Original Article

Evaluation of Hospital Outcomes Among Very Low Birth Weight Babies in a Community-Level Medical College Hospital

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Abstract

Introduction: Very low birth weight (VLBW) babies are at increased risk from a wide range of hazards resulting from immaturity of structure and functions of many organs, which may cause death or permanent damage.

Objective: The objective of this study was to evaluate immediate outcomes in VLBW babies.

Materials and Methods: This hospital-based prospective cohort study was conducted in the Department of Paediatrics, Kumudini Women's Medical College and Hospital, Mirzapur, Tangail from August 2008 to July 2009. At enrollment VLBW babies (birth weight <1500 grams) were assessed for gestational age and weight. Patients were followed up daily till discharge or death. The outcome in terms of survival till discharge was recorded. Informed verbal consent from the caregiver was taken before enrolment.

Results: A total of 60 VLBW neonates were enrolled in the study. Eight (13.3%) neonates had weights below 1000 grams and 52 (86.7%) had 1000-1499 grams. Five (8.3%) neonates had gestational age ≤28 weeks, 44 (73.3%) were 29-32 weeks, and 11(18.3%) were 33-36 weeks. Maternal age, place, and mode of delivery were significant contributory factors. In the present study, 35(59%) of VLBW babies expired; 100% of babies died below 1000 grams. Neonatal mortality showed an inverse relationship with birth weight and gestational age.

Conclusion: Proper antenatal care should be encouraged throughout the country to prevent the neonatal mortality associated with VLBW infants. Management of labor is important and facilities for the management of high-risk pregnancy should be made available widely. Immediate management of newborns after birth can prevent the worst hospital outcomes in our country.

Keywords: Very Low Birth Weight, Hospital Outcomes, Neonatal mortality

Introduction

Very low birth weight (VLBW) infants are at increased risk of morbidity and mortality, mainly due to infections and complications of prematurity. Bangladesh has achieved substantial health advances in recent decades, marked by significant reductions in maternal and child mortality rates, increased life expectancy, and improved immunization coverage[1]. Like any other part of the developing world, Bangladesh has also substantially reduced under-five and infant mortality[2]. Major declines in infant mortality, however, have occurred in the post-neonatal period, i.e., after the first 28 days of life[3]. The decrease in neonatal mortality (52 per 1000 live births in 1990 to 28 per 1000 live births in 2014) is slower than in under-five children (133 per 1000 live births in 1990 to 46 per 1000 live births in 2014) over the last 21 years[4].

The annual infant mortality rate was reduced globally by 21.3% between 2000 to 2015[4]. Over the last few decades, Bangladesh experienced an immense reduction in child mortality[2]. However, the decrease in infant mortality (87 per 1000 live births in 1990 to 38 per 1000 live births in 2014) is slower than in under-five children (133 per 1000 live births in 1990 to 46 per 1000 live births in 2014) over the last 21 years[3]. More importantly, the neonatal mortality rate also has declined over time (52 per 1000 live births in 1990 to 28 per 1000 live births in 2014) which has a significant role in infant death[4].

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Received Date : 28 July, 2024

Accepted Date : 13 August, 2024

In Bangladesh neonatal mortality accounts for almost two-thirds of infant deaths and about half of deaths among children aged under 5 years. Reducing neonatal mortality in Bangladesh will be necessary for the achievement of the targets for child mortality reduction under the United Nations Sustainable Development Goal (SDG) targets of reducing neonatal mortality (NM) and under-five mortality (U5M) rates to 12 and 25 deaths per 1,000 live births respectively by 2030[5].

According to the World Health Organization (WHO), preterm birth accounts for 30% of global neonatal deaths, sepsis or pneumonia for 27%, birth asphyxia for 23%, congenital abnormality for 6%, neonatal tetanus for 4%, diarrhea for 3%, and other causes for 7% of all neonatal deaths[6,7]. Preterm births are often associated with very low birth weight (birth weight of less than 1500 grams) and are an important determinant of neonatal mortality and morbidity [8,9]. Its prevalence is directly correlated with the developmental state of a country, and it is associated with poverty. Bangladesh is a developing country and an estimated 20% of babies are born prematurely and 30% have low birth weight (LBW)[10].

So, the objective of this study was to evaluate hospital outcomes in very low birth weight (VLBW) babies and implement this knowledge for the prevention and better management of preterm VLBW babies.

Materials and Methods

This was a prospective cohort study conducted in the Department of Pediatrics at Kumudini Women's Medical College and Hospital, Mirzapur, Tangail from August 2008 to July 2009. All the preterm (<37 weeks gestational age) low birth weight (<1500 grams) neonates (0-28 days) admitted in the Department of Pediatrics within 72 hours of birth were screened for enrolment. Patients with small gestational age (SGA), congenital cardiac or other life-threatening anomalies, or those who required surgical intervention were excluded from the study. Babies who fulfilled the inclusion criteria and had no exclusion criteria and parents/caregivers provided informed consent were enrolled in the study. At enrolment detailed history was taken during the immediate postnatal period for each subject by interviewing the parents a thorough clinical examination was conducted and findings were recorded in a structured questionnaire. Maternal information included age, parity, previous preterm deliveries, history of hypertension, UTI, eclampsia, premature rupture of membrane, and mode and place of delivery.

Newborn history included the history of perinatal asphyxia, convulsion, and other details about presenting complaints. Weight was recorded in grams by digital weighing scale and gestational age was determined based on maternal dates (time from the first day of the last menstrual period) and further confirmed by Ballard scoring system[11]. Routine and relevant laboratory investigations, as necessary, were done and patients was managed as per hospital protocol. Patients were followed up daily and findings were also recorded. Finally, the outcome of these babies was recorded as improved and discharged, discharged on risk bond (DORB), or death.

Results

A total of 60 VLBW neonates were included in this study. Out of 60 babies, 32 (53.3%) were males and 28 (46.6%) were females; male to a female ratio of 1.14:1. Among the enrolled neonates, 8 (13.3%) had weights below 1000 grams, and 52 (86.7%) babies from 1000-1499 grams. The gestational age of 5 (8.3%) neonates was 28 weeks or below, 44 (73.3%) were 29-32 weeks, and 11 (18.3%) were <33 weeks.

In this study, 34 (56.7%) babies were born to mothers below 25 years of age, 19 (31.7%) were born to mothers between 26-30 years, and 7 (11.7%) were born to mothers between 30 to 35 years of age. Out of 60 VLBW babies 25 (41.7%) were born to primipara mothers, 20 (33.3%) to mothers with second gravida, 9 (15.0%) were of 3rd gravida, 4 (6.7%) with 4th gravida, and 2 (3.3%) born to mothers with 5th gravida or more.

Table 1: Sociodemographic Characteristics of Participants (n=60)

Baseline characteristics		Total Study Population n=60	
		Number (N)	Frequency %
Gender of baby			
	Female	28	46.6%
	Male	32	53.3%
Birth weight of babies			
	Below 1000gm	8	13.3%
	1000-1499gm	52	86.7%
Gestational Age of babies			
	<28 weeks	5	8.3%
	29-32 weeks	44	73.3%
	<33 weeks	11	18.3%
Maternal age			
	<25 years	34	56.7%
	26-30 years	19	31.7%
	30 to 35 years	7	11.7%
Gravida of mother			
	1st	25	41.7%
	2nd	20	33.3%
	3rd	9	15.0%
	4th	4	6.7%
	5th	2	3.3%

Table 2: Outcome of VLBW babies by gestational age (n=60)

Gestational age	Discharged N (%)	Died N (%)	DORB N (%)
Upto 28 weeks	0(0)	04(80)	01(20)
29-32 weeks	11(25)	30(68.2)	03(6.8)
33-36 weeks	09(81.8)	01(9.1)	01(9.1)

Table 2 shows the outcome of 60 studied infants in different gestational age groups. Among 5 babies in gestational age group of 28 weeks and below, 4(80%) died and 1(20%) obtained DORB, but no survived. Out of 44 babies in 29-32 weeks of gestational age 11(25%) survived, 30 (68.2%) died, and 3(6.8%) obtained DORB. In 33-36 weeks of gestational age group among 11 babies, 9(81.8%) survived, 1(9.1%) died and 1(9.1%) obtained DORB.

Table 3: Mortality rate of VLBW babies by birth weight (n=60)

Weight in gm	Number of VLBW babies	Number of Death	Mortality percentage
Below 1000 gm	08	08	100 %
1000-1499 gm	52	27	51.9 %

Table 3 shows the outcome of 60 studied babies in different weight groups. In below 1000 gm birth weight, there were 8 infants. Out of 8 infants, all 8 (100%) died. In 1000-1499 gm birth weight there were 52 infants. Out of 52 infants, 27(51.9%) died.

Table 4: Outcome of VLBW babies by place of delivery (n=60)

Gestational age	Discharged N (%)	Died N (%)	DORB N (%)
Hospital/Clinic	16(34.8)	26(56.5)	04(8.7)
Home	04(28.6)	09(64.3)	01(7.1)

Table 4 showed that 46 babies were delivered in the hospital of which 16(34.8%) survived, 26(56.5%) died, and 2(10%) obtained DORB. 14 babies were delivered at home of which 20(33.3%) survived, 35(58.3%) died and obtained DORB 5(8.3%).

Table 5: Outcome of VLBW babies by mode of delivery (n=60)

Gestational age	Discharged N (%)	Died N (%)	DORB N (%)
NVD	12(27.9)	27(62.8)	04(9.3)
Cesarean section	08(47.1)	08(47.1)	01(5.9)

Table 5 shows that 43 babies were delivered by spontaneous vaginal delivery of which 12(27.9%) survived, 27(62.8%) died, 4(9.3%) obtained DORB. 17 babies were delivered by LUCS of which 8(47.1%) survived, 8(47.1%) died and obtained DORB 01(5.9%).

Table 6: Comorbidities of the enrolled cases (n=60)

Comorbidities	Number	Percentage
Perinatal asphyxia	31	51.7%
Infections	25	41.7%
Jaundice	22	36.7%
Cyanosis	18	30.0%
Apnoeic Spell	18	30.0%
Convulsion	2	3.3%
NEC	1	1.7%
Bleeding Manifestations	01	1.7%

Table 6 shows the distribution of comorbidities of the participants where 31 (51.7%) cases of Perinatal asphyxia were found present. The presence of infection was also nearly half (47.7%) which includes 25 children. Cyanosis and Apnoeic spells share the same proportion representing 30% of the cases. NEC and Bleeding Manifestations were found as the least occurred comorbidities in this study with one case each.

Discussion

Birth weight is one of the most indispensable predictors of poor health outcomes in neonates and infants as it is related to a wide range of complications. Both preterm and VLBW have long been identified as the most critical risk factor for neonatal mortality and morbidity. The maternal factors and obstetric history should be taken into consideration while studying the risk factors of VLBW babies. Common maternal risk factors are the gestational age of babies, parity, nutritional status, levels of education, socio-economic status, chronic diseases, smoking habits, and antenatal care[12]. The relationship between the risk factors and very low birth weight was evaluated in this study.

In the present study, 59% of VLBW babies expired, and 100% and 52% of babies died in the weight below 1000gm and range 1000 – 1499gm respectively. This conforms with other studies that increasing birth weight has a marked influence towards better survival of these babies [13, 14].

There is a slight preponderance of male babies over female babies in this study comprising 53% male and

47% female (Graph-1). This conforms with three other similar studies [13,15,16].

Considering gestational age, 80% and 62% of babies died in the gestational age up to 28 weeks and range 29 – 32 weeks respectively. Between 33 and 36 weeks of gestational age, only 9% expired. Neonatal mortality bears an inverse relationship with birth weight and gestational age. Neonatal mortality decreases with increasing gestational age and birth weight observed in this and also in other studies[13, 14].

In the present study incidence of VLBW was highest in primi mothers (42%) and declined when the number of parity increased. A similar finding was also seen in another study[14].

The age of the mother influences the birth weight of the newborn. In this study, 56.7% of VLBW babies' deliveries occurred in mothers below 25 years of age. This result is consistent with a similar study where delivery after 35 years of maternal age depicted a lower incidence of neonatal mortality[17,1819].

The place of delivery was found to influence the outcome in the VLBW baby study. More deaths were associated with home delivery than hospital delivery. The mode of delivery was also found to influence the outcome of the preterm study. More deaths were associated with vaginal than lower uterine cesarean section (LUCS) delivery. In two other similar studies, it is also found better outcomes of VLBW babies delivered by LUCS deliveries[20,21].

Discharge on risk bond (DORB) was 8%. Although it remains in an unfavorable hospital environment, the communication gap between doctors and the patient's relatives because of prolonged hospital stays and sometimes unavoidable home situations leads them to get discharged at their own risk.

Limitations

The current study had certain limitations being a hospital-based study. The limitations of the present study are mentioned. The number of patients included in the present study was less in comparison to other studies. Because the trial was short, it was difficult to remark on complications and mortality.

Conclusion

The study concludes that VLBW admissions as well as deaths are still high in our hospital. Although the overall standard of neonatal service has improved in Bangladesh, the outcome of preterm VLBW babies is still not satisfactory. Co-ordination between obstetric and neonatal services, improvement of nursing care, and further improvement of the VLBW care within the available resources are essential to prevent complications and death.

Recommendation

Coordination between obstetric and neonatal services, improvement of nursing care, and further improvement of the VLBW care within the available resources are essential to prevent complications and death.

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