



## A STUDY ON RELATIONSHIP BETWEEN MATERNAL ANAEMIA AND PERINATAL OUTCOME.

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### ABSTRACT

**INTRODUCTION** : Anaemia is one of the most preventable nutritional deficiency problem afflicting pregnant women in developing countries. Severe anaemia in pregnancy carries significant risk to mother and fetus. During the last two decades significant knowledge has been gained about the effect of iron deficiency anaemia on work capacity, work performance, muscle function, resistance to infection. However, information on the effects of the maternal anaemia during pregnancy on the fetal outcome has been meagre and conflicting. Hence we conducted a study to look into these aspects.

**OBJECTIVE:** 1) To study the relationship between maternal anaemia and perinatal outcome. 2) To highlight the importance of the antenatal care regarding maternal and fetal health.

**METHOD AND MATERIAL:** 100 pregnant women admitted for the delivery having Hb less than 10gm/dl (cases) and 100 women admitted for delivery having Hb more than 10gm/dl (control) matched for age, parity, booked/unbooked and gestational age, to analyse the adverse pregnancy outcome in the form of low birth weight, low APGAR SCORE at 1 min and perinatal outcome.

**RESULT:** Perinatal outcome include preterm delivery, low APGAR SCORE at 1min and preinatal mortality higher in study group in comparison to control group. There is direct correlation between maternal anaemia and low birth weight.

**KEYWORDS :** anaemia, low birth weight, APGAR SCORE, preterm birth

### INTRODUCTION

Anaemia is one of the most prevalent nutritional deficiency problem afflicting pregnant women<sup>(1,2)</sup>. The global prevalence of anaemia during pregnancy is estimated by the WHO to be 47.4%. According to recent WHO figures, India is included in higher prevalence of anaemia in pregnant women (40%)<sup>(3)</sup>. The WHO uses the following haemoglobin cut-offs to define anaemia in pregnant women: 100 to 110g/L for mild anaemia, 70 to 100g/L for moderate anaemia, 70g/L for severe anaemia<sup>(4,5)</sup>. Anaemia during pregnancy is associated with a negative impact on both the women and neonate. There is conflicting literature regarding the association between anaemia and perinatal outcome. Low birth weight (LBW), preterm birth, IUGR and IUD associated with maternal anaemia<sup>(6,7)</sup>. Hence we aimed to study the effect of maternal anaemia on perinatal outcome. Some recent studies<sup>(8,9)</sup> have demonstrated a strong association between anaemia and adverse perinatal outcome while other previous studies found no association<sup>(10,11)</sup>. Hence we aimed to study the effect of maternal anaemia on perinatal outcome.

### MATERIALS AND METHODS

#### STUDY DESIGN:

This is prospective case control study. No specific intervention for sake of study was done. Mother was recruited when they arrived in third trimester with labor pain. Informed consent was taken from them before recruitment. Women getting delivered at HKB hospital, Jhalawar during 3month study period (May 16-August 16) were included in study. Women were divided into cases and controls based on haemoglobin levels. Those with Hb % level <10g/dl were cases and those with >10g/dl were controls. The Hb estimation is done by "sahli's method". The babies are weighted immediately after birth without any clothing on a weighing machine. APGAR score at 1min taken. Socioeconomic status assessed based on modified Kuppuswamy's classification into upper, middle and lower groups.

#### INCLUSION CRITERIA:

- 1) Age of pregnant women between 18-35 years
- 2) Hb level - cases <10g/dl, control >10g/dl
- 3) Gravid 3 or less
- 4) Singleton pregnancy

#### EXCLUSION CRITERIA:

- Women with multiple pregnancies, past preterm labor and other associated medical complication like GDM, PIH, Eclampsia,

Heart or renal disease and age more than 35 years excluded from the study.

#### STATISCAL ANALYSIS :

This was designed as a prospective case control observational study. Sample size : 100 pregnant women with Hb % <10g/dl and 100 control with Hb % >10g/dl. Correlation of maternal Hb with fetal birth weight and APGAR Score at 1 min done by "pearson correlation coefficient" method. Comparison between case and control groups for mean birth weight, intrauterine fetal death, premature births and socioeconomic status done by using Student 't' test. Proportion will be compared by using 'chi square' test. Data analysis was carried out using Statistical package for Social Science (SPSS) software trail version package.

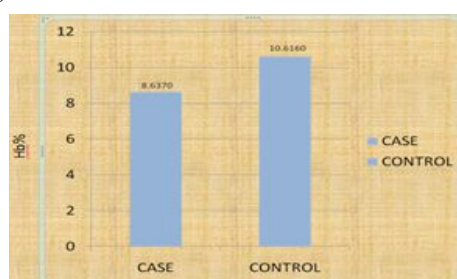
#### RESULT

**Anaemia:** Mean HB% was 8.637 and the standard deviation was +\_0.990 among anaemia mother as compared to mean HB% of 10.6160 and standard deviation was +\_0.747 among anaemia group. (table-1 and fig-1)

(Table-1)

	N	MEAN HB(%)	Std. Deviation	Minimum	Maximum
cases	100	8.6370	0.99032	4	9.8
controls	100	10.6160	0.74708	10	12.8
Total	200	9.6265	1.32272	4	12.8

(Fig-1)



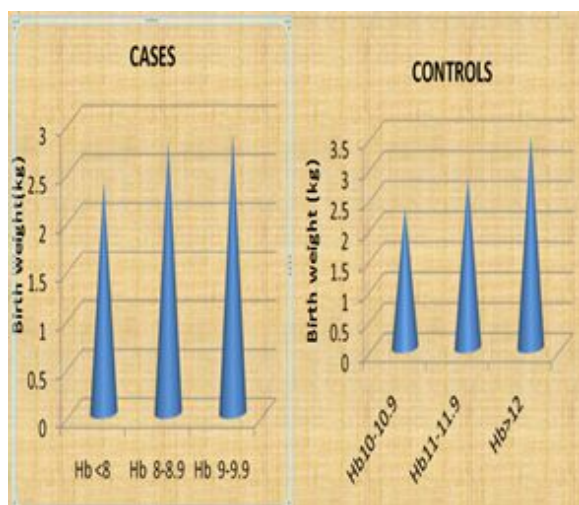
**BIRTH WEIGHT:**

There is direct relationship between maternal haemoglobin and birth weight of babies i.e. mean birth weight increased from 2.2714kg at Hb level <8gm/dl to 2.991kg at Hb level >12 g/dl(table-2, fig2)

(Table-2)

GROUP	HB LEVEL	N	MEAN Birth Wt (kg)	Std. deviation	P - VALUE
CASES	<8	14	2.2714	0.3646	0.001
	8-8.9	41	2.7910	0.5000	
	9-9.9	45	2.868	0.3563	
CONTROL	10-10.9	75	2.6142	0.4737	0.000
	11-11.9	17	2.7987	0.5009	
	>12	8	2.991	0.3470	

(Fig-2)



**Correlation of maternal Hb with birth weight & APGAR Score in case and control group**

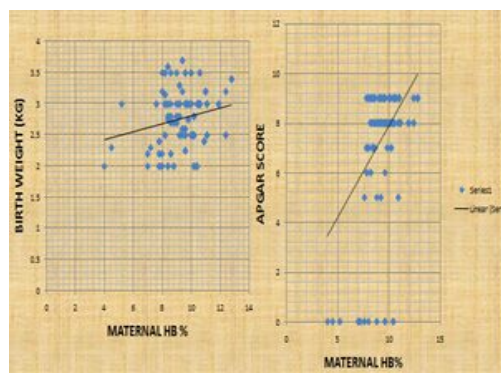
In our study we found there is positive correlation of maternal haemoglobin with birth weight & APGAR Score (1min) by applying "pearson correlation coefficient "method.(table-3,fig-3)

	Mean	Std. deviation	N	r	P-value
Hb	9.6265	1.32272	200	0.010	0.892
Age	24.4950	2.75092	200		
Hb	9.6265	1.32272	200	0.93	0.006*
Birth weight	2.7797	0.42441	200		
Hb	9.62665	1.32272	200	0.434*	<0.0001**
APGAR SCOR( 1min)	7.5950	2.25085	200		

(Table-3)

P value <0.05 shows the difference is statically significant.

(Fig-3)



**Comparison of demographic and socioeconomic status and perinatal outcome among two groups (Table-4)**

Variable	Cases (anaemic group)	Control (non anaemic group)	P-value
Age	24.39±3.04	24.6±2.42	0.58
<b>Socioeconomic status</b>			
Lower	42%	8%	0.000
Lower middle	29%	25%	
Upper lower	22%	31%	
Upper middle	5%	12%	
Upper	2%	4%	
<b>Risk of premature deliveries</b>			
<37week	64%	18%	0.000
>37week	36%	82%	
Low APGAR Scores at 1min <8	32%	8%	0.000
Intrauterine Deaths	11%	3%	0.000

P value <0.05 shows the difference is statically significant.

- Mean age among the anaemic group(cases) was 24.39±3.04 and the non anaemic group (control) was 24.6±2.42. There is no significant association of age between anaemia and non-anaemic group as P-value is non significant (0.58). Majority of anaemic group belong to lower (42%),lower middle(29%), upper lower (22%) class as compared to non anaemic group in which majority were upper lower(31%)& upper middle(12%).Significant number of the anaemic mothers has taken irregular antenatal health checkups as compare to non anaemic groups.

Demographic table 4 outlines the risk of premature delivery (<37weeks) is also higher in anaemic group as compare to non-anaemic groups as P-value is significant i.e 0.000. Risk of IUD is higher in anaemic group as compare to non-anaemic group as P-value is 0.02. The risk of low APGAR SCORE at 1 min is higher in anaemic group as compare to non-anaemic group as P-value is highly significant i.e<0.0001

**DISCUSSION :**

Anaemia is a common problem in pregnant women in developing countries. In present study maternal anaemia was significantly associated with low birth weight in newborn. In several studies, a U-shaped association was observed between maternal haemoglobin concentrations and birth weight. Abnormally high haemoglobin concentrations usually indicate poor plasma volume expansion, which is also a risk for low birth weight. A similar U-shaped association is

likely to be present between maternal haemoglobin concentration and perinatal mortality, but the data to establish this association remain insufficient. The majority of newborns of the anaemic mothers group had an APGAR score of <5 at one minute in our study, with a highly significant difference from the non anemic group (P value < 0.0001). Most of the 7.3 million perinatal deaths which occur annually in the world, are in developing countries especially Asia. Presumably a large portion of these deaths could be prevented just by rectifying maternal anaemia. As LBW, prematurity and birth asphyxia are the important cause of perinatal death. In present study we found that 50-70% cases in anaemic group belong to lower socioeconomic status therefore we can predict that increased incidence of LBW could be due to low nutritional status, low income, illiteracy and poor antenatal care. Both the below mentioned studies (table -5) substantiate our study indicating severe maternal anaemia has poor outcome with respect to like prolonged labor, low birth weight, IUGR, birth asphyxia, prematurity and IUD.

Table-5

STUDY	LBW among cases and controls	Premature birth among cases and controls	IUGR among cases and controls	IUD among cases and controls	Birth asphyxia among cases and control
Abdel Aziem	20.7% vs	11.5% vs	-	13.8% vs	
A Ali et al.(12)	3.3%	2.3%		2.9%	
F.W.Lone et al(1)	4:1	2.2:1	1.9:1	2.5:1	1.8:1

## CONCLUSION

From present study we conclude that anaemic mothers had higher chances of delivering LBW and premature babies. Chances of intrauterine death and birth asphyxia also higher in anaemic pregnant women. This reiterates importance of controlling anaemia not only for mother but also for the health of baby. Hence preventive measures need to be implemented at community level. Public awareness regarding pre-pregnancy haemoglobin status and importance of antenatal checkup relating with maternal and fetal adverse pregnancy outcome should be initiated.

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