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# Impact of maternal determinants in rural areas influencing birth weight of newborn

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***Abstract*---**Background: The birth weight of the newborn determines the health and survival of the newborn. Birth weight depends upon maternal factors such as the nutritional status of the mother, gestational age, multiple gestations, hemoglobin status, weight of the mother, complications of labour such as diabetes, hypertension, seizures, cardiac defects, bleeding manifestations, chronic illness and substance abuse. Methods It's a retrospective study conducted at

Tagore medical college and hospital. Data collection was drawn on 100women for the age of the mother at the time of delivery, parity, gestational age, hemoglobin status, the weight of the mother, weight of the newborn, blood sugar, and blood pressure from July 2018- July 2019. Results: In our study low birth weight seems to be associated with anaemic mothers with a significant p-value of 0.00. Also, underweight mothers delivered 71.43% of low birth weight babies, normal, overweight and obese mothers delivered 82.35%, 84.21% and 100% normal weight babies which are statistically significant, represented by a p-value of 0.004 in our study. LBW in mothers of age group 18-24yrs 12(27.27%) in our study is high when compared to babies born between 25-31years 7(15.22%) and 10% in the age group between 32-38yrs. Birth weight seems to be normal around 75% in Primi mothers and 83.33% babies in multipara mothers. There is no correlation between the blood group, mode of delivery whether it is normal or cesarean section and the complication of pregnancy – thyroid disorders and abruptio placenta. Conclusion: In our study anaemic mothers is less when compared to other studies because the number of booked cases and maternal weight gain are quite higher when compared to other studies implying anaemia in pregnancy was treated during labour. But low birth weight seems to be associated with anaemic mothers in our study with a significant p-value of 0.00. Also, underweight mothers delivered 71.43% of low birth weight babies, and normal and overweight and obese mothers delivered 82.35%, 84.21% and 100% normal weight babies which are statistically significant, represented by a p-value of 0.004 in our study. LBW in mothers of age group 18-24yrs 12(27.27%) in our study is more when compared to babies born between 25-31years 7(15.22%) and between 32-38yrs only 10%. Birth weight seems to be normal around 75% in Primi mothers and 83.33% babies in multipara mothers. There is no correlation between the blood group, mode of delivery whether it is normal or cesarean section and the complication of pregnancy – thyroid disorders and abruptio placenta. Henceforth anaemia programme for pregnant mothers shall also include iron-rich supplementary food along with nutrient-rich food for underweight mothers can prevent LBW and preterm babies in future for anaemic and undernourished pregnant young women. Awareness about complications in teenage and young age pregnancy and neonatal outcomes can be emphasized in textbooks for young parents.

***Keywords*---**Low birth weight (LBW), Anemia, Hemoglobin (Hb), Underweight Overweight, Obese, Maternal factors, Term, Preterm, Newborn.

## Introduction

The birth weight of the newborn determines the health and survival of the newborn. Birth weight depends upon maternal factors such as the nutritional status of the mother, gestational age, multiple gestations, hemoglobin status,

weight of the mother, complications of labour such as diabetes, hypertension, seizures, cardiac defects, bleeding manifestations, chronic illness and substance abuse.

The maternal factors which result in low birth weight in a newborn are of great importance as low birth weight is the common cause of the increase in morbidity and mortality among newborn babies. It makes the newborn vulnerable to sepsis and has fewer chances of survival. Infants of LBW have an increased risk of neurological and developmental problems sometimes associated with other co-morbidities such as respiratory distress, speech delay, visual defects, epilepsy, and cognitive disabilities.[1,2]

In India NFH3 Survey ie National Family Health Survey-3 showed a higher incidence in rural 23% than in urban 19% with regional disparities. LBW <2500gms is the most common cause of infant mortality and morbidity in India. Prevention of LBW results in decreases in perinatal mortality.[3] Women with poor nutritional status such as anaemia, low education and poverty are co-existent in rural areas of India leading to adverse reproductive outcomes.[4] The major maternal factor resulting in LBW in term infants and preterm infants gestational age seems to be the Also, male babies weighed better than female babies but the results are controversial.

Low birth weight is a preventable cause of an increase in morbidity, mortality, and neurological and developmental abnormalities.[4]Ravikumar et al study confirm regular antenatal check-up, supplementation of iron and calcium, education of the mother, nutritional status of the mother and delay in the age of 1st pregnancy can effectively lower the risk of low birth weight in newborns.[5]
According to WHO, low birth weight is less than 2.500 grams, weight being taken within the first few hours of life without much significant postnatal loss of weight.[6] Barker's hypothesis which shows diseases of fetal origin, and low birth weight during fetal growth results in an increased risk of adult diseases such as hypertension, diabetes mellitus, hyperlipidemia and syndrome.[7,8] World Health Assembly Resolution in 2012, endorsed around 65.6 comprehensive implementation plan on maternal, infant and young child nutrition, specified six global nutrition targets for 2025.[9]Among women of reproductive age worldwide anaemia affects half billion women around 29% in non-pregnant women and 38% of pregnant women in 2011 which shows the progress of anaemia and difficulty in attaining the specified nutritional targets for 2025.[10]

Maddalasoujanya et al, study on 121 pregnant women with anaemia showed average birth weight among mothers with no anaemia (Hb>11) was 2.26 kg, with moderate anaemia was 1.95 kg and mild anaemia was 2.22 kg. The birth weight increased from 1.95 to 2.26 kg as the severity of anaemia decreased from moderate to no anemia.[11]Marie Blomberg et al, the teenage groups had significantly more vaginal births, fewer cesarean sections and instrumental vaginal births and showed no increased risk of the adverse neonatal outcome but presented an increased risk of prematurity < 32 weeks The opposite was found among older women reaching a four-fold increase in cesarean section and increased risk of prematurity, perineal lacerations, pre-eclampsia, abruption,

placenta previa, postpartum haemorrhage and unfavorable neonatal outcome compared with the reference group.[12]

Rima Irwinda et al, women with preeclampsia had a higher number of preterm deliveries (26.7%) and low birth weight (median 2575 grams) Based on birth weight independent of gestational age, severe preeclampsia had an impact on VLBW and LBW. PIH women who had SGA or VLBL or LBW infants were caused by the hypoperfusion and LGA infants due to the compensation of the decrease from uteroplacental perfusion or other diseases such as an obese mother or gestational DM.[13]

Nir Melamed et al, Of the 66387women, studied, 34367(51.8%) delivered male and 32020 (48.2%) delivered female neonates. The rate of preterm delivery ( as early as 29 weeks ) was higher for male fetuses and was attributed to an increased incidence of spontaneous preterm labour and preterm premature rupture of membranes and female fetuses were more likely to experience fetal growth restriction. Fetal gender is independently associated with adverse pregnancy outcomes. [14]Amin et al showed an insignificant relationship between the height of the mother and birth weight.[15] But Kranner and Trivedi et al study showed a significant association between maternal height and LBW.[16]

**Objective**

The main objective of this study is to know the maternal factors that contribute to low birth weight in newborn babies at a tertiary care centre.

**Materials and Methods**

It's a retrospective study conducted at Tagore medical college and hospital. Data collection was drawn on 100women for the age of the mother at the time of delivery, parity, gestational age, booked or unbooked, hemoglobin status, the weight of the mother, mode of delivery, blood sugar, blood pressure, the weight of the newborn and group of mother and baby are taken from July 2018- July 2019.

**Inclusion Criteria**

1) Weight and blood group of newborn babies at the time of birth between 2018-2019.
2) Maternal age, weight, parity, gestational age, hemoglobin status, blood sugar, and blood pressure.

**Exclusion Criteria**

1) Newborn babies with chromosomal abnormalities, thyroid and metabolic disorders, diabetic mothers, preeclampsia and anomalous babies are excluded.
2) Mothers of chronic illness who are on drugs.

**Implementation**

To implement govt related programmes to improve the birth weight of a newborn in rural areas. The results of the studies so far have been controversial

**Discussion**

Kumar et al, anaemia in pregnancy as a recognizable association with fetal outcome. They found anaemia developed in the third trimester, the higher chance of LBW babies. If the mother is anaemic in the 2nd and 3rd trimesters, there is a higher chance of preterm delivery. Supplementing iron earlier and maintaining optimal Hb(10- 12gm/dl) through pregnancy has a better overall outcome regarding premature and low birth weight babies.[17] In our study, the number of anaemic mothers is 51 among 100 pregnant women. Out of 51 anaemic mothers, 37% of babies are low birth weight with a significant p-value of 0.00.

Meghavini study showed that 44% with mild PIH and 56% had severe PIH. Low birth weight was found in 53% baby. Perinatal complications in 46% of cases include IUGR (60.9%), birth asphyxia (8.7%), RDS (4.3%) and perinatal death (15.2%) respectively. PIH is associated with multiple complications in the mother and baby and particularly results in preterm delivery.[18] Figure -2, 89% of normotensive mothers delivered 16.85% of low birth weight babies whereas 11% of PIH mothers delivered 45.45% of low birth weight babies with a significant p-value <0.025.

Figure-3 In preterm babies the incidence of low birth weight is 56% when compared to 8% low birth weight in term babies which also has a significant p-value of <0.000, around 92% of term babies and 44% of preterm babies are born by normal weight. Figure -4, Nutritionally deprived underweight mothers delivered 71.43% of low birth weight babies, normal and overweight and obese mothers delivered 82.35%, 84.21% and 100% normal weight babies which is statistically significant, represented by a p-value of 0.004 in our study.LBW in mothers of age group 18-24yrs 12(27.27%) in our study when compared to babies born between 25-31years 7(15.22%) and between 32-38yrs only 10% had LBW. Among Primi mothers, 75% of babies were born with normal weight and 83.33% of babies in multipara mothers. In Marie Blomberg et al study, teenage mothers had more normal delivery than cesarean when compared to the reference group and older women. But teenage mothers had more preterm <32weeks and mothers with advancing age > 30 years had an increased risk of preterm, and more maternal complications .[13]

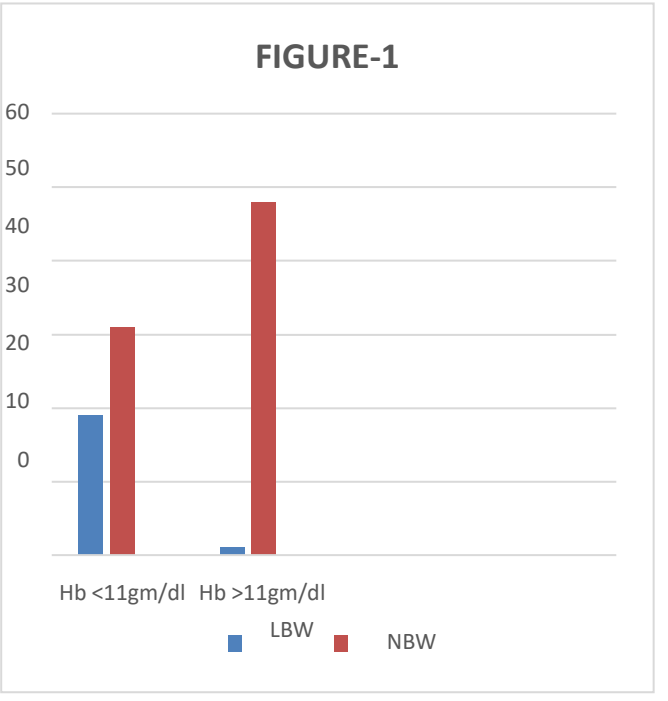


Fig 1 - Association Of Anemia Status In Low Birth Weight And Normal Birth Weight Neonates

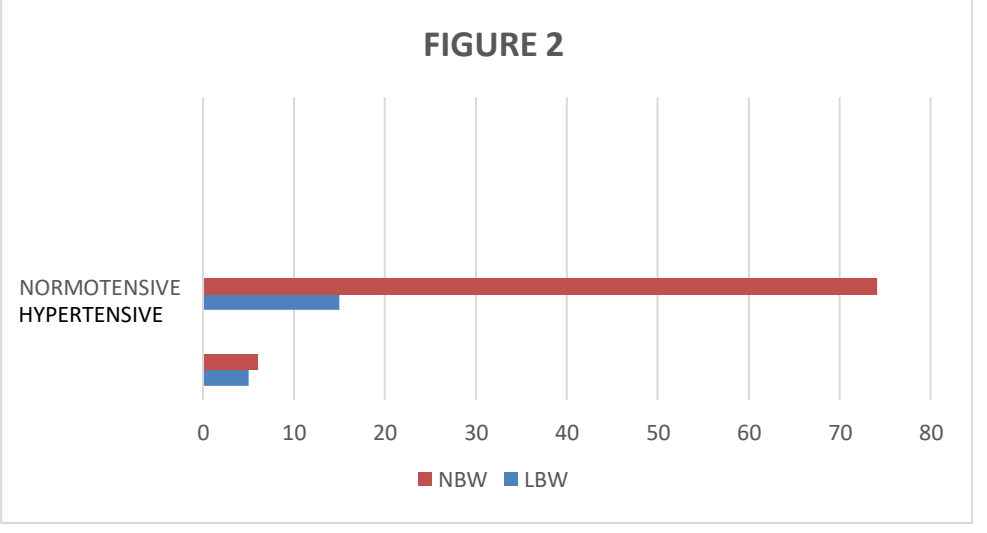


Fig – 2: Birthweight Concerning Blood Pressure Of Mothers

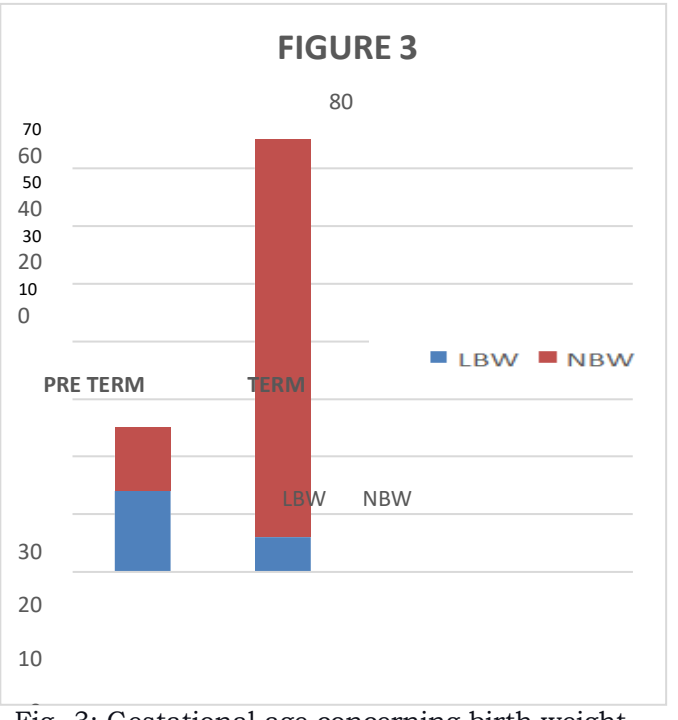


Fig -3: Gestational age concerning birth weight


Fig -4: Maternal nutritional status and neonatal outcome

There is no correlation between the blood group, mode of delivery whether it is normal or cesarean section and the complication of pregnancy – thyroid disorders and abruptio placenta.

**Conclusion**

In our study, anaemic mothers among 100 pregnant mothers are less when compared to other studies, because the number of booked cases and maternal weight gain are quite higher when compared to other studies implying anaemia in pregnancy was treated during labour. Around 19% LBW babies were born to anaemic mothers in our study with a significant p-value of 0.00. Also, underweight mothers delivered 71.43% of low birth weight babies, and normal and overweight and obese mothers delivered 82.35%, 84.21% and 100% normal weight babies which are statistically significant, represented by a p-value of 0.004 in our study. LBW in mothers of age group 18-24yrs 12(27.27%) in our study is more when compared to babies born between 25-31years 7((15.22%) and between 32-38yrs only 10%. Birth weight seems to be normal around 75% in Primi mothers and 83.33% babies in multipara mothers. There is no correlation between the blood group, mode of delivery whether it is normal or cesarean section and complications of pregnancy – thyroid disorders and abruptio placenta. Henceforth anaemia programme for pregnant mothers shall also include iron-rich supplementary food along with nutrient-rich food for underweight mothers on daily basis ,can prevent LBW and preterm babies in future for anaemic and undernourished pregnant young women. Awareness about complications in teenage and young age pregnancy and the neonatal outcome can be emphasized in textbooks for young parents.

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