

## Maternal Risk Factors Associated With Low Birth Weight

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### ABSTRACT

**Objective:** To identify the association of maternal bio-social, medical and obstetric risk factors with low birth weight babies.

**Methodology:** Cross sectional descriptive case study. Study was conducted in Department of Obstetrics and Gynaecology Unit IV, Sir Ganga Ram Hospital, Lahore. From March 2007 to 20<sup>th</sup> March 2008. 100 pregnant women at term (between 37-42 weeks) with singleton pregnancy were included in the study. Information regarding maternal, bio-social, medical and obstetric risk factors during pregnancy was recorded on a pre tested proforma.

**Results:** The birth weight of new born was taken as less than 2.5kg. The factors like maternal education ( $p=0.0280$ ) inter-birth interval ( $p=0.036$ ), low BMI ( $p=0.023$ ), Maternal Socio-economic status ( $p=0.002$ ) had significant effect in causing low birth weight.

**Conclusion:** It is concluded from this study that maternal malnutrition, illiteracy, low family income, close birth spacing had strong association with low birth weight. To overcome this problem, special attention is required to strength the mother and child health care services in the community.

**Keywords:** Low birth weight, prematurity, intrauterine growth restriction.

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### INTRODUCTION

Weight of the newborn is not only the most important parameter reflecting the status of maternal health and nutrition but also a universal predictor of neonatal morbidity and mortality<sup>1</sup>. More than 20 million infants worldwide, representing 15.5% of all births are born with low birth weight, out of these 95.6% of them in developing countries. The level of low birth weight in developing countries (16.5%) is more than double the level in developed regions (7%). Half of all low birth weight babies are born in south Central Asia<sup>2</sup>.

Low birth weight is the result of complex and poorly understand interactions between the biological determinants of the mother and fetus<sup>3</sup>. Maternal risk factors associated with low birth weight babies are social, medical and obstetrical<sup>4</sup>. These risk factors are low socioeconomic conditions<sup>1,4,5</sup> low education status<sup>1,5</sup>, maternal age<sup>1,4</sup>, short birth interval<sup>1,4</sup>, maternal weight and height, multiparity<sup>1</sup> and maternal medical conditions like hypertension<sup>1,5</sup>, anemia<sup>1,4,5</sup> and diabetes<sup>1</sup>. Fetal factors associated with low birth weight are genetic and multiple gestation<sup>6</sup>. Birth weight is an indicator of newborn's chances for survival, growth, long term health and psychosocial development. Low birth weight babies has increase risk of death, during the 1<sup>st</sup> month and years of life<sup>7</sup>. Low birth weight infants have 3-4 times greater risk of dying from diarrhea and acute respiratory infections

as compare to normal birth weight babies.<sup>8</sup> Children who survive are more prone to develop diabetes, coronary heart disease, immune dysfunction and impaired cognitive development<sup>1,9</sup>.

Weight of baby is affected to a great extent by mother's own fetal growth and her diet from birth to pregnancy.<sup>2</sup> In developing countries babies are low birth due to mother's poor nutrition. Women taking folic acid, iron, vitamins and minerals during pregnancy are less likely to have low birth weight babies.<sup>10,11</sup> With this background, I am interested to identify the association of maternal risk factors with low birth weight babies so that these factors are avoided to improve fetal and neonatal outcome.

### METHODOLOGY

This cross section descriptive case study was carried out in department of Obstetrics and Gynecology Unit-IV, Sir Ganga Ram Hospital, Lahore from 20<sup>th</sup> March 2007 to 20<sup>th</sup> March 2008 on 100 pregnant women by Non probability convenience sampling. All pregnant women at term (between 37-42 week) single pregnancy twin pregnancy, pregnant women with previous history of chromosomally abnormal baby or congenital abnormal baby, diagnosed case of any autoimmune disorder were excluded. After obtaining consent from hospital ethic committee, informed written consent was taken from each patient before including her in study. Hundred pregnant women fulfilling inclusion criteria were registered from outpatient department, indoor and emergency. The

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socio-demographic information like name, age, socio economic status, level of education and address were obtained. LMP, EDD, DOP calculation was taken, age of last born child was asked, history of gravidity, parity was recorded.

The history of maternal illness like hypertension, diabetes, anemia was obtained. BMI was calculated by recording weight and height. The subject was examined for positive signs of anemia, hypertension, and obesity. The fetal outcome was recorded in term of fetal weight. The data was analyzed through SPSS.

**RESULTS**

The study was conducted on 100 pregnant women at term (between 37-42 weeks) with singleton pregnancy. The birth weight of newborn was taken as less than 2.5 kg. Birth weight of baby was divided into two groups i.e. group-I with birth weight 1-2 kg and group-II with weight 2.1–2.4 kg. Out of 100 babies, 56% belong to group-I and 44% belong to group-II (Table-1). The mean and SD ratio is 2.030±0.326.

Body Mass Index (BMI) of pregnant women was classified into three categories. Out of 100 pregnant women, 67% were under weight, 16% had normal weight and 17% were obese (Table 2). This indicated that majority of under nourished mothers delivered low birth weight babies. The mean and SD value is 19.73±3.827.

Socioeconomic status of pregnant women was assessed by monthly income. Out of 100 pregnant women, 58% women had their monthly income less than Rupees 6,000/- (Table 3). 42% women had their monthly income greater than Rupees 6,000/-. This result depicts that majority of the mothers belong to poor socioeconomic class.

Close birth is also related to low birth weight. In our study 75% of pregnant women belong to group-I who had birth interval less than 18 months and remaining 25% of pregnant women had birth interval greater than 18 months (Table 4).

Frequency distribution of maternal education among different groups is shown in Table 5. 56% of pregnant women were illiterate. Illiteracy was found to be significantly associated with low birth weight with Chi-square value of 12.570 and P value = 0.028.

Table 1: Baby weight in kilograms (n=100)

Baby weight (kg)	No.	%age
1.0 – 2.0	56	56.0
2.1 – 2.4	44	44.0
Mean±SD	2.09±0.32	

Table 2: Baby mass index (BMI) of pregnant women (n=100)

BMI	No.	%age
< 19	67	67.0
19 – 25	16	16.0
> 25	17	17.0
Mean±SD	19.73±3.827	

Table 3: Effect of monthly income on birth weight (n=100)

Maternal income (rupees)	No.	%age
< 6000	58	58.0
> 6000	42	42.0

p = 0.002 (Significant)

Table 4: Association of inter-birth interval with birth weight (n=100)

Inter-birth Interval (months)	No.	%age
< 18	75	75.0
> 18	25	25.0

p = 0.036 (Significant)

Table 5: Effect of maternal education on neonate birth weight

Educational status of mother	Baby weight in kilograms		Total (n=100)
	1.0 – 2.0 (n=56)	2.1 – 2.5 (n=44)	
Illiterate	28 (50.0%)	28 (63.6%)	56 (56%)
Primary	3 (5.4%)	7 (15.9%)	10 (10%)
Middle	14 (25.0%)	3 (6.8%)	17 (17%)
Matric	4 (7.1%)	5 (11.4%)	9 (9%)
Intermediate	2 (5.4%)	1 (2.3%)	3 (3%)
BA	4 (7.1%)	-	4 (4%)

X<sup>2</sup> = 12.570, df = 5, p value = 0.028

**DISCUSSION**

Low birth weight (LBW) infants have a high risk of mortality as they are more likely to die during their infancy, especially during neonatal period. Their organ systems are immature so they have fight more for life. Birth weight has long been a subject of clinical and epidemiological investigations and a target for public health intervention<sup>1</sup>. Low birth weight is the most prevalent and dominant risk factor for infant mortality and childhood developmental disorders, making it an important target for improvement efforts. Public health initiatives aimed at reducing LBW rates have been largely unsuccessful and national rates have actually increased over the past decade, despite the goal of the Healthy People 2010 of 5 per 100 live births, a 30% reduction.<sup>3</sup> The findings of our study illustrate that teenage, illiterate mothers, those who belongs to poor socioeconomic group, pregnant women with low BMI and had close birth spacing are more likely to give birth to LBW babies.

Maternal age is an important risk factor related to birth weight of the neonate. Young mothers (teenage pregnancies) had increased risk of LBW that might be due to their anatomical and reproductive immaturity.<sup>1</sup> and more prone to anemia, urinary tract infections, pregnancy induced hypertension<sup>4</sup>. In our study the relationship between maternal age and birth weight was found to be insignificant as P-value = 0.466. But mothers who were less than 18 years had increased proportion of LBW teenage pregnancy as a risk factor<sup>1</sup>.

Maternal education also contributed as a risk factor for LBW. Higher education revealed a significant protective effect against occurrence of LBW.<sup>1</sup> We observed in our study that illiterate mothers were more likely to give birth to LBW babies as P-Value = 0.028. This result in accordance with previous studies<sup>12</sup>.

Family income also effects birth weight. In our study we had more LBW babies born to family income <6000 Rupees/month so low socioeconomic status found to be significant for LBW babies as P-Value = 0.002 Literature also report that poor socioeconomic conditions are related to LBW<sup>13</sup>.

Parity of mother is related to LBW babies. One study showed that primigravida mothers were more prone to deliver LBW babies.<sup>14</sup> In our study 46% of primigravida deliver LBW babies but parity was found to be significant as P-value = 0.046.

I take maternal weight and height at term and calculated body mass index. Maternal malnutrition expressed as BMI < 19 was significantly associated with LBW.<sup>1</sup> In our study 67% of patients had BMI <19 so BMI is significantly related to LBW (p=0.023). It supported Seyal<sup>12</sup> study which stated that maternal malnutrition had independent effect on LBW babies. The studies from neighboring countries had shown that BMI, pre-pregnant body weight and weight gain during pregnancy had significant effect on birth weight<sup>13,15</sup>.

Short birth interval associated with increased risk of maternal anemia, Low Birth weight babies, and preterm delivery. Our study showed that close birth spacing is significantly related to LBW (p=0.036). Nusrat Khan in his study demonstrated that inter-pregnancy interval is an important factor for birth weight of new born because a short birth interval lead to poor pregnancy outcome.<sup>1</sup> Pregnancy related medical ailments like pregnancy induced hypertension, diabetes, maternal anemia are well known factors affecting birth weight.<sup>14</sup> Our study demonstrated that maternal anemia (p = 0.406), hypertension (p=0.553) and diabetes (p=0.595) are not significantly associated with low birth weight.

## CONCLUSION

It is concluded from this study that maternal malnutrition, illiteracy, low family income, close birth spacing have strong association with low birth weight. To overcome this problem, special attention is required to improve maternal and child healthcare.

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