

# MATERNAL FACTORS AFFECTING LOW BIRTH WEIGHT IN URBAN AREA OF BANGLADESH

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## **Abstract:**

**Objectives:** In Bangladesh low birth weight (LBW) rate is quite high even in urban area. The present study was conducted to determine the maternal factors (e.g. socioeconomic, nutritional and pregnancy related) affecting LBW in urban community of Bangladesh. **Methods:** This case control study was done at Shaheed Shohrawardy Medical College Hospital, Dhaka. Normally delivered singleton live births babies from January 2003 to January 2005 in obstetrics wards were selected purposively and after enrollment all newborn's birth weight was measured. Then from the total (N=583) study populations child-mother pairs formed and were divided in LBW group (n=135) and normal birth weight (NBW) group (n=448). Maternal socioeconomic, nutritional and pregnancy regarding data (e.g. parity, inter pregnancy interval, number of antenatal visits) were collected and then variables were analyzed to find out maternal factors affecting LBW.

**Results:** The LBW incidence was found 23.2% and mean birth weight was found 2762 gm. More proportion of LBW babies came from the mother of <20 year of age group. Significant relationship was found between early maternal age, education, socioeconomic status, anaemia, iron & vitamin supplementation during pregnancy, maternal weight, body mass index (BMI) with LBW. Parity, inter pregnancy interval and number of antenatal visit were also found significant risk factors for LBW. No relationship was found between tobacco use and maternal height with LBW.

**Conclusion:** Among the various epidemiological factors the maternal factors like antenatal care, parity, inter pregnancy interval, iron & vitamin supplementation during pregnancy are found to influence birth weight. Hence, it is the need of the hour to strengthen the existing maternal services at the community level to reduce LBW in Bangladesh.

**Key words:** LBW (Low Birth Weight), NBW (Normal Birth Weight).

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## **Introduction:**

Birth weight is the first weight of the foetus or newborn obtained after birth preferably measured within the first hour of life before significant postnatal weight loss has occurred. Low birth weight (LBW) is defined as that less than 2,500 gm. More than twenty million LBW babies were born every year throughout the world and about 15.5% of all births are born with LBW<sup>1</sup>. Ninety percent (90%) of these LBW babies' are born in developing countries. In spite of consistent efforts to improve the quality of maternal and child health LBW rate is quite high in Bangladesh. According to national low birth weight survey of Bangladesh (2003-2004) LBW rate is 36%. Half of all perinatal deaths

are directly or indirectly related to LBW<sup>2</sup>. Infants are born with low weight either because they are premature (<37 weeks gestation at birth) and/or because they suffered intrauterine growth retardation. The majority of LBW infants in developing countries are intra uterine growth retardation (IUGR)<sup>3</sup>. The shorter the gestation and the smaller the baby, higher the risk of morbidity and mortality. Low birth weight due to restricted fetal growth (IUGR) has a poor prognosis compared to that due to preterm birth.

It is generally acknowledged that the etiology of LBW is multifactorial<sup>4,5</sup>. During the fetal phase, growth depends on the nutritional condition of the mother, indicating that

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pregnant women should not only increase their weight but also consume essential nutrients. For many women in the developing world however, economic, social and cultural factors make it difficult for them to obtain the necessary food and health care, which are closely interrelated<sup>6-8</sup>. The biological processes that affect the foetus in utero are related to the mother's nutrition, exercise, infections and consumption of tobacco by chewing or smoking, alcohol and other drugs. Low birth weight is strongly associated with undernutrition in mothers and about half of all IUGR in developing countries is attributable to low maternal weight, low weight gain during pregnancy and iron deficiency anaemia<sup>9-13</sup>. Multiple gestations are high risk pregnancies, which may be complicated by pre-maturity, low birth weight infants, preeclampsia, anemia, postpartum hemorrhage, intrauterine growth restriction, neonatal morbidity and high perinatal, neonatal and infant mortality. The rate of multiple gestation pregnancies has grown exponentially over the last few decades and is responsible for the steady increase in the rate of low birth weight infants. As a group, infants of multiple gestation pregnancies have higher mortality and morbidity than singleton pregnancies<sup>11</sup>. Mothers who are <20 years or >35 years old are more likely to give birth to LBW infants<sup>4,5,14</sup>. Neonatal survival depends on both gestational maturity and birth weight<sup>2,14,15</sup>. The beneficial effects of good antenatal care on pregnancy outcome have been described in many observational studies over several decades<sup>5,13,16</sup>. LBW survivors demonstrate significant growth retardation, as reflected by lower body weights, heights and head circumferences, in comparison to normal weight peers<sup>16-18</sup>. Although there is some tendency for catch up growth, the deficits persist even up till 14 years of age<sup>19-21</sup>. The catch up is more for the preterm births in contrast to the growth retarded subjects. There is evidence of delayed skeletal growth and maturation in children aged between 6 to 10 years<sup>22</sup>. While delayed puberty has been reported in LBW children<sup>23,24</sup>. Earlier onset of menarche was documented in a longitudinal follow up study<sup>19</sup>. These growth retarded adult

women (stunted and underweight) are likely to give birth to LBW babies thereby perpetuating a vicious cycle through generations. The socio-economic factors are income, education, occupation affect birth weight. Other important factors are parity; inter pregnancy interval, quality and number of antenatal care along with nutrition education affect birth weight<sup>6,8,25-29</sup>. The individual effect and magnitude of each of the factors for LBW is still debatable. On the basis of available evidence this study will highlight selected independent factors (e.g. socioeconomic, nutritional and pregnancy related) affecting LBW in urban area and that would have contributed in reducing the incidence of low birth weight in Bangladesh.

### **Methodology:**

This study was a case control study and was done at Shaheed Shohrawardy Medical College Hospital, Dhaka, Bangladesh from January 2003 to January 2005. All babies with birth weight less than 2,500 gm were labeled as low birth weight (LBW) group and were compared with Normal birth weight (NBW) babies weight 2,500 gm or more as control group. From the department of Gynae & Obstetrics samples were selected purposively following the inclusion criteria: alive baby born by normal delivery. Exclusion criteria were as follows: still born babies, baby born by caesarian section, babies with congenital anomalies, baby born by multiple pregnancies, baby with maternal history of complications (e.g eclampsia and preeclampsia, diabetes mellitus, heart disease, jaundice, chronic lung disease etc.) After enrollment in this study weight of all newborns were measured. NNC weighing scale was used to measure birth weight of the babies just after the delivery. Then the total (N=583) study populations were divided in two groups. All babies with birth weight less than 2,500 gm at birth were labeled as low birth weight (LBW) group (n=135) and birth weight 2,500 gm or more at birth were labeled as Normal birth weight (NBW) group(n=448).

Informations were collected from the mothers through face to face interview by structured interview form. Questionnaire was completed

within 24 hours of birth. Data were collected for age, socioeconomic status, educational status, anaemia, intake of iron and vitamins. Socioeconomic status was classified according to income as below average group <1500 taka /person/month, and above average group >1500 taka /person/month. Data regarding parity, inter pregnancy interval and number of antenatal visit, history of tobacco intake were also collected. Height, weight were measured of all mothers and Body mass index (BMI) was calculated as weight in kg divided by height in square meter (Kg/ M<sup>2</sup>). Data were analyzed by standard statistical formula using statistical package for social science program (SPSS 11.0 version). Chi square (c<sup>2</sup>) test was used for comparative analysis between two groups of study population. At 95% confidence limit p value <0.05 was labeled as significant. Informed consent was taken from mothers before enrolment in this study.

### Results:

After fulfilling inclusion and exclusion criteria total 583 babies were included in this study. Out of 583 babies 135 babies were found LBW

and 448 babies were found NBW. The LBW prevalence was 23.2% and mean birth weight was 2762 gm in this study. Among total 583 babies 296(50.1%) were female and 287(49.9%) were male. In LBW group 69 were female and 66 were male besides 227 were female and 221 were male in NBW group. No relation was found between birth weight and sex of the baby. Majority of the LBW 69/135(51.1%) came from the mother of <20year of age group and most of the NBW 327/448(73%) came from the mother of 20-30years age group showing association between LBW and early maternal age. Most of the LBW 67/135(50%) came from the mother without education but in NBW group 165/448(37%) came from the mother completed primary education and 238/448(53%) from mother who completed secondary level or above. These data showed significant relationship between LBW and poor educational status. Majority of the mother came from below average socioeconomic status but it was more in LBW 107/135(79.2%) in comparison to mother of NBW 302/448(67.4%) showing association between LBW and poor socioeconomic status.

**Table-I**

*Shows maternal socio-economic factors affecting birthweight*

Risk factors	LBW babies (n=135)	NBW babies (n=448)	p value
Age			
<20 years	69	79	p<0.001*
20-30 years	36	327	
>30 years	30	42	
Resident area			
Urban	108	356	p>0.05
Rural	27	92	
Occupation			
Housewife	102	334	p<0.01*
working	33	114	
Educational status			
Illiterate	67	45	p<0.001*
upto primary	41	165	
Secondary & above	27	238	
Socioeconomic status			
Below average	107	302	p<0.01*
Above average	28	146	

Most of the mothers (52.6%) were found anemic who gave birth LBW and anaemia was absent among majority (67.9%) of the mothers of NBW showing association between LBW and maternal anaemia during pregnancy. Iron & vitamin supplementation during pregnancy were found significantly less among the mothers of LBW babies 69.6% (94/135) and it was more in mothers of NBW babies 82.4% (369/448). Those data showing significant positive effect of iron & vitamin supplementation during pregnancy and negative effect of maternal anaemia on birth weight. No differences were found considering maternal height between two groups but

significant relationship was found between maternal weight and birth weight. Maternal BMI was found significantly low among LBW group showed positive impact of maternal BMI on birth weight. Maternal anxiety or depression was found more commonly among the mothers of LBW babies 60% (81/135) whereas it was only 27.7 % (124/448) among the mothers of NBW babies reflecting significant negative effect of maternal anxiety or depression on birth weight.

Table II also shows amongst the mothers of LBW there were a significantly greater proportion of primiparas 45.9% (62/135) in comparison to NBW 37.7% (169/448). Last pregnancy interval

**Table-II**  
*Shows maternal factors affecting birthweight*

Risk factors	LBW babies (n=135)	NBW babies (n=448)	p value
Age			
<20 years	69	79	p<0.001*
20-30 years	36	327	
>30 years	30	42	
Parity			
Primi	62	169	p<0.01*
Multiparous	73	279	
Inter pregnancy interval			
<2 years	72	201	p<0.01*
2years or more	63	247	
No. of antenatal visit			
<2	70	30	p<0.001*
>2 to 4	46	121	
>4	19	297	
Iron & vitamin supplementation			
Yes	94	369	p<0.01*
No	41	79	
Tobacco smoking or chewing			
Yes	19	51	p>0.05
No	116	397	
Maternal anaemia			
Yes	71	144	p<0.001*
No	64	304	
Maternal Height			
<1.55 meter	41	152	p>0.05
>1.55 meter	84	296	
Maternal Weight			
<55 Kg	53	133	p<0.001*
>55 Kg	82	315	
Maternal BMI in Kg/M <sup>2</sup>			
<19	41	59	p<0.01*
>19	84	389	

was found short (<2 years) among 53.3% (72/135) in LBW group and 44.9% (201/448) in NBW group, showing statistically significant association between short last pregnancy interval (<2 years) and LBW. Number of antenatal visits were found (<2) in 51.9% (70/135) cases of LBW group in comparison to only 6.7% (30/448) in NBW group. Number of antenatal visits were found (>4) only in 14% (19/135) cases of LBW group and 66.3% (297/448) in NBW group showing highly significant relationship between less number of antenatal visits and LBW. Significant effect of maternal tobacco smoking or chewing on birth weight was not found in this study.

### Discussion:

Mean birth weight was found 2762 gm in this study and that was 2961 gm by Hosain G. et al<sup>28</sup> and 2669 gm by Deshmukh J. et al<sup>4</sup>. The LBW incidence in this study showed 23.2% which was similar to Hosain G. et al<sup>28</sup> where they found 24% in their study. But national low birth weight survey of Bangladesh (2003-2004) showed 36% and that difference may be explained as our study was done in an urban area which does not reflect the true scenario of Bangladesh. Significant association was found in our study between LBW and early maternal age (<20 year) which is also seen by other study<sup>5,6,28</sup>. Finding of statistically significant relation of LBW with maternal socioeconomical status and educational level are consistent with the study of Nair NS. et al<sup>14</sup>. Maternal anaemia was found significantly more common in LBW and iron & vitamin supplementation during pregnancy were found significantly less among the mothers of LBW babies in comparison to NBW. Those data showed significant positive effect of iron & vitamin supplementation during pregnancy and negative effect of maternal anaemia on birthweight, which is similar to other study<sup>6,9,29</sup> and differ from study of Khatun S, Rahman M<sup>8</sup>. No relationship was found between LBW and maternal height which observation was same by Hosain G. et al<sup>28</sup>. Maternal weight and BMI were found as significant risk factors for LBW that was also found by Borja JB et al<sup>9</sup>

and Mavalankar DV et al<sup>12</sup>. Among the LBW there were a significantly greater proportion of primiparas in comparison to NBW, significant association between short last pregnancy interval (<2 years) and LBW alongside highly significant relationship between less number of antenatal visits and LBW. These observations were also found in other studies<sup>5,11,13</sup>. Significant effect of tobacco smoking on LBW was not found in this study like Nair NS. et al<sup>14</sup>. There were limitation in this study as it was done in an urban area thus it can not be the true representative of the country scenario. As there are several factors interacting in this phenomenon so it was not feasible to single out any particular factor affecting low birth weight. Among the various epidemiological factors the maternal factors like age of pregnancy, antenatal care, parity and iron & vitamin supplementation during pregnancy are found to influence birth weight. To reduce LBW in Bangladesh strategically we have to focus more to expand & strengthen the existing maternal services at the community level, which will improve antenatal health care and thereby reduce LBW in our country.

### Conclusion:

In this study significant relationship was found between early maternal age, education, socioeconomic status, anaemia, iron & vitamin supplementation during pregnancy, weight, BMI, parity; inter pregnancy interval and number of antenatal visit with LBW. To prevent and reduce LBW prevalence in urban Bangladesh along with rural area we have to fix strategy, have to give more attention towards awareness building to increase inter pregnancy interval and number of antenatal visit along with iron & vitamin supplementation during pregnancy and discouraging teenage pregnancy.

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