

Risk Factors for Mortality in Neonates with Birth Weight <1500 gm

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Abstract

Background and objective: Neonates with birth weight <1500 gm constitute approximately 4-7% of all live births. Mortality in this group is very high, contributing to as much as 30% of early neonatal death. This study was done to evaluate the morbidities associated with preterm neonates with birth weight < 1500 gm and possible factors determining the death of these babies. **Methods:** This study was done at Special Care Baby Unit (SCABU), BIRDEM Hospital from January to October 2010. The medical records of neonates with birth weight <1500 gm admitted in SCABU during the study period were retrospectively reviewed. The outcome measure was in-hospital death. Univariate analysis was done to determine the risk factors of mortality. **Results:** Total 64 babies with birth weight <1500 gm were admitted during this study period. Mean gestational age was 30.76 (\pm 2.97) weeks, mean birth weight was 1182

(\pm 283) gm. Jaundice (59.4%), Thrombocytopenia (57.8%), apnoea (53.15), sepsis (45.3%) feeding intolerance (43.8%), and RDS (23.4%) were common co-morbidities in these neonates. Among 64 babies more than one-third died (36%). Risk factors for mortality were gestational age less than 30 wks (OR: 7.73; 95% CI: 2.43-24.53), weight <1000 gm (OR: 4.93; 95% CI: 1.28-18.87), RDS (OR: 13.81; 95% CI: 13.81-57.86) and baby who required mechanical ventilation (OR: 61.66; 95% CI: 12.54- 303.22). **Conclusion:** Extreme low birth weight (birth weight <1000 gm), prematurity (gestational age <30 wks) and RDS were the significant risk factors for mortality in this study population. Prevention of prematurity and appropriate management of RDS may reduce the mortality of these neonates.

Key word: VLBW, ELBW, RDS, Prematurity

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Introduction

Among all newborn babies very low birth weight (VLBW) constitutes approximately 4-7%¹. They carry increased risk of neonatal morbidity and mortality. Mortality rate in this group is very high, contributing to

as much as 30% of early neonatal deaths¹. Morbidities include respiratory distress syndrome (RDS), intraventricular haemorrhage (IVH), sepsis, necrotizing enterocolitis (NEC), patent ductus arteriosus (PDA), hyperbilirubinemia, feeding difficulties, temperature instability, hypoglycemia and hypocalcaemia²⁻⁶. Causes of morbidities and mortality in these neonates are immaturity of respiratory, cardiovascular and metabolic function, as well as lower resistance to exogenous bacteria⁷. Survival of these babies is depended on gestational age, birth weight and disease severity. Well thermal control, monitoring of vital signs, oxygen therapy, maintenance of fluid and electrolyte, special attention to nutritional support and prevention of infection are the cornerstone of management of these neonates⁸. Implementation of intensive care in neonatal unit, use of mechanical ventilation and exogenous surfactant has been reported to improve the outcome of very low birth weight babies but the survival of these neonates varied from hospital to hospital and also from country to country depending on the quality of antenatal, intrapartum, and neonatal care.⁹ Outcome of these infants have been reported in developed countries¹⁰ but are not well reported in developing countries. In Bangladesh 22% babies are born prematurely and have

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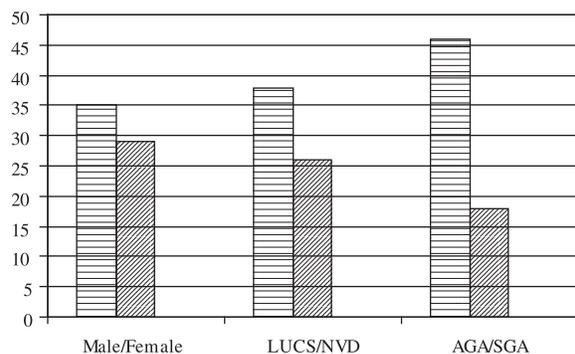
low birth weight, but no data is available of very and extreme low birth weight cases¹¹. The purpose of this study was to evaluate the morbidities associated with very low birth weight newborn and also to evaluate the possible factors determining the death of these neonates.

Methodology

This study was carried out at special care baby unit of BIRDEM Hospital, over a period of nine month from January to September 2010. Medical records of babies with birth weight < 1500 gm admitted to the special care baby unit were retrospectively collected. Neonates weighing less than 500 gm or gestational age less than 26 weeks or presence of lethal congenital anomalies were excluded from the study. Detailed antenatal and natal histories, anthropometric measurements, gestational age as per new ballard score were collected. Clinical findings, progress during the hospital stay were also recorded. Morbidities and mortalities during the period of hospital stay were evaluated. Laboratory parameters like complete blood count, blood for culture and sensitivity, C reactive protein, blood sugar, serum bilirubin, serum calcium, serum electrolyte reports were recorded. Statistical analysis was performed using the commercial statistical software Epi info version 3.5.

Results:

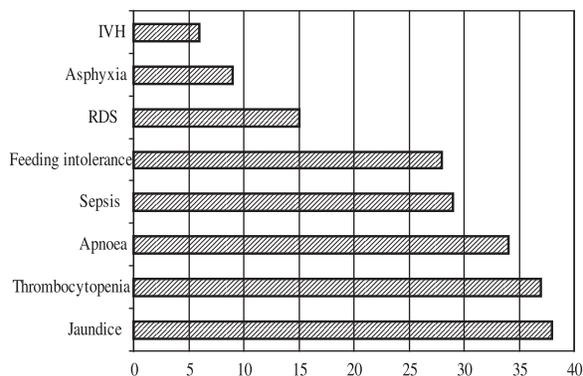
A total 64 neonates with birth weight <1500 gram who fulfill the inclusion criteria were included in this study. Among them 35 (54.7%) were male, mean birth weight was 1182 (±283) gm and mean gestational age was 30.76 (± 2.97) weeks. Forty six (71.9%) babies were appropriate for gestational age and 38 (59.4 %) babies were delivered by lower uterine caesarian section (Figure: 1).



LUCS: Lower Uterine Caesarian Section, NVD: Normal Vaginal Delivery
 AGA: Appropriate for Gestational Age, SGA: Small for Gestational Age

Fig.-1: Distribution of neonates according to sex, mode of delivery, and gestational age (n=64)

Most common problems were jaundice 38 (59.4%), thrombocytopenia 37 (57.8%), apnoea 34 (53.15%), feeding intolerance 28 (43.8%). Respiratory distress syndrome (RDS) was present in 15 (23.4%) babies. Sepsis was found in 29 (45.3%) babies and among them 15 (23.4%) babies had culture positive sepsis (Fig.-2).



• More than one problem was present in almost all babies

Fig.-2 : Morbidity distributions of newborns

Among the study newborn assisted ventilation like bubble CPAP and mechanical ventilation was required in 24 (37.5%) babies. During the period of hospital stay 23 (36%) neonates were died.

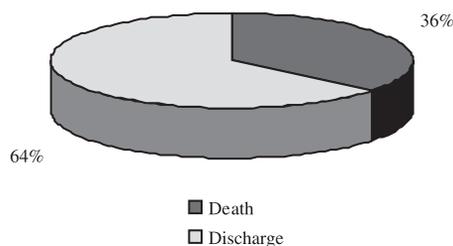


Fig.-3: Distribution of neonates according to outcome (n=64)

Risk factors for mortality were significantly higher in neonates whose gestational age \leq 30 wks (OR: 7.73; 95% CI: 2.43-24.53) and birth weight <1000 gms (OR: 4.93; 95% CI: 1.28-18.87).

Presence of RDS was the significant risk factor for mortality (OR: 13.81; 95% CI: 13.81- 57.86). Most of the babies who required mechanical ventilation was died OR: 61.66; 95% CI: 12.54- 303.22). Thrombocytopenia, Apnoea, Jaundice, Sepsis, feeding intolerance and asphyxia had no significant risk of mortality (p>0.05) (Table 1)

Table-I

<i>Risk factors of mortality (n=64)</i>		
Risk factors for mortality	Odd (95% confident limit)	p value
Birth weight < 1000 gm	04.93 (1.28-18.87)	0.01*
Gestational age £30 weeks	07.73 (2.43-24.53)	0.00*
Thrombocytopenia	0.52 (0.18- 01.49)	0.14
Apnoea	0.71 (0.25 -01.99)	0.21
Jaundice	0.62 (0.22- 01.77)	0.12
Sepsis	0.86 (0.25- 02.91)	0.41
Feeding intolerance	0.56 (0.19- 1.60)	0.12
DIC & Bleeding	02.28 (0.74- 06.98)	0.08
RDS	13.81 (13.81- 57.86)	0.00*
Asphyxia	01.51 (0.36- 06.31)	0.41
Required Mechanical Ventilation	61.66 (12.54- 303.22)	0.00*

* Statistically significant (p<0.05)

Discussion:

Neonate weighing less than 1500 gms (VLBW) and particularly less than 1000 gms (ELBW) are of major concern because of maximum perinatal morbidity and mortality found in this group¹²⁻¹⁵. This retrospective study was carried out to evaluate the morbidities associated with very low birth weight newborn and also to evaluate the possible factors determining the death of these neonates. The survival of very low birth weight neonates in the present study was 66%, which is lower to the survival of 72%-90% from other developed countries¹⁶⁻²². But a study was done by Haque et al to evaluate the morbidity pattern of very low birth weight babies and they also found survival of very low birth weight infants was 69%²³. In India Basu et al also found 36.9% mortality among the babies with birth weight <1500gm²⁴. The mortality and morbidity of these neonates varied from hospital to hospital and country to country reflecting the quality of antenatal, intrapartum and neonatal care. In developing countries and areas where the availability of exogenous surfactant, NICU beds, mechanical ventilation, and equipment are limited, the survivals of especially extreme low birth weight tend to be low^{21, 25-26}. Common morbidities found in this study were Jaundice, thrombocytopenia, apnoea of prematurity, feeding intolerance, respiratory distress

syndrome and sepsis. Haque et al also found common morbidities of very and extreme low birth weight neonates were sepsis, Jaundice, RDS, NEC²³. Basu et al also found common morbidities of VLBW were RDS, apnoea, sepsis, hypothermia, hypoglycaemia, shock and intraventricula haemorrhage (IVH)²⁴.

Gestational age at birth and birth weight are closely related to the degree of organ maturity. These are considered to be the major factors determining the survival of VLBW infants. In this study birth weight £ 1000 gram were significantly associated with mortality (OR: 04.93; 95%CI: 1.28-18.87) gestational age £ 30 weeks was also significantly associated with mortality (OR: 07.73; 95% CI: 2.43-24.53). Basu et al found perinatal risks of mortality among VLBW infants included no use of antenatal steroids (p = 0.015), gestational age of <28 weeks (p = 0.012), ELBW (p < 0.001)²⁴. Sehgal et all found incidence of mortality was highest in 26-28 weeks' gestation babies (71%) and < 800 g birth weight category (62%)²⁷.

In this study RDS was significantly associated with mortality (OR: 13.81; 95% CI: 13.81- 57.86). Surfactant therapy has been a major contribution to care of the preterm newborn with RDS during the past 25 years²⁸. Due to high cost of surfactant it cannot be used routinely in our unit. Sritipsukho found in his study survival rate of very-low-birth-weight (VLBW) infants and extremely-low-birth-weight (ELBW) infants were 81% and 52% respectively and respiratory distress syndrome (RDS) was the major cause of death²⁹. Most of the babies with RDS (12/15) required mechanical ventilation in this study and mortality was also very high who required mechanical ventilation (OR: 61.66; 95% CI: 12.54- 303.22)

Conclusion

Birth weight <1000 gm and gestational age £ 30 weeks were significant risk factors for mortality in very low birth weight babies. Jaundice, thrombocytopenia, apnoea and sepsis were the common problems but mortality risk was significantly associated with RDS and baby who required mechanical ventilation. Improvement of skilled management of RDS is necessary to reduce the mortality of these neonates, as well as prevention of prematurity also can reduce high morbidity and mortality of very low birth weight babies.

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