

Prevalence and Associated Factors of Low Birth Weight among Newborns in a Tertiary Level Hospital in Nepal

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ABSTRACT

Background

A United Nations Children's Fund reported that the global low birth weight was 15.5%, more than 95.6% of them being from developing countries. Low Birth Weight is a major factor associated with neonatal deaths in developing countries. Also, birth weight is one of the major factor in determining child survival, growth and development.

Objective

The objective of the study was to identify the prevalence and associated factors of low birth weight among newborns delivered in Dhulikhel Hospital.

Method

A cross sectional research design was carried out among all newborns delivered at the maternity ward of Dhulikhel Hospital within a period of one year. Data were collected using delivery record register as well as its electronic version which was available in the ward. The collected data were entered and analyzed using software SPSS 20 version with descriptive and inferential statistics.

Result

Total 2,798 numbers of newborns delivered in the hospital during the period of one year met the inclusion criteria for the study. Among them, 21.6% had low birth weight. We found that low birth weight of newborns was significantly affected by younger age of the mother and lesser weeks of gestation at birth. There were no significantly affected by antenatal clinic visit, parity, sex of the baby, type of delivery.

Conclusion

The study found that more than one fifth of babies had Low Birth Weight. The study findings suggest that special emphasis should be given to minimize early pregnancy to avoid low birth weight babies.

KEY WORDS

Delivery, Hospital, Low birth weight, Newborn

INTRODUCTION

Birth weight is the first weight of the newborn measured after birth which is preferred to measure within the first hour of life before significant weight loss.¹ Birth weight is the single most important criterion for determining neonatal and infant survival. According to WHO, low birth weight (LBW) is defined as live born infants with birth weight less than 2500 grams, irrespective of the gestational age.² A baby's LBW at birth is either the result of preterm birth or restricted fetal intrauterine growth. LBW is closely associated with fetal and neonatal mortality and morbidity, inhibited growth and cognitive development, and chronic diseases later in life.¹

Regional estimates of LBW include 28% in South Asia, 13% in sub-Saharan Africa and 9% in Latin America. Indian Statistical Institute reported nearly 20% of newborns have LBW.³ According to Nepal Demographic and Health Survey (NDHS), the prevalence of LBW in Nepal was 12% which was calculated from the available birth weight of infants. There was no change in the percentage of babies with a low birth weight between 2011 and 2016 in the country.⁴ Similarly, the prevalence of LBW was 15.4% in a data base survey in Nepal.⁵ As per the previous study in Dhulikhel Hospital the incidence of LBW was 11.07%.⁶ The study in Koshi Zonal Hospital showed that prevalence of LBW was 23.1%.⁷ Similarly, the study on prevalence and contributing factors of LBW babies in Patan Hospital showed that the prevalence of LBW was 11.99% and the factors associated with LBW included preterm babies and oligohydramnios.² Maternal age, maternal weight, maternal height, and inter-pregnancy interval were found to be associated with LBW.⁸ The LBW babies are approximately 20 times more likely to die than normal babies. These babies are at increased risk of asphyxia, hypoglycemia, polycythemia, hyperviscosity, and hypothermia. They are also more prone to have impaired neurodevelopment and diabetes mellitus in adult life.⁹

LBW is the strongest determinant of infant morbidity and mortality in developing countries like Nepal.⁸ It is a public health problem caused by factors that are potentially modifiable. Hence, identification of those risk factors associated with LBW is essential in order to guide program planning and organizing care for mother during antenatal care and care of their newborns.³ Thus, the objective of the study was to identify the prevalence and associated factors of LBW among newborns in hospital based delivery.

METHODS

Quantitative cross-sectional study design was undertaken at Dhulikhel Hospital. The register of maternity ward from 13th April 2016 to 13th April 2017 was reviewed for newborns deliveries. All the singleton newborn babies were included in the study. All the newborns of one year excluding multiple deliveries and congenital abnormalities were taken for the study. Total of 2798 newborns were the

total study subjects. Prior to the study, ethical clearance was obtained from the Institutional Review Committee of Dhulikhel Hospital. From the records, multiple pregnancy and stillbirth were excluded.

The normal birth weights were considered as more than or equal to 2500 grams. Low Birth Weight was classified as extremely LBW (less than 1000 grams), very LBW (1000 grams to less than 1500 grams) and LBW (1500 grams to less than 2500 grams,) according to WHO. The newborn whose weight was less than 2500 grams was considered as LBW. First, the data were entered in Microsoft Excel format and transferred to SPSS 20 Version for further analysis. Frequency, percentage and mean were used to expressed descriptive findings In inferential statistics, chi-square test was applied to identify the associated factors for LBW newborns.

Table 1. Background information of the mothers (n=2798)

Characteristics	Frequency	Percentage
Age (In completed years)		
≤20	504	18.0
>20	2294	82.0
Mean ± SD	24.7 ±4.48 years	
Ethnicity		
Disadvantaged Janajati	951	34.0
Upper caste groups	931	33.3
Relatively advantaged Janajatis	739	26.4
Dalits	156	5.6
Others	21	0.7
Parity		
Primiparous	1384	49.5
Multiparous	1414	50.5
Weeks of gestation		
Unknown	33	1.2
<37weeks	233	8.3
≥37 weeks	2532	90.5
ANC Attendance		
No	30	1.1
Yes	2768	98.9
Modes of delivery		
Normal Vaginal Delivery	327	11.7
Normal Vaginal Delivery with Episiotomy	853	30.5
Normal Vaginal Delivery with Tear	792	28.3
Vacuum Delivery	61	2.2
Breech vaginal Delivery	26	0.9
Elective Cesarean Section	178	6.4
Emergency Cesarean Section	561	20.1

RESULTS

Majority of mothers (82%) being more than 20 years of age. The mean age of the mothers was 24.7 ± 4.48 years. Regarding the ethnicity, slightly more than one third of the mothers (34%) were disadvantaged Janajatis, while the other one third were from upper caste groups. Similarly, regarding completed weeks of gestation at delivery, majority (90.5%) of mothers had delivered the newborns after 37 completed weeks of gestation. Most of mothers (98.9%) had visited antenatal clinic (ANC). Among them, 93.5% mothers had four or more ANC visits while only 6.5% mothers had less than four times ANC visited. The most common mode of delivery among them was normal vaginal delivery with episiotomy (30.5%). (Table 1)

The overall prevalence of LBW newborns was 21.6% whose weights were less than 2500 grams irrespective of weeks of gestation. (Table 2)

Table 2. Classification of birth weight of newborns (n=2798)

Birth Weight	Frequency	Percentage
Classification of birth weight		
Extremely Low birth weight	135	4.8
Very Low Birth Weight	131	4.7
Low birth weight	337	12.0
Normal weight	2195	78.4
Prevalence of low birth weight		
Low birth weight	603	21.6
Normal birth weight	2195	78.4

The delivery of LBW newborns among mothers less than or equal to 20 years of age (25.6%) was significantly higher than among mothers more than 20 years of age (20.7%). Hence, occurrence of LBW newborns was found to be significantly associated with lower age group of mothers (p value 0.015). Likewise, prevalence of LBW newborns was also significantly associated with weeks of gestation at birth (p value <0.001). Also, the prevalence of LBW newborns was slightly higher among female babies than among male babies. However there was no significant association of LBW newborns with ANC checked up, parity, sex of the baby and types of delivery. (Table 3)

DISCUSSION

The present study found that prevalence of LBW newborns was 21.6%. This finding was consistent with the finding of the study done in the Zonal Hospital of Nepal (23.1%).⁷ However, this finding was higher than national prevalence of LBW 12% in 2016, NDHS report and 9% in annual report of 2017.^{4,10} Similarly the finding was slightly higher than studies done in Nepal in different institutions.^{2,5,6} Likewise the present study prevalence of LBW was higher than the finding of study done in North India which reveals that prevalence of LBW was 17%.³ The high prevalence of LBW

Table 3. Association between low birth weight and selected variables (n=2798)

Selected Variables	Low birth weight f (%)	Normal birth weight f (%)	p-value
Age of mothers(In years)			
≤ 20	129 (25.6)	375(74.4)	
>20	474 (20.7)	1820 (79.3)	0.015
ANC visited			
No	8(26.7)	22(73.3)	
Yes	595 (21.5)	2173 (78.5)	0.493
Weeks of gestation*			
< 37 weeks	122(52.4)	111(47.6)	
≥ 37 weeks	475(18.8)	2057(81.2)	< 0.001
Parity			
Primi Parous	308(22.3)	1076(77.7)	
Multi parous	295(20.9)	1119(79.1)	0.371
Sex of the baby			
Male	312(21.0)	1174(79.0)	
Female	291(22.2)	1021(77.8)	0.447
Types of delivery			
Vaginal delivery	426(20.7)	1633(79.3)	0.064
Cesarean section	177 (24.0%)	562(76.0)	
Total	603(21.6)	2195(78.4)	2798(100%)

χ^2 test

Note* 33 mothers' weeks of gestation were not recorded

newborns in this study may be because Dhulikhel hospital being a tertiary level hospital and also a referral center for surrounding communities, large number of high risk mothers come to delivery to the hospital.

In the present study, the prevalence of LBW newborns was significantly associated with the mother's age at birth which is consistent with the findings from a study in Janakpur Zonal Hospital.¹¹ However, previous study done in the same hospital did not show significant relation of LBW newborns with age of the mother.⁶ In the present study, there were no significant associations of LBW newborns with ANC checked up, parity, and types of delivery. From a study done in Nepal, the ANC visits during pregnancy were not significant with LBW newborns.⁵ However, previous hospital based study found that ANC visits were found to be significant protective factors against LBW newborns.^{6,12} This study found that female newborns had higher chance of LBW than male newborns. This finding was similar in different studies that female newborns were likely to be more risk of LBW than male newborns.^{6,12}

The information of this study was collected from the delivery records register of the mothers. If it was possible to cross check the record with the mothers' response to questions, better and adequate information (educational status, economic status, the height of mother, iron taking etc.) would have been collected. This was the major limitation of the study.

CONCLUSION

The study found that more than one fifth of babies had Low Birth Weight which is higher as compared to the prevalence of LBW in national figure. The study findings suggest that special emphasis should be given to minimize early pregnancy to avoid low birth weight babies. Also, as preterm deliveries have more chances of having low birth weight babies, every pregnancy should be taken care of to avoid delivery before term as far as possible.

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