

Neonatal mortality: a scenario in a tertiary level hospital of a developing country

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Abstract

This study was designed to observe the overall neonatal mortality and pattern of neonatal death in a developing country. The factors related to neonatal mortality are also analyzed. This retrospective study was carried out in all pediatric patients in a tertiary level hospital of a developing country in the year 2008. Total neonatal (0-28 days) and non-neonatal (after 28 days-12 years) admissions and death records were analyzed. There were a total of 3,194 admissions in the year 2008. Neonatal and non-neonatal admissions numbered 942 and 2,252, respectively. There were a total of 146 (15.5%) neonatal deaths among neonatal admissions and 114 (5.06%) non-neonatal deaths among non-neonatal admissions. There were 87 (59.59%) preterm related deaths and 98 (67.12%) deaths due to Low Birth Weight (LBW). There were 102 (70%) deaths among neonates who had no antenatal follow-up. Mother's age was under 20 years in 80 (55%) cases of neonatal death. The number of neonatal deaths is high in developing countries. Preterm with Low Birth Weight (LBW) is the major cause of mortality. Regular antenatal care and social discouragement of early marriage can greatly reduce neonatal death. Skilled and trained nursing care is necessary for the survival of the preterm and Low Birth Weight (LBW) baby in the hospitals of developing countries.

Introduction

Each year 4 million neonates die during the first four weeks of life. In the less developed countries, these account for 98% of reported neonatal deaths.¹ There has been a global decline in under five and infant mortality rates in recent decades, but neonatal mortality rates have remained relatively unchanged.² Mortality during the first 28 days of life now accounts for two thirds of deaths in children under one year of age and nearly four-tenths of all deaths in children under five years of age.^{3,5}

Infections may account for approximately half of newborn deaths at the community level.⁶ Low Birth Weight (LBW) is an overriding factor in the majority of the deaths.²

Since 2000, when the United Nations Millennium declaration was signed, there have been ever greater efforts to reduce mortality among children under five years of age. It will be difficult to reach the stated goal (cutting the rate by two-thirds by 2015) without reducing the number of neonatal deaths.¹

In this study, we present overall percentage and pattern of neonatal deaths in a tertiary hospital of a developing country. In order to prevent the neonatal mortality, it is imperative to know the causes and predisposing factors.

Materials and Methods

In this retrospective study, all the records in the pediatric department of a tertiary medical college hospital of a developing country in the year 2008 (1st January to 31st December) were observed. The neonatal causes of death and factors related to cause of death were analyzed. Total neonatal admissions and deaths were also compared with other age groups. Neonates are up to 28 days of age. Non-neonates are from the age of 28 days to 12 years. Preterm was considered if the gestational age was less than 37 completed weeks. Low Birth Weight (LBW), Very Low Birth Weight (VLBW), Extreme Low Birth Weight (ELBW)

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was recorded if the birth weight was under 2.5 kg, under 2 kg, under 1.5 kg, respectively. Every case was diagnosed according to the clinical and investigation criteria.

Results

There were 3,194 admissions in the year 2008 in a pediatric department of Khulna Medical College Hospital in Bangladesh. Among them, there were 942 neonatal admissions and 2,252 non-neonatal admissions. In that period, there were 146 (15.5%) neonatal

Table 1. Pattern of neonatal deaths (Total neonatal deaths, n=146).

Preterm related death		Infection related death	
Preterm LBW with septicemia	22	Preterm LBW with septicemia	22
Preterm LBW with birth asphyxia	11	Septicemia	09
Preterm LBW with HIE	34	Neonatal jaundice with septicemia	03
Preterm LBW with RDS	20	Aspiration pneumonia	04
		Very LBW with septicemia	04
Total	87 (59.59%)	Total	42 (28.77%)
Low birth weight (LBW) related death		Others	
Preterm LBW with septicemia	22	HIE	06
Preterm LBW with birth asphyxia	11	Birth asphyxia	02
Preterm LBW with HIE	34	Birth asphyxia with congenital anomaly	01
Preterm LBW with RDS	20	Brought dead	08
Extreme LBW	06	Congenital Heart Disease with birth asphyxia	01
Very LBW with septicemia	04	Meconium aspiration syndrome	06
LBW with multiple congenital anomaly	01	Rh incompatibility with kernicterus	01
		Hirschprung disease with aspiration pneumonia	01
		HIE with laryngomalacia	02
		Meningocele	01
		Tracheoesophageal fistula	01
Total	98 (67.12%)	Total	30 (20.50%)

HIE = Hypoxic Ischemic Encephalopathy, RDS = Respiratory Distress Syndrome, LBW = Low Birth Weight. All preterm cases were associated with LBW

deaths among neonatal admissions but the percentage of deaths among total admissions was 4.57%. The non-neonatal death rate was 5.06% (n=114) among the non-neonatal admissions. This death rate was 3.57% of total admissions. The majority of neonatal admissions were between the months of July and December (n=516, 55%). There were 87 (59.5%) preterm related deaths in the neonatal period. All the preterm cases were associated with LBW. There were 98 (67.12%) deaths associated with LBW neonates.

Death from neonatal infection was observed in 42 (28.77%) cases. Table 1 shows the pattern of death in the neonatal period in the year 2008. Preterm-Low Birth Weight related cases in discharged neonates were lower in relation to infection and other diseases. Table 2 shows the pattern of cases in discharged neonates.

Most deliveries took place at home and the remainder in hospital. There were 102 (70%) cases of neonatal death concerning babies who had had no antenatal follow-up through the pregnancy. Among the discharged neonates, 238 (30%) had no antenatal follow-up through the pregnancy. Of the neonatal deaths, there were 80 (55%) cases in which the mother was aged under 20 years.

No preterm infant received antenatal steroids or surfactant in either group. Surfactant was less available in this country. The neonatal care system was poor. There was no special neonatal transportation system. All the neonates were transported by the attendant directly from the home and hospital. There was no neonatal intensive care facility in the hospital. There was a separate neonatal ward with facilities for incubator care, phototherapy and radiant heater but no facility for blood gas analysis. There were a total of 10 beds and 5 incubators in the neonatal ward. There were no specialized trained neonatal care nurses on the neonatal ward. A total of 4 nurses were on duty on each shift. Each shift lasted eight hours. Nurses looked after both the non-neonatal and neonatal wards. There were 5 pediatric consultants for both the neonatal and non-neonatal wards.

Discussion

Although there has been a global decline in under five and infant mortality rates in recent decades, neonatal mortality is still relatively high.² Our study confirms this because neonatal mortality was higher in relation to non-neonatal deaths (15.5% in the neonatal and 5.06% in the non-neonatal age group). Considering deaths in relation to total admissions, the neonatal mortality in our study was 4.57% but in the non-neonatal age group the death rate was 3.5%. The majority of neonatal

Table 2. Pattern of cases in discharged and referred neonates (Total n=796).

Preterm neonate		Infected neonate	
Preterm low birth weight with birth asphyxia	13	Pneumonia with congenital heart disease	02
Preterm low birth weight	79	Congenital pneumonia	61
Preterm	17	Preterm low birth weight with septicemia	01
Preterm with congenital anomaly	01	Septicemia	50
Preterm low birth weight with club foot	01	Meningitis	04
Preterm low birth weight with septicemia	01	Acute Gastro Enteritis	26
Preterm low birth weight with neonatal jaundice	03	Birth asphyxia with septicemia	01
Preterm with meningocele	01	Septicemia with neonatal jaundice	01
Preterm low birth weight with hypoxic ischemic encephalopathy	01	Skin infection	01
		Septic arthritis	01
		Tetanus neonatarum	01
		Hypoxic ischemic encephalopathy with Septicemia	01
		Umbilical sepsis	01
	Total 117 (14.7%)		Total 151 (19%)
Low birth weight neonate		Others	
Preterm low birth weight	9	Birth asphyxia	208
Very low birth weight	02	Muconium aspiration syndrome	14
Preterm low birth weight with birth asphyxia	13	Apnea	01
Preterm low birth weight with club foot	01	Neonatal jaundice	48
Preterm low birth weight with septicemia	01	Hypoxic ischemic encephalopathy	47
Low birth weight	58	Gastro-esophageal reflux	10
Low birth weight with birth asphyxia	10	Pneumothorax	01
Low birth weight with cleft lip	01	Aspiration pneumonia with congenital anomaly	04
Preterm low birth weight with neonatal jaundice	03	Hydrocephalus	04
Low birth weight with hypoxic ischemic encephalopathy	01	Congenital rubella syndrome	02
Low birth weight with congenital heart disease	01	Intestinal obstruction	01
		Baby of a diabetic mother	02
		Congenital hypertrophic pyloric stenosis	01
		Pierre Robin syndrome	01
		Erythema toxicum	04
		Baby for check-up	86
		Aspiration pneumonia	02
		Birth trauma	01
		Congenital heart disease	02
		Storage disease	01
		Baby of hepatitis B positive mother	01
		Hydrocephalus with meningitis	01
		Rh incompatibility	04
		Hemorrhagic disease of the newborn	01
		Cephalhematoma	01
		Hirschsprungs disease	02
		Anencephaly with cleft lip	01
		Bilateral cleft lip with palate	01
		Tracheo-esophageal fistula	01
	Total 170 (21%)		Total 454 (57%)

admissions were in the last six months of the year. There might be some seasonal impact on neonatal admission.

Worldwide, 98% of all neonatal deaths occur in developing countries and are largely due to infections (32%), birth asphyxia (29%), and consequences of prematurity and congenital anomalies (34%).⁷ In our series, there were 87 (59.5%) preterm with LBW related deaths. Infection was the second leading cause of death

in the neonatal period (n=42, 28.77%). There was also overlapping causes of death in the neonatal period. As in another study, our observation was that Low Birth Weight (LBW) was an overriding factor in the majority of the deaths.² Neonatal deaths generally result from complication of preterm birth, birth asphyxia or trauma during birth, infection, severe malnutrition or other specifically perspective perinatal causes.¹

Maternal health and antenatal care can have

a profound effect on reducing perinatal and neonatal morbidity and mortality.⁸ In our observation, 70% of mothers in cases of neonatal death had no antenatal follow-up. Our study also showed a similar picture for reducing the neonatal morbidity and mortality. About 55% of mothers were under 20 years of age. This early child bearing age had a negative influence on the nutritional status of the mother which was related with higher neonatal mortality.

The death rate in the neonatal period was high in comparison to the non-neonatal admissions. Preterm with LBW was the major cause of mortality. Preventive measures are the mainstay for the reduction of neonatal mortality. Regular antenatal care and discouraging early maternal marriage is necessary for this. Skilled and trained nursing care could prevent the death of these preterm with LBW babies in the neonatal care unit but this is lacking in the hospitals of developing countries.

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