Assessment the Factors Related to Low Birth Weight on Tertiary Hospitals of Sylhet City in Bangladesh

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Abstract

Introduction: Low birth weight (LBW) is one of the major health problems of children both in developed and developing countries. LBW has been defined as a birth weight of less than 2500 grams, with the measurement being taken preferably within the first hour of life. It contributes substantially to neonatal, infant and childhood mortality and morbidity. Across the world, neonatal mortality is 20 times more likely for LBW babies compared to NBW babies ($>2.5\,$kg). It is now a well recognized fact that birth weight is not only a critical determinant of child survival, growth, and development but also a valuable indicator of maternal health, nutrition and quality of life.

Methodology: A descriptive cross-sectional study was conducted at selected Hospitals in Sylhet City of Bangladesh. Total 130 individual mothers of newborn babies were randomly selected for interviewing. A pretested semi-structured questionnaire was used for data collection.

Result: The study enrolled 130 individual mothers of newborn babies. According to their age wise distribution the highest percentage of LBW was 39% at the age group (26-30 years). Status of mother's education who delivered LBW babies 35 % of them completed their primary school level but 39% participants did not get any formal education. Among total LBW babies mother 37% were House maid, 24% Service holder, 21% Day labor and also 18% was Housewife. Iron and vitamin supplementation during pregnancy were found significantly less among the mothers of LBW babies 69.6% (23out of 33) and it was more in mother of normal birth weight babies 82.4% (80 out of 97).Those data showing significant positive effect of iron and vitamin supplementation during pregnancy and negative effect of maternal anemia on birth weight. But here shows strong relationship between infant birth weight and her previous gestational age whose delivery occurred before 37 weeks of them 81% were delivered low birth weight babies.

Conclusion: This study was conducted to identify the factors related to LBW. Study findings suggest that improving maternal education and nutrition, taking adequate

rest, antenatal check-up, gestational age and iron supplementation during pregnancy can prevent LBW.

Keywords: Low birth, Maternal health, Education and Nutrition.

Introduction

Low birth weight (LBW) is one of the major health problems of children both in developed and developing countries. It is one of the most serious challenges in maternal and child health. Its public health significance may be ascribed to numerous factors – high incidence, association with physical and mental retardation, high risk of perinatal and infant mortality and morbidity, human wastage and suffering, the very cost of special care and intensive care units and its association with socio economic under development.

LBW has been defined by the World Health Organization (WHO) as weight at birth of less than 2,500 grams (5.5 pounds) in first hour of delivery (WHO, 1992). This practical cut-off for international comparison is based on epidemiological observations that infants weighing less than 2,500 gm are approximately 20 times more likely to die than heavier babies [1].A birth weight below 2,500 gm contributes to a range of poor health outcomes which is more common in developing than developed countries. LBW is closely associated with foetal and neonatal mortality and morbidity, inhibited growth and cognitive development of children, and increased risks of chronic diseases later in life [2]. Many of them suffer from protein-energy malnutrition and infection [2]. Evidence now shows that adults born with LBW face an increased risk of chronic diseases including high blood pressure, non-insulin dependent diabetes mellitus, coronary heart disease and stroke in adulthood [3]. LBW is the single most important factor determining the survival chances of the child. Many of them die during the first year of their life[4]. Every year approximately 17 million infants in developing countries are born with LBW [5] and those who survive have little chance of fully reaching their growth potential. The latest regional estimates of LBW range from 25% in South Asia, where more than one-half of the world's respondents were all mothers who delivered babies LBW infants are born, to

10% and 12% in Sub-Saharan Africa and Latin America, respectively[6]. Although these rates are higher than the goal of 10% that was established by the world leaders at the 1990 World Summit for Children, the between June to September 2009. Official permission for data for examining trends in developing countries are limited and the quality of data are questionable when available. More than two-thirds of births are not reported in many parts of Africa, Asia, and Latin America, as many deliveries occur in homes or small health clinics[7]. This may result in an underestimation of the proportion of babies with LBW, because lower-income, higher-risk groups may be the least likely to be included in hospital or urban-based data sets.

Being born underweight is one of the major problems faced by infants in Bangladesh. Bangladesh is among the poorest countries of the world, with low socio-cultural, economic and health statistics. As there is no civil registry, it is impossible to obtain reliable information on health statistics (WHO, 2007). Also not many studies have been done on newborn babies in Bangladesh. According to WHO health statistics the prevalence of LBW (weight <2500 grams) in Bangladesh was about 40% in 2005[7].

LBW also indicates malnutrition and ill health of the mother. There is a significant and strong correlation between maternal nutrition and the length of pregnancy and birth weight. High incidence of LBW indicates the deficient health status of the mother, inadequate antenatal care and the need for improved care of the newborn babies[7]. It has long been used as an important public health indicator. LBW is not a proxy for any one dimension of either maternal or perinatal health outcomes. Globally, the indicator is a good summary measure of multifaceted public health problems that include long-term maternal malnutrition, ill health, hard work and poor pregnancy health care. The smaller the baby, the more important it is to monitor his or her growth in the weeks after birth. This is particularly important for infants at high risk of poor feeding and inadequate growth. Countries should therefore be encouraged to ensure accurate and reliable weighing of infants as close to birth as possible.

LBW was regarded as one of the major targets of the Health for All (HFA) initiative and the Millennium Development Goals (MDGs). The goal of reducing the incidence of LBW by at least one third between 2000 and 2010 is one of the major goals of the Declaration, 'A World Fit for Children', and the Plan of Action adopted at the United

Nations General Assembly Special Session on Children in 2002[8]. Like other developing countries, quality and quantity of the relevant data for analyzing trends of LBW in Bangladesh is lacking [9]. The current study is aimed at identifying the proportion of LBW at a tertiary level hospital in Bangladesh for a selected period of time.

Methodology

 A descriptive cross-sectional study was conducted at Sylhet M.A.G Osmani Medical College Hospital and Sylhet Women's Medical College Hospital in Sylhet City of Bangladesh. The study was conducted from January to April 2017.Total 130 individual mothers of newborn babies were randomly selected for interviewing. A pretested semi-structured questionnaire was used for data collection. The collected data were analyzed by computer statistical software program (SPSS version 16).

Results

The study enrolled 130 individual mothers of newborn babies. According to their age wise distribution the highest percentage of LBW was 39% at the age group (26-30 years). Status of mother's education who delivered LBW babies 35 % of them completed their primary school level but 39% participants did not get any formal education. Among total LBW babies mother 37% were House maid, 24% Service holder, 21% Day labor and also 18% was Housewife. Iron and vitamin supplementation during pregnancy were found significantly less among the mothers of LBW babies 69.6% (23out of 33) and it was more in mother of normal birth weight babies 82.4% (80 out of 97).Those data showing significant positive effect of iron and vitamin supplementation during pregnancy and negative effect of maternal anemia on birth weight. But here shows strong relationship between infant birth weight and her previous gestational age whose delivery occurred before 37 weeks of them 81% were delivered low birth weight babies.

Table 1: Age wise distribution of those neonates mother (n=130).

Variables	LBW babies n=33	NBW babies n=97
Age group (years)		
16-20	07 (33%)	14 (14%)
21-25	08 (20%)	33 (34%)

26-30	13 (39%)	20 (21%)
31-35	04 (14%)	25 (26%)
36-40	01 (17%)	05 (5%)

Table 1: Total 130 individuals of mother. According to their age wise distribution the highest percentage of LBW was 39% at the age group (26-30 years) and the second highest percentage was 33% at the age group (16-20 years).Here the lowest percentage was found 14% at the age groups (31-35 years). But alarming that 16% mother of total respondents became pregnant below 20 years.

Table 2: The education status of neonate's mother

Level of Education	Percentage of who delivered LBW babies	Percentage of who delivered NBW babies
None	39%	2%
Primary school certificate	35%	45%
Junior school certificate	18%	36%
Secondary school certificate & above	8%	17%

Table 2: Mother's education about half of the mother (who delivered LBW babies) 35% education was primary school certificate but 39% none. Junior school certificate complete 18% and only 8% had SSC and more education.

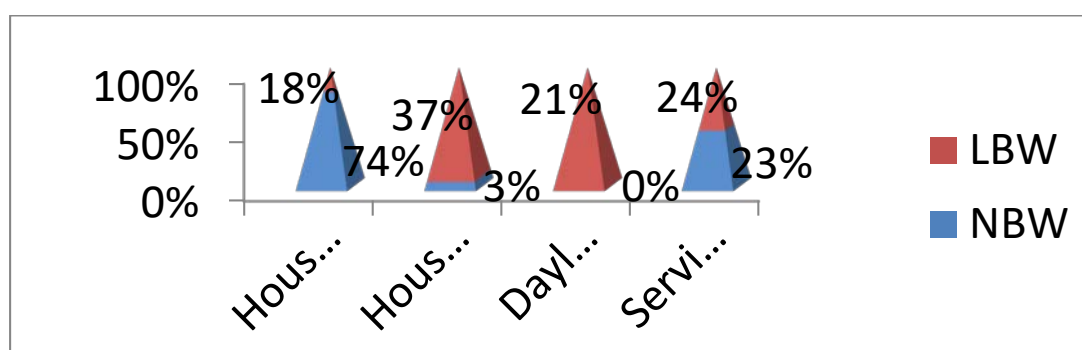**Figure-1. The occupation of neonates mother.**

Figure-1: Among total LBW babies mother 37% were House maid and 24% Service holder. Here 21% day labor and also 18% was housewife. That's why it's

established that moderate and heavy work increase the chance of delivered LBW babies.

Table 3: The residential status of respondent affecting birth weight of their babies.

Residence	LBW babies n=33	NBW babies n=97
Urban	26 (78%)	77 (79%)
Rural	07 (22%)	20 (21%)

Table-III: In this study showed there is no any significant relation showed birth weight with respondent residence.

Figure 2: The effects of Vitamin & IFA taken (during pregnancy) among respondents on neonates birth weight.
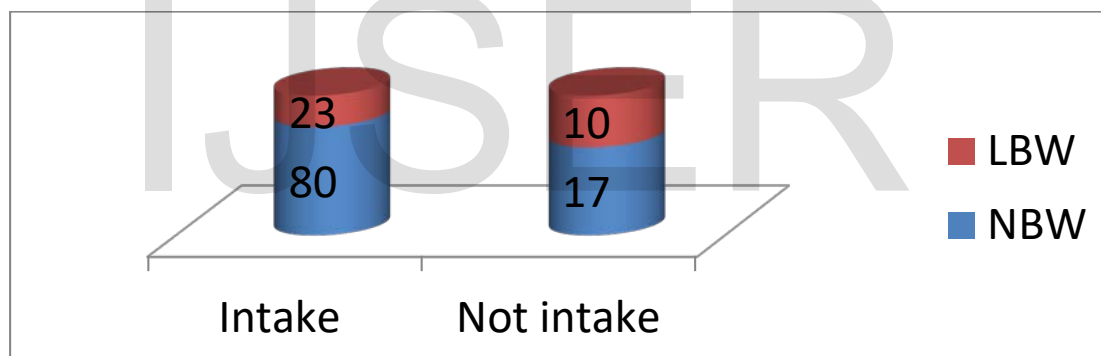

Figure 2 Iron and vitamin supplementation during pregnancy were found significantly less among the mothers of LBW babies 69.6% (23out of 33) and it was more in mother of normal birth weight babies 82.4% (80 out of 97).Those data showing significant positive effect of iron and vitamin supplementation during pregnancy and negative effect of maternal anemia on birth weight.

Table 4: The effects of maternal health service on neonates birth weight.

ANC Status	LBW babies n=33	NBW babies n=97
None	47%	7%

3 ANC	34%	37%
3+ ANC	19%	56%

Table 4: Out of 130 respondents who's were never taken any antenatal checkup, they delivered 47% low birth weight babies. But who were taken more than 3 antenatal checkup delivered only 19% low birth weight babies.

Figure 3: The effects of adequate rest among respondents on neonates birth weight.
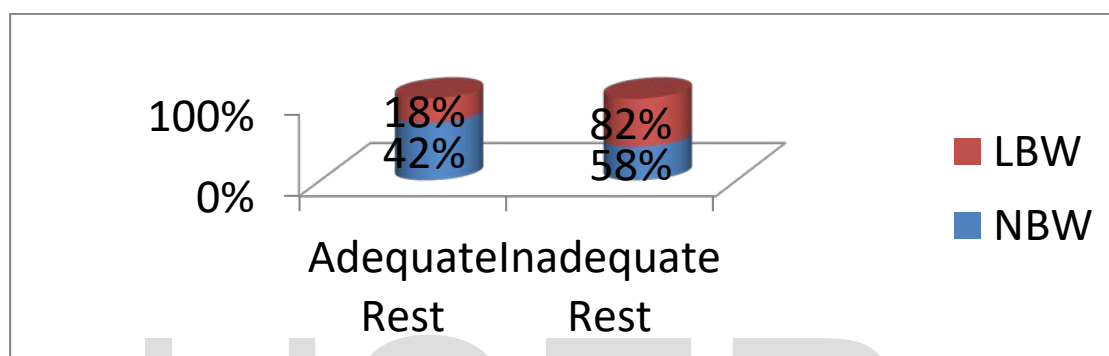

Figure 3: Here showed taking adequate rest during pregnancy helps to delivered normal birth weight baby. During pregnancy taking in adequate rest due to multiple reason they delivered 58% low birth weight babies.

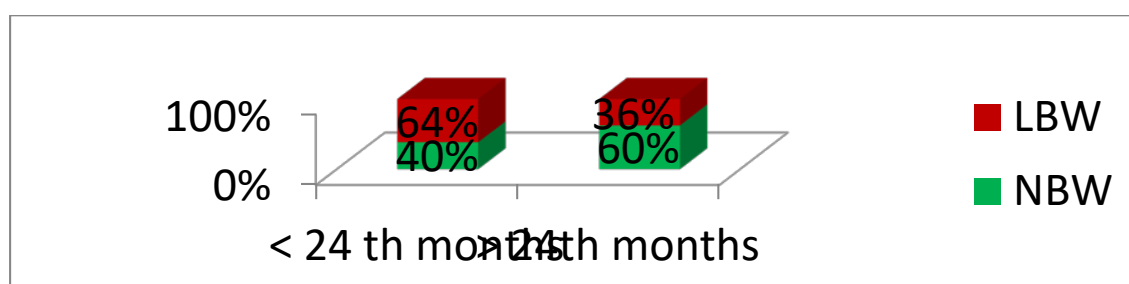**Figure 4: The effect of birth spacing on neonate birth weight.**

Figure 6: If birth spacing is more than 2years, it significantly reduces the rate of low birth weight.

Table 5: The age of respondent during 1ˢᵗ pregnancy affecting infant birth weight

Age during 1ˢᵗ pregnancy(in Year)	LBW babies n=33	NBW babies n=97
<18	52%	23%
18-19	30%	63%

| 20-21 | 15% | 8% |
| 22 & above | 3% | 6% |

Table 5: Among total low birth weight babies mother Age wise first pregnancy 17 person (52%) were below 18 years and 10 person (30%) in 18-19 years.05 (15%) within 20-21 years and 1 person (3%) were 22 & above aged.

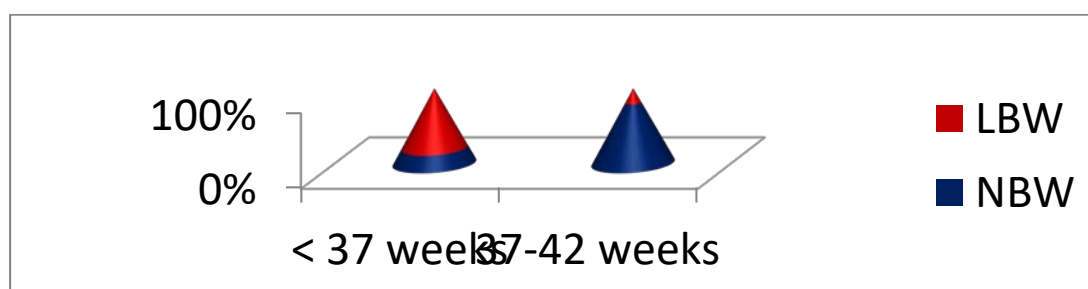**Figure 5: The effect of gestational age on neonate birth weight**

Figure 5 Out of 130 babies 46 (36%) were born before completing 37 weeks of the gestational period, where as 84 (64%) were born after completing 37 weeks (up to 42 weeks) of the gestational period. But here shows strong relationship between infant birth weight and her previous gestational age. Whose delivery occurred before 37 weeks, of them 81% were delivered low birth weight babies.

Discussion

The goal of this study to assess the status and determinants of low birth weight among delivered baby at tertiary hospitals of northeastern city in Bangladesh. The study found that socioeconomic and lifestyle variables play a significant role regarding the prevalence of LBW. Complications of the worldwide prevalence of LBW show a large variation among regions. Although the prevalence is highest in developing countries.

LBW is considered to be an indicator not only of the health and nutritional status of the pregnant woman but also of the social development of the population of a country.

The global prevalence of LBW is 15.5%, which means that about 20.6 million such infants are born each year, with 96.5% of them in developing countries. There is a significant variation in LBW incidence rates across the United Nations regions, with

the highest incidence in South-Central Asia (27.1%) and the lowest in Europe (6.4%) [10].

The results of this study showed that LBW in a tertiary level hospital is 25.49%,.

Another study in Sir Salimullah Medical College, Dhaka found that the incidence of LBW was 33.54% among admitted patients.

Compared to another study done in The Dhaka Shishu Hospital, the current study found that the incidence of LBW was 33% among the young mothers (16-20 years), which is supported by another study conducted at the same hospital [11].

A previous study conducted on 1,000 pregnant women in Dhaka Medical College Hospital, reported the rate of LBW was 31.2% [12].

In the current study, significant association was found among family income (p<0.001) and LBW. In general, the rate of LBW was higher in low family income groups. Similar findings were observed in other studies in Bangladesh and other countries. This study also reveals that women with low body weight (less than 55 kg) were more likely to deliver small babies. Low maternal weight may also increase the risk of prematurity.

In this study, respondents universally receive a balanced diet and extra nutrients but iron and folic acid supplementation was not universal. Several studies identified an association between maternal nutrition and LBW babies but in this study no significant association found. As most of the mothers from better socioeconomic backgrounds, it can be assume that data may not reflect the actual situation as there is no standard concept of having a balanced diet or extra nutrient supplementation among the respondents.

LBW is a public health problem linked to a wide range of possible predictors, sometimes those are difficult to handle. Despite efforts to decrease the proportion of newborns with LBW, success has been quite limited and the problem persists in both developing and developed countries. There are a number of studies around the world done on this subject by using different methodologies.

Either they evaluate the effects of the factors in isolation through cross tabulations or, utilizing statistical techniques to see the individual factors in presence of others. The later is more likely to give a better indication of the contribution to low birth weight of each of the various risk factors. Both ways were followed in this study. Some of the information of this study was collected from the mother by interviewing her and some

by reviewing the records. If it could have been possible to cross check the mother's interview answer with that of records, it would have been better enough.

Most of the mother of LBW babies in this study belonged to the 16-20 years where as it was 31-35 years for the mother with normal birth weight babies. Thus the maternal age of 21-25 years has found to be the most suitable age group for giving birth to normal weight babies. The finding of the present study is in agreement with many similar studies in developing countries.

Mother's educational status has great influence on birth weight of the baby. In this study maternal education, income and occupation had significant association with birth weight. The findings are similar with some other studies. There is statistically insignificant association between family size and birth weight.

The relationship of incidence of low birth weight and gestational age at 1st visit was significant. The relationship between pre delivery BMI and birth weight is consistent with a large number of studies in the west and in developing and Gulf countries though most of them used post delivery BMI. But there was negative correlation between maternal BMI at 1st visit and birth weight.

The present study showed the positive effect of number of antenatal care visit on birth weight. Mothers received 3 or more antenatal care gave birth to higher birth weight babies in comparison to mothers who received less than 3 antenatal care visits.

Conclusions

Low birth weight is now a global concern & one of the most serious problems in the world, especially in the developing and least developed countries. The situation is really alarming, especially for the least developed countries like Bangladesh.

Low birth weight (<2,500 g) affects 25.49% of infants in Bangladesh, more than twice the 15% threshold that indicates a public health problem. Less than 1% of infants were born with very low birth weight (<1,500 g).

The status of LBW higher among girls (60.6%) than boys (39.39%). However, this finding is not necessarily a cause for concern as birth weights throughout the world tend to be lower among girls than boys. The higher prevalence among girls is because the cut-off point for LBW is the same for all infants regard less of sex.

Lack of antenatal check-up and iron supplementation during pregnancy, pre-term delivery, and lack of adequate rest during pregnancy is also significant at low birth weight.

This study was conducted to identify the status of LBW in a tertiary hospital in Bangladesh. This study identified that more than a quarter of the babies had LBW, and a significant relationship was demonstrated between LBW and other factors e.g. the socio-economic condition of the families, age, education and physical status of the mothers and the gestational age of the babies. The findings of the present study will help as guidelines to initiate programs 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.

Recommendations

1. Immediate priority should be given to LBW since the growth, health and survival of both children and adults.

2. Special attention should be given to health and nutrition of adolescent girls and women before their first pregnancy and between pregnancies.

3. An advocacy and behavioral communication change (BCC) campaign is needed to ensure that LBW prevention is given a high profile and accepted as important and necessary at all levels Where necessary, interventions studies and operational research should be conduct to identify effective approaches to LBW prevention

4. Efforts must be made to educate women and enhance their social status and level of awareness about cause, prevention initiated by the active collaboration of all sector's involvement, including GO, NGO, donor agencies, different media, local academic institutions and local communities.

5. An effective, low-cost, countrywide intervention across all at-risk groups is needed to reduce the prevalence of LBW. This could be incorporated in the national LBW baby for Bangladesh and be addressed through subsequent programs to control LBW.

6. The implementation of the IPHN national guidelines for prevention and treatment of LBW should be reinforced.

7. Regular monitoring of the prevalence of LBW among all vulnerable groups at national level is needed with a multidisciplinary approach is essential with active

collaboration of all sectors involved, including government, donor agencies, local academic institutions, non-governmental organizations and local communities.

References

1. Kramer MS. (1987) Determination of low birth weight: methodological assessment and meta-analysis. Bull. World Health Org. 65: 663-737.

2. Barker DJP et al. (1992) Maternal Nutrition, Fetal Nutrition & Diseases in later life.

3. Barker DJP et al . (1998) Early growth & CVD.

4. UN ACC/SCN, 2000 & Barker DJP et al . (1998). LBW

5. UN ACC/SCN, (2000) The world nutrition situation- 4th reports.

6. UNICEF, (1998). The state of the world's children.

7. UNICEF, (1998) & WHO, (2007). The state of the world children.

8. UNICEF & WHO, 2004 and Lawn JE, Cousens S, Zupan J et al. (2005) 4 Million neonatal deaths, When? Where? Why?

9. Kawser CA, Islam MN, Selina K.,et al, (1995) Outcome of very LBW neonates in Tertiary level Hospital outside capital of Bangladesh, A study in Faridpur Medical College Hospital

10.   Dhar B, Mowlah G, Nahar S, Islam N. (2002) Birth weight status of newborns and its relationship with other anthropometric parameters in a public maternity hospital in Dhaka, Bangladesh. J. Health Popul. Nutr. 20: 36-41.

11. UNICEF/WHO (2004). Low birth weight: country, regional and global estimates. UNICEF, New York.

12. Begum MR, Bhuiyan AB, Khanam ST. Incidence of e low birth weight babies in DMCH. Bangladesh J Obstet. 1995;10:26–37.