

# Incidence and major risk factors for term low birth weight babies in a southern district of Rajasthan

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## Abstract

**Background:** Birth weight is an important determinant of child survival and development. Low birth weight (LBW) is an index of our status of public health, maternal health and nutrition. The major challenge in the field of public health is to identify the factors influencing low birth weight and to institute remedial measures.

**Aim:** The aim of this study was attempted to assess incidence of low birth weight and its risk factors affecting low birth weight.

**Materials and methods:** A cross sectional study design was carried out in a tertiary care government hospital. A total of 1120 postnatal mothers who delivered in the hospital during study period were included in the study except still births. All babies were weighted on standard beam balance within 24 hours of delivery and mother's height was measured by height measuring stand. The collected data was analyzed using statistical package for the social sciences (SPSS) version 22.

**Results and analysis:** incidence of LBW neo-born babies was 240/1120 (21.4%) where 104 (43.3%) were males and 136 (56.7%) were female babies. Mean age of the mothers was 23.52±3.16 years; mean weight noted was 58.94±10.09 kg and mean height was 159.1±7.15 cm. The study showed associations between birth weight and mother's age, weight, height, hemoglobin (Hb) %, birth interval, income, bad obstetric history and complications

**Discussion and conclusion:** The incidence of low birth weight was found to be very high and it was associated with many risk factors related to maternal health and services. Hence it is recommended to improve maternal health through strengthening the existing maternal services at the basic level of community.

**Keywords:** Low birth weight, risk factors, maternal anemia, neonates

## Introduction

Low birth weight (LBW) is a challenging public health problem. Its high priority stems from the fact that it is the major predictor of infant mortality in developed countries and that it contributes substantially to the overall burden of childhood handicap <sup>[1]</sup>. World Health Organization (WHO) defines low birth weight as the weight at birth less than 2500 grams

<sup>[2]</sup>.LBW incidence in India is between 25-30%; IUGR contributes 60-65% of the cases <sup>[3]</sup>. It is a significant determinant of infant and childhood morbidity, particularly of neuro-developmental impairments such as mental retardation and learning disabilities. It is also closely associated with foetal and neonatal mortality and morbidity; inhibit growth and cognitive development and chronic diseases later in life <sup>[4]</sup>. WHO has fixed the Sustainable Development Goal (SDG) to achieve 30% reduction in LBW burden by 2025 <sup>[5]</sup>.

Some of the major risk factors that influence the birth weight are teenage pregnancies, malnutrition, anemia, reduced spacing between pregnancies and bad obstetric history. There is a need to reduce and prevent LBWs and should be a public priority <sup>[6-7]</sup>. Low maternal socio-economic and education status has been also associated with small birth size <sup>[8]</sup>. Furthermore, maternal ill-health during pregnancy such as malaria and HIV infection, low body mass index (BMI) or low gestational weight gain, and hypertension have also been associated with small birth size <sup>[9]</sup>.

LBW babies have a higher risk of morbidity and mortality relative to the risk in an infant of normal birth weight. These babies are at an increased risk of asphyxia, hypoglycemia, polycythemia- hyper viscosity, hypothermia and are more prone to have impaired neurodevelopment and diabetes mellitus in adult life <sup>[10]</sup>.

The best way of prevention of low birth weight is prevention of preterm births. Prenatal care is a key factor in preventing preterm births and low birth weight babies and improves maternal health.

The aims of this to determine the incidence of LBW babies and the maternal risk factors contributing to the LBW in an institution that caters to the urban population in Southern, Rajasthan, India.

## Materials and Methods

The design of the study was cross-sectional analytical study. The study was conducted in the department of pediatrics, in a tertiary care Hospital, Rajasthan. The study was done to identify the risk factor of LBW among the babies delivered in our tertiary care Hospital. The study population were all the cases who had delivered term low birth weight babies less than 2500 gm and whose mothers had done at least 3 ANC visit in our hospital.

The duration of the study was one year from November 2020 to October 2021.

All babies born in our hospital and participants willing to participate in the study with informed consent of the mother were included in the study.

Mild anemia is considered for the cases whose haemoglobin is between 8.1 to 11g/dl. Moderate anemia is considered for the cases whose haemoglobin is between 5.1 to 8g/dl. Severe anemia is considered for the cases whose haemoglobin is less than 5g/dl. Variables like sex of the baby, ethnicity, age of the mother, weight, height and hemoglobin level of the mother, number of ANC visit, mode of delivery and APGAR scores of baby were measured among all the cases.

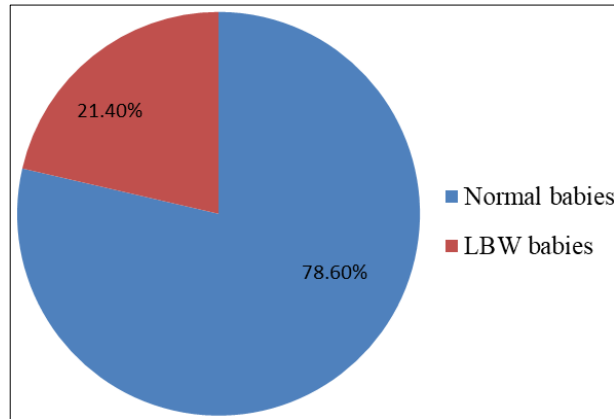
## Statistical analysis

The data collected was compiled, tabulated and subjected to statistical analysis wherever applicable. The analysis of the data was carried out by using SPSS version 20. P value less than 0.05 considered statistically significant

## Results

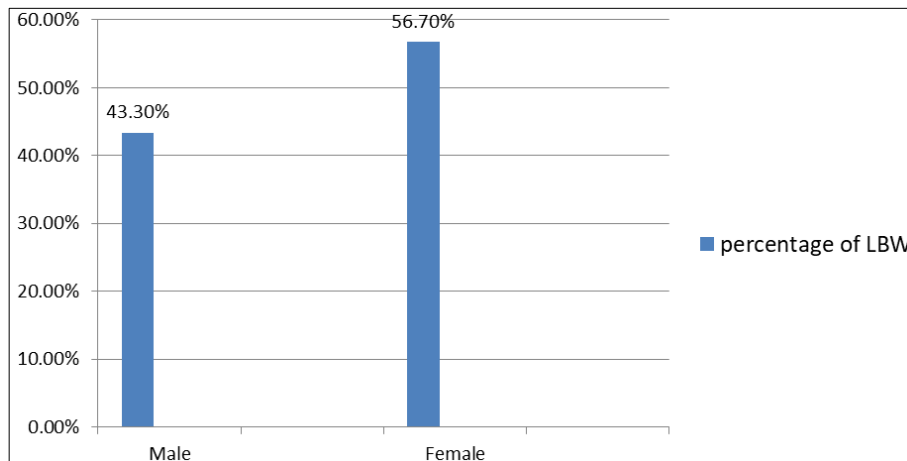
During the study period a total of 240 LBW babies were born among 1120 births, the incidence of low birth weight was found to be 21.4% [Figure:1].

The incidence of low birth weight was more in female babies (n=136) (56.7%) when compared to male babies (n=104) (43.3%) [Figure: 2].



**Fig 1:** Incidence of LBW babies

The incidence of low birth weight was more in mothers from rural areas (59.6%) when compared to mothers from urban areas (40.4%). The incidence of low birth weight was more in illiterate mothers (56.3%) when compared to literate mothers (43.7%). Incidence of LBW as more in Hindu mothers (85.4%) with low socio-economic status (55.8%) [Table: 2].



**Fig 2:** Gender distribution of LBW babies

**Table: 1:** Distribution of socio-demographic factors influencing LBW babies

Sociodemographic parameters		Frequency	Percentage
Religion	Hindu	205	85.4%
	Muslim	23	9.6%
	Christian	12	5%
Education	Illiterate	135	56.3%
	Primary	75	31.2%
	Higher Secondary	24	10%
	Post graduate	6	2.5%
Occupation	Service	5	2.1%
	Skilled	24	10%
	Self employed	64	26.7%
	House wife	149	62.2%
Place of residence	Rural	143	59.6%
	Urban	97	40.4%
Socio-economic status	Upper	10	4.2%
	Middle	76	31.7%
	Lower	154	64.1%

The incidence of low birth weight was more in multigravida mothers (57.5%) when compared to primipara mothers (42.5%), more in mothers who had irregular antenatal checkups (59.2%) when compared to mothers who had regular antenatal check-ups (40.8%). The incidence of low birth weight was more in mothers who had any complication during pregnancy (PIH, oligohydramnios etc.) (57.9%) when compared to mothers who had adequate liquor (42.1%). The mode of delivery did not show any significant effect on birth weight in my study

**Table 2:** Distribution of Maternal Risk Factors influencing low birth weight

Maternal Risk Factors		Frequency	Percentage
Gestational age	Term (37-40 weeks)	196	81.4%
	Pre-term (<37 weeks)	35	14.6%
	Post-term (>40 weeks)	12	5%
Parity	Primipara	102	42.5%
	Multipara	138	57.5%
ANC visit	Regular	98	40.8%
	Irregular	142	59.2%
Anemia (g/dl)	Normal (>11)	82	34.2%
	Mild (9-10.9)	114	47.5%
	Moderate (7-8.9)	34	14.2%
	Severe (<7)	10	4.1%
Bad obstetric history	Yes	106	44.2%
	No	134	55.8%
Complications	Yes	139	57.9%
	No	101	42.1%
Mode of delivery	Normal	122	50.8%
	Cesarean	118	49.2%

The mean age of the mothers was  $23.52 \pm 3.33$  years; mean weight noted was  $58.94 \pm 10.09$  kg and mean height was  $159.1 \pm 7.15$  cm (Table 3).

**Table 3:** Distribution of mothers according to age, weight and height

Maternal factors	Mean
Age	$23.52 \pm 3.33$ years
Weight	$58.94 \pm 10.09$ kg
Height	$159.1 \pm 7.15$ cm

## Discussion

For reducing the incidence of low birth weight babies, public health strategy needs to focus attention on better maternal nutrition and education. Interventional programs should be encouraged not only in health sectors but in all those sectors concerned with social development and social welfare programs. Women should be educated and encouraged for regular ANC checkups, which augments the detection of these risk factors at the earliest to improve the weight of a newborn. Good nutrition during pregnancy would result in increased birth weight [11-12].

LBW has been a major challenging concern in developing countries like India. In India, according to National Family Health Survey conducted in 2015-16 (NFHS 4), prevalence of LBW was 16.4% [13].

In the present study incidence of low birth weight babies was 21.4%, comparable to the Bhimwal RK *et al.* [14], Yadav *et al.* [15] and De Bernabé JV *et al.* [16] reported incidence of LBW were 22.4%, 21.5% and 19% respectively, whereas some study found higher incidence rate than our study: Raghu Raman, *et al.* [17] and Mondal B, *et al.* [18], reported incidence were 32.1% and 28.5% respectively.

The present study did not reflect any significant association between gender and LBW though incidence of LBW was higher in female newborns (56.7%) as compared to males (43.3%), similar finding also reported by Patel S *et al.*<sup>[19]</sup> and Oladeinde *et al.*<sup>[20]</sup>.

The maternal age (19–39 years) was not significantly associated with LBW in our study and also similar findings were showed by Matinet *et al.*<sup>[21]</sup> and Domple VK<sup>[22]</sup>.

Mother's education might affect birth weight directly or indirectly through acquired knowledge of health processes such as antenatal care and nutrition. The results of our analysis are also similar to previous studies that showed that illiterate mothers were at a higher risk of delivering LBW babies than literate mothers<sup>[23-24]</sup>.

Our results showed that mother's low economic status was an important risk factor for LBW. This finding is in agreement with previous studies which showed that poor economic status increased the risk of delivering a LBW baby<sup>[25-26]</sup>.

Current study found incidence of low birth weight was more in mothers from rural areas (33.6%) when compared to mothers from urban areas, our finding consistent with the Sarika M *et al.*<sup>[27]</sup> and Bora M *et al.*<sup>[28]</sup>.

Our study showed the significant association of anemia with low birth weight, where higher incidence of mild anemia was 47.5% in pregnant women. Concordance finding reported by S. D. Singh *et al.*<sup>[29]</sup> and Odongkara B *et al.*<sup>[30]</sup>.

Present study observed that Multipara women had more chance of having LBW new born babies than Primipara women, similar to the many other studies<sup>[31-32]</sup>.

In this study, lower socio-economic class, low maternal weight or height. Poor obstetric history, lack of antenatal care (irregular antenatal checkup), clinical anemia, complicated pregnancy, and Multiparous women were significant independent risk factors for both term and preterm, similar risk factors also reported by many of the other researchers<sup>[33-35]</sup>.

It was concluded that gestational age, maternal age, regular antenatal checkup, mother's height, mother's weight, anemia, physical work, and tobacco chewing are significant determinants of LBW.

## Conclusions

Higher incidence of LBW babies (21.4%) was found in the present study. Many factors affect the birth weight of the neo-born babies. Among the various risk factors the maternal factors like height, hemoglobin, total maternal weight gain, ANC visit and complication during pregnancy was found to influence the birth weight. Hence, it is important strengthen the existing maternal services at the basic level of community to solve this problem.

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