ORIGINAL ARTICLE

Study on low birth weight and its associated factors among newborns delivered in a tertiary care hospital of Banda district, Uttar Pradesh

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Article Cycle

Abstract

Background: Low birth weight is associated with higher morbidity and mortality including impaired growth and development, malnutrition etc. Worldwide, one- fifth of newborns delivered are low birth weight. **Aims & objectives:** To estimate frequency of low birth weight & its associated factors among newborns delivered in a tertiary care hospital. **Materials & Methods:** A cross sectional analysis of 290 newborns delivered in tertiary care hospital, Banda, Uttar Pradesh during period of 15th February 2021 to 31st December 2021 was done for estimating low birth weight frequency & its associated factors including child characteristics, mother characteristics & father characteristics using data from medical record section of hospital. Frequency, percentages, mean, standard deviation, chi square test & independent t- test was used. P value <0.05 was considered significant. **Results:** 91 out of 290 newborns delivered were low birth weight (27.9%, 95% CI- 23.1%- 33.4%). The following factors were shown to have a significant association with low birth weight: education of mother (p=0.04), education of father (p=0.03), occupation of father (p=0.02), and duration of pregnancy (p<0.001). **Conclusion:** This study demonstrated that education of mother, education of father, occupation of father, and duration of pregnancy had significant association with low birth weight frequency that suggests that improving literacy status can help in decreasing burden of low birth weight apart from other factors.

Keywords

Introduction

According to WHO, low birth weight is defined as baby weighting <2500 g at birth.(1) Globally, 15 to 20% low birth weight newborns are delivered which accounts to >20 million low birth weights in a year. Low and middle income country contribute over 95% of low birth weight. Regional variation was also observed in number of low birth weight; 9%, 13% and up to 28% of infants were born low birth weight in East Asia, Sub Saharan Africa and South Asia respectively.(2) Low rates of low birth weight

reported in high income regions; 6.9% are reported in UK.(3)

Low birth weight is most important public health problem because of its association with mortality. A systemic review done on low birth weight with literature upto 2011 and in meta-analysis found an odd ratio of 8.5 which was associated with neonatal mortality with full term and birth weight < 2.5 kg.(4)

Small for gestation age (IUGR) is defined as when neonates weight less then 10th percentile or more than 2 SD below the mean for gestation age. Small for gestation

is most important cause of concern in developing countries including India. 25-30% incidence of low birth weight in India (because 60-65% cases of low birth present in the form of intra uterine growth retardation).(5) Infection – malaria, HIV and intrauterine infection and other infection also leads to low birth weight because these conditions causes growth restriction and short gestation. Multiple reasons of maternal side which cause IUGR and pre term births are maternal short stature, maternal malnutrition, low BMI, substance abuse, stress and emotional.(3,6-8)

Government of India has many program for monitoring various crucial indicator (for achieving global targets), National Family Health Survey (NFHS) is one of them. NFHS-3 and NFHS-4 were conducted 2005-2006 and 2015-2016 respectively. NFHS-3 included 11,300 children and NFHS-4 included 99,894, all these children were single live birth, born within last 3 year prior to survey start. In India, prevalence of low birth weight has significantly declined from 20.4% (95% CI 19.4-21.4) to 16.4% (95% CI 16.1-16.8) in the last decade.(9) The World Health Assembly (WHA) focussed on a comprehensive implementation plan on maternal, infant and young child nutrition in 2012, WHA has specified six global nutrition targets including 30% reduction in the number of LBW live births in between from 2012 to 2025.[10]

Weight of newborn is most important indicator for newborn survival, growth and development and it is also depended on many maternal factors. A healthy woman delivers healthy baby and malnourished woman delivers to low birth weight baby.

Aims & Objectives

To estimate the frequency of low birth weight & its associated factors among newborns delivered in a tertiary care institute.

Material & Methods

Study design: We did a cross-sectional analysis of data from Medical Record Section of Rani Durgavati Medical College & Hospital, Banda related to birth weight and its determinants among the newborns who delivered in the Medical College hospital during period of 15th February 2021 to 31st December 2021.

Study population: Newborns who delivered in the Medical College hospital during above mentioned study period.

Sample size: All newborns (n=290) who delivered at Rani Durgavati Medical College & Hospital, Banda in the above mentioned study duration were included in the study.

Data collection: The data collection was done using pre-designed schedule. The variable included in study were related to child characteristics such as birth weight, gender of child, mode of delivery; mother characteristics such as age of mother at marriage & at time of delivery, education, occupation, religion, total alive children & duration of pregnancy; father characteristics such as occupation & education.

Ethics Statement: The study was approved by Institutional Ethics Committee, Rani Durgavati Medical College, Banda. Participants confidentiality was assured by anonymizing data before analysis. Permission for using data was obtained from Incharge, Medical Record Section of Rani Durgavati Medical College & Hospital, Banda. Ref N-RMDCB/ADI/2022/577 Dated 07/05/2022.

Statistical analysis: For analysis, data was imported to trial version of SPSS 20.0. For descriptive statistics, mean & SD, frequency & percentages were calculated and for testing association Chi square test was used for categorical variable & independent t- test was applied for continuous variable. The p-value less than 0.05 considered statistically significant.

Results

Population characteristics: Among 290 newborns delivered, 55.2% were females; 86.2% belonging to Hindu religion; approx. half of parents were educated upto class 10th; approx. half of father were labourer by occupation (44.8%); most of mothers were home makers (95.9%); approx. one-third mothers were <20 years (35.2%) at the time of marriage; most of mother were ≥20 years (99%) at the time of current delivery; more than half of mothers had <2 alive child (55.9%); approx. two-third newborns were delivered by LSCS (63.1%); approx. one-third newborns were pre- term delivered (31.4%). 91 out of 290 newborns (27.9%, 95% CI- 23.1%- 33.4%) delivered were low birth weight i.e. birth weight <2.5 kg. (Table 1)

Factors associated with low birth weight: The proportion of low birth weight was similar in both male (28.5%) & female newborns (27.5%). Similar proportion was also observed in newborns belonging to Hindus (28.0%) & Muslims (27.5%). The proportion of low birth weight was significantly associated with education of mother with highest proportion (36.4%) in mothers educated upto class 10th (p=0.04). The proportion of low birth weight was significantly associated with education of father with highest proportion (45.7%) in illiterate fathers (p=0.03). The proportion of low birth weight was higher in homemakers (28.4%) as compared to others (16.7%) although not significant. The proportion of low birth weight was significantly associated with occupation of father with highest proportion (35.3%) in labourers (p=0.02). The proportion of low birth weight was similar in mothers age <20 years at marriage (28.4%) and age ≥20 years at marriage (27.7%). The proportion of low birth weight was higher in mothers age <20 years at current delivery (33.3%) as compared to mothers age ≥20 years at current delivery (27.9%) although not significant. The proportion of low birth weight was lowest in mothers with alive child ≥3 (16.7%) as compared to others although not significant. The proportion of low birth weight was higher in mothers delivered normally (33.6%) as

compared to mothers delivered by LSCS (24.6%) although not significant. The proportion of low birth weight was significantly lower in newborns delivered at ≥37 weeks (18.6%) as compared to those delivered at <37 weeks (48.4%). (Table 2)

Discussion

The prevalence of LBW in this study was 27.9% (95% CI- 23.1%- 33.4%) which was significantly associated with education of mother, education of father, occupation of father, and duration of pregnancy whereas no significant association was seen with newborn sex, mother age at marriage & current delivery, occupation, type of delivery, number of alive children.

The study showed overall prevalence of LBW in the study countries was 15.9% (range, 9.0 to 35.1%) which was significantly associated with age of mother, education of mother, sex of newborn, parity.(11) The study showed overall prevalence of LBW was 73.3% which was significantly associated with parity, but no significant association was seen with current age & occupation of mother.(12) The study showed overall prevalence of LBW was 57.9% which was significantly associated with age & education of mother.(13) The study showed overall prevalence of LBW was 16.9% which was significantly associated with education of mother but no significant association was seen with age of mother.(14) LBW was significantly associated with parity, age of mother at present delivery and age of mother at marriage.(15) The study showed prevalence of LBW ranged from 9.87%- 73% in different geographical regions of India which was significantly associated with education of mother, type of delivery, sex and birth order of child.(16) The study showed overall prevalence of LBW was 33.78% which was significantly associated with age of mother and religion but no significant association was seen with type of delivery and newborn sex.(17) The study showed overall prevalence of LBW was 16.49% (95% CI 0.16–0.17) which was significantly associated with newborn sex, birth order, maternal education, maternal occupation but no significant association was seen with maternal age.(18) The overall prevalence of low birth weight in the present study was 22.3% which was significantly associated with duration of pregnancy but no significant association was seen with maternal age, education, occupation and age at marriage.(19) The overall prevalence of low birth weight in the present study was 23.6% which was significantly associated with period of gestation but no significant association was seen with maternal age, education, newborn sex and age at marriage.(20) The incidence of low birth weight was 18.1% which was significantly associated with maternal age and gestational age but no significant association was seen with maternal occupation, education, newborn sex.(21) Low birth weight was significantly associated with maternal education and gestational age but no significant association was seen

with maternal occupation, age, newborn sex and mode of delivery.(22) The prevalence of LBW was 17% which was significantly associated with newborn sex, mother education, occupation but no significant association was seen with religion.(23) The prevalence of LBW was 35.1% which was significantly associated with mother age, education, but no significant association was seen with mother occupation.(24) The prevalence of LBW was found to be 24.6% which was significantly associated with gender, religion, education of mother, occupation of father, mode of delivery and duration of pregnancy but no significant association was seen with mother occupation, total alive child, mother age at marriage, current delivery, father education.(25) The prevalence of LBW was found to be 27.4% which was significantly associated with maternal age, education, parity.(26)

Conclusion

The study highlights that various factors are significantly associated with low birth weight among which some are modifiable such as education of father & mother.

Recommendation

As the results showed that education plays an important role in birth weight focusing on education can improve the birth weight to some extent.

Limitation of the study

The study had certain limitations that the study findings could not be generalized as it was based on hospital data which does not include other factors that affects birth weight such as maternal nutrition, ANC check-up etc. for which adjusted analysis would have provided the better estimates of low birth associated factors.

Relevance of the study

The study provides the add on evidence to present literature on low birth weight & its associated factors.

Authors Contribution

Acknowledgement

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Tables

TABLE 1: DEMOGRAPHIC PROFILE OF STUDY PARTICIPANTS (N=290)

Characteristics	Frequency	Percentage (%)
Sex		
Male	130	44.8
Female	160	55.2
Religion		
Hindu	250	86.2
Muslim	40	13.8
Education of father		
Illiterate	35	12.1
upto 10th	129	44.5
12th	37	12.8
Graduate and above	89	30.7
Education of mother		
Illiterate	42	14.5
upto 10th	123	42.4
12th	34	11.7
Graduate and above	91	31.4
Occupation of father		
Labour	130	44.8
Farmer	51	17.6
Business	22	7.6
Private job	30	10.3
Unemployed	19	6.6
Others	38	13.1
Occupation of mother		
Home maker	278	95.9
Others	12	4.1
Age of mother (at marriage)		
<20 years	102	35.2
≥20 years	188	64.8

Characteristics	Frequency	Percentage (%)
Age of mother (at time of delivery)		
<20 years	3	1.0
≥20 years	287	99.0
Total alive child		
<2	162	55.9
2-3	110	37.9
≥3	18	6.2
Mode of delivery		
Normal	107	36.9
LSCS	183	63.1
Weight of child at birth		
<2.5 kg	81	27.9
≥2.5 kg	209	72.1
Duration of pregnancy (in weeks)		
<37	91	31.4
≥37	199	68.6

TABLE 2: FACTORS ASSOCIATED WITH LOW BIRTH WEIGHT (N=290)

Characteristics	Birth weight of child		Total	Chi-Square	P-value
	LBW	Normal			
	n (%)	n (%)	N (%)		
Gender					
Male	37 (28.5)	93 (71.5)	130 (100)	0.033	0.85
Female	44 (27.5)	116 (72.5)	160 (100)		
Religion					
Hindu	70 (28.0)	180 (72.0)	250 (100)	0.004	0.94
Muslim	11 (27.5)	29 (72.5)	40 (100)		
Education of father					
Illiterate	16 (45.7)	19 (54.3)	35 (100)	9.247	0.03
upto 10th	39 (30.2)	90 (69.8)	129 (100)		
12th	7 (18.9)	30 (81.1)	37 (100)		
Graduate and above	19 (21.3)	70 (78.7)	89 (100)		
Education of mother					
Illiterate	12 (28.6)	30 (71.4)	42 (100)	8.574	0.04
upto 10th	44 (36.4)	77 (63.6)	121 (100)		
12th	7 (19.4)	29 (80.6)	36 (100)		
Graduate and above	18 (19.8)	73 (80.2)	91 (100)		
Occupation of father					
Labour	47 (35.3)	86 (64.7)	133 (100)	13.323	0.02
Farmer	17 (33.3)	34 (66.7)	51 (100)		
Business	5 (22.7)	17 (77.3)	22 (100)		
Private job	5 (16.7)	25 (83.3)	30 (100)		
Unemployed	3 (15.8)	16 (84.2)	19 (100)		
Others	4 (11.4)	31 (88.6)	35 (100)		
Occupation of mother					
Home maker	79 (28.4)	199 (71.6)	278 (100)	0.789	0.37
Others	2 (16.7)	10 (83.3)	12 (100)		
Age of mother (at marriage)					
<20 years	29 (28.4)	73 (71.6)	102 (100)	0.020	0.88
≥20 years	52 (27.7)	136 (72.3)	188 (100)		
Age of mother (at time of delivery)					
<20 years	1 (33.3)	2 (66.7)	3 (100)	0.44	0.83
≥20 years	80 (27.9)	207 (72.1)	287 (100)		
Total alive child					
<2	46 (28.4)	116 (71.6)	162 (100)	1.225	0.54
2-3	32 (29.1)	78 (70.9)	110 (100)		
≥3	3 (16.7)	15 (83.3)	18 (100)		
Mode of delivery					
Normal	36 (33.6)	71 ()66.4	107 (100)	2.75	0.09
LSCS	45 (24.6)	138 (75.4)	183 (100)		
Duration of pregnancy (in weeks)					
<37	44 (48.4)	47 (51.6)	91 (100)	27.472	0.00
≥37	37 (18.6)	162 (81.4)	199 (100)		