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RELATION BETWEEN MATERNAL HAEMOGLOBIN LEVEL IN THIRD TRIMESTER PREGNANCY AND NEONATAL BIRTH WEIGHT: A RETROSPECTIVE STUDY

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ABSTRACT

Background: Anaemia in pregnancy is associated with the high risk of low birth weight. This study aimed at comparing the neonatal birth weight with maternal haemoglobin level during the third trimester. **Materials and methods:** This was a retrospective study done at Bethany Hospital, Shillong and the study population included all pregnant women who were admitted for deliveries at their third trimester from January, 2019 to September, 2021. Mothers with regular antenatal care visits at this hospital were included and those with known causes for anaemia were excluded from the study. The third-trimester haemoglobin level of all pregnant females was correlated with the birth weight of the babies. **Results:** Out of 1410 pregnancies, 459 (32.55%) had anaemia while 951 (67.45%) had a normal haemoglobin level. The overall prevalence of anaemia in the third trimester was 32.55 %. The neonatal birth weight ranged from 430 g to 4900 g. Low birth weight was seen in 262 (18.58%) whereas 1148 (81.42%) babies had weight more than 2500 g. The overall prevalence of LBW was 18.58% and among anaemic mothers, it was 20.4%. **Conclusions:** Despite regular antenatal care, anaemia in pregnancy still prevails, affecting the birth weight of new-borns. There was a statistically significant correlation between maternal haemoglobin and neonatal birth weight.

KEYWORDS: Anaemia, Low birth weight, Pregnancy, Retrospective.

INTRODUCTION

Pregnancy leads to various physiological changes in the mother's body in response to the foetal development. Foetal growth demands an increased requirement for nutrients and the foetal demand for iron increases maternal iron requirements by about 1g.[1,2] Haemoglobin and haematocrit decline throughout the 1st and 2nd trimesters, reach their lowest point late in the second trimester to early 3rd trimester, and then rise again nearer to term with peak haemodilution occurring during 24 to 26 weeks period of gestation.[3]

According to WHO, haemoglobin level less than 11gm/dl in pregnant women is defined as anaemia.[4] Poor foetal growth results not only from a deficiency of protein and lipids but also from low maternal haemoglobin concentration during pregnancy.[5,6] Maternal haemoglobin level during pregnancy has greatly influenced the neonatal anthropometry especially the birth weight of new-born.[5] One review observed a relatively higher anaemia-attributable proportion of LBW in Pakistan and Bangladesh compared to Ghana and India.[7] LBW is defined by the World Health Organization (WHO) as weight at birth of less than 2,500 g (5.5 pounds) irrespective of the gestational age. It can be resulted from preterm birth (birth before 37 completed weeks) or small for term gestation (intra uterine growth restriction) or preterm as well as small for gestational age.[8,9] Shrestha et al. in their study found that anaemic mothers were three times more prone to deliver LBW babies as compared to non-anaemic mothers.[10]

Thus, this study was performed to correlate the maternal haemoglobin level in the third trimester with the neonatal birth weight.

MATERIALS AND METHODS

A retrospective study was done at Bethany Hospital, Shillong. Study population included all pregnant women who were admitted for deliveries at Bethany Hospital, Shillong at their third trimester from 1st January, 2019 to 30th September, 2021. The data included age of the mother, gestational period, mode of delivery, haemoglobin level of the pregnant women at the time of admission and the neonatal birth weight of the baby after delivery. Pregnant women with known cases of anaemia were excluded. These data were retrieved retrospectively from hospital medical records. A pregnant woman was considered anaemic if haemoglobin was <11 g/dl and a baby is considered low birth weight if birth weight is <2500g as per WHO guidelines.[4,8] The data were entered in Microsoft Excel and statistical analysis was done using statistical package for social sciences (SPSS) version 21.

RESULTS

Table 1: Mother's demographic profile.

Mean age group of pregnant mother	31 years
Mean haemoglobin concentration of non-anaemic mother	12.3 g/dl
Mean hemoglobin level in anemic mother	9.68 g/dl

Table 2: Correlation between maternal Hb concentration and foetal birth weight.

	p-value
Maternal haemoglobin concentration and foetal birth weight	0.02

The total number of cases included in the study was 1410. Maternal age ranged from 18 years to 48 years with a mean age of 31 years. Majority of the babies were delivered via caesarean section (1010; 71.6 %) followed by vaginal deliveries (400; 28.4%), the ratio being 2.5:1. The period of gestation in this study ranged from 18-45 weeks. There were 188 (13.3 %) preterm cases whereas 1222 (86.7 %) were term deliveries.

Out of 1410 pregnancies, 459 (32.55%) had anaemia while 951 (67.45%) had a normal haemoglobin level. The overall prevalence of anaemia in the third trimester was 32.55 %. The mean haemoglobin level was found out to be 11.4 g/dl - 12.3% among non-anaemic and 9.68% among anaemic mothers. The mean birth weight of the new born was 2.9 kg with 3.0 kg among non-anaemic and 2.8 kg among anaemic. The neonatal birth weight ranged from 430 g to 4900 g. LBW was seen in 262 (18.58%) whereas 1148 (81.42%) babies had weight more than 2500 g. The overall prevalence of LBW was 18.58% and among anaemic mothers, it was 20.4%.

DISCUSSION

Anaemia in pregnancy is an important public health problem worldwide. As per WHO Global Anaemia estimates 2021, global anaemia prevalence was 29.9% in women of reproductive age, equivalent to over half a billion women aged 15-49 years. Prevalence was 29.6% in non-pregnant women of reproductive age, and 36.5% in pregnant women. Since 2000, the global prevalence of anaemia in women of reproductive age has been stagnant, while the prevalence of anaemia in pregnant women has decreased slightly.[11]

In our study, the prevalence of maternal anaemia during the third trimester was 32.55 % which is similar to a study done by Bansal et al[12] which had a prevalence of 31% at some stage in the third trimester.

Low birth weight is widely used as an indicator of new born health. The association of LBW has been studied with a variety of factors relates to geo-demographics, maternal health and pregnancy history in various studies. Anaemia which is a common problem in pregnant women in developing countries like India increases the incidence of low birth weight. Anaemic mothers were more likely to have LBW than non-anaemic.[13] Our study showed that the birth weight ranged from 430 g to 4.9 kg with an overall prevalence of low birth weight as 18.5% and 20% among anaemic mothers which is similar to a study done by Bharati et al[14] where nearly 20% of new-borns have LBW. The correlation between maternal haemoglobin and birth weight was found to be statistically significant (p-value = 0.02) in the present study. Levy et al had similar results in their study.[15] Rasmussen also reported that strong evidence exists for an association between maternal haemoglobin concentration and birth weight.[16]

CONCLUSION

In conclusion, the current study indicated the association of maternal anaemia in pregnancy with increased risk of low birth weight babies. Maternal anaemia can be prevented as early as possible by educating the mothers and providing them proper nutrition before and during pregnancy. Further efforts are needed to prevent maternal anaemia which in turn reduces the low birth weight and its consequences in the new-born.

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