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Original Article

Proportion of Low Birth weight and Associated Maternal Risk Factors in a Developing Country, Bangladesh

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Abstract

Introduction: Though the health situation of Bangladesh has been improved substantially over the years, the low birth weight (LBW) rate is still pretty high. LBW has been associated with high probability of infection, malnutrition, mental deficiencies and behavioural and learning problem in later life. The principle focus of this study was to ascertain the proportion of LBW and its associated maternal risk factors identification.

Materials & methods: It was a cross-sectional type of descriptive study done at two tertiary level hospitals – Rajshahi Medical College Hospital and Islami Bank Medical College Hospital. A total of 270 mothers were interviewed within 1 month of their delivery. The purposively selected participants were asked about their socio-demographic characters and other associated factors related to birth of the babies. Weights of the babies at birth were documented from hospital records.

Result: Proportion of LBW was found 28.1% with no significant sex variation. Majority of the LBW babies were found in mothers of 15-20 years of age group. Mothers' educational qualifications, occupations, early age pregnancy and type of pregnancy were associated significantly for LBW. Less than 37 weeks of gestational age of baby, home delivery, NVD were also significant risk factors of LBW. Residence and sex of neonate were not significantly associated with LBW.

Conclusion: Proportion of LBW in tertiary care hospitals were found 28.1%. Early maternal pregnancy, lower gestational age, higher parity, NVD and home delivery played an important role in the incidence of LBW.

Key words: Low birth weight, Gestational age, Maternal risk factors.

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Introduction

Weight at birth of a new born baby is a reliable indicator for foetal wellbeing and maturity. It also affects its survival and quality of life[1]. It is estimated that 15% to 20% of all births worldwide are LBW, representing more than 20 million births a year. Infants weighing less than 2,500 grams at birth are considered to be of low birth weight. This criterion was recommended by the American Academy of Paediatrics in 1935 and adopted by the World Health Organization (WHO) in the

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Sixth Revision of the International Lists of diseases and causes of death (1948). LBW infants may be either premature, that is, born before 37 weeks of gestation, or full term but small for their gestational age. Recent studies have found that LBW increases the risk for noncommunicable diseases such as diabetes and cardiovascular disease in later life[2,3]. The goal is to achieve a 30% reduction in the number of infants born with a weight lower than 2500 gm by the year 2025[4].

There is considerable variation in the prevalence of low birth weight across regions and within countries; however, the great majority of low-birth-weight births occur in low and middle-income countries and especially in the most vulnerable populations[5]. Regional estimates of LBW include 28% in south Asia, 13% in sub-Saharan Africa and 9% in Latin America. A high percentage of infants are not weighed at birth, especially in low-income countries. Therefore, identifying populations at greatest risk of low birth weight, as well as those that are most likely to face barriers in access to health and nutrition interventions, is a global priority and fundamental for the success of large scale programmes. There are multiple causes of low birth weight, including early induction of labour or caesarean birth (for medical or non-medical reasons), multiple pregnancies, infections and chronic conditions such as diabetes and high blood pressure[6].

In Bangladesh the first National Low Birth Weight Survey (NLBWS) was conducted in 2003-2004 and reported in 2005. The study found an average birth weight of 2,632 gm and 36% of the newborns were less than 2,500 gm[7]. This indicates that the low birth weight rate is still a national health problem in Bangladesh. The risk of neonatal death for infants who are LBW weighing 2000-2499 gm at birth is estimated to be four times higher than for infants weighing 2500-2999gm and ten times higher than for infants weighing 3000-3499 gm[8].

The proposed Sustainable Development Goal (SDG) target for child mortality aims to end by 2030, with all countries aiming to reduce neonatal mortality to at least as low as 12 deaths per 1,000 live births and under-5 mortality to at least as low as 25 deaths per 1,000 live births. Urgent action is needed to accelerate reductions in child mortality to reach the SDG targets on ending preventable child deaths by 2030. This study was undertaken with the aim to provide locally representative data on the proportion of LBW including Intra Uterine Growth Retardation (IUGR) and associated maternal factors related to LBW against which interventions might be planned and implemented and progress might be measured towards the impact of relevant interventions[9,10]. Significant reduction in prevalence of LBW is necessary to achieve SDGs.

Materials and Methods

It was a cross-sectional type of descriptive study. This study was conducted from July, 2017 to December, 2018. Total sample size was 270 who were selected through purposive sampling technique. After taking informed consent from the participants, data was collected by principle investigator according to a pretested partially structured questionnaire from Rajshahi Medical College Hospital and Islami Bank Medical College Hospital, Rajshahi within 1 month of delivery. Respondents were asked about their socio-demographic characteristics and different birth related factors. Weight of the baby at birth was recorded from hospital document. Respondents with severe post-partum complication were excluded from the study. All the collected data were checked, compiled and statistically assessed to search any significant association between maternal factor and LBW. Statistical analysis was done by SPSS (version 16) and statistical significance was set at $P<0.05$.

Results

Table 1 showed the socio-demographic characteristics of the respondents. Most of the respondents (40%) were in 15-20 years age group. Rural and urban distribution was almost equal. Majority (88.5%) of the

mothers had secondary level of education and most of them (93.7%) were homemakers. More than a half (53%) of the respondents belonged to joint/extended family.

Table 2 and 3 showed that the mean age of the respondents was 23.48 ± 5.01 years. The mean birth weight of the babies was 2.6912 ± .69796 kg with proportion of LBW 28.1%. Among the babies, male was 54.8% and female was 45.2%. Majority of the participants (70.4%) had more than 37 weeks of gestation. About 55.9% were para 1 and 44.1% were para 2 to 5. Most (94.4%) of the deliveries were hospital delivery with 71.9% by LUCS. Majority (72.2%) of the respondents had attended regular ANC visits during their pregnancy period.

Table 4 and figure I showed the association of different risk factors with LBW. Majority (59.2%) of LBW found in mothers of 15-20 years age group and maternal age was found as a significant risk factor for LBW. Mothers of primary level education had delivered significantly more LBW baby (22.4%) than the graduates (13.2%). Gestational age of baby was found significantly associated with LBW. New born babies who were delivered in the gestational age of <37 weeks were significantly associated with LBW compared to babies born in the gestational age of >37 weeks. In addition, the risk of LBW was significantly more in those who were multipara compared to primipara. Parity, place of delivery, mode of delivery, previous history of LBW were also found significantly associated for LBW.

Table 1 Socio-demographic characteristics of the respondents (n=270)

Variables	Frequency	Percentage
Age group of mothers (years)		
15-20	108	40.0
21-25	73	27.0
26-30	70	25.9
31-35	14	5.2
36-45	5	1.9
Residence		
Urban	130	48.1.
Rural	140	51.9
Educational status		
No schooling	6	2.2
Primary	25	9.3
Secondary (SSC) to Higher	190	70.4
Secondary (HSC)		
Graduation and above	49	18.1
Occupation		
Housewife	253	93.7
Service	13	4.8

Others	4	1.5
Type of family		
Nuclear	127	47.0
Joint	143	53.0

Table 2 Mean and Standard deviation (Mean ± SD) of different covariates of the baby and the respondents

Variables	N	Mean ± SD
Age of the mother (years)	270	23.48 ± 5.01
Birth weight of baby (kg)	270	2.6912 ± .69796
Gestational age of baby at birth (weeks)	270	37.00 ± 3.12
BMI of mother	270	2.56 ± 0.68

Table 3 Birth related associated factors of respondents (n=270)

Variables	Frequency	Percentage
Birth weight group		
Low birth weight (<2.5 kg)	76	28.1
Normal birth weight (2.5-4.5 kg)	194	71.9
Gestational age of baby (weeks)		
27-30	18	6.7
31-33	23	8.5
34-36	39	14.4
>37	190	70.4
Sex of neonate		
Male	148	54.8
Female	122	45.2
Parity of mother		
Para 1	151	55.9
Para 2	88	32.6
Para 3	25	9.3
Para 4+	6	2.2

Place of delivery		
Home	15	5.6
Hospital	255	94.4
Mode of delivery		
NVD	76	28.1
LUCS	194	71.9
Type of pregnancy		
Single	238	88.1
Multiple	32	11.9
Antenatal visit		
Regular	195	72.2
Irregular	75	27.8
Previous history of LBW baby		
Yes	10	13.2
No	41	53.9
Not applicable	25	38.1

Table IV Association between different factors with birth weight of the baby

Variables	Birth weight (kg)		χ^2	*p* value
	LBW (<2.5 kg) (n = 76)	NBW (2.5-4.5 kg) (n = 194)		
Age group of the mother (years)				
15-20	45 (41.7%)	63 (58.3%)	26.37	**.000**
21-25	8 (11.0%)	65 (89.0%)		
26-30	14 (20.0%)	56 (80.0%)		
31-35	7 (50.0%)	7 (50.0%)		
36-45	2 (40.0%)	3 (60.0%)		
Educational status of the mother				
No schooling	3 (50.0%)	3 (50.0%)		
Primary	17 (68.0%)	8 (32.0%)	17.34	**.000**
Secondary + Higher 2ndary	46 (24.2%)	144 (75.8%)		
Graduation and above	10(20.4%)	39 (79.6%)		
Occupation of the mother				
Housewife	72 (28.5%)	181 (71.5%)	2.00	.367
Service	2 (15.4%)	11 (84.6%)		
Others	2 (50.0%)	2 (50.0%)		

Residence				
Urban	35 (26.9%)	95 (73.1%)	0.18	.666
Rural	41 (29.3%)	99 (70.7%)		
Gestational age of baby (weeks)				
27-30	18 (100.0%)	0 (0)	24.50	**.000**
31-33	23 (100.0%)	0 (0)		
34-36	23 (59.0%)	16 (41.0%)		
>37	12 (6.3%)	178 (93.7%)		
Sex of neonate				
Male	43 (29.1%)	105 (70.9%)	0.13	.715
Female	33 (27.03%)	89 (73.03%)		
Parity of mother				
Para 1	44 (29.1%)	107 (70.9%)	11.71	**.020**
Para 2	22 (25.0%)	66 (75.0%)		
Para 3	6 (24.0%)	19 (76.0%)		
Para 4+	4 (66.7%)	2 (33.3%)		
Place of delivery				
Home	14 (93.3%)	1 (6.7%)	33.36	**.000**
Hospital	62 (24.3.%)	193 (75.7%)		
Mode of delivery				
NVD	51 (67.1%)	25 (32.9%)	79.37	**.000**
LUCS	25 (12.9%)	169 (87.1%)		
Type of pregnancy				
Single	60 (25.2%)	178 (74.8%)	8.57	**.003**
Multiple	16 (50.0%)	16 (50.0%)		
Previous history of LBW baby				
Yes	10 (52.6%)	9 (47.4%)	6.41	**.041**
No	41 (27.7%)	107 (72.3%)		
Not applicable	25 (24.3%)	78 (75.7%)		
Antenatal visit				
Regular	42 (21.53%)	153 (78.46%)	16.05	**.001**
Irregular	34 (45.3%)	41 (54.6%)		

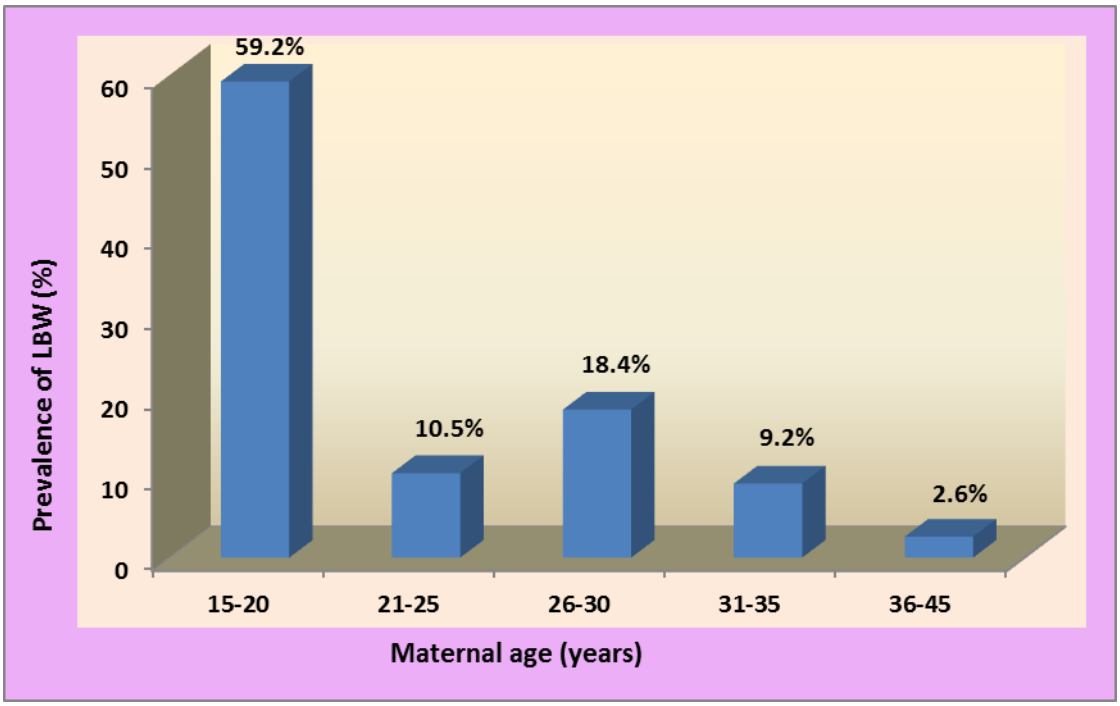

Figure I Prevalence of LBW according to maternal age

Discussion

LBW is a public health problem linked to a wide range of possible predictors. There are a number of studies around the world done on this subject by using different methodologies. Either they evaluate the effects of factors in isolation through cross tabulation or utilizing statistical techniques to see individual factor in presence of others[12,13]. In our study regarding age distribution it was revealed that 40% were in age group of 15-20 years. The proportion of LBW in this study is 28.1%. A previous study, conducted on 1000 pregnant women in Dhaka Medical College Hospital, reported the rate of LBW was 31.2%[12]. Another study in Sir Salimullah Medical College Hospital found the incidence was 45.54% amongst the admitted patient[13].

We found that the age of the mother had a significant relation with LBW. Most of the LBW baby were found in maternal age group 15-20 years. The finding of the present study was similar with studies done in other developing countries[14,15].

Though the likelihood of having an LBW child is negatively associated with the educational status of the mother (i.e. the lower the educational status, the higher the likelihood) but in this study educational qualification was also found as a significant risk factor. In some previous studies it was found as independent risk factor for LBW.[14]

A study conducted in Pakistan[17] observed that if mother had repeated pregnancy she didn't get enough nutrition to improve her health and this severely hamper the health of the baby. But we found mother with first baby was significantly associated with LBW baby. This finding might be due to the fact that most of our LBW baby were found in mother age range in 15-20 years age who were supposed to have less awareness about pregnancy related nutrition and maternal health. We also observed significant association of antenatal visit, place of delivery, mode of delivery with LBW. This was consistent with different studies done in Ethiopia and Nepal[18,19]. We got significantly higher LBW in NVD than caesarean delivery. Our finding is similar to some study

which conclude that children who were delivered by caesarean were less likely to be born with LBW than other babies[20]. The present study findings were clearly at variance with some other international trends in the findings that, children delivered by caesarean had less chance to have LBW[21,22].

Conclusion

It was found that more than one quarter of the babies (28.1%) had LBW. The study showed that some factors those were significantly associated with LBW were maternal age, parity, gestational age, place of delivery, mode of delivery, etc. The findings of present study might help to initiate preventive programme to improve maternal and child health. Large scale national studies involving other primary and secondary care hospitals should be conducted to identify valid and reliable evidence to outline relevant national policies and guidelines.

Conflict of interest: None declared

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