

ORIGINAL ARTICLE

Predictors of Mortality in Newborn Admitted in Special Care Baby Unit (SCABU) of Dhaka Shishu Hospital

MA Kamal¹, Mahbubul Hoque²

Abstract

Background: *The current neonatal mortality rate of Bangladesh is very high compared to developed countries.*

Objective: *The objective of the study was to find out the predictors that are associated with mortality in newborn admitted in Special Care Baby Unit (SCABU) of Dhaka Shishu (Children) Hospital.*

Methods: *This prospective study was conducted in the SCABU of Dhaka Shishu (Children) Hospital from 1st June 2016 to 30 November 2016. A semi-structured questionnaire was prepared before the study. Data were collected from the attendants of each neonate by asking questions who died at the neonatal period after hospital admission. Detail history regarding gestational age, birth weight, place of birth, person conducting delivery, mood of delivery, problem at birth, residence, reasons of referral, vehicle during transport, condition of baby at arrival, time taken during transport and need for any resuscitation was recorded. Data were analyzed by using SPSS version 16.*

Result: *Total 970 neonates were admitted during data collection period out of them 98(10.10%) died. Majority (58.16%) of the death occurred in neonate who was admitted before 72 hours of age having gestational age <37 weeks (65.31%). Majority of the neonates were from urban area (56.12%) but from poor socioeconomic status (54.08%) and only 32.65% were on regular antenatal care. Majority were delivered by normal delivery at home and attended by TBA. Among the neonates 30.61% reached hospital only by ambulance and 64.29% were found hypothermic during admission. Majority 70(71.43%) were died within 24 hours of hospital admission. Neonatal sepsis, perinatal asphyxia and prematurity contributed majority of neonatal death.*

Conclusion: *Early (age <72 hours) and premature neonates, neonates from poor socioeconomic background, lack of antenatal care, home delivery, lack of facility in local areas, inadequate transport and unstable initial condition contributed majority of neonatal death. Neonatal sepsis, perinatal asphyxia and prematurity contributed most of neonatal death.*

Key words: *Predictors, mortality, newborn, Special Care Baby Unit.*

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Introduction

High neonatal mortality remains a challenge for many low-income countries^{1,2} and a major threat to the achievement of the fourth Millennium Development Goal (MDG-4).³⁻⁵ Worldwide neonatal mortality represents more than half of the overall infant mortality and over one third of under five deaths. Neonatal mortality rates vary from five in developed countries to 34 per 1,000 live births in the less-developed regions of the world. Although there has been a remarkable worldwide decline in child mortality in the last quarter of the 20th century, this reduction in death rate has occurred mainly among older children, mostly due to the effects of immunization and infectious disease-control programmes.⁶

Mortality of neonatal unit of Dhaka Shishu (Children) Hospital, the largest paediatric teaching hospital in Bangladesh was 237/1000 admissions in mid nineties.⁷ Some improvement of mortality has been evident for the last 10 years though not satisfactory. Standard of neonatal service has improved in Bangladesh in last four decade but the mortality rate still remains unacceptably and alarmingly high.⁸ The current neonatal mortality rate of Bangladesh is also very high compared to developed countries.⁹ Various factors are responsible for the high mortality like socioeconomic condition, hygiene and sanitation, education especially female education, culture, local medical facilities etc. contribute to this high neonatal mortality rate. On an average 85% of our population lives in rural area with minimal educational qualification.¹⁰ Communication system is very poor dependent mainly on primitive type of transport. Majority of the deliveries are conducted at home by traditional birth attendants. The care during pregnancy, child birth and infancy is often compromised due to a large number of traditional beliefs and cultural practices.¹¹

The Millennium Development Goal for child survival cannot be met without Substantial reduction in neonatal mortality.¹² Neonatal mortality rate is a reliable yardstick for evaluating the overall progress of potential care in a community. Knowledge of local or regional health problems is a prerequisite for establishing an effective health care delivery system.¹³ Although 40% reduction of neonatal mortality was achieved over the past two decades,

it still remains high compared to the developed countries.³

Bangladesh is one of the most populous countries in this world. Too many mothers and children are suffering and dying each year in this country.¹⁴ Neonatal mortality is unacceptably high in Bangladesh. About 30-50% of newborn are of LBW, which causes mortality and morbidity to a large number of subjects. Perinatal and neonatal mortality and morbidity rate are the reflection of a country's obstetric and neonatal services, which again is determined by various complex interrelated medical, socio-economic, cultural and infrastructural factors.¹⁵ Neonatal mortality contributes a great deal to infant mortality rate.^{16,17}

Causes of neonatal deaths in immediate postpartum period is different in developing countries from developed countries. Thus causes of neonatal mortality vary across the nations and from rural to urban set up.¹⁸ The major direct cause of neonatal deaths were prematurity, infections and birth asphyxia. In a report which was published in the Lancet, the major direct causes of the deaths were preterm birth, infections, asphyxia, congenital anomalies, tetanus, and diarrhea.¹⁹ Non institutional birth constitutes a significant proportion of total births with a high incidence of low birth weights, hypothermia and perinatal and neonatal mortality. Though institutional delivery and in utero transport of newborn is safest but unfortunately pre term delivery and perinatal illness cannot always anticipated resulting in continued need of transfer of these babies after delivery.²⁰ These babies are often critically ill and outcome also dependent on effectiveness of transport system.²¹ Most of the neonatal transports are self transport without any pretreatment stabilization or care during transport. Many of these newborns thus transported are cold, blue and hypoglycemic.²²

In high-income countries when deaths occur they are usually reported and investigated but in low-income countries most neonates are born and die without any record.²³ Peer reviewed literature has drawn attention to the absence of reliable data for births, deaths, and causes of death, and the need to count and account for these deaths to set priorities for action and strengthen health systems.²⁴ While neonatal deaths due to infection and preterm complications have solutions that can potentially be taken to scale,²⁵

even in weak health systems,²⁶ solutions for intrapartum related outcomes are more challenging and require strengthening the quality and responsiveness of the health system at all levels.²⁷

Bangladesh has made considerable progress in child survival rate as the mortality has declined rapidly over the last 10-12 years. Despite this progress, there still remain challenges. While the mortality rates have declined substantially, inequalities in terms of access and utilization of health services among the populations still need to be addressed.²⁸ In a developing country like Bangladesh, where neonatal support systems are mainly concentrated in metropolitan cities, it is important to understand the predictors that are contributory to neonatal mortality amongst newborns referred to tertiary centers. The present study was done to assess the associations between mortality and condition of newborns delivered outside (home, government health centers and private hospitals at arrival to a tertiary care center) and assessment of predictors which contribute to mortality.

Materials and Methods

This study was conducted in the SCABU of Dhaka Shishu (Children) Hospital for a period of six months from 1st June 2016 to 30 November 2016. This center is a tertiary care center, where most of babies referred are high- risk babies. A semi-structured questionnaire was prepared and before enrollment, parent/ attendants of the neonate was given a detail explanation of the study. Data were collected from the attendants of each neonate by asking questions who died at the neonatal period after hospital admission. Detail history regarding gestational age, birth weight, place of birth, person conducting delivery, mood of delivery, problem at birth, residence, reasons of referral, vehicle during transport, condition of baby at arrival, time taken during transport and need for any resuscitation was recorded. Weight of neonates are measured using electronic weighting machines having gram as smallest division. Gestational age was calculated from last menstrual period (LMP). Time taken to receive the neonate after admission, time of death after admission and diagnosis was recorded from hospital record. The purpose and procedure of the study was explained to the parents/attendants and their consents were taken. Data were analyzed by using SPSS version 16.

Results

During the 6 months period there were 970 neonatal admissions and out of them 98 died (10.10%). Among

them 10.2% were admitted before 12 hours of age, 27.55% were between 12-24 hours, 20.41% between 24-72 hours and 41.84% were >72 hours of age. Majority (58.16%) of the death occurred in neonate who was admitted before 72 hours of age (Fig.-1).

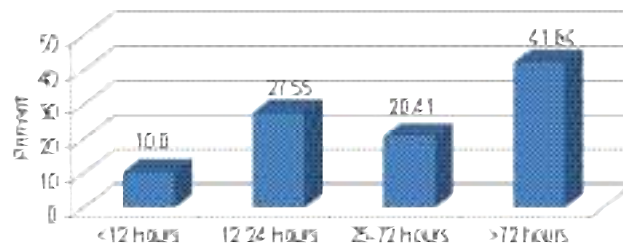


Fig 1 Age distribution of the study neonates

Among the neonates 57.14% were male and 42.86% were female with a male female ratio 1.33:1 (Fig 2).

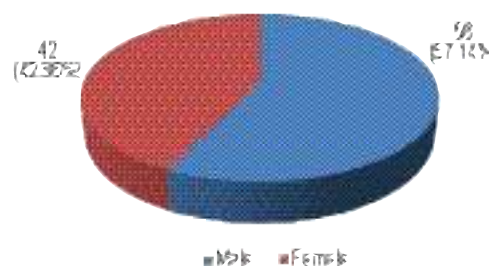


Fig 2 Sex distribution of the study neonates (n=98)

Mortality was high among preterm neonate (65.31%). Mortality was 34.69% among term neonate. Mortality decreases along with advancement of gestational age (Fig.-3).

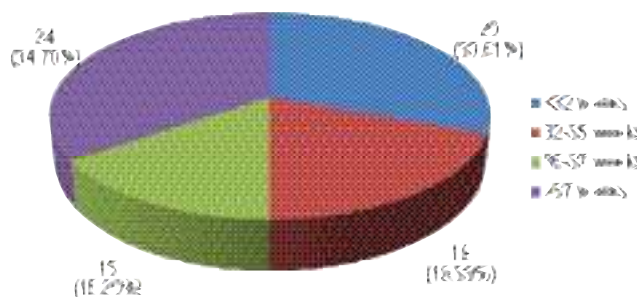


Fig 3 Distribution of gestational age of the study neonates (n=98)

Majority of the neonates were from urban area but from low socioeconomic status. Only 32.65% were on regular antenatal care. Majority were delivered by normal delivery at home and attended by TBA (Table-I).

Table I
Sociodemography, antepartum and intra-partum history (N= 98)

Variable		Number	%
Residence	Rural	43	43.88
	Urban	55	56.12
Socioeconomic status	Poor	53	54.08
	Middle class	35	35.72
	Higher class	10	10.20
Antenatal Care	Yes	32	32.65
	No	66	67.35
Maternal Illness During Pregnancy	Yes	25	25.51
	No	73	74.49
Place of delivery	Hospital/Clinic	28	28.57
	Home	70	71.43
Delivery conducted by	Doctor	30	30.61
	Nurse	22	22.45
	TBA	46	46.94
Type of Delivery	Normal	64	65.31
	Caesarean	34	34.69
Pre-lacteal Feed	Yes	30	30.61
	No	68	69.39

Majority of the neonates (51.02) were referred due to lack of facility in local areas, 20.41% were referred from local hospital as the condition was not improved and 28.57% came with their own interest (Table-II).

Table II <i>Causes of referral of neonates (n=98)</i>		
Causes of referral	Number	%
Lack of facility	50	51.02
Condition not improved in local hospital	20	20.41
Own interest	28	28.57

Among the neonates 17.34% reached hospital within 2 hours, 41.84% within 2-5 hours, 24.49% within 6-10 hours and 16.33% needed >10 hours (Fig.-4).

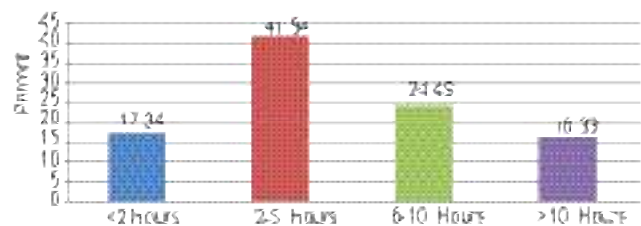


Fig 4 Time taken to reached hospital from referral hospital (n=98)

Among the neonates 9.19% reached hospital by

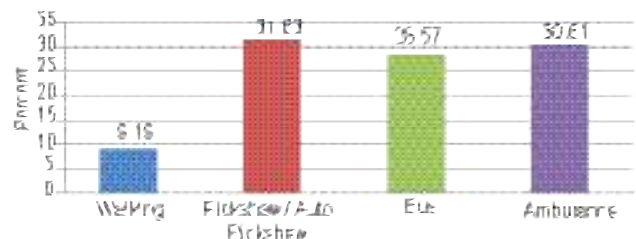


Fig 5 Mode of transport of neonates from referral hospital (n=98)

walking, 31.63% by rickshaw or auto rickshaw, 28.57% by bus and only 30.61% by ambulance (Fig.-5).

Among the neonates 64.29% were hypothermic, 40.82% had respiratory distress, 10.2% had gasping respiration, 62.25% had arrhythmias and 34.69% had prolong capillary refill time (Table-III).

Table III
Clinical conditions of neonates on arrival of hospital

Clinical conditions	Number	%
Hypothermia	63	64.29
Respiratory distress	40	40.82
Gasping respiration	10	10.20
Tachycardia	23	23.47
Bradycardia	38	38.78
Prolong capillary refill time	34	34.69

After admission treatment were given within 30 minutes in 40.82% neonates, 32.65% after 30 minutes and time was not recorded in 26.53% cases (Fig-6).

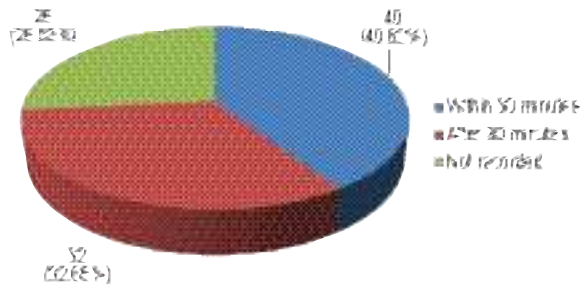


Fig 6 Time taken to start treatment after hospital admission (n=98)

Only 10(10.2%) neonate died within 6 hours of hospital admission, 40(40.82%) during 6-12 hours, 20(20.41%) during 12-24 hour and 28 (28.57%) more than 24 hours. Majority 70 (71.43%) were died within 24 hours of hospital admission (Fig.-7).

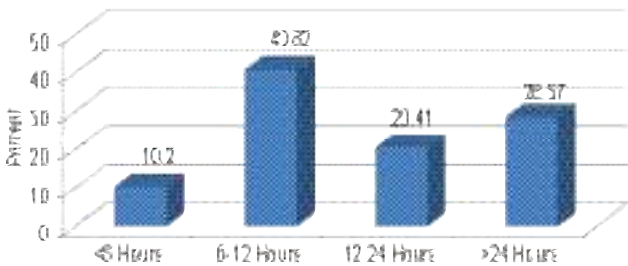


Fig 7 Time of death after admission (n=98)

Mortality was high (30.61%) among the neonates admitted with perinatal asphyxia. Second most common cause was (23.47%) PTLBW with sepsis and neonatal sepsis (23.47%). Sepsis contributed 46.94% of neonatal death. So neonatal sepsis, perinatal asphyxia and prematurity contributed majority of neonatal death (Fig.-8).

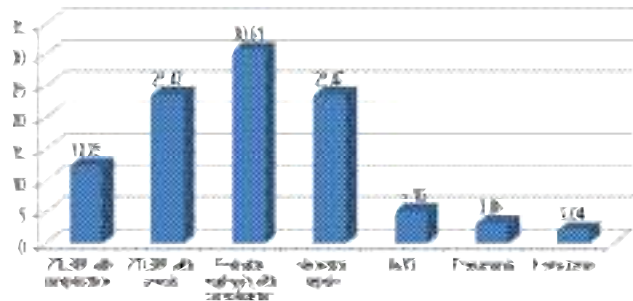


Fig 8 Diagnosis of the death cases (n=98)

Discussion

Neonatal death is a serious concern both in developing and developed countries. While infant mortality rates have been decreasing steadily worldwide, changes in neonatal mortality rate have been much slower.²⁹ The present study showed mortality was 10.10%. Khan et al³⁰ in Bangladesh found neonatal mortality 10.9% which is similar to present study. Hossain et al⁸ found 15.7% mortality among the neonates admitted in SCABU of Dhaka Shishu (Children) Hospital. A high mortality rate was found in India (37%) by Basu et al²⁹ and 44.2% was reported by Jumah et al³¹.

The present study showed majority (71.43%) of the neonates were died within 24 hours of hospital admission. Hoque et al³² found most of the neonate death occurred within 24 hours of hospital admission. In this study mortality was high (30.61%) among the neonates admitted with perinatal Asphyxia. Second most common cause was PTLB with sepsis (23.47%) and neonatal sepsis (23.47%). Sepsis contributes 46.94% of neonatal death. In Bangladesh the leading cause of neonatal death are perinatal Asphyxia, neonatal infection & prematurity.⁹ Nahar et al¹² found similar report in their study. Advances in perinatal and neonatal care have significantly reduced neonatal mortality rates. Variations in mortality rates are important because they permit inferences about quality of care. Examination of care practices associated with

variations in mortality rates can provide insights into how care practices might be changed to improve outcomes.³³ Present study showed majority (58.16%) of the death occurred in neonate who was admitted before 72 hours of age. Hossain et al⁸ showed that 65% of the neonatal admission occurred within 3 days of age. Male accounted for more of the death in present study. Hoque et al³² found higher mortality in male neonates. Mortality was high among preterm neonate (65.31%) and mortality decrease along with advancement of gestational age. Basu et al²⁹ and Khan et al³⁰ also found higher mortality in preterm neonates.

Majority of the neonates died in their early neonatal period. This period is a highly vulnerable time for the neonate who is completing many of the physiological adjustments required for extra uterine existence. Almost two-third of infant deaths occur in the first month of life, among these, more than two-thirds die in their first week and among those also, two-thirds die in their first 24 hours.³ The World Health Organization reported that most deaths in the neonatal period occur in the first few days after birth and this constitutes approximately 75% of neonatal mortality in all regions of the world.³⁴

The present study showed majority of the neonate with low socioeconomic status, came from urban area and reached hospital within 2-5 hours and only 30.61% by ambulance with minimum (32.65%) regular antenatal care and most of neonates delivered by normal vaginal delivery at home and attended by trained birth attendant. Various factors are responsible for the high mortality like socioeconomic condition, hygiene and sanitation, education especially female education, culture, local medical facilities etc. contribute to this high neonatal mortality rate. Communication system is very poor dependent mainly on primitive type of transport. Majority of the deliveries are conducted at home by traditional birth attendants. The care during pregnancy, child birth and infancy is often compromised due to a large number of traditional beliefs and cultural practices.¹¹

Conclusion

Early (age <72 hours) and premature neonates, neonates from poor socioeconomic background, lack of antenatal care, home delivery, lack of facility in local areas, inadequate transport and unstable

initial condition contributed majority of neonatal death. Neonatal sepsis, perinatal asphyxia and prematurity contributed most of neonatal death.

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