

**Original Article**

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**Effect of Maternal Factors on Low Birth Weight Baby Delivered in A Medical College of Kolkata**Dr. Sonali Sain<sup>1</sup>, Dr. Prianka Mukhopadhyay<sup>1</sup>, Dr. Tushar Kanti Saha<sup>1</sup>, Dr. Amitabha Chattopadhyay<sup>2</sup>, Dr. Indira Dey<sup>3</sup>, Dr. Nirmal Kumar Mandal<sup>3</sup><sup>1</sup>Assistant Professor, Dept. of Community Medicine, NRS Medical College, Kolkata;<sup>2</sup>Assistant Professor, Dept. of Community Medicine, RG Kar Medical College, Kolkata;<sup>3</sup>Associate Professor, Dept. of Community Medicine, NRS Medical College, Kolkata;**Corresponding Author:**

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**Abstract:**

**Background:** Low birth weight is a major determinant of mortality, morbidity and disability in infancy and childhood and also has a long-term impact on health outcomes in adult life. **Objectives:** The present study was undertaken with the objectives of assessment of occurrence of low birth weight babies delivered in NRS Medical College & Hospital and to find out the role of different sociodemographic and pregnancy related factors influencing low birth weight. **Method:** A descriptive, observational study was conducted in the

postnatal ward of the Hospital. All mothers who delivered during the study period were interviewed and relevant record was reviewed. **Results:** 38% of the babies had low birth weight. Proportion of teenage mothers were higher in case of low birth weight babies compared to the mothers of normal birth weight babies ( 27.7% Vs 17% ). 72.3% of the LBW babies were from family with per capita income < Rs 3000/- compared to 37.7% normal birth weight babies. 67.7% of mothers of low birth weight babies had last child birth within

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3years compared to 33% of normal babies. 10.7% of the mothers of LBW babies had <3 ANC visits compared to 1.8% in other group. 22.6% of the mothers consumed <100 Folifer tablets and 23.1% smoked tobacco during the antenatal period who delivered LBW babies compared to 1.8% and 2.8% respectively in their counterparts.

### **Introduction:**

Low birth weight (LBW) has been defined by the World Health Organization (WHO) as weight at birth of less than 2500 g. Globally prevalence of LBW is 15.5%, which is about 20 million LBW infants born each year. 96.5% of the LBW babies are born in the developing countries.<sup>1</sup> The number of low birth weight babies is concentrated in two regions of the developing world: Asia and Africa. 72% of low birth weight infants in developing countries are born in Asia where most births also take place. India alone accounts for 40 per cent of low birth weight births in the developing world and more than half of those in Asia. There are nearly 8 million infants born with low birthweight in India.<sup>2</sup>

Whereas the global prevalence of such births is slowly dropping, it is as high as 30% in many developing countries, especially in Asia, predominantly because of

**Conclusion:** Magnitude of low birth weight is still high and various unfavourable socio-demographic, antenatal and obstetric factors increased the risk of delivering low birth weight baby.

**Keywords :** Low birth weight baby , risk factors

undernutrition of the mother prior to and during pregnancy. In the developing countries like India, the majority of causes of low birth weight babies are due to intrauterine growth retardation. However only 6.7% are born prematurely among them.<sup>3</sup>

Low birth weight is a major determinant of mortality, morbidity and disability in infancy and childhood and also has a long-term impact on health outcomes in adult life. Thus it also results in substantial costs to the health sector and imposes a significant burden on society as a whole.<sup>4</sup>

With this background the current study was conducted to find out the occurrence of low birth weight babies among newborns delivered in NRS Medical College & Hospital and to find out the effect of different sociodemographic factors , past and present pregnancy related variables that can contribute to low birth weight .

## Materials and Methods:

The present study was a descriptive observational study, which was conducted in the postnatal ward of Gynaecology and Obstetrics department of NRS Medical College and Hospital. All the mothers who delivered during the period of data collection ( 03.06.13 to 17.06.2013 ) and given verbal consent for participation in the study were included in the study. The mothers who were very sick and not in a position to respond properly and mothers whose baby were very sick were excluded from the study. The study population were informed about the purpose and methods of the study before taking consent. The necessary clearance was obtained from

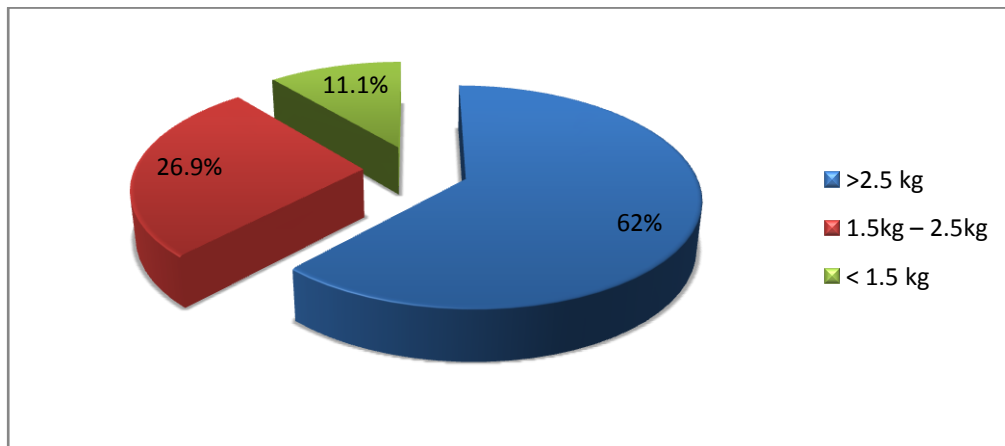
Institution Ethics Committee and Hospital Administration. Predesigned, pretested, structured questionnaire was prepared and translated into local languages. Mothers were interviewed about their personal history, family history, past history including obstetric history. Past records were obtained from the antenatal card, prescription and hospital records, if any. All information regarding newborn baby was obtained from the baby tickets. Data was entered and analysed in Microsoft Excel. Results were expressed as proportions and summarised in the form of tables and figures.

## Results:

Total 171 mothers were studied in the postnatal ward of Gynaecology and Obstetrics department of NRS Medical College and Hospital.

38% of the newborn babies were low birth weight babies. Among this 11.1% were extremely low birth weight baby. (Fig 1)

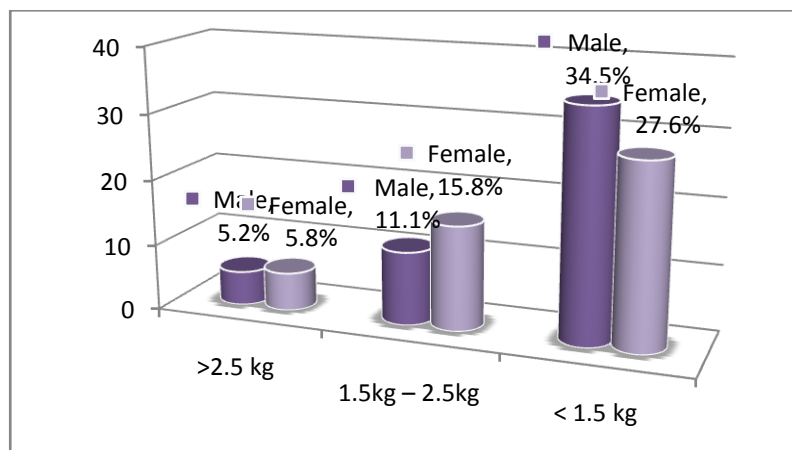
**Figure 1 : Occurrence of Low birth weight babies**



Occurrence of low birth weight babies was similar in both sexes. (Male vs. Female was 45.6% and 43.4%) . However 34.5% males were Extremely lowbirth weight compared

to 27.6% in females (Fig 2) . Among the low birth weight babies 41.5% were preterm babies. While rest were babies of foetal growth retardation.

**Figure 2: Relation Between sex of the child and weight of the child:**



**Table 1: Sociodemographic factors contributing to the occurrence of low birth weight babies:**

Variables	LBW (n <sub>1</sub> = 65)	NBW (n <sub>2</sub> = 106)	Total (N= 171)
<b>Age of mothers:</b>			
15-20	18 (27.7)	18 (17)	36 (21.1)
20-25	29 (44.6)	59 (55.8)	88 (51.5)
25-30	10 ( 15.4)	21 ( 19.8)	31 (18.1)
>30	08 (12.0)	08 (7.5)	16 (9.4)
<b>Residence:</b>			
Urban	47 (72.3)	66 ( 62.2)	113 (66.1)
Rural	18 (27.7)	40 ( 37.8)	58 (33.9)
<b>Religion:</b>			
Hinduism	56 (86.1)	90 (84.9)	146 (85.4)
Muslim	09 (13.9)	16 (15.1)	25 (14.6)
<b>Type of family:</b>			
Nuclear	25 (38.4)	60 (56.6)	85 (49.7)
Joint	40 (61.6)	46 (43.7)	86 (50.3)
<b>PerCapita Income:</b>			
<1000	20 (30.8)	18 (17)	38 (22.2)
1000-3000	27 (41.5)	22 (20.7)	49 (28.7)
3000-5000	10 ( 15.4)	25 (23.5)	35 (20.4)
>5000	8 (12.9)	41 (38.8)	49 (28.7)
<b>Maternal Educational Status:</b>			
Illiterate	8 (12.3)	8 (7.5)	16 (9.4)
Primary & Middle	51 (78.5)	88 (83.0)	139 (81.3)
Secondary and above	6(9.2)	10 (9.5)	16 (9.3)
<b>Paternal Educational Status:</b>			
Illiterate	5 (7.7)	13 (12.3)	18 (10.5)
Primary & Middle	51 (78.5)	63 (59.4)	114 (66.7)
Secondary and above	9 (13.8)	30 (28.3)	39 (22.8)
<b>Maternal Occupational status:</b>			
Housewife	55 (84.6)	98 (92.5)	153 (89.5)
Unskilled labour	9 (13.8)	6 (5.6)	15 (8.8)
Skilled labour	1(1.6)	2(1.9)	3 (1.7)

More mothers were found to be teenage mothers in case of low birth weight (LBW) babies compared to the mothers of normal birth weight (NBW) babies (27.7% Vs 17%). 72.3% of the mothers of LBW babies were from urban region compared to the 62.2% mothers of NBW babies. 61.6% mothers of LBW babies were from joint families compared to 43.7% mothers of NBW babies. Economic condition of the family also contributed to the birth weight of the babies. 72.3% of the LBW babies were from family with per capita income < Rs 3000/- compared to 37.7% normal birth weight babies. 12.3% mothers were illiterate in case of LBW babies while 7.5% mothers of NBW babies. Better educated fathers (secondary and above) had more normal birth weight babies ie 28.35 of fathers of NBW babies were educated up to secondary and

above while 13.8% of fathers of LBW babies were educated up to secondary and above. 15.4% of LBW babies had working mothers compared to only 7.5% mothers of normal babies. (Table1)

Table 2 shows some of the past obstetric events contribute to the birth weight of newborn babies. 36.9% of mothers of LBW babies were married before legal age ie. 18 years compared to 11.3% mothers of normal babies. 67.7% of mothers of low birth weight babies had last child birth within 3years whereas only 33% of mothers of normal babies had last child birth within last 3 years. There was no relation found between weight of newborn baby and parity of mothers, number of living children and maternal age at 1<sup>st</sup> pregnancy.

**Table 2: Past obstetric history contributing to the occurrence of low birth weight babies:**

Variables	LBW (n <sub>1</sub> = 65)	NBW (n <sub>2</sub> = 106)	Total (N= 171)
<b>Age of Marriage:</b>			
< 18 years	24 ( 36.9)	12 (11.3)	36 (21.1)
≥ 18 years	41 ( 63.1)	94 ( 88.7)	135 (78.9)
<b>Maternal age at 1<sup>st</sup> pregnancy:</b>			
< 20 years	14 ( 21.5)	21 ( 19.8)	35 (20.5)
20 -25 years	38 (58.4)	73 ( 68.9)	111 (64.9)
25- 30 years	12 ( 18.4 )	11 ( 10.4)	23 (13.5)
>30 years	1 ( 1.5)	1 (0.9)	2 (1.1)
<b>Parity of mothers:</b>			
1	56 (86.2)	89 ( 83.9)	145 (84.8)
2	6 (9.2)	17 ( 16.1)	23 (13.4)

≥ 3	3 (4.6)	0	3 (1.8)
<b>Spacing with the last child birth:</b>			
< 3 years	44(67.7)	35 (33.0)	79 (46.2)
≥ 3 years	21(32.3)	71 (67.0)	92 (53.8)
<b>Number of living children:</b>			
1	58(89.2)	89 (83.9)	147 (86.0)
2	4 (6.2)	17(16.1)	21 (12.3)
≥3	3(4.6)	0	3 (1.7)

Present obstetric parameter also contributes to the birth weight of newborn babies. 10.7% of the mothers of LBW babies had <3 ANC visits whereas only 1.8% of mothers who delivered normal baby had the same. 21.5% of the mothers of LBW babies took average rest of < 10 hours daily during their pregnancy compared to 6.6% of their counterpart. 33.8% of the mothers of LBW babies perform moderate intensity work during their pregnancy compared to 8.5% of mothers of normal babies. Same trend was evident in relation to consumption of one extra meal during pregnancy (90.7% vs. 80.1%). 22.6% of the mothers consumed <100 Folifer tablets and 23.1% smoked

tobacco during the antenatal period who delivered LBW babies compared to 1.8% and 2.8% respectively in their counterparts. 16.9% had height of <145cms and 72.3% had weight gain < 10 kgs among the mothers of LBW babies compared to 25.4% & 30.2% respectively for the mothers of normal weight babies. 53.8% of the mothers of LBW babies suffered from anaemia among which 3.1% suffered from severe anaemia whereas 48.1% of the mothers of normal babies suffered from anaemia. 16.9% of the mothers suffered from Preeclampsia 4.65 suffered from Eclampsia compared to 8.4% & 1.9% respectively among their counterparts.

**Table 3: Present obstetric history contributing to the occurrence of low birth weight babies**

Variables	LBW (n <sub>1</sub> = 65)	NBW (n <sub>2</sub> = 106)	Total (N= 171)
<b>Antenatal care received by the mothers:</b>			
No. Of ANC < 3	7 (10.7)	2 (1.8)	9 (5.3)
No. Of ANC ≥ 3	58 ( 89.3)	104 (98.2)	162 (94.7)
<b>Adequate rest taken during pregnancy:</b>			
< 10 hours	14 (21.5)	7 (6.6)	21 (12.3)
≥ 10 hours	51 (78.5)	99 (93.4)	150 (87.7)
<b>Type of work done during pregnancy:</b>			
Moderate	22 (33.8)	9 ( 8.5)	31 (18.1)
Sedentary	43 (66.2)	97 ( 91.5)	140 (81.9)
<b>Maternal exposure to tobacco*:</b>			
Tobacco smoking	15 (23.1)	3 (2.8)	18 (10.5)
Tobacco chewing	4 (6.1)	5 (4.7)	9 (5.3)
<b>*Multiple response</b>			
<b>Meals consumed:</b>			
One extra meal taken	59 (90.7)	85 (80.1)	144 (84.2)
No extra meal taken	6 (9.3)	21 (19.9)	27 (15.8)
<b>Consumption of Iron and Folifer tablets:</b>			
< 100 tablets	12 (22.6)	2 (1.8)	14 (8.2)
≥ 100 tablets	53 (77.4)	104 (98.2)	157 (91.8)
<b>Height of mother ( in cms ) :</b>			
<145 cms	11 (16.9)	27 (25.4)	38 (22.2)
≥ 145 cms	54 (83.1)	79 (74.6)	133 (77.8)
<b>Average weight gain during present pregnancy ( in kgs ):</b>			
< 10 kgs	47 (72.3)	32 (30.2)	79 (46.2)
≥ 10 kgs	18 (27.7)	74 (69.8)	92 (53.8)
<b>Haemoglobin concentration ( in gm/dl ):</b>			
< 7	2 (3.1)	3 (2.8)	5 (2.9)
7-9.9	5 (7.7)	7 (6.6)	12 (7.0)
10.0 – 10.9	28 (43)	41 (38.7)	69 (40.4)
> 11	30 (46.2)	55 (51.9)	85 (49.7)
<b>Present Pregnancy Complication:</b>			
Anaemia	35 ( 53.9)	30 ( 28.3)	65 (38.0)
Preeclampsia	11 ( 16.9)	9 (8.4)	20 (11.7)
Eclampsia	3 (4.6)	2 (1.9)	5 (2.9)
Hypothyroidism	1 (1.5)	8 (7.6)	9 (5.3)
Diabetes and Gestational diabetes	0	4 (3.8)	4 (2.3)
No Complication	15 (23.1)		



## Discussion:

The low birth weight babies constituted 38% of all babies delivered in the Gynaecology and Obstetrics Department of NRS Medical College and Hospital. Among the LBW babies 41.5% were premature babies. Similar type of study shows that prevalence of Low birth weight babies was 11.81% at the community level, including both rural and urban areas.<sup>3</sup> Whereas the estimated proportion of LBW infants in India is 7.8% , that in South-eastern Asia is 11.6% of all the babies born.<sup>2</sup> But the study conducted in an urban resettlement area of Delhi showed the prevalence of LBW was much higher about 39.1% and a cross sectional study conducted in a tertiary care hospital , attached to Subharti medical college of Meerut District found it to be 32.30%. Both were comparable to our study findings.<sup>5,6</sup>

Present study found similar occurrence of LBW baby among both sex with slight inclination towards male babies irrespective of gestational age. For the same gestational age, girls weigh less than boys when birth weight of both sexes is compared. Firstborn infants are lighter than subsequent infants, and twins weigh less than singletons.<sup>2</sup> Similar finding of birth weight of children of different birth order was also found in our study.

Our study found prevalence of LBW among teenage mothers was 50%. 27.7% of the

mothers who had LBW babies were teenage mothers and 12% were above 30 years. Similar type study conducted in Subharti medical college of Meerut District found it to be 42.86% among those <18years and 33.33% among those > 35years.<sup>6</sup>

Current study showed that LBW mothers were mostly less educated, from joint families, urban areas and family of low per capita income but no relation found with maternal religion. Worldwide it is found that mothers in deprived socio-economic conditions frequently have low birth weight infants. It is primarily from the mother's poor nutrition and health over a long period of time,

Physically demanding work during pregnancy also contributes to poor foetal growth leading to LBW which was also evident from the current study.<sup>2,7</sup>

Several studies highlighted that various manual physical activity during pregnancy is associated with small for gestation age (SGA) babies and lower birth weights.<sup>8,9</sup> In India, studies have demonstrated an inverse relationship between daily physical activity and birth weight in pregnant women , the majority of whom had high levels of physical activity related to agricultural and domestic activities.<sup>10</sup>

Maternal age of marriage, parity of mother, spacing with last child birth found to

contribute in birth weight of the newborn baby both in our study and also similar kind of other study.<sup>8, 11</sup> Dasgupta A et al. found that housing, poverty level, gestational age were found significant in the analysis.<sup>12</sup>

Gagan A et al. found that the prevalence among primiparous mothers was found to be (42.86%) which was comparable with current study finding of 38.62%. High prevalence was seen in those who were addicted to tobacco chewing (53.33%) and smoking (33.33%).<sup>6</sup> Our study found it to be 44.44% and 83.33% respectively. Another Nagpur based study findings supported our study findings.<sup>7</sup>

Smoking causes fetal hypoxia by increasing carboxyhemoglobin levels, reducing blood oxygen available to fetal tissue and reducing maternal blood supply to the placenta.<sup>13</sup> Risk of delivering LBW was 3.12 times higher in women who had history of tobacco chewing and were also exposed to passive smoking. Studies have shown that passive

smoking and tobacco chewing reduces the birth weight.<sup>14,15</sup>

Current study showed that the 21.5% of mothers of LBW baby had history of inadequate rest taken during pregnancy and 33.8% moderate type of work done during pregnancy. Dasgupta A et al. found that consumption of food and of IFA tablets, height of mother and anaemia were significant contributing factor in determination of birth weight of newborn.<sup>12</sup> Other studies also found similar type of association.<sup>6,7</sup>

Currently we found that maternal prepregnancy height and weight gain during pregnancy contribute to the occurrence of LBW baby. It was also found that 53.8 % of mothers who delivered LBW baby suffered from anaemia. Gagan A et al. also found prevalence of 47.61% of LBW and weight of newborn was inversely proportional to the maternal Haemoglobin status.<sup>6</sup>

### **Conclusion:**

Consistency of present results with those of similar studies done previously is helpful to conclude that magnitude of low birth weight is still high and various maternal unfavourable socio-demographic, antenatal and obstetric factors increased the risk of delivering low birth weight baby. To

overcome this problem, public health strategy needs to focus more attention on prevention of teenage pregnancy, family planning, better maternal nutrition, correction of anaemia and routine antenatal care for early detection and control of the risk factors.

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## References:

- Retrieved from : [http://www.who.int/maternal\\_child\\_adolescent/topics/newborn/care\\_of\\_preterm/en/](http://www.who.int/maternal_child_adolescent/topics/newborn/care_of_preterm/en/) Accessed on 20.6.14.
- New York: UNICEF; 2004. United Nations Children's Fund and World Health Organization, Low birth weight: Country, regional and global estimates.
- Muthayya S. Maternal nutrition & low birth weight – what is really important? Indian J Med Res. November 2009; 130:pg 600-608)
- Retrieved from : [http://www.who.int/nutrition/topics/feto\\_materal/en/](http://www.who.int/nutrition/topics/feto_materal/en/) Accessed on 20.6.14.
- Chhabra P<sup>1</sup>, Sharma AK, Grover VL, Aggarwal OP. Prevalence of low birth weight and its determinants in an urban resettlement area of Delhi. Asia Pac J Public Health. 2004;16(2):95-8.
- Gagan A, Satraj A, Kapil G, Kumar V, Parul G et al. Maternal Risk factors Associated with Low Birth weight Neonates in a Tertiary Care Hospital, Northern India, J Community Med Health Educ 2012;2:177.
- Deshmukh J.S., Motghare D.D, Zodpey S.P. and Wadhva S.K. Low Birth Weight and Associated Maternal Factors in an Urban Area, January 1998; Indian Pediatrics; 35:33-36
- Launer LJ, Villar J, Kestler E, de Onis M. The effect of maternal work on fetal growth and duration of pregnancy: a prospective study. Br J ObstetGynaecol 1990; 97: 62-70.
- Cavalli AS, Tanaka T. Relationship between maternal physical activities and preterm births. Environ Health Prev Med 2001;
- Rao S, Kanade A, Margetts BM, Yajnik CS, Lubree H, Rege S, et al. Maternal activity in relation to birth size in rural India. The Pune Maternal Nutrition Study. Eur J Clin Nutr 2003;57: 531-42.
- Nurul A, Abel R, Sampathkumar V. Maternal risk factors associated with low birth weight. Indian J Pediatr 1993; 60: 269-274.
- Dasgupta A, Basu R. Determinants of low birth weight in a Block of Hooghly, West Bengal: A multivariate analysis. Int J Biol Med Res. 2011; 2(4): 838 – 842
- Abel EL, Smoking during pregnancy: A review of effects on growth and development of the offspring. Hum. Biol 1980; 52; 593-625.
- Krishna K. Tobacco Chewing in pregnancy. Br J ObstetGynecol 1978; 85: 726-728.
- Verma RC. Effect of tobacco chewing by mother on fetal outcome. Indian J Pediatr 1983; 20:105-111.3