

NEONATAL MORBIDITY AND MORTALITY PATTERN IN  
THE SPECIAL CARE BABY UNIT OF BIRDEM

Jebun Nahar, Bedowra Zabeen, Shahida Akhter, Kishwar Azad, Nazmun Nahar

Department of Paediatrics, Ibrahim Medical College & BIRDEM

**Abstract**

To identify the main causes of neonatal morbidity and mortality a retrospective study was carried out at the Special Care Baby Unit (SCABU) of the Department of Paediatrics, Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine and Metabolic Disorders (BIRDEM) for a period of 1 year from January to December 2005. A total of 361 neonates were included in this cohort. The ratio of male (200) and female (154) neonates was 1:0.7. Most of the babies (300) were born in this hospital. Major causes of morbidity were prematurity (60.7%), LBW (48.2%), jaundice (23.3%), severe perinatal asphyxia (10.8%), transient tachypnoea of newborn (10.8%), respiratory distress syndrome (6.4%) and sepsis (6.4%). Most deaths were associated with prematurity (71.1%), LBW (65.8%), intrauterine growth retardation (23.7%), respiratory distress syndrome (36.8%), severe perinatal asphyxia (18.4%) and sepsis/pneumonia (15.9%). Outcome of babies born in this hospital was better than those referred from other hospitals ( $p < 0.001$ ).

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**Key Words:** Neonates, morbidity, mortality, baby care.

**Introduction**

Each year about 130 million babies are born and 4 million die in the first 4 weeks of life- the neonatal period. About two thirds of neonatal deaths occur in Africa and South East Asian regions<sup>1</sup>. In Bangladesh, neonatal mortality rate is 42/1000 live births and accounts for two-thirds of the infant mortality<sup>2,3</sup>. Although a 40% reduction of neonatal mortality was achieved over the past two decades, it still remains high compared to the developed countries<sup>1</sup>. In general, neonatal morbidity and mortality are the consequences of poor status of maternal health and nutrition and lack of care during delivery or immediately after birth. Prematurity, LBW, infection, jaundice and asphyxia are the major problems affecting neonates in the developing countries which are easily preventable<sup>4</sup>. It is estimated that 30% of neonatal deaths is contributed by prematurity/ LBW in Bangladesh, the direct causes of mortality being sepsis (32%), asphyxia (26%), tetanus (15%), respiratory distress (6%) while 14% remains unknown<sup>5</sup>.

The Millennium Development Goal for child survival cannot be met without substantial reduction in neonatal mortality. Very few studies have reported information on the neonatal situation in our country. This retrospective study was done at BIRDEM hospital to identify the main causes of neonatal morbidity and mortality.

**Methods**

This retrospective study was carried out at the Special Care Baby Unit (SCABU) of the Department of Paediatrics, BIRDEM for a period of 1 year from January to December 2005. This center is a tertiary care center, where most of the babies referred are high-risk babies. The SCABU has facilities of intensive care, ventilation, and exchange transfusion. All admitted neonates are enrolled on a structured protocol. This protocol includes data on antenatal care, maternal morbidity, mode and place of delivery, age,

**Address for Correspondence:**

Dr. Jebun Nahar, Department of Paediatrics, Ibrahim Medical College & BIRDEM  
122 Kazi Nazrul Islam Avenue, Shahbag, Dhaka-1000

weight at admission, gestational age, diagnosis, relevant investigations, duration of stay and outcome. Weight of neonates are measured using electronic weighing machines having gram as smallest division. Gestational age is calculated from last menstrual period (LMP) and clinical assessment is made by modified Ballard scoring. Diagnosis is made on the basis of clinical, radiological and laboratory findings. For this study, detailed case records of the babies were collected and analyzed by SPSS programme.

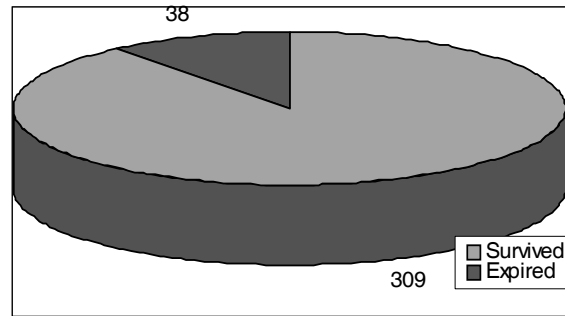
**Results**

A total of 361 neonates were included in this cohort. The ratio of male (55.4%) and female (44.6%) neonates was 1:0.7. Most of the babies were born in this hospital (83%). About four-fifths of neonates were born by lower uterine caeserian section (81.4%) and two-thirds were admitted within first 24 hours of delivery. There were 219 (60.7%) premature deliveries with a mean gestational age of 35.6 ± 3.4 weeks and 174 LBW neonates with mean birth weight of 2420 ± 808 gm. According to their weight for gestational age, 78.4%, 13.9% and 7.8% were age appropriate for gestational age (AGA), small for gestational age (SGA) and large for gestational age (LGA) respectively. Major causes of morbidity were prematurity (60.7%), LBW (48.2%), jaundice (23.3%), SPA (10.8%), TTN (10.8%), RDS (6.4%) and sepsis (6.4%) (Table-1). Infants of diabetic mothers (63%) were also one of the major causes of morbidity.

**Table-1: Neonatal morbidities at admission**

Morbidity	Preterm (n=219)	Term (n=142)	Total (n=361)
LBW	148(67.6%)	26(18.4%)	174(48.2%)
IUGR	30(13.7%)	20(14.8%)	50(13.9%)
Jaundice	30(13.7%)	54(38.3%)	84(23.3%)
TTN	26(11.8%)	13 (9.1%)	39(10.8%)
RDS	22(10.4%)	01 (0.7%)	23 (6.4%)
SPA	15 (6.8%)	24(16.8%)	39(10.8%)
Sepsis	11 (9.1%)	12 (8.4%)	23 (6.4%)
MAS*	02 (0.9%)	04 (2.8%)	06 (1.7%)
Pneumonia	02 (0.9%)	01 (0.7%)	03 (0.8%)
Congenital anomalies	02 (0.9%)	04 (2.8%)	06 (1.7%)
Others	02 (0.9%)	07 (4.9%)	09 (2.8%)

\*MAS- Meconium aspiration syndrome



**Fig-1: Outcome of neonates**

The outcome of neonatal admission is shown in Figure-1. Those babies who were discharged on risk bond and transferred to other hospitals were excluded from the analysis. Incidence, case fatality and relative risk of deaths associated with morbidities were calculated (Table-2). Most deaths were associated with prematurity (71.1%), LBW (65.8%), IUGR (23.7%), RDS (36.8%), SPA (18.4%) and sepsis/pneumonia (15.9%).

**Table-2: Case Fatality and Relative Risk of Deaths associated with selected neonatal morbidities: Univariate Analysis (n=347, neonatal death = 38)**

Morbidity	Sick neonates n (%)	Deaths n (%)	Relative Risk of death (95% CI)	Proportion of total (%)*
Prematurity	210(60.5)	27 (12.9)	0.55 (0.3-1.1)	71.1
LBW	167(48.1)	25 (15.0)	3.9 (1.8-8.3)	65.8
IUGR	50(14.4)	09 (18.0)	0.6 (0.3-1.1)	23.7
RDS	23 (6.6)	14 (60.9)	8.2 (5-13.6)	36.8
SPA	36(10.4)	7 (19.4)	2 (0.9-4.1)	18.4
Sepsis/Pneumonia	26 (7.5)	6 (23.1)	2.3 (1.9-5)	15.9
MAS	06 (1.7)	1 (16.7)	1.3 (0.2-8.5)	2.6
*Congenital anomalies	03 (0.9)	3(100.0)		7.9

\*A neonate having more than one morbidity is counted in each category. Hence, the sum may be more than the total neonates or deaths in the study population.

Mortality rates in neonates were analysed. Half of all neonatal deaths occurred in the babies weighing less than 1500g of birth weight and in premature babies having gestational age less than 34 weeks (Table-3).

**Table-3:** Neonatal mortality by birth weight and gestation period

Birthweight/gestation	Total	No of deaths(%)
<1500g	56 (16.1)	21 (55.3)
1500-2499g	111 (32)	08 (21.1)
2500g-3999g	167 (48.1)	08 (21.1)
>/4000g	13 (3.7)	01 (02.6)
<34weeks	71 (20.5)	19 (50.0)
34-37weeks	140 (40.3)	09 (23.7)
>37weeks	136 (39.2)	10 (26.3)

Outcome of babies born in this hospital (inborn) and of babies referred from other hospitals (outborn) was analyzed. Among inborn babies 23 (8%) expired, while 15 (25.4%) expired among outborn. The difference was significant ( $p < 0.05$ ). Primary causes of neonatal deaths for inborn and outborn are shown in Table-4. Prematurity with LBW and prematurity with or without respiratory distress syndrome were the dominant causes of death among inborn babies, while prematurity with RDS and SPA were the most important causes of mortality among the outborn neonates.

**Table-4:** Primary Causes of Neonatal Mortality Inborn & Outborn Compared

Cause	Inborn (n=23)	Outborn (n=15)
Prematurity+LBW	7 (30.9%)	0
Prematurity+RDS	8 (34.8%)	6 (40%)
SPA	2 (8.7%)	5 (33.3%)
Sepsis/Pneumonia	3 (13%)	3 (20%)
Cong. Anomalies	3 (13%)	0
MAS	0	1 (6.6%)

## Discussion

In our study about two-thirds of neonates were premature. High proportion of high-risk pregnancies may be responsible for this high incidence of prematurity. Respiratory distress (10.4%), jaundice (13.7%) and infection (10%) were the main presenting features among the admitted premature babies in our study. In a hospital based study<sup>6</sup>, the incidence of premature deliveries were 16.3%. Premature babies suffered adverse effects like respiratory distress, apnoea, infection and jaundice. According to one UNICEF report<sup>3</sup>, one third of neonates are born with

LBW in Bangladesh. The high proportion of LBW (48.2%) in this study was similar to those reported from other tertiary level care centers in the country<sup>7,8</sup>.

Neonatal jaundice is the most common problem amongst the neonates. In our study, 23% of newborns had jaundice. It was consistent with the findings of a similar study<sup>9</sup>. Between 25-50% of term newborns and a higher percentage of premature infants develop jaundice<sup>10</sup>.

Perinatal asphyxia is an important cause of neonatal morbidity and mortality. Several grades of perinatal asphyxia was observed in 103 (28.5%) newborns in the present study. Among them 38 (36.9%) had severe perinatal asphyxia. The incidence of perinatal asphyxia in our finding was similar to Chandra *et al.*'s finding from India<sup>11</sup>.

Preterm LBW deaths accounted for 55% of the total deaths in our study. This mortality rate is almost double the figure that was found in a rural area of Bangladesh<sup>5</sup>. Similar mortality rate has been reported from a study in India<sup>12</sup>. LBW babies died four times more than those with birth weight >2500g in our studied population. A seven fold increase in neonatal mortality was also reported among LBW infants in Tanzania<sup>13</sup>. Our study also showed that preterm babies with less than 34 weeks and birth weight less than 1500g were strongly associated with high mortality. Yasmin *et al.*<sup>14</sup> also reported that VLBW and lower gestational age (<32weeks) carried a high mortality risk. Prematurity with respiratory distress syndrome was the commonest cause of mortality among our studied neonates (36.8%). In a community hospital study, Pankaj *et al.* had shown that prematurity with respiratory distress syndrome was the main cause of mortality in the neonates<sup>15</sup>.

In developing countries, neonatal sepsis is a great problem and dominates as the major cause of death<sup>16</sup>. It accounted for 16% of neonatal deaths in our study.

Severe perinatal asphyxia, one of the major cause of neonatal death (18.4%) was similar to findings reported from tertiary level hospitals<sup>7,17</sup>. Neonates with severe perinatal asphyxia had two times more mortality than those having no asphyxia.

## Conclusion

Neonatal mortality in babies delivered at BIRDEM was only 8% compared to 32.6% in babies referred

from other hospitals. The better outcome in babies born at BIRDEM was possible due to timely perinatal interventions at the tertiary care level and early availability of effective neonatal intensive care at SCABU. Prematurity with or without respiratory distress was the major cause of death in inborn babies while severe perinatal asphyxia was the most important cause of mortality among the outborn neonates. Since this was a tertiary level private hospital based study and most patients came from a higher socio-economic status, the results of the study may not reflect the true burden prevalent in the community.

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