Nair et al (20).

" Risk of Apgar score <7 at 5 minutes increased significantly with odd's ratio of 1, 2.3, 5.2 respectively for women with mild, moderate and severe anaemia as compared with women with normal Hb level. Both Bakhtiar et al. (18) and Lone et al. (19) also observed risk of Apgar score <7 at 5 minutes in anaemic women to be 1.7 times higher than non-anaemic women. Alizadeh et al (21) and Goswami et al (22) also found low apgar scores in anaemic patients.

" In the present study, number of NICU admissions increased significantly with the severity of maternal anaemia with odd's ratio of 2.0, 2.9, 7.4 respectively with women with mild, moderate and severe anaemia. Sak et al. (23) also observed significantly higher rate of NICU admissions in anaemic group as compared to non-anaemic group. "Risk of perinatal mortality increased significantly with the severity of anaemia with OR 1.0, 2.9, 13.9 respectively with mild, moderate and severe anaemia. Bakhtiar et al. (18) and Lone et al. (19) respectively observed 3.5 times and 3.2 times increased risk of perinatal mortality in anaemic group.

### Conclusion

The present study depicted that anaemia in pregnancy is a major health problem in our valley that leads to adverse perinatal outcome. Thus the need of the hour is to take preventive measures like general public awareness about anaemia by proper functioning of JSSK scheme under NRHM and better collaboration of healthcare workers in rural areas.

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