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# Distribution And Determinants Of Low Birth Weight In Term Neonates In A Tertiary Care Centre

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**ABSTRACT:**

**INTRODUCTION:**

The weight of the new born is a reliable indicator of a good infancy. Low birth weight babies have a greater chance of experiencing perinatal and infant mortality rates.

A serious public health issue in developing nations like India is LBW. According to epidemiological observations, infant mortality is intimately linked to pregnancy and neonatal illness and death, with babies weighing less than 2500 grams having a 20 times higher risk of dying than bigger babies. In India, over half of babies are born at full term, but 30–35 % have low birth weights. In India, about 7.5 million babies are born every year with LBW, accounting for Over one-third of the global burden of low birth weight (LBW).This is the largest burden of any nation, accounting for 42% of the world burden. After fetal growth restriction, about 60% of LBW babies are born at term, while the remaining 40% are delivered preterm.

**METHODS:**

Cross-sectional study done in NICU in Sree Balaji Medical College and Hospital. During the period from January 2023-June 2024.The study was conducted at Neonatal Intensive Care unit, Department of Paediatrics, Sree Balaji Medical College Hospital, Chromepet, Chennai, Tamil Nadu, India.LBW (less than 2500gms - more than 1500 gms) term new born babies (both inborn and outborn) admitted in NICU at Sree Balaji Medical College Hospital.

SAMPLING METHOD: Purposive sampling.

**RESULTS:**
In this study the distribution of LBW babies in term neonates was found to be 19%.And there was an assessment of risk factors contributing to low birth weight in term babies. The prevalence of LBW was higher among women those aged < 20 years and more than 35 years. The distribution of LBW is more among primis (28 %) and multigravida mothers with more than 3 parity (25%). When compared with the other group. Mothers with birth interval less than 2 years (29%) were found to have more low birth weight babies than mothers with birth interval more than 2 years. It was found that lower the mother's weight higher the incidence of babies with low birth weight (34%).Mothers involved in heavy work were found to have more LBW babies (29%).There was significant correlation between the per capita income of the family and LBW. Maternal illness such as Gestational hypertension, maternal anemia lead also found to be significant.

**DISCUSSION:**
The frequency of low birth weight has been closely correlated with the age of the mother. Both primi gravida and multigravida with more than three birth orders have a very high incidence of low birth weight. Baby birth weight is mostly influenced by the weight of the mother. Mothers with a birth interval of less than two years are reported to have a higher risk of low birth weight baby. Mothers who had the bad obstetric history in their prior pregnancies had a very high incidence of low birth weight.
Low birth weight is strongly correlated with per capita income. Lesser the Per Capita Income higher the incidence of LBW. Low birth weight is more common in illiterate mothers. Gestational Hypertension, Maternal anemia and maternal substance abuse was found to be strongly correlated with LBW at term.

**KEYWORDS:**
Low birthweight, Term, Preterm, Prevalence, Distribution, Gestation, Diabetes, Anemia, Hypertension.

**INTRODUCTION:**
The weight of the new born is a reliable indicator of a good infancy. Low birth weight babies have a greater chance of experiencing perinatal and infant mortality rates. Apart from increasing the risk of death for the babies who do make it through, LBW has also been correlated with long-term developmental problems and morbidity. One can use the distribution of LBW as a good indicator of the nutritional status of mothers and as a measure of the socioeconomic development of a certain population.
A serious public health issue in developing nations like India is LBW. According to epidemiological observations, infant mortality is intimately linked to pregnancy and neonatal illness and death, with babies weighing less than 2500 grams having a 20 times higher risk of dying than bigger babies. In India, over half of babies are born at full term, but 30–35 % have low birth weights.(1,2)
In India, about 7.5 million babies are born every year with LBW, accounting for Over one-third of the global burden of low birth weight (LBW). (3)
This is the largest burden of any nation, accounting for 42% of the world burden. After fetal growth restriction, about 60% of LBW babies are born at term, while the remaining 40% are delivered preterm.4
According to the UNICEF-WHO Low Birth weight Estimates for 2023, 19.8 million babies, or 15% of all newborns, were born with low birth weight in 2020. This suggests that the global target of a 30% reduction in low birth weight by 2025.By 2025, there should be only 14 million newborns weighing less than 2,500 grams, down from an estimated 20 million at birth.5. In India, low birth weight babies account for significant rate of illness and mortality roughly one in four babies born. 2.7 million pre- term births, 1 million VLBW, and eight

million LBW births occur in India each year. Babies with LBW have a 46-percent increased risk of dying in the newborn period. Babies with LBW have a 200-times increased risk of dying before their first birthday, and preterm babies often die before turning one. Survivors may experience a variety of health issues.
Low birth weight baby mortality and morbidity rates have significantly decreased in recent years as a result of improvements in healthcare facilities and global human standards of living. The issue of low birth weight has declined in industrialized nations as a result of better healthcare facilities and higher health spending. According to 4 NFHS a falling sequence is seen in the prevalence of LBW. LBW newborns in India are caused by several maternal and socio-demographic variables. LBW newborns pose a threat to worldwide public health. The fundamental causes of LBW newborns in India should receive particular attention.(5)

## AIM AND OBJECTIVES

### AIM:

To assess the distribution and determinants contributing to Low Birth Weight in Term neonates in a tertiary care centre.

### OBJECTIVES:

1. To determine the distribution of Low Birth Weight in term neonates.
2. To assess the determinants contributing to Low Birth Weight in term neonates.

## MATERIALS AND METHODS

Cross-sectional study done in NICU in Sree Balaji Medical College and Hospital. During the period from January 2023-June 2024 (18 months)

STUDY AREA:
The study was conducted at Neonatal Intensive Care unit, Department of Paediatrics, Sree Balaji Medical College Hospital, Chromepet, Chennai, Tamil Nadu, India.
STUDY PERIOD: January 2023-June 2024 (18 months)
STUDY POPULATION: LBW (less than 2500gms - more than 1500 gms) term new born babies (both inborn and outborn) admitted in NICU at Sree Balaji Medical College Hospital.

SELECTION CRITERIA

INCLUSION CRITERIA:
All term new borns ( > 37 weeks) delivered in Sree Balaji Medical College Hospital during the study period from January 2023 to June 2024 (18 months).

EXCLUSION CRITERIA:
- Preterm babies
- Still born babies
- Multiple pregnancies
- Newborn babies with congenital anomalies.

STUDY TOOL: Semi structured questionnaire

STUDY VARIABLES:
Data available on maternal factors, delivery factors affecting LBW were noted.
Maternal factors were the age of the mother, parity, gravida, socioeconomic status, ANC, intake of iron and folic acid (IFA) tablets, gestational hypertension, diet intake, anemia, eclampsia, preeclampsia, oligohydramnios, polyhydramnios, thyroid disease, uterus and cervical anomalies, seizures, infections and so on.
Delivery factors consisted of type of delivery, bad obstetric history, weight gain during pregnancy, high-risk pregnancy, previous cesarean delivery, preterm delivery, and risks associated with preterm delivery.
Nutritional status of mother recorded such as type of diet/additional diet during pregnancy, iron and folic acid supplementation during pregnancy, height and weight of the mother during delivery.

DATA ANALYSIS:
- The SPSS program was used to enter all of the data.
- The Chi Square test was used to determine the association between the risk factors under investigation, with a significance level of $P < 0.05$.

**RESULTS:**
In the current study the prevalence of LBW was higher among women those aged < 20 years (62 %) and more than 35 years (25%). The p value was < 0.001 which was statistically very significant. Mothers with birth interval less than 2 years were found to have more LBW babies (29%) .The relationship between gravida and baby birth weight was statistically significant (P=0.001).The distribution of LBW is more among primis (28 %) and multigravida mothers with more than 3 parity (25%). When compared with the other group. The relation between increasing parity and LBW was found to be significant p value <0.004.
The majority (57%) of illiterate mothers gave birth to LBW babies, which was very high compared to mothers with primary (15%),graduate (18%).There was a significant association between LBW and the literacy status of the mother
(P < 0.001). The percentage of LBW babies was maximum (45%) in mothers with low Per capita income < 1272 (P<0.001).
The percentage of LBW babies in those who did not consume a minimum of 100 IFA tablets during pregnancy (39%) was very higher than that in those who took them as recommended. A highly significant association was found between low birth weight and IFA tablets consumption during the antenatal period (P< 0.0001) and maternal hemoglobin levels (P<0.0001). The percentage of LBW was higher for women with a high-risk pregnancy such as gestational hypertension .Out of the 28 mothers with Gestational Hypertension 21 gave birth to low birth babies (75%).out of 222 mothers without Gestational Hypertension 27 gave birth to LBW (12.1%). p value was 0.001 which was found to be statistically significant. The percentage of VLBW babies born to underweight mothers less than 45 kgs was significantly high (34 %) compared to babies born to mothers with normal weight p value ( 0.01).
About 40% of pregnant mothers in the study had less than 4 ANC visits and p value was found to be statistically very significant p value 0.006 .The LBW proportion was higher in women with anemia (hemoglobin levels of less than 11 g%) (44%) p value <0.001.
Among the variables, maternal weight gain during pregnancy was found to be significant with LBW. Weight

gain less than 10kgs had more LBW p value was found to be significant <0.016.There's strong association between mothers who had maternal drug abuse (alcohol, smoking, tobacco chewing) and LBW (90%). p value is statistically very significant 0.003.There's strong association between mothers who had previous bad obstetric history (abortions, still birth) and LBW (96%). p value is statistically significant <0.001.Using a five-step multiple logistic regression analysis, maternal factors such as age, birth interval, height, weight, education, the presence of a bad obstetrics history influenced newborn birth weight.

Enrollment in local colleges, 2005.

| Variables | Category | LBW n(%) | NBW n(%) | 95% CI | p Value |
|---|---|---|---|---|---|
| Mother's Age | < 20 years | 13(62) | 8(38) | 0.076 to 1.494 | < 0.001 |
| | 20-30 years | 9(7.3) | 114(93) | | |
| | >31 years | 26(25) | 80(75) | | |
| Birth Interval | < 2 years | 12(29) | 29(71) | 3.442 to 223.2 | 0.001 |
| | > 2 years | 1(2) | 67(98) | | |
| Mothers Weight | < 45 Kgs | 11(34) | 21(66) | 0.106 to 0.832 | 0.01 |
| | 45-60 Kgs | 14(25) | 43(75) | | |
| | > 60 Kgs | 23(14.2) | 138(85.8) | | |
| Mother's Literacy | Illiterate | 13(57) | 10(43) | 0.014 to 0.018 | < 0.001 |
| | Primary school | 15(15) | 88(85) | | |
| | Graduate | 20(18) | 109(82) | | |
| Per Capita Income | < 1272 | 9(45) | 11(55) | 0.083 to 8.059 | 0.001 |
| | 1272-4239 | 19(17) | 95(83) | | |
| | >4240 | 20(17) | 96(83) | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Ante natal visits | < 4 | 20(40) | 30(60) | 0.454 to 5.026 | | 0.006 |
| | 4-8 | 22(14) | 135(86) | | | |
| | >8 | 6(14) | 37(86) | | | |
| Weight Gain | 5-9 Kgs | 47(24) | 146(76) | 2.428 to 133.8 | | 0.016 |
| | >10 Kgs | 1(2) | 56(98) | | | |
| Antenatal Supplements | Taken | 23(39) | 36(61) | 2.1681 to 8.3005 | | < 0.01 |
| | Not taken | 25(13.1) | 166(86.9) | | | |
| Gestational Hypertension | Present | 21(75) | 7(25) | 8.4183 to 55.764 | | < 0.001 |
| | Absent | 27(12.1) | 195(87.8) | | | |
| Gestational Diabetes | Present | 2(6.7) | 28(93.3) | 0.061 to 1.1762 | | 0.0812 |
| | Absent | 46(20.9) | 174(79.1) | | | |
| Maternal Anaemia | Present | 23(44) | 29(56) | 2.7543 to 10.9362 | | < 0.001 |
| | Absent | 25(12.6) | 173(87.4) | | | |
| Maternal Substance Abuse | Present | 9(90) | 1(10) | 5.7126 to 376.62 | | 0.003 |
| | Absent | 39(16.2) | 201(83.8) | | | |
| Bad Obstetric History | Present | 23(96) | 7(24) | 9.9816 to 65.8038 | | < 0.001 |
| | Absent | 25(11.3) | 195(89) | | | |

**DISCUSSION:**

Over the past few years, India has seen a significant decline in the prevalence of low birth weight, largely attributable to rising living standards and greater government funding for healthcare. However the proportion of LBW babies born at term is still significant and this is attributable to multitude of factors ranging from socio-economic, genetic factors, maternal obstetric factors, fetal factors, and sometimes idiopathic.

The goal of this study was to determine the association between low birth weight babies at term and obstetric, socio economic and demographic characteristics in India which is still a developing nation, so that appropriate action may be taken to lower the prevalence. In this study the prevalence of low birth weight is found to be 19%. This was similar to the study done by Damini Singh et al in 2023(6).And the most common determinants affecting low birth weight was found to be due to maternal age, birth interval of less than 2 years, Mothers literacy status, weight gain of the mother during pregnancy, per capita income of the family and diseases such as Gestational Hypertension and anaemia being the most common causes. Maternal substance abuse and bad obstetric history in previous pregnancy was also found to have strong association resulting in low birth weight babies. In our study, there was a 100% correlation found between low birth weight and birth interval. When the birth interval is shorter than two years, the incidence of low birth weight is higher than when the interval is longer than two years. This could be because it takes the mother's nutrition and general health at least two to three years to return to their pre-pregnancy 76. Moreover, D Singh et al (2023) (6), validated this relationship. Our study found a strong correlation between low birth weight and the mother's weight. Compared to women who weigh more than 45 kg, women who weigh less than 45 kg have a higher frequency of low birth weight. Study by Chhabra P et al (7), 2004 lend support to this. There was a substantial correlation between low birth weight and mother's literacy. This study found a correlation between the frequency of low birth weight and the number of antenatal visits. Women who had < 4 antenatal visits had more LBW babies. This can be the result of taking into account the standard of antenatal treatment and routine antenatal checkups. Previous research by Nair NS et al (8), IJP, - 2000 Jan., supports this. The percentage of LBW in the current study was much higher in those who did not take the required antenatal supplements (Folic acid, Iron, calcium) tablets throughout pregnancy than in those who did. (A minimum consumption of 100 IRON and FOLIC ACID tablets were taken into consideration.) This can result from a disregard for ANC quality. Study by Koripadu S et al in march 2022 supported this (9).

Current study has strong association between maternal anaemia and LBW. Haemoglobin less than 11 g/dl was taken into consideration. The risk of LBW increases in the first trimester if Hb is less than 11 g/dl. Study by Shobeiri et al was supporting this (10) , Thus one of the main reasons of baby LBW might be regarded as anaemia during pregnancy (11).There was very strong association with maternal substance abuse (tobacco chewing, smoking, alcohol) and LBW. Risk of delivering LBW was 3.12 times greater in women with a history of chewing tobacco, smoking, who were also exposed to passive smoking (12). In the current study mothers who had gestational hypertension had more prevalence of delivering low birth weight baby than normotensive mothers. This study found a strong correlation between bad obstetric history in previous pregnancies and low birth weight babies. Mothers who had experienced any of the bad obstetric history in previous pregnancies indicated above had a higher incidence of low birth weight. Studies done by Bhargavi AB et al in 2021 (14) and Singh G et al (2010) (6) supported this.

**CONCLUSION:**

Numerous biological and socioeconomic factors influence an infant's birth weight. Certain ones are predetermined even prior to conception. The greatest probability of having a baby with a healthy weight is a well-nourished mother between twenty to thirty years with birth interval of > 2 years with good literacy and without any significant negative obstetric history has the best chance of producing a good weight baby. In order to accomplish the aforementioned goal, focus should be shifted to female literacy, nutrition for girls and adolescents, health education, genetic counselling, raising living standards, simple access to healthcare, and early identification and timely treatment of obstetrical problems. Therefore, action is required in the field of

maternal welfare to lower the frequency of low birth weight newborns. Additionally, legislators should prioritize resolving social issues like lower socioeconomic status, literacy in state health policy. Therefore Interventions to uplift the educational status of women and young girls was therefore crucial to reducing the prevalence of Low Birth weight in India (14,15).

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