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A Study on Low Birth Weight and its Risk Factors Among Babies Admitted in Sncu of Medical College Kolkata

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ABSTRACT
To investigate the sociodemographic pattern of LBW babies and the relationship between birth weight and the socioeconomic status of the LBW mother. From October 1, 2018, to September 30, 2019, The Medical College of Kolkata, West Bengal's Department of Paediatrics is where the study was carried out. It was cross-sectional, descriptive and observational in style. Seventy patients were involved in this investigation. Additionally, we discovered that the patient's mean age (mean±s.d.) was 26.8429±3.4584. Of the patients, the mean maternal weight (mean±s.d.) was 55.4804±9.2448. The patient's mean BMI (mean±s.d.) was 20.4486± 2.4496 and their mean maternal height (mean± s.d.) was 1.6530±.1960 meters. Six patients (8.6%) had P0+0, 17 patients (24.3%) had P0+1, 18 patients (25.7%) had P1+0, 17 patients (24.3%) had P1+1, 6 patients (8.6%) had P2+0 and 6 patients (8.6%) had P2+1. In our study, the proportion of LBW neonates was 19.8% and a higher percentage of patients were from urban areas. The majority of patients 36, or 51.4% had lower socioeconomic class and 48, or 68.6% had mothers who were illiterate. These findings were statistically significant. In addition the LBW group had a higher proportion of girls than the normal group and the socioeconomic status of LBW patients with low socioeconomic position was higher than that of the normal group.

INTRODUCTION

Low birth weight (LBW) is defined by the World Health Organization as an infant weighing 2,499 g or less at birth, regardless of gestational age[1]. Subcategories include very low birth weight (ELBW) and very low birth weight (VLBW), both of which are classified as less than 1500 g (3 pounds 5 ounces) and less than 1000 g (2 pounds 3 ounces), respectively[2]. The weight at term ranges from 2500-4200 g (5 pounds 8 ounces to 9 pounds 4 ounces). Preterm birth (low gestational age at birth, generally defined as less than 37 weeks of gestation), small infant for gestational age (slow prenatal growth rate), or a combination of the two are the two main causes of low birth weight (LBW). Risk factors in the mother include her young age, her history of pregnancies, her low birth weight babies, her poor nutrition, her heart condition or hypertension, her untreated celiac disease, her drug or alcohol addiction and her lack of prenatal careRisk factors for the environment include smoking, lead exposure and other types of air pollution[3]. Four distinct paths can lead to an early birth decidual hemorrhage, uterine overdistension, intrauterine inflammation/infection and premature fetal endocrine activity. In practice, various factors have been related to preterm birth, nevertheless, a relationship does not indicate causality. Being small for gestational age can be due to intrauterine growth restriction, which can be caused by a multitude of factors, or it can be constitutional, which means there is no underlying medical explanation. Babies with chromosomal abnormalities or congenital problems, for example, are usually associated with LBW. If the placenta has issues, it may not be able to provide adequate oxygen and sustenance to the fetus. Infections that might affect the fetus during pregnancy, such as syphilis, toxoplasmosis, rubella, and CMV, can also affect the baby's weight.

Although there is ample evidence linking active maternal tobacco use to unfavorable perinatal outcomes, including low birth weight (LBW), moms who smoke throughout pregnancy are twice as likely to give birth to low birth weight babies. An analysis of the consequences of environmental tobacco exposure (ETS), also known as passive maternal smoking, showed that mothers who were exposed to ETS were more likely to expect higher risks of low birth weight (LBW) children.

When it comes to environmental pollutants during pregnancy, even blood lead levels that are significantly below 10 ug dL^{-1} might result in miscarriage, early birth and low birth weight (LBW) in the fetus. Given that the Centers for Disease Control and Prevention have designated 10 ug dL^{-1} as their "level of concern," further consideration and implementation of this cut-off number are imperative going forward[4].

In developing nations, the byproducts of solid fuel burning can lead to a variety of harmful health problems for individuals. Since indoor air pollution exposes most pregnant women in underdeveloped countries, where LBW rates are high, to significant levels, an increase in relative risk corresponds to a significant population attributable risk of 21% of LBW[5]. Any birth weight under 2500 grams is considered low birth weight, regardless of gestational age[6]. A baby's birth weight has a big impact on whether or not they survive and grow up. A infant with LBW has a higher chance of dying or becoming ill, and it also restricts their ability to grow to adulthood. LBW accounts for 40-60% of neonatal deaths worldwide. Both intrauterine growth restriction and preterm birth can result in low birth weight. Babies in the latter category are also known as small for gestational age (SGA) babies. Compared to preterm in Western and African nations, intrauterine growth retardation is primarily responsible for low birth weight (LBW) in developing Asian countries[7,8].

MATERIALS AND METHODS

Study site: The research was conducted at the "medical college, kolkata" at the Department of Paediatrics in Kolkata, West Bengal.

Study population: All the neonates with low birth weight getting admitted in Dept. of Paediatrics.

Study period: 1st October 2018-30th September 2019.

Study design: Observational, Cross-sectional and descriptive study.

Inclusion criteria: Neonates with low birth weight were included.

Exclusion criteria: Still-born Babies or Twins were excluded. Babies with birth weight of kg or more than 2.5 kg were excluded.

RESULTS

Residence: Of the patients in the LBW group, 42 patients (60.0%) lived in urban areas and 28 patients (40.0%) in rural areas. Among the patients in the Normal group, 108 (38.3%) lived in a rural location and 174 (61.7%) in an urban one. The relationship between group and residence was not statistically significant ($p = 0.7934$).

Parity: Six patients (8.6%) in the LBW group had P0+0 parity, 17 patients (24.3%) had P0+1 parity, 18 patients (25.7%) had P1+0 parity, 17 patients (24.3%) had P1+1 parity, 6 patients (8.6%) had P2+0 parity, and 6 patients (8.6%) had P2+1 parity. Within the Normal group, P0+0 parity was present in 32 (11.3%) patients, P0+1 parity in 76 (27.0%), P1+0 parity in 75 (26.6%),

Table 1: Association between residence, parity, socioeconomic status, maternal occupation and tobacco substance use (smoking / chewing) group

	Group			
Residence	LBW	Normal	Total	p-value
Rural	28	108	136	0.7934
Row%	20.6	79.4	100.0	
Col%	40.0	38.3	38.6	
Urban	42	174	216	
Row%	19.4	80.6	100.0	
Col%	60.0	61.7	61.4	
Total	70	282	352	
Parity				
P0+0	6	32	38	0.4500
Row%	15.8	84.2	100.0	
Col%	8.6	11.3	10.8	
P0+1	17	76	93	
Row%	18.3	81.7	100.0	
Col%	24.3	27.0	26.4	
P1+0	18	75	93	
Row %	19.4	80.6	100.0	
Col %	25.7	26.6	26.4	
P1+1	17	43	60	
Row%	28.3	71.7	100.0	
Col%	24.3	15.2	17.0	
P2+0	6	18	24	
Row%	25.0	75.0	100.0	
Col%	8.6	6.4	6.8	
P2+1	6	38	44	
Row%	13.6	86.4	100.0	
Col%	8.6	13.5	12.5	
Total	70	282	352	
Socioeconomic status				
LC	36	101	137	0.0468
Row%	26.3	73.7	100.0	
Col%	51.4	35.8	38.9	
LMC	16	74	90	
Row%	17.8	82.2	100.0	
Col%	22.9	26.2	25.6	
MC	18	107	125	
Row%	14.4	85.6	100.0	
Col%	25.7	37.9	35.5	
Total	70	282	352	
Maternal occupation				
House wife	70	246	316	0.0016
Row%	22.2	77.8	100.0	
Col%	100.0	87.2	89.8	
Working	0	36	36	
Row%	0.0	100.0	100.0	
Col%	0.0	12.8	10.2	
TOTAL	70	282	352	
Tobacco substance use (smoking/chewing)				
No	65	282	347	<0.0001
Row%	18.7	81.3	100.0	
Col%	92.9	100.0	98.6	
Yes	5	0	5	
Row%	100.0	0.0	100.0	
Col%	7.1	0.0	1.4	
Total	70	282	352	

Table: 2 Distribution of mean with all parameter

Birth Weight of the baby	Number	Mean	SD	Minimum	Maximum	Median	p-value
LBW	70	2083.5714	249.3065	1500.0000	2400.0000	2150.0000	<0.0001
Normal	282	2863.4929	291.3912	2500.0000	3250.0000	2900.0000	
BMI							
LBW	70	20.4486	2.4496	16.0000	25.0000	20.2000	0.5911
Normal	282	20.6298	2.5415	16.0000	25.0000	20.2000	
Height in metre							
LBW	70	1.6530	.1960	1.4000	2.0000	1.5800	0.9338
Normal	282	1.6551	.1923	1.4000	2.0000	1.5800	
Weight in Kg							
LBW	70	55.4804	9.2448	40.5004	76.0247	55.6198	0.6627
Normal	282	55.9810	8.4178	41.5872	76.0247	54.5468	

P1+1 parity in 43 (15.2%) patients, P2+0 parity in 18 (6.4%) and P2+1 parity in 38 (13.5%) patients. The statistical significance of the Parity vs. Group association was p = 0.4500.

Socioeconomic status: 36 (51.4%) of the patients in the LBW group belonged to the Lower Class, 16 (22.9%) to the Lower Middle Class, and 18 (25.7%) to the Middle Class. Within the Normal group, there were 101

patients (35.8%) who belonged to the Lower Class, 74 patients (26.2%) to the Lower Middle Class, and 107 patients (37.9%) to the Middle Class. Socioeconomic position and group had a statistically significant association (p = 0.0468).

Maternal occupation: Of the patients in the LBW group, 70 (100.0%) were housewives. The Normal group consisted of 246 (87.2%) housewives and 36 (12.8%) workers. The statistical significance of the association between maternal occupation and group was observed (p = 0.0016).

Tobacco substance use (smoking/chewing): Five (7.1%) of the patients in the LBW group smoked or chewed tobacco regularly. The statistical significance of the association between tobacco substance usage (smoking/chewing) and group was p<0.0001.

Birth weight of the baby: The mean birth weight (mean±sd) of the patients in the LBW group was 2083.5714±249.3065. The mean birth weight (mean±sd) of the patients in the Normal group was 2863.4929± 291.3912 and the distribution of the mean birth weight with Group was statistically significant (p<0.0001).

BMI: The patient's mean BMI (mean±sd) in the LBW group was 20.4486±2.4496. The mean BMI (mean±s.d.) of the patients in the normal group was 20.6298±2.5415. The mean BMI distribution among the group did not reach statistical significance (p = 0.5911).

Height in metre: The patients in the LBW group had a mean height in meters (mean±sd) of 1.6530±.1960. The mean height in meters (mean±sd) of the patients in the normal group was 1.6551±.1923.The mean height distribution among the group was not statistically significant (p = 0.9338). Weight in Kg The mean weight (mean±s.d.) of the patients in the BW group was 55.4804±9.2448. The patient's mean weight (mean±sd) in the normal group was 55.9810± 8.4178. The mean weight distribution among the group did not show statistical significance (p = 0.6627).

DISCUSSIONS

A total of 279 birth weights (93 cases and 186 controls) with mean birth weights of 2138.3 g±SD206.87 for cases and 3145.95 g±SD415.98 for controls were included in the study, according to Girma *et al*.[9]

Satija *et al*.[10] discovered that birth weight is influenced by a number of social and maternal factors and is a reliable indicator of a newborn's likelihood to have a healthy life. The purpose of the study was to determine potential factors influencing birth weight and to examine the pattern of birth weight of neonates. 2.69±0.57 kg was the average birth weight. Maternal height, pre-pregnancy underweight moms, younger maternal ages and poorer socioeconomic position were all substantially correlated with lower mean birth weight. 18.1% of births were under 2.5 kg in weight.

The average birth weight (mean±standard deviation) of the patients in our study was 2083.5714±249.3065 grams. Gebremedhin *et al*.[11] discovered that a child's survival and development are significantly influenced by their birth weight. The prevalence of low birth weight was found to be high and was associated with the following: gestational age <37 wks, presence of any chronic medical illness and maternal weight <50 kg. Low birth weight was also associated with preterm birth/gestational age less than 37 weeks (AOR = 18.5 (95% CI = 4.94-69.4).

The LBW in our study was 19.8% for newborns. 42 patients (60.0%) were from metropolitan areas, while 28 patients (40.0%) were from rural areas. Patil *et al*.[12] demonstrated a strong correlation between LBW and the neonate's sex (p = 0.0001), socioeconomic class (p = 0.0001), mother's educational level (p = 0.043), maternal weight (p = 0.003) and use of prenatal treatment (0.024).

According to our findings, 41 (58.0%) newborns had male sex and 29 (41.0%) had female sex. 36 patients (51.4%) belonged to the lower class, 16 patients (22.9%) to the lower middle class and 18 patients (25.7%) to the middle class. 22 patients (31.4%) had completed elementary school, whereas 48 patients (68.6%) were illiterate. Ugwa *et al*.[13] the average age of mothers was 28.2±5.7 years. The parity mean was 3±2. At delivery, the mean gestational age was 38.5±2 years. At birth, the average weight was 3.27±0.53 kg. 72.03±11 kg was the mean weight of the mother. A statistically significant (p<0.001) strong positive connection was seen between maternal weight and newborn weight (r = 0.48). Maternal height averaged 1.64±0.55 meters.The average BMI of the mother was 27.9±4.33. A weak positive connection (r = 0.28) between maternal BMI and birth weight was observed, and this correlation was statistically significant (p<0.001).

Additionally, we discovered that the patients' mean age (mean±s.d.) was 26.8429±3.4584. Of the patients the mean maternal weight (mean±s.d.) was 55.4804±9.2448. The patient's mean BMI was 20.4486± 2.4496 and their mean maternal height was 1.6530±.1960 meters (mean±s.d.). Six (8.6%) of the patients in our study had P0+0, 17 (24.3%) had P0+1, 18 (25.7%) had P1+0, 17 (24.3%) had P1+1, 6 (8.6%) had P2+0 and 6 (8.6%) had P2+1.

Of the patients in the LBW group, 42 patients (60.0%) lived in urban areas and 28 patients (40.0%) in rural areas. Among the patients in the Normal group,

108 (38.3%) lived in a rural location and 174 (61.7%) in an urban one. The relationship between group and residence was not statistically significant (p = 0.7934).

Within the LBW group, 41 patients (58.6%) had a male baby and 29 patients (41.4%) had a female baby. Within the Normal group the baby's sex was found to be female in 53 cases (18.8%) and male in 229 cases (81.2%). The relationship between the newborn's gender and group was statistically significant (p<0.0001).

Six patients (8.6%) in the LBW group had P0+0 parity, 17 patients (24.3%) had P0+1 parity, 18 patients (25.7%) had P1+0 parity, 17 patients (24.3%) had P1+1 parity, 6 patients (8.6%) had P2+0 parity and 6 patients (8.6%) had P2+1 parity. Within the Normal group, P0+0 parity was present in 32 (11.3%) patients, P0+1 parity in 76 (27.0%), P1+0 parity in 75 (26.6%), P1+1 parity in 43 (15.2%) patients, P2+0 parity in 18 (6.4%) and P2+1 parity in 38 (13.5%) patients. Parity vs. Group association was not statistically significant (p = 0.4500). 36 (51.4%) of the patients in the LBW group belonged to the Lower Class, 16 (22.9%) to the Lower Middle Class and 18 (25.7%) to the Middle Class. Within the Normal group, there were 101 patients (35.8%) who belonged to the Lower Class, 74 patients (26.2%) to the Lower Middle Class and 107 patients (37.9%) to the Middle Class. Socioeconomic position and group had a statistically significant association (p = 0.0468).

Seventy patients (100.0%) in the LBW group were housewives. Within the Normal group, 36 patients (12.8%) were employed and 246 patients (87.2%) were housewives. Maternal occupation and group had a statistically significant association (p = 0.0016). Within the LBW cohort, 22 patients (31.4%) had completed primary education, whereas 48 patients (68.6%) were illiterate. Among the patients in the Normal group, 3 (1.1%) had completed their high school, 12 (4.3%) had completed their higher education, 171 (60.6%) were illiterate, 75 (26.6%) had completed their primary education and 21 (7.4%) had completed their secondary education. The relationship between Group and Maternal Education was statistically significant (p = 0.0408). Within the LBW group, 12 (17.1%) and 58 (82.9%) patients experienced unplanned pregnancies. Within the Normal group, 54 (19.1%) and 228 (80.9%) of the patients experienced an unplanned pregnancy. Pregnancy planned or unplanned was not statistically significantly correlated with group (p = 0.7003). Five (7.1%) of the patients in the LBW group smoked or chewed tobacco regularly. Association of Tobacco substance use (smoking/ chewing) vs. Group was statistically significant (p<0.0001).

Patients in the LBW group had an average age (mean±standard deviation) of 26.8429±3.4584 years. The patients in the Normal group had an average age (mean±s.d.) of 24.1879±2.5555 yrs. The mean age distribution among the group showed statistical significance (p<0.0001).

The mean birth weight (mean± standard deviation) of the patients in the LBW group was 2083.5714±249.3065. The mean birth weight (mean±standard deviation) of the patients in the Normal group was 2863.4929±291.3912.The baby with group's mean birth weight distribution was statistically significant (p<0.0001). The patient's mean BMI (mean±standard deviation) in the LBW group was 20.4486±2.4496.The mean BMI (mean±s.d.) of the patients in the normal group was 20.6298±2.5415. The mean BMI distribution among the group did not exhibit statistical significance (p = 0.5911).

The patients in the LBW group had a mean height in meters (mean±standard deviation) of 1.6530±.1960. The mean height in meters (mean±standard deviation) of the patients in the normal group was 1.6551±.1923. The mean height distribution among the group was not statistically significant (p = 0.9338). The mean weight (mean±s.d.) of the patients in the LBW group was 55.4804±9.2448. The patient's mean weight (mean±standard deviation) in the normal group was 55.9810±8.4178. The mean weight distribution among the group did not exhibit statistical significance (p = 0.6627).

CONCLUSION

In our study, the proportion of LBW neonates was 19.8% and a higher percentage of patients were from urban areas. The majority of patients 36, or 51.4% had lower socioeconomic class, and 48, or 68.6% had mothers who were illiterate. These findings were statistically significant. Additionally, there were more girls in the LBW group than in the normal group, and LBW patients with low socioeconomic status had higher socioeconomic status than the normal group. Maternal education was found to be strongly correlated with LBW in our study as compared to the normal group. The statistical significance of the association between tobacco substance usage (smoking/chewing) and group was observed (p<0.0001).

The results of the study showed that illiterate women, low socioeconomic level, grand multipara, and LBW newborns in urban areas of west Bengal were significant risk factors for LBW. The gender of a woman offers protection from LBW. To lower the prevalence of LBW in India, it is important to address two important determinants maternal education and the quality of antenatal care received. Our research revealed a variety of maternal and socioeconomic variables that have a substantial impact on low birth weight. We also recommended interventions to assist

lower the risk factors of low birth weight, encourage care-seeking, and increase the demand for high-quality care during the entire pregnancy.

Women who lived in cities, were from lower socioeconomic backgrounds, and were illiterate were more likely to be LBWs. Scientific advice from this study will help identify women who may benefit from food and lifestyle changes throughout the preconception period. We may draw the conclusion that in order to lower the number of LBW, community-specific tactics including raising community awareness and utilizing the available maternal health care are crucial.

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