

Risk Factors and Outcomes of Low Birth Weight Neonates Admitted In a Tertiary Care Center

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ABSTRACT

Introduction: Birth weight <2500 grams, <1500 grams and <1000 grams irrespective of gestational age is low birth weight, very low birth weight and extremely low birth weight respectively. Low birth weight is associated with high morbidity and mortality. **Aim:** To find out the possible maternal risk factors associated with low birth weight babies, morbidities and mortalities seen in them during their hospital stay. **Methods:** Hospital based cross sectional observational study was performed in 200 newborns <2500 grams in Nepalgunj Medical College, Kohalpur, Banke, Nepal. **Results:** Out of 200 neonates 8 (4%), 40 (20%) and 152 (76%) were extremely low birth weight, very low birth weight and low birth weight respectively with Male:Female ratio of 1.12:1. Most common maternal risk factors for low birth weight was Illiterate mothers (88%) followed by preterm delivery (68%). Inadequate antenatal visit was associated with low birth weight (P<0.05). Most common morbidity seen in low birth weight was neonatal sepsis (96%) followed by neonatal jaundice (87%). 44 (22.0%) neonates expired and 156 (78.0%) survived. Neonatal sepsis was most common (36.4%) cause of mortality followed by respiratory distress syndrome (22.7%). **Conclusion:** Certain measures could be taken to prevent low birth weight deliveries: discouraging delivery at teenage, adequate antenatal visits, avoiding smoking and alcohol during pregnancy. Well trained staffs and better facilities in neonatal intensive care unit could improve the survival and minimize the morbidities in low birth neonates.

Keywords: Low birth weight, Morbidity, Mortality, Neonates, Risk factors

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INTRODUCTION

Neonatal period is defined as the first 28 days of life.¹ Birth weight is a major determinant of morbidity, mortality and disability in neonates and children. Low birth weight (LBW) is associated with high morbidity, mortality and lifelong consequences.² LBW has been defined by the World Health Organization (WHO) as birth weight less than 2500 gm irrespective of gestational age.³ Subcategories include Very Low Birth Weight (VLBW) and Extremely Low Birth Weight (ELBW) in which birth weight is less than 1500 grams and 1000 grams respectively.⁴ Worldwide, about 16.0% of live births are LBW. Over 90.0% of these are born in developing countries. Asia is the region with the highest incidence (19.7%), almost 3 times that of Europe (6.5%) or USA (7.0%).⁵ In Nepal, the LBW rate is relatively high, ranging from 14-32%, as documented from various hospital and community based studies. LBW babies in Nepal was reported at 17.8 % according to the World Bank

collection of development indicators in 2011.⁶

LBW is caused by prematurity, intra-uterine growth retardation (IUGR) or both. Poor nutritional status, maternal illness like tuberculosis, anemia, bad obstetric history, poor weight gain, toxemia/pre-eclampsia, placental bleeding, short inter pregnancy interval and multiple pregnancy are other contributing factors. Smoking, alcohol, physically demanding work during pregnancy, lack of the health care facilities, inadequate prenatal care and iatrogenic prematurity/IUGR add to the risk of LBW.⁷

Birth weight is an indicator of greater influence on infant health and survival. Epidemiological data show that an infant born with a low weight is at higher risk of dying as compared to those with normal weight. The association between mortality and birth weight is inversely proportional that is, the probability of death decreases as the weight increases.⁸ A better understanding of

maternal antenatal factors contributing to LBW births and need for improvement in perinatal care is necessary to prevent LBW.

METHODS

A hospital based cross sectional study was carried out among 200 newborns with birth weight <2.5 kg admitted to neonatal intensive care unit (NICU) from labor room and obstetric ward of Nepalgunj Medical College Teaching Hospital, Kohalpur, Banke, Nepal over the period of one year from May 2018 to April 2019. Newborns whose mothers were willing to participate and delivered in NGMCTH were included in the study whereas those mothers not willing to participate delivered outside NGMCTH, neonates with congenital anomalies and with birth weight ≥ 2.5 kg were excluded from the study.

Every mother was interviewed personally in Nepalese language. General information of mother and newborn was taken in detail and documented. Details of neonates in terms of sex, presenting complains were recorded. Maternal details such as age, educational level, parity, behavioral history (smoking, alcohol) and medical history was noted. Detailed obstetric history in terms of ANC visit, period of gestation, PV leaking/bleeding, hypertension during pregnancy was taken.

All data were processed and analyzed by using Statistical Package for Social Science (SPSS) software version 20. Variables were expressed in the form of frequencies and percentages. Descriptive statistics such as mean, range, standard deviation were computed. Chi-square test and Fisher's exact test were used to analyze relationship between maternal risk factors and outcomes of cases. The study was aimed to find out possible maternal risk factors associated with LBW babies, morbidities and mortalities seen in them during their hospital stay.

RESULTS

Out of 200 neonates included in the study, 8 were ELBW (4%), 40 were VLBW (20%) and remaining 152 (76%) were LBW. 106 (53%) newborn were males and 94 (47%) were females giving M: F ratio of 1.12:1. Duration of hospital stay ranged from 1-16 days with mean duration of 6.81 ± 3.80 days.

Maternal Risk Factors	Frequency (n)	Percentage (%)
Illiterate Mothers	176	88.0
Preterm delivery	136	68.0
Inadequate ANC visits	118	59.0
Teenage pregnancy	104	52.0
PROM for >12 hrs	64	32.0
Smoking & Alcohol Intake	12	6.0
Pre-eclampsia & Eclampsia	6	3.0
Past h/o LBW/Preterm birth	2	1.0
Gestational Hypertension (GHTN)	2	1.0

Table I : Percentage maternal risk factors for LBW neonates n=200)

There were various maternal risk factors for LBW neonates among which the most common was Illiterate mothers (88%) followed by preterm delivery (68%), inadequate ANC visits (59%) and teenage pregnancy (52%).

Maternal Age (Years)	Frequency (n)	Percentage (%)
≤ 19	54	27.0
20 – 25	104	52.0
25 – 30	24	12.0
30 – 35	12	6.0
35 – 40	6	3.0
Total	200	100.0

Table II : Percentage of maternal age distribution in LBW neonates (n=200)

In the present study minimum age of mother was 16 years while maximum age was 39 years. Mean age being 23.51 years.

ANC Visits	Birth Weight				Total		P-Value
	<1.5 Kg		≥ 1.5 Kg		N	%	
Adequate	8	4.0	68	34.0	76	38.0	<0.01
Inadequate	40	20.0	84	42.0	124	62.0	
Total	48	24.0	152	76.0	200	100.0	

Table III : Association between ANC visits and LBW

Association between maternal ANC visits with low birth weight newborns was statistically significant (P-value <0.05). Out of 48 (24.0%) VLBW newborns, mothers of 40 (20.0%) and that of 84 (42.0%) LBW newborns had inadequate ANC visits.

Morbidities	Frequency (n)	Percentage (%)
NNS (Neonatal Sepsis)	192	96.0
NNJ (Neonatal Jaundice)	174	87.0
Hypoglycemia	82	41.0
Apnea	34	17.0
Hypothermia	30	15.0
Birth Asphyxia	26	13.0
RDS (Respiratory Distress Syndrome)	24	12.0
Seizures	12	6.0
Pulmonary Hemorrhage	6	3.0
Anemia	6	3.0
Others (ARF=2, Hypocalcaemia=2, MAS=2, OralC andidiiasis=4&NEC=2)	12	6.0

Table IV : Percentage of morbidities in LBW Neonates (n=200)

In the present study, most common morbidity (96%) was neonatal sepsis, followed by neonatal jaundice (87%).

Birth Weight	Neonatal Outcomes				Total		P-Value
	Death		Survival		N	%	
	N	%	N	%			
<1.5 Kg	24	12.0	24	12.0	48	4.0	<0.01
≥1.5 Kg	20	10.0	132	66.0	152	76.0	
Total	44	22.0	156	78.0	200	100	

Table V: Association between birth weight and neonatal outcomes

Above table shows 44 (22.0%) neonates expired and 156 (78.0%) survived. Out of expired newborns, 24 (12.0%) were VLBW and 20 (10.0%) were LBW. This association was statistically significant (P Value <0.05) as shown in table V.

Cause of Death	Frequency (n)	Percentage (%)
Birth asphyxia	2	4.5
Prematurity	8	18.2
Pulmonary hemorrhage	8	18.2
RDS	10	22.7
Septicemia	16	36.4
Total	44	100.0

Table VI. Percentage of Causes of Mortality in LBW Neonates (n=200)

156 newborns out of 200 survived and were discharged from the hospital and 44 of them expired. Neonatal sepsis was most common (36.4%) cause of mortality followed by Respiratory Distress Syndrome (RDS) (22.7%), pulmonary hemorrhage (18.2%) and prematurity (18.2%). 4.5% died of birth asphyxia as shown in table VI.

DISCUSSION

Birth weight is an indicator of greater influence on infant health and survival. Survival of LBW babies is dependent on gestational age, birth weight and disease severity. NICU based incidence of LBW in the hospital was 28.10%, that of very low birth weight and extremely low birth weight babies were 10.25% and 5.16% respectively which is comparable to other studies.^{13,14,15}

53% of neonates were males and 47% females which is comparable to the study done by Manikyamba D et al where males were 54.28% and females 45.71%.¹⁴ In other study done by Kayastha S et al males and females were 52.0% and 48.0% respectively.⁵ Males were predominant in the current study as male babies are given extra care, attention and preferential hospitalization in many parts of our country.

In the present study, 43% of the neonates stayed in hospital for 6-10 days followed by 2-5 days in 37%. Mean duration of stay was 6.81±3.79 days which is comparable to other study.¹⁸ This is known fact that LBW newborns are physiologically immature and very prone to complications and need extra care. All this extra facility and care always increases hospital stay of LBW newborn.

The maternal age in our study ranged from 16-39 years. Minimum age of mother was 16 years while maximum was 39 years with mean of 23.51 years. LBW was most common (52%) in mothers with age group 20-25 years followed by ≤19 years (27%) and 3% were above 35 years. This might be consequence of aging in elderly women due to decline hormonal activities, which may occur after the age of 34 years and biological immaturity in case of mothers below 20 years of age.

59% of mothers had inadequate ANC visits whereas 38% had adequate visits which is comparable to other studies.^{9,10,11} High number of inadequate ANC visits in the present study could be because of unavailability of easy access to proper health facilities in this part of the country. Most common complication in LBW neonates was neonatal sepsis (96%) followed by neonatal jaundice (87%), hypoglycemia (41%), apnea (17%), hypothermia (15%), birth asphyxia (13%), respiratory distress syndrome (12%), seizures (6%), pulmonary hemorrhage (3%), anemia (3%) and others (6%) which included ARF-1%, hypocalcaemia-1%, MAS-1%, oral candidiasis-2% and NEC-1%. In study done by Budhathoki S et al complications seen in LBW neonates were clinical sepsis (64.6%), non-physiological jaundice (61.9%), hypoglycaemia (15.2%), apnoea (14.6%), perinatal asphyxia (12.7%), hypocalcaemia (12.3%), culture proven sepsis (11.6%), hypoxic ischemic encephalopathy (8.9%), hyaline membrane disease (3.3%), meconium aspiration syndrome (3.0%), necrotizing enterocolitis (3.0%), polycythemia (2.6%).¹⁹ Common morbidities seen in LBW babies in various studies were neonatal sepsis, hyperbilirubinemia, Respiratory Distress Syndrome, MAS which can be explained by the fact that LBW newborns are very prone to these complications because of the immaturity of organs. In the study group of 200 neonates, 48 were VLBW and 152 were LBW. 12.0% of VLBW and 10.0% of LBW expired which is comparable to other studies.^{16,17} The results showed LBW is a risk for neonatal survival. Neonatal septicemia was most common (36.4%) cause of mortality followed by Respiratory Distress Syndrome (RDS) (22.7%), pulmonary hemorrhage (18.2%) and prematurity (18.2%). 4.5% died of birth asphyxia. In a study by Ballot DE et al causes of mortality was extreme multiorgan immaturity (40%), HMD (15.7%), asphyxia (12.1%), NEC (10%), nosocomial sepsis (10%), septicemia (2.1%), congenital infection (1.4%), IVH (2.1%), congenital abnormality (2.8%), pulmonary hemorrhage (1.4%).²⁰ In another study by Bhatnagar PK common causes of mortality were asphyxia neonatorum (40.18%), neonatal jaundice (39.26%), neonatal infections (15.88%), gastroenteritis (4.68%).¹² Similarly in a study by Poudel P et al major causes of death were HMD (51.0%) and sepsis (34.7%).¹³

LIMITATION

Small sample size, single center study, unable to randomize the samples are some of limitations of this study.

CONCLUSION

In this study data like gender, birth weight, maternal risk factors, causes of morbidity and outcomes were recorded and analyzed among newborns. Inadequate ANC visit significantly increased the delivery of LBW babies. Neonatal sepsis was the most common morbidity as well as the cause of mortality in LBW babies. Total mortality was 22% which was higher in the newborns who were <1500 gms (12%) in comparison to weight >1500 gms (10%).

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