



EFFECT OF MATERNAL HAEMOGLOBIN AND WEIGHT GAIN ON BIRTH WEIGHT OF NEW BORN

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ABSTRACT

Pregnancy is one of the most critical and unique period in a woman's life cycle. For the present study 285 pregnant women in the last trimester were selected for study from private hospitals and maternity nursing homes in Nagpur city. Information was collected by direct interview method through structured questionnaire. The questionnaire for this study consisted of demographic and socioeconomic profile, education level, antenatal history and weight. The haemoglobin level and birth weights were taken from the hospital record. The results of the study shows that with an increase in mean weight gain and haemoglobin level of mothers, there is subsequent increase in birth weight of newborns. The neonatal birth weight showed positive and significant correlation coefficients with maternal haemoglobin ($p < 0.01$) and maternal weight gain ($p < 0.01$).

Keywords: Maternal Haemoglobin, Maternal weight, birth weight, Private Hospitals, Maternity homes

INTRODUCTION

Quality prenatal care involves actions of prevention and health promotion, early diagnosis and the adequate treatment of problems that occur during this period. In this context, for good prenatal monitoring, the evaluation of the initial nutritional status and the monitoring of the gestational weight gain stand out among the recommended technical procedures, as well as the evaluation of the haemoglobin level, which have direct implications on maternal-infant health (Sato and Fujimori 2012). Anaemia in pregnancy is a common problem and 50% pregnant women in developing countries are suffering from anaemia; 20% of the maternal deaths are directly or indirectly related to anaemia. According to WHO criteria Haemoglobin concentration of less than 11 gm/dl and haematocrit of < 0.33 is declared as anaemia in pregnancy. Anaemia is a critical health concern because it affects growth and development of neonates. Prevalence of anaemia in developing countries is 56% it is even higher in the Central Asia, reported as being 80% in India (Ahmad *et al.*, 2011).

Anaemia during pregnancy is associated with higher rates of maternal and perinatal morbidity and mortality, with a higher risk for miscarriage, prematurity, low birth weight and infants with iron stores below normal, and therefore at higher risk for developing anaemia in the first months of life (Sato and Fujimori 2012).

Gestational weight gain during pregnancy influence infant birth weight. A strong relationship between maternal pregnancy weight gain and birth weight has been

consistently demonstrated, and low maternal weight gain is considered a preventable risk factor for LBW (Fateme and Saraswathi, 2012). Low birth weight is a major determinant of mortality, morbidity and disability in infancy and childhood and has a long term impact on health outcomes in adult life. Hence, the present study was undertaken to know the relation of haemoglobin level and maternal weight and birth weight.

MATERIALS AND METHODS

Private hospitals and maternity nursing homes in Nagpur city were selected for the study. The study comprised of a total 285 pregnant women in their last trimester. Information was collected by direct interview method through structured questionnaire. The questionnaire for this study consists of demographic and socioeconomic profile, education level, antenatal history and weight. Hospital records were also referred for haemoglobin status and birth weight of newborn. Data was analysed using means and standard deviations. Correlations were assessed using Pearson's Product moment Coefficient.

RESULTS AND DISCUSSIONS

Socio-demographic Profile

The mean age of pregnant women was 26.26±3.66 years. A majority (61.40 %) of respondents got married between 20-25 years of age. Majority of the respondent (44.91%) belonged to nuclear family. 88.42 per cent respondent belonged to Hindu religion. 48.77 % pregnant women were graduate. The mean per capita income of pregnant women was Rs.2974.45±1963.43.

Haemoglobin Levels of pregnant women

The distribution of mothers according to haemoglobin has been presented in Table 1. Data shows that the majority of mothers (54.74%) had mean haemoglobin of 11.56 ± 0.53 gm/dl and were classified as normal. About 28.42% and 16.84% PMH mothers had mild and moderate anaemia having mean haemoglobin of 10.32 ± 0.29 and 9.36 ± 0.45 gm/dl respectively. The overall mean haemoglobin levels of pregnant women were found to be 10.84 ± 0.97 gm/dl.

Prevalence of 71.5% to 83% moderate, 17% to 28% severe and 71.6% mild anaemia among the pregnant mothers has been reported by several workers (Awasthi *et al.*, 2001; Agrawal and Chaturvedi, 2004; Parvathi and Begum, 2007).

Haemoglobin Levels of Mothers and Birth Weight

The mean haemoglobin levels of pregnant women and mean birth weight levels of new-borns have been presented in Table 2. Data reveals that pregnant women with normal haemoglobin level (11g/dl and above) showed highest mean birth weight of babies i.e., 3.00 Kg. Mothers having mild and moderate anaemia showed correspondingly lower mean birth weights of babies. The mean birth weight of neonates for mild and moderate anaemic mothers was 2.64 ± 0.23 kg and 2.58 ± 0.34 kg respectively. The correlation coefficient between haemoglobin level of mothers and birth weight were positive and significant ($r = 0.494$, $p < 0.01$). With an increasing maternal haemoglobin level, subsequent increase in babies' weight was observed.

Paul and Purushothman (2002) also stated that as the degree of anaemia increased, the weight of the new neonate was found to be decreasing and low birth weight babies (<2.5kg) were delivered by both moderately and severely anaemic mothers. The number of low birth weight infants (64%) was statistically very highly significantly more ($p < 0.001$) in the anaemic group of mothers than the non-anaemic group (10%) (Ahmad *et al.*, 2011). Anemia (Hb < 10g/dl) was associated with a significantly increased risk of low birth weight (<2500g) (Sekhavat *et al.*, 2011). 57% of babies were LBW in anaemic group. Perinatal mortality in the severely anaemic group was 70.5% (Agrawal and Chaturvedi (2004).

Relation of Gain in Weight and Birth Weight of New-borns

The maternal gain in weight and birth weight of neonates has been presented in Table 3. Results show that the mothers who gained more than 12 kg weight during pregnancy had the highest birth weight of babies (3.18 ± 0.23 kg). The lowest mean birth weight was observed in the group of mothers who gained less than 6 kg weight during pregnancy (2.51 ± 0.39 kg). Results also showed that the mothers gaining weight less than 6 kg during pregnancy had more chances of delivering a low birth weight babies. With an increase in weight gain during pregnancy, there was a corresponding increase in mean birth weight of new-borns. The gain in weight during pregnancy and mean birth weight of babies showed a positive and significant ($r = 0.488$, $p < 0.01$).

Suchdeva *et al.*, (2009) also reported that with an increase in a maternal weight gain (the last trimester) the weight of the new-borns also increased.

Conclusion

The results of the study reveal that with an increase in haemoglobin level and weight gain of mothers, there is subsequent increase in birth weight of neonates. There is a need to focus attention on such mothers and provide them special nutrition education and better monitoring facilities especially before and during pregnancy.

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Table 1: Haemoglobin levels of pregnant women

| Sr. No. | Cut -Off value for haemoglobin (g/dl)by WHO | Degree of anaemia | N=285 | Haemoglobin Level Mean ± SD |
|---------|---|-------------------|-------------|-----------------------------|
| 1 | 11 and Above | Non-anaemic | 156 (54.74) | 11.56 ± 0.53 |
| 2 | 10.0 - 10.9 | Mild anaemia | 81 (28.42) | 10.32 ± 0.29 |
| 3 | 7.0 - 9.9 | Moderate anaemia | 48 (16.84) | 9.36 ± 0.45 |
| 4 | Below 7.0 | Severe anaemia | 0 (0.00) | 0.00 ± 0.00 |
| | Total | | 285(100) | 10.84 ± 0.97 |

(The number in parenthesis indicates per cent cases)

Table 2: Mean Haemoglobin levels and Birth Weight of New-borns

| Cut -Off value for haemoglobin (g/dl) by WHO | No | Haemoglobin levels of pregnant women (g/dl) Mean ± SD | Birth weight of New born(kg) Mean ±SD | Correlation Co-efficient |
|--|-----|---|---------------------------------------|--------------------------|
| > = 11.0 Non-anaemia | 156 | 11.56 ± 0.53 | 3.00 ± 0.34 | 0.494** |
| 10.0 - 10.9 Mild-anaemia | 81 | 10.32 ± 0.29 | 2.64 ± 0.23 | |
| 7.0 - 9.9 Moderate anaemia | 48 | 9.36 ± 0.45 | 2.58 ± 0.34 | |
| Below 7.0 Severe anaemia | 00 | 0.00 ± 0.00 | 0.00 ± 0.00 | |
| Total | 285 | 11.56 ± 0.53 | 2.82 ± 0.37 | |

**P<0.01

Table 3: Maternal Gain in Weight and Mean Birth Weight of New-borns

| Sr.No. | Maternal Gain in Weight (Kg) | N = 285 | Birth weight (kg) N=285 Mean \pm SD | Correlation Coefficient |
|--------|------------------------------|---------|---|-------------------------|
| 1 | < 6 | 06 | 2.51 \pm 0.39 | 0.488** |
| 2 | 6-9 | 71 | 2.66 \pm 0.33 | |
| 3 | 9-12 | 154 | 2.79 \pm 0.34 | |
| 4 | > = 12 | 54 | 3.18 \pm 0.23 | |
| | Total | 285 | 2.83 \pm 0.37 | |

** p < (0.01)

