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Low Birth Weight and its Predictors Among the New Borns in a Medical College of West Bengal : A Cross Sectional Study

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ABSTRACT

Background: Low Birth Weight (LBW) is a significant determinant of infant mortalityand childhood morbidity.It is amultifaceted medico-social and a major public health problem globally. Numerousfetal as well as maternal predictors attribute LBW. **Aims:** The present study was conducted among the newborns in Bankura Sammilani Medical College and Hospital to estimate the prevalence of low birth weight as well as to determine its predictors. **Settings, Design, Methods and Material:** This hospital based descriptive cross sectional study was conducted from June - September 2022among 268 newborns in the Post Natal Ward of Bankura Sammilani Medical College and Hospitalwith the help of a predesigned pretested semi-structured schedule. **Statistical Analysis Used:** Trial version of Statistical Package for the Social Sciences was used to analyze the data. Chi square test was applied when necessary. **Results:** 32.1% of the newborns were low birth weight. Age of the mothers, spacing of birth, morbidities present in the mother during pregnancy and anaemia in pregnancy were the factors which were significantly associated with the occurrence of low birth weight. **Conclusions:** Low birth weight is a quite prevalent in Bankura. Strategies may be planned to prevent the modifiable maternal factors like teenage pregnancy, comorbidity, spacing of birth, anaemia in pregnancy etc.

Key Words: *Anaemia, LBW, Morbidities, Spacing of birth, Teenage pregnancy*

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INTRODUCTION

Low Birth Weight (LBW) i.e. weight less than 2500 g at birth as defined by World Health Organization (WHO) is considered as an important predictor of infant mortality.[1] It is also a significant determinant of infant and childhood morbidity.[2] Birth weight is a crucial factor in determining the future growth and attacks of communicable diseases. Many maternal and fetal factors are found to be significantly associated with low birth weight.[3] Studies have shown that fetal growth and development to a great extent are influenced by various factors.[4-7]Maternal age, education of mother, residence, time of pregnancy registration, number of Iron Folic Acid (IFA) tablets consumption during pregnancy were also considered as important predisposing factors.[8]Low Birth Weight is a multifaceted medico-social and a major public health problem globally. It is an indicator of maternal and child health programs and is a determinant of neonatal and infant mortality. Globally,more than 20 million Low Birth Weight occur annually with the incidence of 15 to 20%, majority of this occur in low- and middle-income countries and 95.6% occur in developing nations.[9]Asia constitutes 72% of Low Birth Weight infants born in developing countries.[9] India alone accounts for 40% of Low Birth Weight in the developing world and more than half of those in Asia.[9] Low Birth Weight contributes to a variety of pitiable health outcomes.[10] The majority of LBW in low income countries is due to Intra Uterine Growth Restriction (IUGR), while it is mostly due to Preterm birth in high income countries.[10] The causes of IUGR include, poor nutritional status of the mother at conception, low weight gain during pregnancy due to insufficient dietary intake or extra expenditure of calories, short maternal height due to youthful under-nutrition and infections, anaemia, acute and chronic infections that could result in under-nutrition and consecutive poor pregnancy outcomes including LBW.[11] Regional estimate of LBW was 28% in South Asia, 13% in sub-Saharan Africa and 13% in least developed country.[10,12,13] Among all neonatal death 60 to 80% occur due to LBW.[12] It is an important cause of perinatal mortality and both short- and long-term infant and childhood morbidity. Mortality rate of LBW infant were up to 40 times higher than infants with birth weights of at least 2500 g, and they are many times more likely to end up with long-term handicapping conditions.[14-20] Bankura Sammilani Medical College and Hospital is a tertiary hospital where large number of mothers are admitted for their child

birth. In this context the study was conducted to measure the magnitude of low birth weight and to determine its predisposing factors.

OBJECTIVES

1. To describe the socio-demographic characteristics of the newborns of Bankura Sammilani Medical college and hospital.
2. To estimate the prevalence of low birth weight among the study participants.
3. To determine the associated predictors of low birth weight.

METHODS

Study type and design: It was a hospital baseddescriptive cross sectional study
Study area: Post Natal Ward of Bankura Sammilani Medical College and Hospital (BSMCH)
Study duration:4 months (June - September 2022)
Study population: All the Neonates who were born in BSMCH were the study population.

Inclusion criteria: All the neonatesin the Post Natal WardofBankura Sammilani Medical Collegeand Hospitalwere included as study subjects.

Exclusion criteria:

1. Baby needing special care in Sick Newborn Care Unit(SNCU)
2. Neonates whose mothers were seriously ill
3. Non-consenting mothers

Sample size and Sampling techniques: Total number of babies born during the data collection period were 286 but 18 babies were excluded by exclusion criteria. So, the total sample size became 268. Complete enumeration method was used.
Study tools: A predesigned, pretested, semi-structured schedule was used

Study techniques:
1. Interview of the mother of the study participants
2. Review of relevant records

ETHICS: Ethical approval was obtained from the Institutional Ethics Committee [No. BSMC/IEC/3340].

STATISTICS:

Prior to data collection permission from the concerned authority and ethical approval from the Institutional Ethics Committee was taken. After collection, data were entered in the Microsoft Office Excel sheet and it was checked twice to detect anyerroneous entry. Trial version of Statistical Package for the Social Sciences (IBM SPSS Statistics for Windows, Version 20.0.) was used to analyze the data. Data were expressed in terms of mean, standard deviation, proportion or percentages and subsequently presented in the forms of tables and figures. Chisquaretest and Fisher's Exact test were applied as necessary. For all statistical purposes *P* value less than 0.05 was considered statistically significant.

RESULTS

Majority of the study subjects were born to the mothers who were teenagers (25%), Hindu (89.9%), general caste (41.4%), residing in rural areas (93.7%), belonging to joint families (78.7%), home makers (95.1%) and educated up to secondary level (35.8%). The families of majority (65.3%) of the new-born had BPL cards. **[Table 1]Table 2** revealed that most of the study participants (67.5%) had a birth order of one. Of the rest approximately a quarter of them (26.4%) were born after inadequate birth spacing. The proportion of term babies were higher (78.0%) in the study participants. Majority (82.5%) of the mothers had received at least four antenatal check-ups. Most (75.4%) of the mothers had taken at least 180 IFA tablets during pregnancy. Few of the mothers (14.9%) of the study participants were exposed to passive smoking during pregnancy. 28.7% mothers among the study participants did not take extra meal and majority (95.9%) of the mothers did sedentary activities during pregnancy.**[Table 2]Table 3** showed that almost one third of the study participants (32.1%) were low birth weight.

Table 4 revealed that teenage pregnancy, spacing of birth, morbidities present in the mother during pregnancy and anaemia in pregnancy were significantly associated with the occurrence of low birth weight.

Table 1: Distribution of the study subjects according to socio-demographic characteristics (n= 268)

Socio-demographic characteristics	Number (%)
Age (in years)	
≤ 19	67 (25.0)
>19	201 (75.0)
Religion	
Hinduism	241 (89.9)
Islam	26 (9.7)
Others	1 (0.4)
Caste	
General	111 (41.4)
Scheduled caste (SC)	79 (29.5)
Scheduled tribe (ST)	35 (13.1)
Other backward classes (OBC)	43 (16.0)
Type of family	
Nuclear	57 (21.3)
Joint	211 (78.7)
Residence	
Rural	251 (93.7)
Urban	17 (6.3)
Education of the mother	
Illiterate	25 (9.3)
Below primary	8 (3.0)
Primary	17 (6.3)
Middle school	38 (14.2)
Secondary	96 (35.8)
Higher Secondary	65 (24.3)
Graduate/above	19 (7.1)
Occupation of the mother	
Homemaker	255 (95.1)
Working outside	13 (4.9)
BPL card	
Present	175 (65.3)
Absent	93 (34.7)
Total	**268 (100.0)**

Table 2: Distribution of the study subjects according to background characteristics of pregnancy: (n= 268)

Background characteristics of pregnancy	Number (%)
Birth order	
1	181 (67.5)
≥ 2	87 (32.5)
Time of delivery	
Pre-term	59 (22.0)
Term	209 (78.0)
Birth Spacing (n= 87)	
< 3 Years	23 (26.4)
≥ 3 Years	64 (73.6)
Time of registration of pregnancy	
Within 12 weeks	207 (77.2)
After 12 weeks	61 (22.8)
Number of antenatal check-ups	
< 4	47 (17.5)
≥ 4	221 (82.5)
Number of IFA tablets consumed by mother	
< 180	66 (24.6)
≥ 180	202 (75.4)
Extra meal intake by mother	
Yes	191 (71.3)

No	77 (28.7)
Physical activity of mother during pregnancy	
Moderate	11 (4.1)
Sedentary	257 (95.9)
Exposure to passive smoking during pregnancy	
Present	40 (14.9)
Absent	228 (85.1)
Morbidities present in mother during pregnancy	
Yes	91 (34.0)
No	177 (66.0)
Total	**268 (100.0)**

Table 3: Distribution of the study subjects according to birth weight (n=268)

Birth Weight	**Number (%)**
Low Birth Weight (< 2500 gm)	86 (32.1)
Normal Birth Weight (≥ 2500 gm)	182 (67.9)
Total	268 (100.0)

Table 4: Risk factors associated with low birth weight (n=268)

Background characteristics	**Low Birth Weight (Row %)**	**Normal Birth Weight (Row %)**	**Total (Column %)**
Teenage pregnancy (n=268)			
Present	30 (44.8)	37 (55.2)	67 (25)
Absent	56 (27.9)	145 (72.1)	201 (75)
χ^2 value, df, p value: 4.531, 1, 0.033			
Birth Spacing (n=87)			
<3 Years	13 (56.5)	10 (43.5)	23 (26.4)
≥3 Years	12 (18.8)	52 (81.2)	64 (73.6)
χ^2 value, df, p value: 13.199, 1, 0.001			
Morbidities present in mother during pregnancy (n=268)			
Present	40 (44.0)	51 (56.0)	91 (34.0)
Absent	46 (26.0)	131 (74.0)	177 (66.0)
χ^2 value, df, p value: 11.454, 1, 0.001			
Anaemia in pregnancy (n=268)			
Present	35 (53.03)	31 (46.97)	66 (24.6)
Absent	51 (25.2)	151 (74.8)	202 (75.4)
χ^2 value, df, p value: 19.138, 1, <0.001			

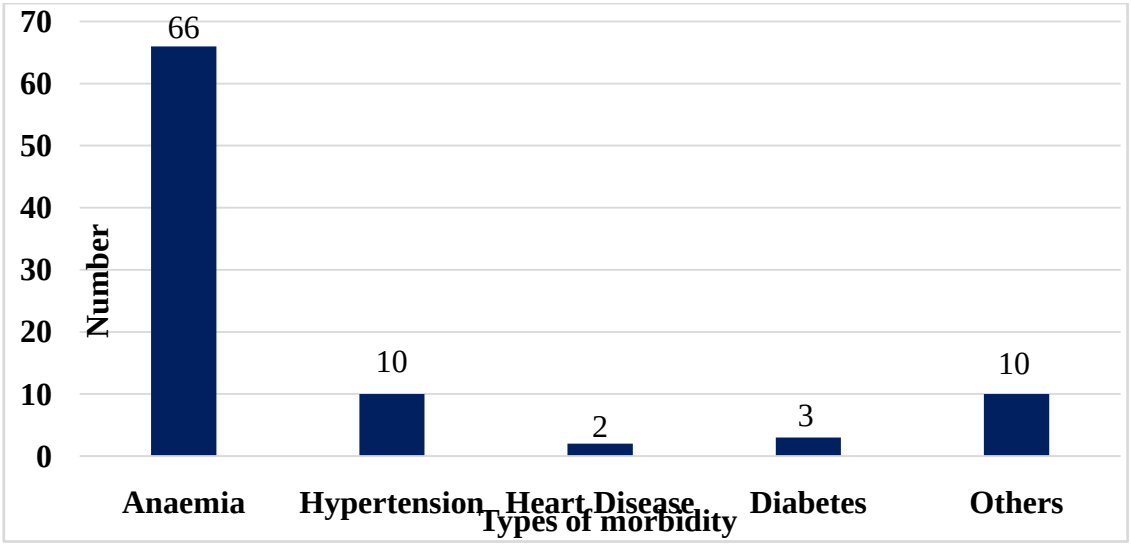

Figure 1: A simple bar diagram showing distribution of the study participants according to type of morbidity of mother detected during pregnancy

DISCUSSION

In the present study 32.1% of the newborns in Bankura Sammilani Medical College and Hospital were of low birth weight. It was also found that teenage pregnancy, spacing of birth, morbidities present in the mother during pregnancy and anaemia in pregnancy were significantly associated with the occurrence of low birth weight.

A recent study done in India by **Ghimire et al.** [19] has reported that maternal age (< 19 years) has a strong association with low birth weight. In our study also teenage pregnancy was proved to be significantly associated with low birth weight. A number of studies have shown correlates of young maternal age, bad obstetric history, maternal anaemia and rural settlements, antenatal care received, prematurity, the birth interval with low birth weight.[21-26]In the present study also it was seen that spacing of birth, morbidities present in the mother during pregnancy and anaemia in pregnancy were significantly associated with the occurrence of low birth weight.

In a study done by **Girma et al.** [27] several factors were found to be associated with low birth weight. Lack of iron and folic acid supplementation, absence of nutritional counselling during pregnancy, not taking snacks during pregnancy, MUAC less than 23 cm and maternal anaemia were identified to be significant predictors of LBW. Similarly in our study anaemia in pregnancy was provedto be significantly associated with low birth weight.**Ganesh Kumar et al.** [28]in their study found anaemia in pregnancy (Hb< 11gm %), age less than 20 years and maternal height (<145 cm)asthe significant risk factors of low birth weight for the term babies. In another study done by **Mavalankar et al.** [29] prevalence of Low Birth Weight stood at 30%. Low maternal weight, poor pregnancy history, lack of prenatal care, clinical anaemia, and hypertension were all significant independent risk factors for term and preterm LBW infants.Also, in another study done by **Hirve et al.** [30]severe anaemia in pregnancy had substantial attributable risk for LBW.

LIMITATION OF THE STUDY: Study duration was short and chances of recall bias and conscious falsificationmaybe present.

CONCLUSIONS

Low birth weight is an important public health problem in our country. Magnitude of low birth weight and its various predictors among the babies born in BSMCH were determined by this study.32.1% of the newborns in Bankura Sammilani Medical College and Hospital were low birth weight. Mothers of 91 newborns out of 268 (33.95%) had different types of morbidities. Anaemia was the commonest morbidity that was present during pregnancy among the mothers (66 out of 91 mothers i.e. 72.5%) of study participants.From this study, it was found that teenage pregnancy, spacing of birth, morbidities present in the mother during pregnancy and anaemia in pregnancy were the important predictors of low birth weight.

DECLARATIONS

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Ethical approval: Ethical clearance was received from Institutional Ethics Committee of Bankura Sammilani Medical College, Bankura. [No. BSMC/IEC/3340].
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Author's Contribution: AG[1] and THM[2] - Concept and design of the study, prepared first draft of manuscript; AG [1] and SSM[3]- Reviewed the literature, and manuscript preparation; THM[2] & SC[4]- Concept, coordination, statistical analysis and interpretation, Interpreted the results; SSM[3] and SC[4] - Revision of the manuscript.

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