

Original Research Article

Factors associated with low birth weight among deliveries at a tertiary healthcare hospital in Bundelkhand region of Uttar Pradesh

Seema Barman¹, Naresh Kumar², Ashok Kumar Patel³, Navin Kumar^{3*},
Santosh Kumar Barman³

¹Department of Forensic Medicine, Autonomous State Medical College Fatehpur, Uttar Pradesh, India

²Department of General Surgery, District Hospital, Fatehpur, Uttar Pradesh, India

³Department of Community Medicine, Government Allopathic Medical College Banda, Uttar Pradesh, India

Received: 15 July 2021

Accepted: 13 August 2021

*Correspondence:

Dr. Navin Kumar,

E-mail: navin.bhu2016@gmail.com

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ABSTRACT

Background: Low birth weight (LBW) is an important factor of infant morbidity and mortality in developing countries. Approximately 20.5 million new-borns, i.e., an estimated 15% of all babies are born with LBW globally. Various factors such as maternal age, education, parity, gestation period, nutritional status and socioeconomic status influence the of birth weight of baby. Objectives of the study to find out the prevalence of LBW babies and their determinants.

Methods: This was a hospital based cross-sectional study. The data has been taken from the period of 1st January 2019 to 15th February 2020.

Results: 223 mothers and their newborn babies were included in the study. The 55 infants (24.6 %) were LBW (<2500 g) babies. From binary logistic regression analyses of each variable with LBW; gender {0.430 (0.230-0.804), p=0.007}, religion OR={3.477 (1.178-10.264), p=0.018}, education of mother OR={2.051 (1.009- 4.170), p=0.044}, occupation of father OR={1.991 (1.008-3.933), p=0.045}, mode of delivery OR={1.880 (1.004-3.519), p=0.047} and duration of pregnancy OR={6.286 (2.895-13.648), p<0.001} were found to have significant association.

Conclusions: The study assessed the variables of LBW in Bundelkhand region of Uttar Pradesh. The study showed that teenage mothers are at a higher risk of having a low-birth-weight baby. It is important to strengthen health education, capacity building, spreading awareness for marriage after twenty along with diagnosing and treating any type of medical or gynaecological conditions resulting premature babies.

Keywords: LBW, Bundelkhand, Determinants, Tertiary health care

INTRODUCTION

Low birth weight (LBW) is an important factor of infant morbidity and mortality in developing countries. In India, LBW is a major public health problem. Approximately 20.5 million newborns, i.e., an estimated 15% of all babies are born with LBW globally.¹ “According to WHO, LBW is defined as a birth weight of less than 2500 grams at the time of birth, regardless of the gestational age”.² The weight of newborn should be taken weighed

within the first hour of life before the physiological postnatal weight loss occurs.³ Incidence of LBW babies is different across the countries. In developing countries, the prevalence of LBW is higher than that of developed countries. Majority of LBW births occur in low- and middle-income countries.^{4,5} LBW include 28% in south Asia, 13% in sub-Saharan Africa and 9% in Latin America.⁶ In India, the prevalence of LBW is high at 18.2%.⁷ There is higher risks of early childhood morbidity and mortality of LBW babies when compared with normal birth weights.⁸

Variety of factors such as maternal age, education, parity, gestation period, nutritional status and socioeconomic status influence the of birth weight of baby.⁹ Children with LBW may have poor neuro developmental and cognitive functions, as well as poor academic performance.¹⁰ When these children are grown up, they might suffer from lower earnings and productivity due to their poor cognitive achievements and pre-natal under nutrition.

The birth weight of a new born is an important factor of its survival, development, healthy growth and it also depends on several maternal factors. If mother is healthy, then baby will also healthy, but a malnourished mother delivers LBW baby. This study was planned to find out the determinants associated with LBW among the newborns.

Aims and objectives

Aim and objectives of the study were to find out the prevalence of LBW babies in Bundelkhand region of Uttar Pradesh and to find out association of several predictors with LBW.

METHODS

Study design

This was a hospital based cross-sectional study.

Study duration

The data has been taken from the period of 1st January 2019 to 15th February 2020.

Study area

All desired data was obtained from medical record section, government medical college Banda, Uttar Pradesh.

Inclusion/exclusion criteria

The data which were completely filled according to our objective has been taken from medical record section after taking permission from concerned authority.

Sample size

In this study 223 new born were taken for analysis between the study periods.

Data collection

Demographic and epidemiological characteristics were obtained from electronic medical records. In this study we also have included the weight of new born, period of

gestation, mode of delivery and mean age of mother's marriage and age at time of delivery.

Statistical analysis

Initially data has been entered in MS excel, and then transferred to trial version of SPSS 20.0. The gender of new born, religion, education of father and mother, occupation of father total no. of alive child, mode of delivery, weight of new born and duration of pregnancy were calculated in number and percentage. Also, crude odds ratio and adjusted odds ratio with a 95% confidence interval was estimated for all the potential covariates associated with LBW. The p-value less than 0.05 considered statistically significant.

RESULTS

Two hundred twenty-three mothers and their newborn babies were included in the study. Among the selected 223 babies, 120(53.8%) were male and 103 (46.2%) were female. The details of the maternal socio-demographic characteristics are shown in (Table 1). It was found that majority of them (82.1%) belonged to Hindu religion followed others (17.9%) 86.1% father and 79.4% mother were literate. 64.1% of the baby's father were labourer or farmer. Rest was doing their business, shopkeeper or private job. Most of the mothers were housewife. 35.4% of mothers got their marriage before age of 20 years while 97.3% deliveries occurred after the age of 20 years. Almost equal number of the parents has two and more than two alive children at the time of present delivery. The 51.6% deliveries were normal vaginal while 48.4% occurred through caesarean section. 84.8% deliveries occurred more than or equal to 36 weeks of gestation period while 15.2 % occurred before 36 weeks of gestation.

Table 2 shows that 55 infants (24.6%) were low birth weight (<2500 gm) babies. From binary logistic regression analyses of each variable with LBW; gender OR={0.430 (0.230-0.804), p=0.007}, religion OR={3.477 (1.178-10.264), p=0.018}, education of mother OR={2.051 (1.009-4.170), p=0.044}, occupation of father OR={1.991 (1.008-3.933), p=0.045}, mode of delivery OR={1.880 (1.004-3.519), p=0.047} and duration of pregnancy OR={6.286 (2.895-13.648), p<0.001} were found to have significant association. Education of father, age of mother at the time of marriage, age of mother at the time of delivery and total alive child had no significant association with low birth weight.

As showed in the Table 3 shows multivariate logistic regression analysis of the factors reports that gender, religion and duration of pregnancy were significantly associated with low birth weight. Education of mother, occupation of father and mode of delivery did not show any statistically significant relation with low birth weight.

Table 1: Demographic characteristics of study subjects.

Characteristics	Numbers	Percentage (%)
Gender		
Male	120	58.3
Female	103	46.2
Religion		
Hindu	183	82.1
Others	40	17.9
Education of father		
Illiterate	31	13.9
Literate	192	86.1
Education of mother		
Illiterate	46	20.6
Literate	177	79.4
Occupation of father		
Labour/farmer	143	64.1
Others	80	35.9
Age of mother at the time of marriage (Years)		
<20	79	35.4
≥20	144	64.6
Age of mother at the time of delivery (Years)		
<20	6	2.7
≥20	217	97.3
Total alive child		
<2	111	49.8
≥2	112	50.2
Mode of delivery		
Normal	115	51.6
Caesarean section	108	48.4
Duration of pregnancy (Weeks)		
<36	34	15.2
≥36	189	84.8

Table 2: Association between various factors with LBW.

Characteristics	Birth weight of the child		Odds ratio, 95% CI	P value
	LBW (%)	Normal (%)		
Gender				
Male	21 (17.5)	99 (82.5)	0.430 (0.230-0.804)	0.007*
Female	34 (33.0)	69 (67.0)	Ref	
Religion				
Hindu	51 (27.9)	132 (72.1)	3.477 (1.178-10.264)	0.018*
Others	4 (10.0)	36 (90.0)		
Education of father				
Illiterate	8 (25.8)	23 (74.2)	1.073 (0.450-2.559)	0.874
Literate	47 (24.5)	145 (75.5)		
Education of mother				
Illiterate	16 (36.4)	28 (63.6)	2.051 (1.009- 4.170)	0.044*
Literate	39 (21.8)	140 (78.2)		
Occupation of father				
Labour/farmer	41 (29.1)	100 (70.9)	1.991 (1.008-3.933)	0.045*
Others	14 (17.1)	68 (82.9)		
Age of mother at the time of marriage (Years)				
<20	24 (30.0)	56 (70.0)	1.548 (0.831-2.884)	0.167
≥20	31 (21.7)	112 (72.3)		

Continued.

Characteristics	Birth weight of the child		Odds ratio, 95% CI	P value
	LBW (%)	Normal (%)		
Age of mother at the time of delivery (Years)				
<20	2 (33.3)	4 (66.7)	1.547 (0.27-8.687)	0.618
≥20	53 (24.4)	164 (75.6)		
Total alive child				
<2	29 (26.1)	82 (73.9)	1.170 (0.636-2.152)	0.614
≥2	26 (23.2)	86 (76.8)		
Mode of delivery				
Normal	35 (30.2)	81 (69.8)	1.880 (1.004-3.519)	0.047*
Caesarean section	20 (18.7)	87 (81.3)		
Duration of pregnancy (Weeks)				
<36	20 (58.8)	14 (41.2)	6.286 (2.895-13.648)	<0.001*
≥36	35 (18.5)	154 (81.5)		

Table 3: Multivariate logistic regression of the factors associated with LBW.

Risk factors	Adjusted odds ratio (95 % CI)	P value
Gender	0.415 (0.207-0.832)	0.013*
Religion	4.158 (1.263-13.689)	0.019*
Education of mother	1.793 (0.758-4.242)	0.184
Occupation of father	1.493 (0.667-3.342)	0.330
Mode of delivery	1.284 (0.625-2.638)	0.497
Duration of pregnancy	6.750 (2.857-15.952)	<0.001*

DISCUSSION

This study was carried out among two hundred twenty-three mothers and their newborns, to assess the various factors associated with LBW. The proportion of LBW in this study was less than 25%. Many studies show that prevalence of LBW is almost near to our findings.¹¹⁻¹³ The reason could be; at tertiary health care settings the most of high-risk pregnancies are delivered. Another study from Tamil Nadu reported that the prevalence of LBW was 11.67%.¹⁴ The prevalence of LBW was higher in Northern India (32.3%) than that of the present study.¹⁵ When we compare globally; the prevalence of LBW baby in this study area was higher than those reported in Malaysia (12.6%), Tanzania (13.6%), Sri Lanka (8.7%), Iran (8.8%) but lower than Nepal (34.37%).¹⁶⁻²⁰ In the present study, we found that 33% female child was born with LBW. This study confirms previous study findings that female babies are at a higher risk of LBW as compared to males.²¹⁻²⁴ Possible reason for this might be that female babies has the higher levels of intolerance to mother's glucose.²² Babies born in Hindu families have higher prevalence of LBW. LBW of newborn was also associated with education of mother and occupation of father.²⁵ This was similar with findings from previous studies in India.²⁶ Health-seeking behaviour and the financial condition of the mothers is influenced by education and therefore, literacy plays an important role in determining the birth weight of babies.

Our study shows that mothers under age of 20 years at the time of delivery had a higher risk of giving birth to an

LBW child. This has similarity with previous studies, which found that teenage mothers are at a higher risk of having LBW baby.²⁷ This could be due to physical and mental immaturity of mothers who are under twenty. Also, young mothers have a higher chance to suffer from nutritional deficiency due to their growing age, which could be a risk factor for having an LBW child.²⁶

More than 85% of newborn babies have normal weight delivered through caesarean section. In this study, mode of delivery has significant association with LBW. It was found that newborns delivered by caesarean section were less likely to have LBW as compared to normal vaginal delivery. This means that among caesarean deliveries, LBW is less common; while it is more common among normal vaginal deliveries. It could be that caesarean deliveries are indicated for larger sized babies or any other maternal or foetal complications while smaller size babies are likely to be born normal vaginal.

Maximum percentage of LBW babies were born to mothers with gestational period <36 weeks 20 (58.8%). Prematurity and LBW has stronger association in this study. This association has already been described in previous studies worldwide, and it has been well throughout the main factor for keeping LBW.²⁸⁻³⁰ The finding of this study shows that premature newborns are at higher risk to have LBW. Therefore, it is very important that any medical, gynaecological, or any other complication that could be possible cause of preterm delivery should be recognized timely and managed properly.

CONCLUSION

The study assessed the variables of LBW in Bundelkhand region of Uttar Pradesh. This study investigated the association between maternal age, education of parents, mode of delivery, duration of pregnancy and LBW among the newborns. The study showed that teenage mothers are at a higher risk of having an LBW baby. The findings of this study suggest that the prevalence of LBW can be reduced as most of the variables are modifiable. This can help policymakers and public health personnel in developing interventions for LBW babies. It is important to strengthen health education, capacity building, spreading awareness for marriage after twenty along with diagnosing and treating any type of medical or gynaecological conditions resulting premature babies.

ACKNOWLEDGEMENTS

The authors would like to thanks the authorities of medical record section to give permission for taking data.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Barman S, Kumar N, Patel AK, Kumar N, Barman SK. Factors associated with low birth weight among deliveries at a tertiary healthcare hospital in Bundelkhand region of Uttar Pradesh. *Int J Res Med Sci* 2021;9:2662-7.