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Original Article

Clinical Patterns and Outcome of Low Birth Weight Babies Admitted in NICU Tertiary Hospital of Western Nepal

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Abstract

Introduction: Low birth weight (LBW) is one of the major determinants of neonatal morbidity and mortality. The survival and outcomes of LBW infants varied from hospital to hospital within a country. The objective of the study is to identify the clinical patterns and hospital outcome of LBW babies in a Tertiary care centre, Pokhara.

Methods: A descriptive cross-sectional study conducted in a tertiary hospital after taking ethical approval from the institutional review board. Data on all the LBW babies admitted in Neonatal Intensive Care Unit from 15th May 2019 to 16th October 2020 were retrospectively reviewed. Data entered in excel and descriptive analysis were done in SPSS version 25.

Results: Of 198 LBW babies, 120 (60.6%) were males and 78 (39.4%) females. Mean birth weight was 1.67 kg (± 0.42 SD), median 1.7 kg, ranging from 0.6 kg to 2.4 kg. Mean gestational age was 32.86 weeks (± 2.72 SD) and median was 33 weeks. 187 (94.4%) were preterm and 11 (5.6%) term. By birth weight, 17 (8.6%) were found to be ELBW, 53 (26.8%) VLBW and 128 (64.6%) LBW. 143 (72.2%) were AGA, 54(27.2%) SGA and one was LGA. Hyperbilirubinemia, neonatal sepsis and hypoglycemia were common problems encountered in NICU. Inadequate ANC, premature rupture of membrane, and low hemoglobin were the common maternal factors for LBW babies.

Conclusions: Prematurity was the major cause of LBW and majority were male babies. LBW babies had relatively more problems in NICU.

Introduction

Low birth weight (LBW) is defined as a birth weight of less than 2500 gm regardless of gestational age.[1] It is related to two conditions, namely, preterm birth and birth weight that are small for gestational age (SGA). LBW is considered as an important factor for neonatal morbidity as well as mortality.

Globally, it is estimated that 15 to 20% of all births, or more than 20 million newborns annually, are LBW infants.[1] The burden of LBW in developing countries is more than double the level in developed regions (16.5% vs 7%).[1] The prevalence of LBW in Nepal has decreased from 21% to 12%.[2] However, a higher prevalence data were noted ranging from 21.6 - 23.1% in hospital-based studies.[3,4]

Therefore, knowledge on morbidity and mortality of LBW infants in our institute may help to plan special care and strategies for the management of LBW babies. This study aims to find out the clinical patterns, morbidities during hospital stay and immediate hospital outcome of the LBW babies admitted in tertiary centre in western Nepal.

Methods

A cross sectional descriptive conducted in Gandaki Medical College and Teaching Hospital over a period of one year six months among the LBW babies admitted from 15th May 2019 to 16th October 2020 AD. Ethical clearance was taken from the Institutional Review Committee of Gandaki Medical College with the reference number (100.77.78) before commencing the study. All LBW babies, including inborn (babies delivered in our centre) and out born (babies delivered somewhere but not in our hospital) were recruited in the study. Inborn LBW babies not admitted in NICU, those with inadequate medical data, those babies whose birth weight not documented within 24 hours of life and babies with gross congenital anomalies excluded from the study.

A total 198 LBW babies out of 2218 neonates admitted in Neonatal Intensive Care Unit (NICU) were identified by reviewing the admission registry of NICU and their record files were obtained from medical record section. Medical data regarding perinatal factors, morbidity and mortality were recorded retrospectively. The gestational age (GA) was calculated from the date of last menstrual period (LMP) and confirmed by New Ballard Score method. If LMP was not available or in cases of gross discrepancy between LMP and New Ballard Score, then New Ballard Score method was taken as valid.[5] Mothers with three or less than three antenatal checkup (ANC) visits to health care facility were defined as inadequate ANC visits.[6] Ethnicity of the mother was noted which social hierarchical system of Nepal to which the women's family belonged to and was classified into groups.[7] Mother hemoglobin level below 11 gm / dl during pregnancy is considered maternal anemia.[8] The weight of the babies was labelled as small for gestational age (SGA) when weight lies below the 10th percentile and appropriate for gestation age (AGA) when the weight lies above between the 10 to 90th percentile and large for gestation it lies above 90th percentile. The outcome was classified into four groups as improved, expired, LAMA (babies discharged against medical advice) and referred. Improved babies were those who were discharged after being treated completely in hospital. Expired includes all the babies died in NICU. Babies who went into LAMA were those babies who were either in a very bad medical condition or had some financial burden due to prolonged NICU stay or related to family problems and referred were those babies whose medical conditions were bad and have been asked to transfer in other centre. Data was entered using Microsoft Excel and analyzed using SPSS version 25 (SPSS Inc. Chicago, Illinois, USA). Descriptive statistical tools like frequency, percentage, mean, standard deviation, tables were used to express the result. Chi square test was done for depicting correlation between variables. A p-value of less than 0.05 was considered to be statistically significant.

Results

The study included 198 LBW neonates whose mean birth weight was 1.67 kilograms with standard deviation (SD) ± 0.42 kg and median was 1.7 kg, ranging from 0.6 to 2.4 kilograms. Mean .GA was 32.86 (SD ± 2.72) weeks and median was 33 weeks

Table1. Frequency of LBW babies according to gestational age

Gestational age	Birth wt for Gestational age			Total (%)
	SGA	AGA	LGA	
weeks 28	0	13	0	13 (6.5)
weeks 32 ≤	85	5	1	64 (32.3)
weeks 37 ≤	35	75	0	110 (55.6)
weeks 37 <	11	0	0	11 (5.6)
Total	54	143	1	198 (100)

By GA, majority of LBW babies were preterm (94.4%) and only 11 (5.6%) were term. Among the preterms, 110 (55.6 %) were born at 32 to 37 weeks of gestation, 64 (32.3%) between 28 to 32 weeks of gestation and 13 (6.5%) below 28 weeks of gestation (Table1). While comparing the birth weight with GA, 143 (72.2%) were AGA, 54 (27.2%) were SGA and only one was LGA (Table1).

More than half of the mothers' age (n = 99) ranged from 20 to 25 years with the mean age 23.84 years. Of them, 143 (73.2%) were primi and remaining 41 (20.7%) were second gravida, 11 (5.6%) third gravida and only one mother was fourth gravida. By ethnicity, 54 (27.3%) of mothers were Brahmin, 29 (14.6%) Chhetri, 60 (30.3%) were Dalit, 39 (19.7%) Janajati, eight (4%) Newar, five (2.5%) Muslim and three (1.5%) in other categories. The other maternal factors associated with LBW babies are summarized in Table 2.

Table 2. Associated Factors of mother for preterm delivery (N = (198

Cause of prematurity	Cause of prematurity	Percentage (%)
Inadequate ANC	79	39.9
Premature rupture of membrane	36	18.1
Low maternal hemoglobin	27	13.6
Twins	23	11.6
Pregnancy induced hypertension	22	11.1
Oligohydramnios	17	8.5
Maternal UTI	18	9.0
Antepartum hemorrhage	10	5.0
Fetal distress	5	2.5
Ecclampsia	2	1.0
Short stature	2	1.0
Previous LSCS	2	1.0
Chorioamnionitis	2	1.0
Gestational diabetes	1	0.5

Seventy nine (39.9%) mothers were found to have less than three ANC visits which was found to be the most common associated cause of LBW (Table 2). The second risk factor noted in this study was premature rupture of membrane which was seen in 36 (18.1%) mothers and the third risk factor was maternal anemia noted in 27 (13.6%) cases as summarized in Table 2.

Of the total babies, 159 (81.5%) were admitted within 24 hours of life and 174 (87.9%) were born in our institute and only 24 (12.1%) babies were outborn. Around 128 (64.6%) babies were born vaginally and 70 (35.4%) babies born via LSCS. 177 (89.4%) babies didn't receive any form of active resuscitation whereas remaining 21 (10.6%) received some forms of active resuscitation. During the course of the hospital stay, 26 babies intubated and kept in mechanical ventilation and of whom six babies survived and successfully discharged whereas 11 expired and nine left against medical advice.

Table 3. Comorbidities in LBW babies in NICU

Complication	Frequency (N)	Percentage (%)
Neonatal jaundice	103	52
Neonatal sepsis	93	47
Hypoglycemia	71	35.9
Apnea	47	23.7
Hyaline membrane disease	42	21.2
Hypothermia	23	11.6
Hypocalcemia	19	9.6
Anemia	12	6.0
Seizure	13	6.6
Perinatal asphyxia	13	6.6
CHD	11	5.6
Necrotizing enterocolitis	09	4.5

During the hospital stay, three most common problems encountered were neonatal jaundice (103, 52%), neonatal sepsis (93, 47%) and hypoglycemia (71, 35.9%) (Table 3).

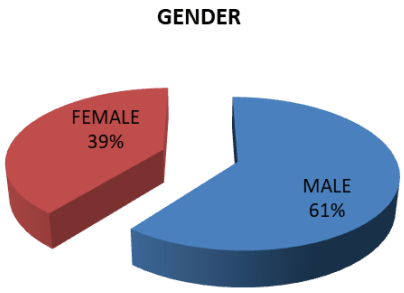
Table 4. Final outcome of LBW babies (n = 198)

A	B	C	D	E	F	G
ELBW	17	3	8	6	0	0.00
VLBW	53	37	10	5	1	
LBW	128	101	11	12	4	
Total	198	141	29	23	5	

Note: A = LBW Categories, B = No (N), C = Improved, D = Expired, E = LAMA, F = Referred, G = p value

Patterns of weight distribution showed 17 (8.6%) were ELBW, 53 (26.8%) VLBW and 128 (64.6%) LBW (Table 4). Of them, 141 (71.2%) were discharged with full recovery, 29 (14.6%) expired, 23 (11.6%) LAMA and five (2.5%) referred (Table 4). Antenatal steroid was received by 55 (27.8%) mothers and surfactant was given to five preterm babies. A total 29 (14.6%) LBW neonates expired and survival outcome was directly proportionate to increasing weight of the babies and was statistically significant (p = 0.00) (Table 4).

Figure 1. Gender wise distribution of LBW babies



By gender, 120 (60.6%) were males and 78 (39.4%) were females (Figure 1). Of them, 128 (64.6 %) were born vaginally and remaining 70 (35.4%) babies born through cesarean section.

Discussion

LBW babies directly or indirectly indicate inadequate maternal health and nutritional status in antenatal period. Birth at early GA carries a risk to have a LBW baby. This finding is similar to another study by S Budhathoki et al conducted in Eastern Nepal.[9] The study findings revealed that male babies outnumbered female babies which was similar to many other studies.[10-12] In contrast, study in Dhulikhel conducted in two different setups found female newborns had higher chance of LBW than male newborns.[4,13] This study found that most LBW babies were delivered to Dalit mothers (60, 30.3%) followed by Brahmin (54, 27.3%), Janajati (39, 19.7%) and Chhetri (29, 14.9%). In contrast, a study by SD Singh et al found baby born to mothers of Brahmin and Chhetri had highest incidence of LBW whereas baby born to Dalit mothers had lowest number of LBW.[13] The difference could be because of the fact that two studies were being conducted in two different .places with different population groups

This present study found more than two third babies (72.2%) were AGA and only one third were SGA. In contrast, a study conducted in Pakistan reported half the babies were AGA (58.4%) and 40.6% were SGA.[14] Around two third babies were born vaginally and the remaining one third were born through Caesarean section. This finding is similar to the study conducted in Eastern Nepal where 71.7% were born through vaginal delivery and only 28.3% were born through LSCS. The common associated factors noted with LBW in this study were inadequate ANC visit, premature rupture of membrane, and maternal anemia. Early detection of high risk pregnancies might be missed due to inadequate antenatal visit which ultimately have a risk of LBW. The second common associated risk was PROM that lead to LBW. The integrity of membrane is maintained by collagen which is dependent on ascorbic acid.[15] Tissue-damaging molecules called reactive oxygen species (ROS) has been suggested to have a damaging effect on collagen in the chorioamnion that could lead to PROM.[16] In the present study, neonatal hyperbilirubinemia (103, 52%) and neonatal sepsis (93, 47%) were the most common morbidities which was similar to other previous studies.[11,12] The least common problem among

LBW babies in this study was necrotizing enterocolitis (9, 4.5%) which is similar to the studies conducted by S Budhathoki et al and L Shrestha et al who found 3% and 4% of the cases having necrotizing enterocolitis respectively.[9,12] In contrast to our study, P Poudel et al in Eastern Nepal found 8.6% of the VLBW babies had NEC. The study findings are contrast due to difference in study population.

The study findings revealed that 29 (14.6%) babies expired during hospital course. It was comparable to many other studies conducted in different centers where 13.82%, 12% and 10.9% LBW babies expired respectively.[11,13,17] Around 141 (71.2%) LBW babies were discharged after full recovery. Of the VLBW babies, 57.14% (40 out of 70) babies survived. This was consistent with the findings of another study conducted by P Poudel et al who found 54.3% VLBW babies survived.[18] The limitations of this study was it is a hospital-based study with limited sample size that cannot be generalized to the community.

Conclusions

Prematurity is the leading cause of LBW babies admitted in NICU. Babies born with lower GA and LBW had higher morbidities and mortality. Common morbidities were hyperbilirubinemia, neonatal sepsis and hypoglycemia whereas inadequate ANC, PROM, maternal anemia were the common associated factors for LBW babies.

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