

## MATERNAL FACTORS ASSOCIATED WITH LOW BIRTH WEIGHT NEWBORN IN A TERTIARY CARE CENTRE OF SOUTHERN RAJASTHAN

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Received: 02 October 2022, Revised and Accepted: 20 November 2022

### ABSTRACT

**Objective:** Low birth weight is defined as weight at birth of <2500 g as per the World Health Organization. Low birth weight (LBW) newborns have higher risk of morbidity and mortality during perinatal period. The aim of the study was to ascertain the maternal factors leading to low birth weight in newborns.

**Methods:** A cross-sectional study was done for a period of 1 year. Mothers delivering term LBW babies from singleton pregnancy were taken as cases and mothers with term, normal weight newborns from singleton pregnancy were termed as control group. Babies with congenital malformations, still births, and multiple gestations were excluded from the study. Written consent for the study in local language from each subject was taken. Institutional ethical clearance was obtained.

**Results:** One thousand two hundred and fifty-six babies were born during the study period and out of these 258 babies were weighing <2.5 kg thus the incidence of LBW <2.5 kg was 20.54%. Young maternal age (<30 years) and multi parity ( $\geq 3$ ) had significantly increased LBW incidence of 28.7% and 32%, respectively. Pregnancy complications such as anemia and pre-eclampsia had significantly increased incidence of LBW newborn of 33.45% and 29.1%, respectively.

**Conclusion:** Pregnancy-related anemia and hypertension are an important risk factor for LBW. Young maternal age pregnancy and poor ante natal visits also contribute toward LBW.

**Keywords:** Anemia, Pre-eclampsia, Low birth weight.

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### INTRODUCTION

According to the World health Organization, a newborn is termed as low birth weight (LBW) when it weighs <2500 g at birth. This definition is irrespective of the gestational age of newborn. It was observed that newborns weighing <2500 g have 20 times more probability of mortality to than heavier babies and thus this was kept as a cutoff point [1].

The reason for low birth weight can be due to preterm birth or small for gestational age or a combination of both [2]. In developed countries, prematurity is the most common cause of LBW but in developing countries like India, intrauterine growth retardation is the main reason behind LBW [3].

According to the World Health Organization, about 20 million babies are delivered as low birth weight. It is around 15.5% of births all over the world. About 96% of these LBW babies are from developing countries [4]. About 35% babies that are delivered in India are born LBW. Out of these, more than 50% have gestational age of more than 37 weeks at birth [5].

There are numerous factors contributing to LBW which comprises of both maternal and fetal. Multiple factors such as genetic, reproductive, social status, cultural, demographical, and surrounding physical environmental conditions play a complex role during the gestation period and it affects the growth of the infant inside the mother's womb. The three factors that majorly affect the growth of the fetus are maternal [6-10], socioeconomic, and psychological [11].

The present study was designed to determine the proportion of LBW infants in hospital deliveries in a tertiary health center of Southern Rajasthan and to identify the maternal factors that could lead to low birth weight in newborns.

### METHODS

This was a cross-sectional study and it was done for a period of 1 year between February 2021 and January 2022 at the Pacific Medical College and Hospital, Udaipur Rajasthan.

All the mothers with babies delivered in our hospital during the study period weighing <2500 g from singleton pregnancy with gestation age 37–41 weeks were included as cases in the study. Mothers who delivered normal weighing (>2500 g) newborns with term gestational age during the same time period were taken as control.

Mothers who delivered multiple newborn (twins/triplets, etc.) and newborns with congenital malformations were excluded from the study. Still births were also excluded from the study. Ethical clearance for the study was taken before the commencement of the study. Written consent from the each subject was taken in their local language.

Birth weight of all the infants born during the study period was noted. Maternal parameters such as mother age, mother weight, and height were noted. Clinical data related to anemia (hemoglobin level <11 g%) and blood pressure were noted. Pregnancy related information such as gestational period, parity of mother, pregnancy-related complications such as PIH, PROM, APH, and maternal antenatal care (ANC) follow-up were noted. Data were analyzed using computer software SPSS v22.

### RESULTS

The present study was conducted over a period of 1 year from February 2021 to January 2022 in Department of Paediatrics, Pacific Medical College and Hospital, Udaipur, India. A total 1256 babies were born in our institute during this period. Out of these 1256 babies, 258 babies were weighing <2.5 kg. The incidence of LBW <2.5 kg was 20.54%.

On the basis of age, mothers were classified in to four groups. The results are stated in Table 1.

**Table 1: Relationship between age of pregnant mothers and low birth weight**

Age of mother (years)	Total live births	Normal weight birth (>2.5 kg)	Low birth weight (%)
≤20	252	188	64 (25.4)
21–30	854	600	254 (29.74)
31–40	125	110	15 (12)
>40	25	20	5 (20)

The P=0.000345. Other parameters that were studied are listed below with their results

**Table 2: Number of antenatal visits during pregnancy and low birth weight outcome**

No. of antenatal care visits	Live births	Normal weight birth (>2.5 kg)	Low birth weight (%)
<3	706	536	170 (24.07)
3 or more	550	462	88 (16)

The P=0.00048

**Table 3: Weight outcome of newborn on the basis of parity of mother**

Parity	Live births	Normal weight birth (>2.5 kg)	Low birth weight (%)
Primiparous	528	435	93 (17.6)
1	425	340	85 (20)
2	178	138	40 (22.4)
3 or more	125	85	40 (32)

The P=0.00401

**Table 4: Weight of mother and neonatal weight outcome**

Weight of mother (in kg)	Live births	Normal weight birth (>2.5 kg)	Low birth weight (%)
<50	786	623	163 (20.7)
≥50	470	385	85 (18.08)

The P=0.253084

**Table 5: Height of mother and neonatal weight outcome**

Height of mother	Live Birth	Normal weight birth (>2.5 kg)	Low birth weight (%)
<150 cm	718	538	180 (25.06)
≥150	538	428	110 (20.44)

The P=0.127174

**Table 6: Pregnancy-related complications and neonatal weight outcome**

Pregnancy complication	Live births	Normal weight birth (>2.5 kg)	Low birth weight (%)
Anemia	825	549	276 (33.45)
Ante partum Hemorrhage	85	63	22 (25.9)
Bad obstetric history	118	92	26 (22.03)
Leaking PV	156	134	22 (14.10)
Pre-eclampsia	72	51	21 (29.1)

Other parameters that were studied are listed below with their results. Table 2 lists number of antenatal visits throughout the pregnancy period.

On basis of parity, classification of mothers is listed in Table 3.

On the basis of maternal weight at the time of delivery, mothers have been classified and results were listed in Table 4.

Table 5 has classified mothers on the basis of height and its prevalence of LBW babies in the respective group.

On the basis of pregnancy complications, results are listed in Table 6.

## DISCUSSION

A total 1256 babies were born in our hospital during the study period of 1 year from February 2021 to January 2022. Out of these, 258 babies were weighing <2.5 kg and thus the incidence of LBW newborn in our institute was 20.54%. Morbidity and mortality risk in newborns delivered as LBW is higher than the infants with normal birth weight [12, 13].

In our study, maximum mother belonged to age group 21–30 years with the LBW incidence of 29.74%. This finding was significant with  $p < 0.05$ . Incidence of LBW decreased with the increase in maternal age and it being maximum (29.74%) in mothers between 21 and 30 years of age and lowest (12%) in mothers between 31 and 40 years of age. Similar observations were made by Ghai [14]. Pal *et al.* [15] and Deka *et al.* [16] in their study had different observation that those mothers who were <20 years of age had more incidences of LBW babies.

Mothers having weight <50 kg had higher incidence of LBW (20.7%) as compared to those weighing >50 kg (18.08%) but statistically it was not found to be significant. Pal *et al.* [15] and Deka *et al.* [16] had significant observations with mother's weight <45 kg as cut off. They found that mothers with weight <45 kg had more risk of LBW babies.

On categorizing mothers on the basis of height, it was found that mother's with height <150 cm had higher incidence of LBW babies (25.06%). However, there was no statistical significance as  $p = 0.12$ . Deka *et al.* [16] had similar observation where the author did not found any association between height of the mother and weight of the newborn. Pal *et al.* [15] did find significant association between LBW incidence and stunted height of mothers.

ANC influenced weight of newborn and thus incidence of LBW (20.06%) was more in mothers who visited <3 times than mothers who visited 3 or more times (17.71%). This result had statistical significance as  $p = 0.0004$ . Malvankar *et al.* [17] had similar observations to that of our study. Pal *et al.* and Desta *et al.* [18] also observed that the mothers who had good antenatal visits had lower incidence of low birth weight babies. Using ANC services are a known factor in improving outcomes of pregnancy. It also reduces maternal mortality to great extent. Through the ANC services, pregnant mothers are educated about adequate nutrition during pregnancy. Medical supplies such as iron folic acid and tetanus vaccine are prescribed to them. Scheduled health check-up of the mother and well-being of fetus can be monitored effectively. These multiple factors help in improving pregnancy outcome. However, there are more steps to be taken in this direction as there is still lack of awareness about pregnancy and its effects on baby among many pregnant women in various rural parts of the country.

In our study, association between the parity of mother and weight of the newborn was also significant. Multiparous mothers had more incidences of delivering lbw babies as compared to primiparous mother. Yadav *et al.* [19] also concluded the similar association in their study.

Pregnancy complications also influenced weight of newborn. The incidence of LBW babies being highest in anemic mothers (33.45%) followed by pre-eclampsia and least in mothers having leaking PV

(14.10%). Desta *et al.* [18] had similar observations where incidences of LBW babies were more in mothers with PIH and PROM. Several other researchers also had the same conclusion in their study [8,19, 20]. Anemia affects the fetal growth because the oxygen deliver to the fetus is affected. Deka *et al.* [16] also made observation that anemia in mother leads to higher incidence of LBW in comparison to those with normal hemoglobin levels during pregnancy. Maternal hypertension affects placental blood flow and thus limiting nutrient supply to the baby and hence more incidences of LBW [19,21,22].

## CONCLUSION

The incidence of low birth weight in our study was 20.54%. Our study suggested that weight and height of the mother had no significant association with increased risk of LBW newborn. Young maternal age and multiparity were significant risk factor for LBW. Inadequate ANC follow-up, history of anemia, and PIH were significant risk factor of low birth weight. Screening and counseling of all the pregnant mothers who are likely to deliver LBW infants must be done by health professionals involved in the ANC. These pregnant women must be informed and educated about the causes of low birth weight and sensitize them about the adverse effects, it would make on the baby. Mothers should receive low birth weight specific counseling by skilled health personnel. They should give emphasis to those mothers with chronic medical illnesses so that timely intervention in early pregnancy can be made. Nutritional guidance and treatment of anemia before conceiving and during pregnancy can decrease the risk of LBW to many folds.

## AUTHOR'S CONTRIBUTIONS

Dr. Sunny Malvia: Data collection, interpretation of results, and writing the article. Dr. Dinesh Rajwaniya: Formulation of the question and design of the study. Dr. Suresh Jakhar: formulation of the question and proof reading. Dr. Jobanjeet Kaur: Data Collection and analysis.

## CONFLICTS OF INTEREST

None.

## AUTHORS FUNDING

Nil.

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