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Determinants of Low Birth Weight in India: An Investigation from a Single Hospital Survey in Madhya Pradesh

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Abstract

Background: Birth weight is one of the most important criteria for determining the neonatal and infant survival. Low birth weight (LBW) is a major public health concern, especially in developing countries, and is frequently related to child morbidity and mortality. LBW is a major public health concern and one of the strongest single risk factors for early neonatal mortality and morbidity. **Materials and Methods:** About 1000 live newborns on the 1st day of birth and their mothers were studied from the department of obstetrics and gynecology and intensive neonatal care, department of pediatrics of a tertiary care teaching hospital between January 2016 and December 2019. Examinations of mother and newborns were carefully carried out in all cases recorded on a pretested and predesigned pro forma. **Results:** Mothers weighing <45 kg delivered significantly higher number of LBW babies than normal birth babies. This is statistically very highly significant. It appears that mothers with mid-arm circumference (MAC) 22 cm or less had given birth to much higher number of LBW babies (74.8%), while mothers with MAC >26 cm gave birth to higher number of LBW babies than normal BW babies. This is very highly significant ($P < 0.001$). Mothers who had taken iron plus folic acid tablets only for few days in any of the trimesters had given birth to higher number of LBW babies while mothers who have taken hematinics throughout pregnancy or taken irregularly had given birth to most of normal birth weight babies. The incidence of LBW was almost 2 ½ times more in joint family (72.6%) than nuclear family. Mothers with moderate to severe anemia have given birth to higher number of LBW babies. Mothers with Hb >10 g% gave birth to higher number of normal BW babies. **Conclusion:** LBW and premature babies were more prevalent in joint families, with low socioeconomic status, maternal illiteracy, and housewives. With increase in income, both LBW and prematurity decreased reflecting a better distribution of nutrition and care for pregnant and the newborn. Mothers educated till primary school and unskilled workers had higher prevalence of LBW babies.

Keywords: Determinants, India, Low birth weight, Newborn, Normal birth weight

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INTRODUCTION

Mortality, morbidity, and disability in neonates, at infancy, and in childhood are more common in developing than developed countries; a birth weight below 2500 g contributes to a range of poor health outcomes. Low birth weight (LBW) has long-term impact on health outcomes in adult life. LBW results in substantial costs to the health sector and imposes a significant burden on the society as a whole.[1]

LBW (birth weight <2.5 kg) is a major challenging public health problem because it is a leading cause of neonatal death and major risk factor for infant and under-five morbidity and mortality.[2] The magnitude of LBW varies from country to country. Worldwide, out of every seven infants, one is born with LBW.[3] According to the World Health Organization (WHO), the prevalence of LBW is 15.5% globally, and 96.5% of LBW infants are born in developing countries.[4] In India, 30–35% of babies are LBW, however, more than half of these infants are full-term babies.[5] India alone accounts for 40% of low weight babies in the overall developing countries and more than half of those born in Asia.[6]

The birth weight of an infant is the first weight recorded after birth, ideally measured within the 1st h after birth, before significant postnatal weight loss has occurred. LBW is defined as a birth weight of <2500 g (up to and including 2499 g), as per the WHO.[4] This definition of LBW has been in existence for many decades. In 1976, the 29th World Health Assembly agreed on the currently used definition. Before this, the definition of LBW was "2500 g or less." LBW is further categorized into very LBW (<1500 g) and extremely LBW (<1000 g).[7] LBW is a result of preterm birth (PTB, short gestation <37 completed weeks), intrauterine growth restriction (also known as fetal growth restriction), or both.[8]

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Contributing factors for LBW are multifaceted and include factors such as maternal age, poor maternal nutritional status, and non-pregnant weight, gestational age, intervals between pregnancies, parity, educational status, violence during pregnancy, lack of antenatal care (ANC), and very low socioeconomic status.[9] In India, low body mass index (BMI), short stature, anemia, and/or other micronutrient deficiencies are known to increase the risk of giving birth to a baby with LBW.[10] For example, low BMI is a reliable indicator for protein-energy malnutrition,

which affects fetal growth during pregnancy.[11] The nutritional status of a pregnant woman can be affected by many factors including low socioeconomic status, higher parity, and short interpregnancy interval. Women with low socioeconomic status are more likely to have inadequate food intake, unhygienic housing and lack of sanitation, reduced ability to seek medical care, and purchase medicine/supplements, which then affect the birth weight of their infants.[12] The incidences of placenta previa and malpresentation increase with high parity and these complications may predispose women to give birth to an infant with LBW.[13] An association between short (<18 months) and long (>59 months) interpregnancy intervals and LBW was highlighted in literatures.[14,15] Maternal nutrient stores may deplete as a result of short interpregnancy interval thus may reduce the birth weight of an infant.[16]

A number of studies from India and abroad are published in literature dealing with this problem, but most of those studies have concentrated over one or few of the causative factors. The frequency of LBW as well as relative importance of its underlying causative factors varies from place to place and time to time.

The aim of the present study was to find out the incidence of LBW in this region and to identify various risk factors responsible for it so that high-risk mothers can be detected earlier. It will help in future to suggest adequate measures to improve the birth weight of babies, which, in turn, will help in reducing the neonatal and infant mortality and morbidity and improve the wellbeing of children. The study was done to find out incidence of LBW and prematurity in hospital deliveries. The study would reveal distribution of LBW in various socioeconomic, occupational, ethnic, environmental, and literacy groups and its comparison with normal birth weight (NBW). The study also revealed the frequency and extent of various epidemiological factors affecting birth weight.

Materials and Methods

About 1000 live newborns on the 1st day of birth and their mothers were studied from the department of obstetrics and gynecology and intensive neonatal care, department of pediatrics of a tertiary care teaching hospital between January 2016 and December 2019. Selection of cases was done into two groups based on their birth weight. Institutional Ethics Committee permission and individual consent were taken before enrolment of the study participants. Newborns weighing ≤2500 g were put under category of LBW and those weighing more than 2500 g were designated as NBW babies (control group). Examinations of mother and newborns were carefully carried out in all cases recorded on a pretested and predesigned pro forma. Socioeconomic status of parents was noted. Maternal history such as obstetric, ANC, diet, physical exertion during different trimesters, duration of rest in pregnancy, any associated acute or chronic systemic disease before or during pregnancy, and its duration, drugs, and radiation exposure during the 1st two trimesters was noted.

Besides, anthropometric measurements general and systemic examination was done. Whenever pre-pregnancy weight was known or recorded on antenatal examination, cards were noted. Serial recordings of weight of mother, if available, were noted for knowing weight gain. Hb estimation, blood pressure recording, and urine examination for albumin data were captured. Weight of the baby was taken on a beam and pan type weighing scale (Detecto scale). Placenta of 297 newborns was weighed on that scale just after delivery and removal of maximum possible clots and cutting the cord. The frequency distribution tables for various variables were calculated in the standard way, Chi-square test was used to test for dependence of one factor over the other.

Results

The present study comprises observations made on 1000 newborns and their mothers admitted in a tertiary care teaching hospital, Indore, Madhya Pradesh.

In LBW group, 145 (29%) were pre-term, 347 (69.4%) term, and 8 (1.6%) post-term, while in LBW group, 399 (79.8%) were term. Only 9 (1.8%) were borderline preterm and remaining 92 (18.4%) were post-term. This difference was statistically very highly significant [Table 1].

Table 2 shows that mean birth weight of preterm babies was 1860±442.044 g and of term babies 2570±400.72 g. This observed difference was statistically significant (t=18.43, $P < 0.001$). Similarly mean birth weight of post-term babies was 2785±300.09 g. The difference from term babies was statistically very highly significant (t=6.44, $P < 0.001$).

Below 20 years, 25.2% were LBW babies and 12.6% NBW babies. After 30 years, again number of LBW babies was higher than control group [Table 3].

Primipara mothers had highest number of LBW babies (39.4%) whereas the second para mothers had maximal NBW babies (38.2%) but the third para and onward the number of LBW babies increased. This difference was significant [Table 4]. Number of LBW babies was more when birth spacing 3 years or more; number of NBW babies was higher than LBW. This was statistically very highly significant. About 366 primigravida mothers were excluded from this observation. As many as, 351 pregnant women had caloric intake <2000 calories. About 297 (84.6%) of them had LBW babies. Mothers who took more than 2200 calories resulted in

Table 1: Distribution of cases according to weight and gestational age

Wt (g)	*Total no.*	*%*	*Pre-term*	*%*	*Term*	*%*	*Post-term*	*%*
1000–1500	37	7.4	35	24.1	2	0.7	-	-
1501–1750	35	7	25	17.2	10	2.9	-	-
1751–2000	78	15.6	35	24.1	41	11.6	2	25
2001–2250	142	28.4	30	20.7	108	31.2	4	50
2251–2500	208	41.6	20	13.8	186	53.6	2	25
Total	500	100%	145	100%	347	100%	8	100%
2501–3000	405	81	8	88.9	319	80	78	85
3001–3500	80	16	1	11.1	68	17	11	12
>3500	15	3	-	-	12	3	3	3
Total	500	100%	9	100%	399	100%	92	100%

X^2=163.1829, P<0.001

Table 2: Birth weight in different gestational ages

Parameters	*Pre-term*	*Term*	*Post-term*
Mean	1860 g	2570 g	2785 g
S.D.	442.04	400.22	300.09
Range	1050–3050 g	1250–3650 g	1850–3950 g
t	18.43	-	6.44
P value	<0.001		<0.001

Table 3: Distribution of cases according to maternal age

Maternal age (years)	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
<18	40	8	14	2.8	54	5.4
18–20	86	17.2	49	9.8	135	13.5
21–25	237	47.4	277	55.4	514	51.4
26–30	114	22.8	140	28	254	25.4
>30	23	4.6	20	4	43	4.3
Total	500	-	500	-	1000	-
Mean	22.9 years	-	23.8 years	-	23.4 years	-

X^2= 32.3335, *P*<0.001

Table 4: Distribution of cases according to birth order/parity

Parity	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
1	197	39.4	169	33.8	366	36.6
2	129	25.8	191	38.2	320	32
3	103	20.6	85	17	188	18.8
4	40	8	38	7.6	78	7.8
5	20	4	11	2.2	31	3.1
>5	11	2.2	6	1.2	17	1.7
Total	500	-	500	-	1000	-

X^2=21.9582, *P*<0.05

progressively increased incidence of NBW babies. Number of LBW babies was more with protein intake <45 g. This was statistically very highly significant.

Mothers weighing <45 kg delivered significantly higher number of LBW babies than normal birth babies. This is statistically very highly significant [Table 5]. In 82.3% of mothers, pre-pregnancy weight was not known hence weight gain could not be calculated. Only in 17% of women record of pre-pregnancy weight was found. Out of these mothers, weight was gain more than 8 kg during pregnancy gave birth to less number of LBW babies (4.6%) only. This difference is statistically very highly significant.

Mothers whose height was <140 cm were 5 times more common to deliver a LBW baby than a NBW baby, but number of cases in this category in comparison to the total number of cases was much less (3.8% only) mothers whose height was <150 cm had more number of LBW babies (36%) while mother >150 cm height gave more number of normal BW babies (48.4%). This difference is statistically very highly significant [Table 6].

It appears that mothers with mid-arm circumference (MAC) 22 cm or less had given birth to much higher number of LBW babies (74.8%), while mothers with MAC >26 cm gave birth to higher number of LBW babies than normal BW babies. This is very highly significant ($P < 0.001$) [Table 7].

Mothers with moderate-to-severe anemia have given birth to higher number of LBW babies. Mothers with Hb >10 g% gave birth to higher number of normal BW babies. This difference was statistically significant [Table 8].

Mothers with a history of abortions were not prone to get another LBW baby but mothers with previous H/o still births,

Table 5: Distribution of cases according to maternal weight

Maternal weight (kg)	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
<35	49	9.8	4	0.8	53	5.3
36–40	151	30.2	14	2.8	165	16.5
41–45	163	32.6	74	14.8	237	23.7
46–50	100	20	257	51.4	357	35.7
51–55	17	3.4	94	18.8	114	11.9
56–60	17	3.4	51	10.2	68	6.8
61–65	-	-	6	1.2	6	0.6
>65	3	0.6	-	-	-	
Total	500	-	500	-	1000	-
Mean maternal wt.	42 kg	-	48.5 kg	-	45.3 kg	-

X^2=333.944, *P*<0.001

Table 6: Distribution of cases according to maternal stature

Maternal height (cm)	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
<140	32	6.4	6	1.2	38	3.8
141–145	94	18.8	46	9.2	140	14
146–150	194	38.8	206	41.2	400	40
151–155	129	25.8	134	26.8	263	26.3
156–160	46	9.2	77	15.4	123	12.3
>160	5	1	31	6.2	36	3.6
Total	500		500		1000	
Mean maternal height	148 cm		151cm		149.5 cm	

X^2=62.2555, *P*<0.001

Table 7: Distribution of cases according to maternal mid-arm circumference

Mid-arm circumference (cm)	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
<18	6	1.2	-	-	6	0.6
19–20	103	20.6	11	2.2	114	11.4
21–22	265	53	94	18.8	359	35.9
23–24	103	20.6	249	49.8	352	35.2
25–26	9	1.8	140	28	149	14.9
>26	14	2.8	6	1.2	20	2
Total	500		500		1000	

X^2=340.3682, *P*<0.001

Table 8: Distribution of cases according to maternal Hb level

Hb (g %)	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
<6	13	2.6	-	-	13	1.3
6.1–8	56	11.2	11	2.2	67	6.7
8.1–10	351	70.2	220	44	571	57.1
10.1–11	60	12	97	19.4	157	15.7
11.1–12	17	3.4	160	32	177	17.7
>12.1	3	0.6	12	2.4	15	1.5
Total	500		500		1000	

X^2=202.925, *P*<0.05

LBW baby, and premature baby had much higher number of LBW babies than normal BW babies. This is statistically very highly significant [Table 9].

It was obvious from this table that the incidence of any form of addiction in Indian mothers is very less. In the present study, 96.5% of mothers had no addiction. None of the mother was consuming

Table 9: Distribution of cases according to complications in previous pregnancies

Complications	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
Abortion	54	9.94	66	13.2	120	12
Still birth	14	2.58	-	-	14	1.4
H/o previous low birth weight	143	26.34	9	1.8	152	15.2
H/o premature baby	40	7.37	11	2.2	51	5.1
H/o induction of premature labor	3	0.55	-	-	3	0.3
None	246	48.12	414	66	660	6.6
Total	500		500		1000	

X^2=173.5702, P<0.001

Table 10: Distribution of cases according to maternal addiction during pregnancy

Complications	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
Tobacco chewing	20	4	6	1.2	26	2.6
Bidi smoking	9	1.8	-	-	9	0.9
Alcohol drinking	-	-	-	-	-	-
None	471	94.2	494	98.8	965	96.5
Total	500		500		1000	

X^2=17.08665, P<0.001

Table 11: Distribution of cases according to sex of the newborn

Sex	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
Female	266	53.2	229	45.8	495	49.5
Male	234	46.8	271	54.2	505	50.5
Total	500		500		1000	

X^2=5.4765, P<0.05

alcohol during or before pregnancy. Only 3.5% of mothers from rural labor class were found to have tobacco chewing. Out of these 35 mothers, 29 mothers (82.8%) gave birth to LBW babies. This is statistically very highly significant [Table 10].

Most of the female newborns in the present study were LBW. In normal weight category, there were more male babies. This was statistically significant [Table 11].

About 51 cases were product of twin deliveries and one case of triplet delivery in the present study. None resulted in delivery of NBW baby. This is statistically very highly significant [Table 12].

Maximum number of mothers in both groups belonged to Classes III and IV. Mothers belonging to Classes I and II delivered significantly more number of NBW babies whereas mothers belonging to social Classes III, IV, and V had higher number of LBW babies [Table 13].

As obvious from the table 14 that women who had adequate antenatal checkup (>4 visits) had lower incidence of LBW. This difference was statistically very highly significant [Table 14].

Mothers who had taken iron plus folic acid tablets only for few days in any of the trimesters had given birth to higher number of LBW babies while mothers who have taken hematinics throughout pregnancy or taken irregularly had given birth to most of NBW babies [Table 15].

Illiterate mothers and those who were up to middle pass had significantly more number of LBW babies (73.2%) while mothers possessing higher education. This was statistically very highly significant [Table 16].

The incidence of LBW was almost 2 ½ times more in joint family (72.6%) than nuclear family. This difference was statistically very highly significant [Table 17].

Table 12: Distribution of cases according to multiple pregnancy

Birth status	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
Singleton	448	89.6	500	100	948	94.8
Twins	51	10.2	-	-	51	5.1
Triplets	1	0.2	-	-	1	0.1
Total	500		500		1000	

X^2=54.8522, P<0.001

Table 13: Distribution of cases according to socioeconomic class

Socioeconomic status	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
I	20	4	60	12	80	8
II	50	10	129	25.8	179	17.9
III	255	51	209	41.8	464	46.4
IV	150	30	87	17.4	237	23.7
V	25	5	15	3	40	4
Total	500		500		1000	

X^2=78.67, P<0.05

Table 14: Distribution of cases according to level of antenatal care received by mothers

Level of antenatal care	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
Adequate	146	29.2	357	71.4	503	50.3
Inadequate	354	70.8	143	28.6	497	49.7
Total	500		500		1000	

X^2=178.0904, P<0.001

Table 15: Distribution of cases according to iron and folic acid supplementation

Duration of treatment	*Low birth weight*	*Normal birth weight*
No treatment taken	130	25
Taken in 1st trimester	09	08
Taken in 2nd trimester	48	21
Taken in 3rd trimester	104	44
Taken throughout pregnancy	17	39
Taken irregularly	179	401

Placental weight was recorded in 297 cases out of these cases more of the babies with placental weight <500 g were in LBW category. The mean placental weight in the present study was found to be 493 g. Mothers of LBW babies had mean placental weight of 478 g and those of NBW babies had 509 g. This was statistically very highly significant [Table 18].

Discussion

LBW is an important cause of morbidity and mortality in infancy and neonatal period.[17] Magnitude of problem of LBW varies from place to place. Even the various factors associated with LBW have shown

Table 16: Distribution of cases according to maternal literacy

Maternal literacy	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
Illiterate	229	45.8	174	34.8	403	40.3
Primary pass	63	12.6	46	9.2	109	10.9
Middle pass	74	14.8	46	9.2	120	12
Higher sec.	102	20.4	145	29	247	24.7
College (non-technical)	32	6.4	83	10.2	115	11.5
Technical Edu./professional	-	-	6	1.2	6	0.6
Total	500		500		1000	

X^2=42.8134, *P*<0.001

Table 17: Distribution of cases according to family structure

Family structure	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
Nuclear	137	27.4	228	45.6	365	36.5
Joint	363	72.6	266	53.2	629	62.9
Single parent	-	-	06	1.2	06	0.6
Total	500		500		1000	

X^2=43.6463, *P*<0.001

regional variation.[18,19] Etiology of LBW is not simple. It is a complex interplay of various contributory factors that result in LBW. Weight of newborn is determined by a variety of maternal, placental, fetal, as well as socioeconomic and environmental factors.[20]

In India, various authors have given incidence of LBW ranging from 20% to 48%.[1,21,22] More than 20 million infants worldwide, representing 15.5% of all births, are born with LBW, 95.6% of them in developing countries. The level of LBW in developing countries (16.5%) is more than double the level in developed regions (7%). The prevalence of LBW is estimated to be 15% worldwide with a range of 3.3–38% and occurs mostly in developing countries. According to NFHS III, the prevalence of low birth in India is 22%.[1,22] In India, the prevalence of LBW has significantly declined from 20.4% (95%CI 19.4–21.4) to 16.4% (95% CI 16.1–16.8) in the last decade.[23]

In the present study below 20 years, 25.2% were LBW babies and 12.6% NBW babies. After 30 years, again number of LBW babies was higher than control group. It is now universally acknowledged that maternal age is an important factor influencing the incidence of LBW. Moreover, the rate of LBW decreases significantly with increasing age of mother after 18 years. In the present study, a higher proportion of mothers among cases were aged either <20 years (OR: 1.9; 95% CI: 1.20–3.01) or more than 30 years (OR: 2.21; 95% CI: 1.01–4.67) as compared to controls. Kramer in his meta-analysis on determinants of LBW had observed low maternal age as an important risk factor and its causal effect was established.[24] Similar findings have been observed by various studies.[25-28]

In the present study, mothers with moderate to severe anemia have given birth to higher number of LBW babies. Mothers with Hb >10 g% gave birth to higher number of normal BW babies. This difference was statistically significant. Kumari *et al*.[29] study revealed that overall anemia in pregnancy was strongly associated with PTB (OR, 3.42; 95% CI, 1.98–5.88; P ≤ 0.0001) as compared to LBW (OR, 1.12; 95% CI, 0.65–1.61; P = 0 .0003). The risk of PTB and LBW was dependent on the stratification of the anemia group, as the strongest association was observed in severe (OR, 4.86) followed by mild (OR, 3.66) and moderate (OR, 3.18) anemia in PTB; whereas risk of LBW was found in severe (OR, 2.5) followed by moderate (OR, 1.11) and mild (OR, 0.57) anemia.

In our study, mothers with a history of abortions were not prone to get another LBW baby but mothers with previous H/o still births, LBW baby and premature baby had much higher number of LBW babies than normal BW babies. This is statistically very highly significant. Desta *et al*.[30] study showed that maternal age ≤20 years (AOR=6.42 95% CI=[1.93–21.42]), ANC follow-up (AOR=3.73 95% CI [1.5–9.24]), history of medical illness (AOR=14.56 95% CI [3.69–57.45]), iron-folate intake (AOR=21.56 95% CI [6.54–71.14]), maternal height <150 cm (AOR=9.27 95% CI [3.45–24.89]), and pregnancy weight gain (AOR=4.93 95% CI=1.8–13.48) were significant predictors of LBW.

In the present study, about 51 cases were product of twin deliveries and one case of triplet delivery in the present study. None resulted in delivery of NBW baby. This is statistically very highly significant. Onyiriuka study[31] revealed that twin gestations are commonly associated with delivery of LBW infants. Twenty-six (35.1%) of the 74 pre-terms were very preterm (<32 weeks gestation), corresponding to 24.3% of all LBW twin infants.

Most of the female newborns in the present study were LBW. In normal weight category, there were more male babies. This was statistically significant. The prevalence of LBW remained high in girl children (OR = 1.2, 95% CI 1.2–1.3; *P* < 0.001), whose mothers were adolescent (OR = 1.2, 95% CI 1.1–1.3; *P* < 0.001) and were stunted (OR=1.3, 95% CI 1.3–1.3; *P* < 0.001). The prevalence of LBW declined among second or higher birth order child (OR = 0.8, 95% CI 0.8–0.9; *P* < 0.001), whose mothers educated up to secondary level and above (OR = 0.6–0.8), belonged to rich wealth quintiles (OR = 0.9–0.8), were from rural area (OR = 0.9, 95% CI 0.9–1.0; *P* < 0.001), received better nutrition and adequate ANC (OR = 0.8, 95% CI 0.8–0.8; *P* < 0.001), and were from eastern, northeastern, and southern regions of India (OR = 0.9–0.5).[23]

Mothers who had taken iron plus folic acid tablets only for few days in any of the trimesters had given birth to higher number of LBW babies while mothers who have taken hematinics throughout pregnancy or taken irregularly had given birth to most of NBW babies. Desta *et al*.[30] study revealed mothers who took <60 iron-folate tab were 21 times more likely to deliver LBW babies than those who take >90 tablets. This can be caused because the growing fetus shares not only iron but also other nutrient from mother so that mothers need complementary iron to compensate for the intrauterine development of the fetus.[30,32]

Kumar *et al*., the magnitude of LBW at term was found to be 33.1% (95% CI: 26.4%–40.4%). On univariate analysis, significant correlates of LBW were consumption of <50 iron-folic acid tables and being born to than mother. On multivariate analysis, the significant correlates were female sex of child (OR=2.856), being born to thin mother (OR=5.320), consumption of <50 tablets (OR=4.648), and complications of pregnancy (OR=2.917).[33]

The incidence of LBW was almost 2½ times more in joint family (72.6%) than nuclear family. This difference was statistically very highly significant. Dayanithi study[34] revealed that the prevalence of LBW was 31.8% and prematurity was 25.6% in the study. LBW

Table 18: Distribution of cases according to weight of placenta

Weight of placenta (g)	*Low birth weight*	*%*	*Normal birth weight*	*%*	*Total*	*%*
<300	9	1.8	-	-	9	0.9
310–400	32	6.4	3	0.6	35	3.5
401–500	77	15.4	74	14.3	151	15.1
501–600	15	0.3	54	10.8	69	6.9
>600	12	2.4	17	3.4	29	2.9
Not done	355	71	352	70.4	707	70.7
Mean placental Wt.	478 g		509 g		493 g	

X^2=74.544, P<0.001

and premature babies were more associated with joint families, ≤Rs. 2999/- monthly income, maternal illiteracy, and housewives. LBW and premature babies decreased with increase in income, Hb >11.1 g and ≥ 100 IFA tablets intake.

Present study revealed that women who had adequate antenatal checkup (>4 visits) had lower incidence of LBW. This difference was statistically very highly significant.

Dayanithi study[34] revealed that the rates of LBW were the same whether mothers had no ANC or full ANC. This raises doubts about the content of the ANC.

In the present study, placental weight was recorded in 297 cases out of these cases more of the babies with placental weight <500 g were in LBW category. The mean placental weight in the present study was found to be 493 g. Mothers of LBW babies had mean placental weight of 478 g and those of NBW babies had 509 g. This was statistically very highly significant. Kabir *et al*. study[35] observed that a very strong correlation existed between placental weight and birth weight (r = 0.391, P < 0.001). Even this correlation was stronger in small for gestational age babies. There is a positive correlation between placental weight and birth weight of the neonate.[20]

Conclusion

Weight of the newborn is an important determinant of the newborn health and health of a nation. Present study revealed that in LBW group 145 (29%) were pre-term, 347 (69.4%) term, and 8 (1.6%) post-term while in NBW group, 399 (79.8%) were term. Only 9 (1.8%) were borderline preterm and remaining 92 (18.4%) were post-term. LBW and premature babies were more prevalent in joint families, with low socioeconomic status, maternal illiteracy, and housewives. With increase in income, both LBW and prematurity decreased reflecting a better distribution of nutrition and care for pregnant and the newborn. Mothers educated till primary school and unskilled workers had higher prevalence of LBW babies. However after graduation in both parents, the LBW and prematurity increased after showing reduction with higher secondary education. Socioeconomic factors reflected on maternal health. This was evident from the study that mothers with moderate-to-severe anemia have given birth to higher number of LBW babies. Mothers with Hb >10 g% gave birth to higher number of normal BW babies. Mothers who had taken iron plus folic acid tablets only for few days in any of the trimesters had given birth to higher number of LBW babies while mothers who have taken hematinics throughout pregnancy or taken irregularly had given birth to most of NBW babies.

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