

A study on clinical profile and outcome of low birth weight neonates admitted to NICU in a tertiary care hospital

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Abstract

Background: Neonatal period is the first 28 days of life since birth. It is considered as the most susceptible period for mortality and morbidity^[1]. Neonatal mortality accounts for 2/3 rd of the infant mortality. **Objectives:**

1. To study clinical profile of LBW neonates
2. To evaluate morbidity and mortality in LBW neonates
3. To analyse the risk factors for mortality in LBW neonates

Material & methods: Study Design: Prospective hospital based observational study. **Study area:** The Neonatal Intensive Care Unit, Department of Paediatrics, Alluri SitaRamaRaju Academy of Medical Sciences, Malkapuram, Eluru, West Godavari (dist.), Andhra Pradesh. **Study Period:** September 2020 to September 2021. **Study population:** All neonates with birth weight less than 2,500 grams admitted to NICU. **Sample size:** study consisted a total of 46 cases. **Sampling method:** Simple Random sampling method. **Study tools and Data collection procedure:** All neonates less than 2500gms irrespective of gestational age, examined and a detailed Antenatal, Natal and Postnatal history was obtained and recorded in a predesigned proforma. Neonate's birth weight, gestational age, sex, mode of delivery, indication for any interventions, immediate postnatal events like APGAR score and if any resuscitation done, were recorded in a predesigned proforma. **Results:** The Most common morbidity found in this study subjects were RDS (30.4%), followed by EONS (28.3%), NNJ (13%), NEC (6.5%), HYPOGLYCEMIA(6.5%), BIRTHASPHYXIA (4.3%), DIC & MAS (2.2%). Pre term LBW babies were more effected by these morbidities than the term LBW babies, but there was no statistical significance in our study. **Conclusion:** RDS and Sepsis were the most common factors associated with LBW. The factors associated with mortality were found to be Birth asphyxia, Sepsis, RDS.

Key words: Neonatal period, Low birth weight, Respiratory distress syndrome, Necrotising enterocolitis

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Introduction

Neonatal period is the first 28 days of life since birth. It is considered as the most susceptible period for mortality and morbidity^[1]. Neonatal mortality accounts for 2/3 rd of the infant mortality^[2]. Current infant mortality rate (IMR) in India is 25/1000 live births^[3]. India contributes to nearly 25% of global neonatal deaths^[4]. Sustainable development goal 2030 focuses mainly on reduction in neonatal mortality to achieve U5MR^[5]. Three major causes (78%) which contribute to neonatal mortality in developing countries are prematurity & low birth weight, neonatal infections and birth asphyxia^[7].

Low birth weight (LBW) has been defined by world health organization (WHO) as a birth weight of an infant of 2499gm or less, regardless of gestational age^[8]. annually 6 to 8 million low birth. seventy-five percent of neonatal deaths occur in weight infants are born in India^[9]. There is high incidence of Low birth weight babies in our country, Intra Uterine Growth Retardation (small for date) accounts for higher number of Low birth weight babies rather than preterm babies. the most important marker for adverse perinatal and neonatal outcome is the birth weight.

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There is increased risk of mortality among low birth weight by 2-3 times as compared to normal birth weight babies due to infection.

There is three times more risk of developing neurodevelopmental sequelae of birth asphyxia in low birth weight babies as compared to normal weight babies. In babies with birth weight of less than 1800 g or babies born before 35 weeks of gestation have inactivity, lethargy and uncoordinated sucking and swallowing which is due to immaturity of central nervous system. Infections are an important cause of neonatal mortality in Low birth weight babies. Premature birth is associated with an increased incidence of early onset sepsis with an incidence of 1.5% of infants having birth weight less than 1500 grams. Low birth weight babies have high risk of developing Hypoglycaemia, Hypocalcaemia, Acidosis Hypoxia.

Hence the present study was undertaken to study clinical profile and outcome of low birth weight neonates admitted to NICU, so that to help to recommend the intervention strategies to reduce the mortality and morbidity by prompt recognition and effective management of Low birth weight neonates

Objectives

1. To study clinical profile of LBW neonates
2. To evaluate morbidity and mortality in LBW neonates
3. To analyse the risk factors for mortality in LBW neonates

Material & methods**Study Design**

Prospective hospital based observational study.

Study area

The Neonatal Intensive Care Unit, Department of Paediatrics, Alluri SitaRamaRaju Academy of Medical Sciences, Malkapuram, Eluru, West Godavari (dist.), Andhra Pradesh.

Study Period

September 2020 to September 2021.

Study population

All neonates with birth weight less than 2,500 grams admitted to NICU

Sample size

Study consisted a total of 46 cases.

Sampling method

Simple Random sampling method.

Inclusion criteria

All neonates with birth weight less than 2,500 gms admitted to NICU.

Exclusion criteria

Neonates with congenital malformation out born babies and babies whose parents did not give consent for investigation will be excluded.

Ethical consideration

Institutional Ethical committee permission was taken prior to the commencement of the study.

Study tools and Data collection procedure

All neonates less than 2500gms irrespective of gestational age, examined and a detailed Antenatal, Natal and Postnatal history was obtained and recorded in a predesigned proforma. Neonate's birth weight, gestational age, sex, mode of delivery, indication for any interventions, immediate postnatal events like APGAR score and if any resuscitation done, were recorded in a predesigned proforma. The weight of the neonate was recorded on digital weighing scale. weight recording was done to the accuracy of +5 grams. length of the neonate was taken using infantometer. Head circumference was measured using non-stretch type (cross tape method) from occipital protuberance to supraorbital ridges in the forehead. General examination was done in detail, vital parameters (heart rate, respiratory rate, temperature, BP, CRT, peripheral pulses), abnormalities like pallor, edema, icterus, cyanosis, congenital and craniofacial anomalies were noted. Detailed head to toe examination will be done. all the neonatal reflexes will be examined for any abnormality. systemic examination was done. All the cases were subjected to following investigations: complete blood count, total serum bilirubin, blood culture, blood sugar level, c- reactive protein and chest x-ray whenever necessary.

Statistical Analysis

The data collected was entered into MS excel and analyzed by using spss version 20 (statistical package for social sciences). frequency and percentage was calculated using SPSS ver 20. proportional comparison was made on basis on chi-square test, fisher exact, yate's corrected test wherever applicable.

Observations & results**Table 1: Distribution of low birth weight babies as per their body weight**

Birth weight(gms)	Male LBW babies (%)	Female LBW babies (%)	Total no of babies (%)	P-value
LBW 1501-2500	15 (75%)	15 (57.7%)	30 (65.2%)	0.384 (NS)
VLBW 1001-1500	5 (25%)	10 (38.5%)	15 (32.6%)	
ELBW <1000	0 (0%)	1 (3.8%)	1 (2.2%)	
Total	20	26	46	

In our study, 75% (15) of the male subjects were LBW. 25% (5) of male patients were VLBW. Among female subjects, 57.7% (15) were LBW, 32.6% (15) were VLBW and 2.2% (1) were in ELBW group. The relationship between birth weight and gender was found to be not statistically significant in our study.

Table 2: Distribution of LBW baby as per gestation

LBW babies	No.	Percentage (%)
Term	11	23.9
Pre term	35	76.1
Total	46	100

In our study out 46 patients, only 23.9% (11) were in term gestation but majority i.e 76.1% (35) were in preterm gestational group.

Table 3: Morbidities in Preterm and Term LBW

Morbidities	Preterm-LBW	Term-LBW	Total	P - value
no abnormality	1 (2.8%)	2 (18.1%)	3 (6.5%)	0.072
NNJ	4 (11.4%)	2 (18.1%)	6 (13%)	0.561
EONS	11 (31.4%)	2 (18.1%)	13 (28.3%)	0.394
BIRTHASPHYXIA	2 (5.7%)	0 (0%)	2 (4.3%)	
RDS	13 (37.1%)	1 (9%)	14 (30.4%)	0.077
MAS	1 (2.8%)	0 (0%)	1 (2.2%)	
NEC	1 (2.8%)	2 (18.1%)	3 (6.5%)	0.072
HYPOGLYCAEMIA	1 (2.8%)	2 (18.1%)	3 (6.5%)	0.072
DIC	1 (2.8%)	0 (0%)	1 (2.2%)	
Total	35	11	46	

The Most common morbidity found in this study subjects was RDS (30.4%), followed by EONS (28.3%), NNJ (13%), NEC (6.5%), HYPOGLYCEMIA (6.5%), BIRTHASPHYXIA (4.3%), DIC & MAS (2.2%). Pre term LBW babies were more effected by these morbidities than the term LBW babies, but there was no statistical significance in our study.

Table 4: Causes of early neonatal mortality in LBW babies

Causes	No.	Percentage (%)
HIE	2	50
RDS	1	25
SEPSIS	1	25

The total number of death were 4 (8.5%) in our study. All the mortality occurred in the preterm babies only. The most common cause of death was BIRTH ASPHYXIA(50%), followed by RDS and Sepsis (25%) each.

Discussion

Low birth weight (<2500 grams) babies have a high risk of neonatal and infant morbidity and hence the proportion of babies with low birth weight is considered as a sensitive index of nation's health and development. The strategies in the past five-year plans like National Health Mission, Millennium Development Goals, India's Newborn Action Plan, and now the recent Sustainable Development Goals (SDG) are to reduce the perinatal mortality, Infant mortality rate, and LBW. SDG 2017 has a target to reduce LBW incidence by 30% by 2025 to reach world health assembly nutrition target levels.

In our study, 75% (15) of the male subjects were LBW. 25% (5) of male patients were VLBW. Among female subjects, 57.7% (15) were LBW, 32.6% (15) were VLBW and 2.2% (1) were in ELBW group. In our study out 46 patients, only 23.9% (11) were in term gestation but majority i.e 76.1% (35) were in preterm gestational group. Our findings are similar to other studies that reported that half of the LBW babies were contributed by preterm. Prematurity is one of the leading causes of neonatal deaths in India[1,10].

In study conducted by Arefin MS et al it was found that during the study period 58% males and 42% females were LBW babies[11]. Rahman K et al studied 1099 neonates during their study period out of which 51.04% were males and 48.95% were females[14]. Budhathoki S et al in 2014 in their study reported the mean birth weight of enrolled neonates was 1640 g with SD of 344g[12]. A study conducted by Dias E and Gada S in 2014, 66% were appropriate for gestational age and 17% were small for gestational age and 17% were large for gestational age[13]. A study conducted by Karegoudar in 2014 in Belgaum showed that the birth weight of 41.61% premature babies was between 1501 and 2000 grams[15].

The Most common morbidity found in this study subjects was RDS (30.4%), followed by EONS (28.3%), NNJ (13%), NEC (6.5%), HYPOGLYCEMIA(6.5%), BIRTHASPHYXIA (4.3%), DIC & MAS (2.2%). Pre term LBW babies were more effected by these morbidities than the term LBW babies, but there was no statistical significance in our study.

Among LBW babies in the present study, RDS, EONS and neonatal jaundice were the most common morbidity in LBW neonates which was similar to a study done by Sangamam R et al[16], where Neonatal jaundice was the common morbidity. Other studies from other places in India presented sepsis and prematurity as the leading cause for admissions[17]. The National Neonatal perinatal data base shows sepsis (36%) as the most common morbidity responsible for admission followed by prematurity (26.5%) and perinatal asphyxia (10%)[18].

In their study done by Kumar M et.al[19], out of 222 low birth weight babies admitted in NICU, 27.02% babies were admitted in view of low birth weight with prematurity, 23.423% babies were admitted in view of respiratory distress, 18.01% babies were admitted in view of other conditions like convulsions, birth asphyxia, feeding difficulties, decreased activity, abdominal distension, apnea, hypoglycemia and hyperglycemia which was statistically very significant.

A study done by Gupta MK et al found that 30% of the LBW infants presented with hyperbilirubinemia, 28.5% LBW infants presented with respiratory distress and 23.5% of LBW infants presented with septicaemia[20]. A study done by Minare M et al found that majority (67%) of the LBW infants presented with neonatal sepsis, birth asphyxia, respiratory distress and hyperbilirubinemia[21].

The incidence of hyperbilirubinemia in late preterm was 26% in this study, higher compared to 14% in a study in Taiwan[22] HMD was the leading cause of respiratory distress among Preterm babies.

The total number of death were 4 (8.5%) in our study. All the mortality occurred in the preterm babies only. The most common cause of death was HIE (4.3%), followed by RDS and Sepsis (2.1%) each. In a previous study by Kumar MK et al[23], it was reported that the overall neonatal mortality rate among patients admitted in NICU was 13.6 % (32/236) and in LBW was 11 (34.8%). The similar trend of significant increase in mortality with decrease in birth weight was also observed by ArefinMS et al[11] and Begum HA et al[24].

Conclusion

RDS and Sepsis were the most common factors associated with LBW. The factors associated with mortality were found to be Birth asphyxia, Sepsis, RDS. Of these, Birth asphyxia in LBW babies was found to have worst prognosis.

Limitations

- single centre study
- study was done in tertiary care hospital
- relatively smaller sample size
- these factors emphasize need for multi centric large sample prospective study in future for better acknowledgement of factors associated with LBW babies.

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