

Original Research Article

Events that occur in premature babies before death during their hospital stay

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ABSTRACT

Background: Globally, more than 80% of newborn babies die due to LBW. PT/LBW babies usually die because of complications from prematurity rather than the prematurity itself. Due to prematurity, they face several problems during their early life, like temperature control, feeding problem, poor immunity, respiratory insufficiency etc. and especially during SCANU and NICU stay they develop sepsis, NEC leading to their death. The aim of this study was to find out the events that occur before the death of premature neonates admitted in the NICU.

Methods: A retrospective study conducted in the NICU of Department of neonatology of Bangladesh Shishu Hospital and Institute, Dhaka, Bangladesh during the period from January, 2021 to December, 2021. During this period preterm babies who died were analyzed.

Result: During study period total 95 preterm babies died. Their mean± SD of birth weight was 1228.26±115.60. Majority (40%) of neonates were 28-31 weeks old and majority (59%) neonates were male. We found 27.3% had PNA, 12% had PDA, 19% had RDS and 33.6% had only prematurity during admissions. Among all neonates, 51.58% developed sepsis, 40% pneumonia, 34% pulmonary hemorrhage 20% intra ventricular hemorrhage, 25% NEC, 13.6% BPD and 12% PDA respectively and finally died.

Conclusion: In our study, 32 (33.6%) babies admitted with only prematurity and rest were admitted with other diagnosis like PNA (27.3%), RDS (19%), PDA (12%) and CHD (9.4%). However, they finally died of Sepsis 49 (51%), Pneumonia 38 (40%), IVH 19 (20%), NEC 24 (25.2%), BPD 13 (13.6%), Pulmonary Hemorrhage 33 (34.7%).

Key words: Preterm, Mortality, LBW, Complication

INTRODUCTION

Even if remarkable progress has been made in reducing preventable child deaths worldwide, neonatal mortality reduction has remained unsatisfactory. Prematurity and Low birth weight (LBW) is the major risk factor for a child's death during the neonatal period.¹ Globally, more than 80% of newborn babies die due to LBW. Around 20% of all births are estimated to be LBW globally, resulting in over 20 million births per year.²⁻⁵ The prevalence of LBW in Bangladesh was 17.7% in 2011, 20% in 2014, and 16% in 2017.⁶⁻⁸

Though the LBW rate has decreased in Bangladesh between 2011 and 2017, it is still higher than in most developing countries.[9] Preterm babies usually die not due to prematurity itself rather they die of complications from prematurity. Goldenberg RL et al found in their studies that in low and middle-income countries, the majority of neonatal deaths occur without a clear cause of death (i.e., pre-maturity). [10,11] It is difficult to confirm the cause because there are many factors that could be linked to the exact underlying cause of neonatal mortality.[12] Due to prematurity they face several problems during their early life like- temperature control,

feeding problem, poor immunity, respiratory insufficiency etc. Muhe et al found that respiratory distress syndrome contributed to 45%, sepsis, meningitis, pneumonia combined contributed to nearly 30% and asphyxia contributed to 14% of the primary causes of preterm deaths. Hypothermia was the most common contributory cause of mortality; 69% of all deaths presented with hypothermia.¹³ Targeting these problems may improve the survival of pre mature infants. Our aim was to identify the events that occurred in these babies while getting admitted to the hospital that subsequently led them to die.

METHODS

This was a retrospective study and was conducted in the NICU of Department of neonatology of Bangladesh Shishu Hospital and Institute, Dhaka, Bangladesh during the period from January, 2021 to December, 2021. During this period detail data from all death cases from prematurity of less than 34 weeks were taken from records. During the study period we found total 95 neonates died. In our study sample size was 95 which was taken by using simple random sampling technique.

Inclusion and exclusion criteria

All preterm death of neonates belonged to gestational age <34 weeks were included. Preterm neonates died before 24 hours of admission were excluded.

All data including age, sex, gestational age, weight, diagnosis on admission, and events that occur subsequently during hospital stay like pneumonia, sepsis, IVH, NEC etc. were recorded in a preformed questionnaire prepared by the researcher herself. All data were recorded systematically in preformed data collection form and quantitative data was expressed as mean and standard deviation and qualitative data was expressed as frequency distribution and percentage. Statistical analysis was performed by using SPSS 23 (Statistical Package for Social Sciences). The study was approved by Ethical Review Committee of Bangladesh Shishu Hospital and Institute, Dhaka, Bangladesh.

RESULTS

In our study Figure 1 shows that majority (51%) of the mothers were 19-24 years old, 29% were 25-30 years old, 15% were more than 30 years old and the least prevalence 5% were ≤18 years old.

In this study (Table 1) showed the distribution of neonatal deaths based on the baseline characteristics of babies. We found the mean±SD of birth weight was 1228.26±115.60. Among all 95 babies 40 (42%) were 28-31 weeks old; 25 (26.31%) were 32-33 weeks old; 20 (21.05%) were 34-36 weeks gestational age and 10 (10.52%) babies were small for gestational age. Among all neonates 59% were male and 41% were female. The mean±SD of head

circumference and length was 25.18±1.53 and 44.82±1.18 respectively.

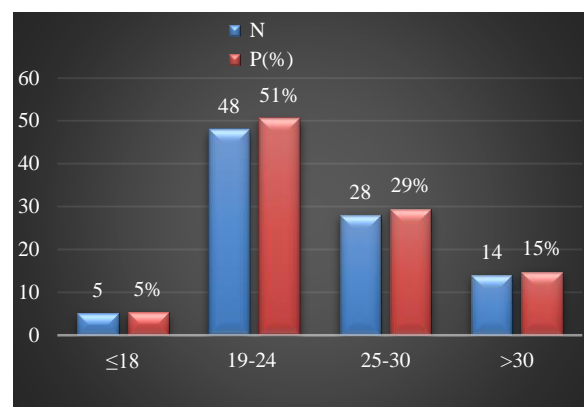


Figure 1: Distribution of neonates based on maternal age.

Table 1: Baseline characteristics of baby.

Baseline characteristics	No. of death	%
Birth weight (gm)		
750-999	28	29.47
1000-1249	33	34.74
1250-1449	34	35.79
Mean± SD	1228.26±115.60	
Gestational age (weeks)		
28-31	40	42.1
32-33	25	26.31
34-36	20	21.05
Small for gestational age (IUGR)	10	10.52
Gender		
Male	56	58.94
Female	39	41.05
Head Circumference(cm)	25.18±1.53	
Length (cm)	44.82±1.18	

Table 2: Condition of the baby on admission.

Diagnosis at admission	N	%
Perinatal Asphyxia (PNA)	26	27.3
Respiratory distress syndrome (RDS)	18	19
Patent ductus arteriosus (PDA)	11	12
Congenital heart disease (CHD)	08	9.4
PTVLBW without any complications	32	33.6

In this study (Table 2) showed that majority 32 (33.6%) babies admitted with only prematurity without any complications and rest were admitted with other diagnosis along with prematurity like PNA (27.3%), RDS (19%), PDA (12%) and CHD (9.4%). In (Table 3) we showed that events that developed during hospitalization before deaths. We found that Majority 51.58% of the babies had sepsis, 34% had pneumonia, 20% had intra ventricular hemorrhage, 25% had necrotizing enter colitis and 13.6%

had Broncho pulmonary dysplasia. We found hypocalcemia, hypoglycemia and hypothermia in 57%, 68% and 75% babies. There were 38%, 41% and 44.2% babies with, apnea, anemia and shock respectively. Many of the diagnosis and comorbidities co-exist.

Table: 3 Events developed during hospitalization before death.

Events	No. of death	%
<i>Sepsis</i>	49	51.58
<i>Pneumonia</i>	32	34.00
<i>Intra ventricular hemorrhage (IVH)</i>	19	20.0
<i>Necrotizing enter colitis (NEC)</i>	24	25.26
<i>Broncho pulmonary dysplasia (BPD)</i>	13	13.6
<i>Pulmonary hemorrhage</i>	33	34.74
<i>Hypoglycemia</i>	65	68.42
<i>Hypocalcemia</i>	54	56.84
<i>Hypothermia</i>	71	74.74
<i>Apnea</i>	36	37.89
<i>Anemia</i>	39	41.05
<i>Shock</i>	42	44.21

DISCUSSION

In this study we found that the majority (51%) of the women were 19-24 years old, 29% were 25 – 30 years old, 15% were more than 30 years old and the least prevalence 5% were ≤ 18 years old (Figure 1). Al Sheyab et al found that women's age ranged between 15 and 48 years. The majority of women (81%) were between 19 and 35 years of age, and 16.5% were older than 35 years.¹⁴ The results are similar to our findings. Eshete et al. reported that 885 mother-neonate pairs were included in the study. Nearly half, 380 (43%), of mothers were 24-29 years old.¹⁵

In this study we found the mean \pm SD of birth weight was 1228.26 \pm 115.60. Among all 95 babies 40(42%) were 28-31 weeks old; 25(26.31%) were 32-33 weeks old; 20(21.05) were 34-36 weeks gestational age. In our study 10(10.52%) babies were small for gestational age. Among all neonates 59% were male and 41% were female. The mean \pm SD of head circumference and length was 25.18 \pm 1.53 and 44.82 \pm 1.18 respectively (Table 1). Al-Sheyab et al found in their study 10,226 were LBW neonates and of all births, 46% were females, 87% weighed 2,500 grams or more, 10% weighed 1,500-2,499 grams, and 3% weighed <1500 grams.¹⁴ Eshete et al found majority of neonates (51.3%) were female. The prevalence of weight less than 2000 grams was 22% and more than 2000 grams was 78% and gestation age less than 37 weeks was 201(22.7%) and more than 37 weeks was 684 (77.3%).¹⁵ Neupane et al found that among 2229 low birth weight young infants, 53% were female.¹⁶ In our study we found majority 51.58% of the babies had sepsis, 34% had pneumonia, 20% had intra ventricular hemorrhage, 25% had necrotizing enter colitis and 13.6% had Broncho

pulmonary dysplasia. We found hypocalcaemia, hypoglycemia and hypothermia in 57%, 68% and 75% babies. There were 38%, 41% and 44.2% babies with, apnea, anemia and shock respectively. Many of the diagnosis co-exist (Table 3). Al-Sheyab et al. found the main leading cause of death was respiratory and cardiovascular disorders which contributed to pre-discharged deaths (43%), post-discharged deaths (33%) and majority (81.8%) were due to respiratory distress syndrome of newborns, 8 (14.5%) were due to pulmonary hemorrhage and 2 (3.6%) were due to neonatal aspiration syndromes. The second leading cause of death was low birth weight and being preterm which contributed to pre-discharged deaths (33%), post-discharged deaths (42%), and congenital malformations of heart (29.2%).¹⁴ Kiatchoosakun et al found the causes of death within the first 7 days of life in the study population were ELBW extreme preterm (1414 cases), respiratory failure (44 cases), asphyxia (8 cases), sepsis (3 cases), bleeding (2 cases), congenital syphilis (1 case), congenital malformation (4 cases), and others (2 cases). According to their study, RDS was the most common respiratory disease, affecting 70.7% of the study population.¹⁷ Muhe et al found that respiratory distress syndrome contributed to 45%, sepsis, meningitis, pneumonia combined contributed to nearly 30% and asphyxia contributed to 14% of the primary causes of preterm deaths. Hypothermia was the most common contributory cause of mortality; 69% of all deaths presented with hypothermia.¹³ Schindler et al found ARI was the leading cause of mortality in the extreme preterm population however IVH and perinatal asphyxia becomes the most common cause of death with increasing gestation.¹⁸

Limitations

Limitations of current study were; study was a single centre study; we could only determine the events that occurs before death of VLBW neonates based on maternal and neonatal baseline characteristic within a short study period. In current study there are more factors we didn't investigate like region, wealth index, mothers' height, twin children, and living children which were significantly associated with LBW.

CONCLUSION

Among all the 95 PT babies, 32(33.6%) babies admitted only with prematurity without any complications and rest were admitted with other diagnosis along with prematurity like PNA (27.3%), RDS (19 %), PDA (12%) and other CHD (9.4%) during admission. Later during hospital stay they developed several complications and finally died of sepsis 49 (51%), Pneumonia 38 (40%), IVH 19 (20%), NEC 24 (25.2%), BPD 13 (13.6%), pulmonary hemorrhage 33 (34.7%).

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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