Original Research Article.

Disease Pattern and Health Outcome among the Neonate in A NICU at Tertiary Care Hospital, Bangladesh

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ABSTRACT

Background: According to the World Health Organization (WHO) and UNICEF under-five death rate, often known by U5MR, neonatal mortality are nearly two-thirds of infant mortality rate and one-third of under-five mortalities worldwide.

Objective: The objective of the studywas to document the amount, disease pattern and outcome of patients admitted to the neonatal intensive care unit (NICU). Data acquired from the pattern of admission and outcome may uncover various aspects and should contribute and help in managing resources, infrastructure, and skilled hands for a far better outcome within the future.

Methods: This retrospective study was done on 343 neonates who were admitted at Uttara Adhunik Medical College and Hospital, Dhaka within the neonatal intensive care unit (NICU) within the Department of Pediatrics from July 2017 to July 2018.

Results: 343 newborns admitted within 28 days of birth were included in the study. Among them, 199 were male and 144 female neonates, (Male: female11:0.42). The low birth weight (LBW) babies were 21.25%, very low birth weight (VLBW) 4.66% and only 0.29% were extremely low birth weight (ELBW) in our study. Among the varied disease pattern of NICU admission, Neonatal Jaundice was present in 98 (28.57%) of neonates, Perinatal Asphyxia of 81 (23.62%) and Neonatal Sepsis 43 (12.54%) being the foremost common causes of neonates. The incidence of Respiratory Distress Syndrome was 38 (11.04%). The neonatal mortality rate found 6% in our study. IUGR and Transient Tachypnea were also found the 2 others commonest causes of neonatal admission in NICU. Low birth weight records had the very best cases death rate, which indicates the necessity to develop an efficient group of excess in teaching hospitals that will provide highly specialized and focused care to the present cohort of vulnerable neonates.

Conclusion: This study has shown neonatal jaundice, perinatal asphyxia, and sepsis because of the predominant causes of neonatal morbidity. Perinatal asphyxia and sepsis are preventable among three. Our health-care programs should be directed toward addressing the danger factors within the community liable for the event of those three morbidities. The preterm and low birth weight babies had significantly high mortality even with standard intensive care; therefore, a robust and effective antenatal program with extensive coverage of all pregnant females specifically in outreach areas should be developed which can help in decreasing preterm deliveries and also lower the incidence of low birth weight babies.

Keywords: Neonatal Outcome, New-born, NICU.

INTRODUCTION

Four million neonates die in the first 4 weeks of life, every year globally. The neonatal period is the most vulnerable for prematurity and low birth weights. Neonatal mortality accounts for nearly two-thirds of infant mortality rate and one-third of under-five mortalities worldwide.[1-5]

Within the first month, one quarter to one-half of all the death occur within the first 24 hours of life and 75% occur in the first week. The first 48 hours immediately following birth is the most crucial period for newborn survival.[6] The primary outcome of this study was to know the spectrum of diseases leading to Morbidity and Mortality Patterns of Neonates and the commonest cause of the diseases. The secondary outcome was to list the measures to prevent the various causes of morbidity and mortality of a neonate.

MATERIALS AND METHODS

This retrospective study was done on 343 neonates who were admitted at Uttara Adhunik Medical College & Hospital, Dhaka, Bangladesh in the neonatal intensive care unit (NICU) in the Department of Pediatrics from July 2017 to July 2018. All inborn neonates admitted to NICU within 28 days of birth. According to the sample size data of all admitted neonates were listed out and categorized on basis of age, admitted duration, mode of delivery, gender, birth weight, gestational age, inborn or outborn delivery, indication for admission, investigations, and outcome after hospitalization in NICU. Sepsis and meningitis were diagnosed on clinical grounds along with C-reactive protein (CRP), complete blood count (CBC), positive blood culture and cerebrospinal fluid (CSF) examination. Congenital heart disease was diagnosed with

Chest X-ray and then confirmed by echocardiography. Birth Asphyxia was diagnosed clinically and hypoxic-ischemic encephalopathy (HIE) by Sarnat and Sarnat Staging.[7] Diagnosis of prematurity was based on the WHO definition for prematurity (live-born neonates delivered before 37 weeks from 1st day of last menstrual period) and using new Ballard scoring.[8] Neonatal respiratory distress syndrome diagnosed with the presence of one or more symptoms of tachypnea, intercostal muscle retraction, grunting, nasal flaring, and cyanosis.[9] Low birth weight was defined as when birth weight was less than 2500 grams, very low birth weight babies were defined when birth weight was less than 1500 grams and extremely low birth weight when the birth weight of fewer than 1000 grams. The data were statistically analyzed using SPSS 23 (SPSS Inc., Chicago).

Table 1: General Findings of Neonates (n=343)

General Findings	Frequency(n)	Percentage (%)	Mean (±SD)
Gender			
Male	199	58.0	
Female	144	42.0	
Age(Hrs.)			
1 hr.	14	51.9	1.85(±1.03)
2 hrs.	5	18.5	
3 hrs.	6	22.2	
4 hrs.	2	7.4	
Age(Days)			
1 to 7 days	245	77.5	4.99(±5.45)
8 to 14 days	50	15.8	
15 to 21 days	15	4.7	
22 to 28 days	6	1.9	
Stay Duration			
1 to 7 days	274	79.9	4.73(±3.97)
8 to 14 days	57	16.6	
15 to 21 days	11	3.2	
More than 21 days	1	0.3	
Patients Out Comes			
Survived	323	94.2	
Died	20	5.8	
Base	343	100	

Table 2: Observation of the neonatal admissions (n=343)

General Findings	Frequency(n)	Percentage (%)
Gestational age (wks.)		
Pre Term Delivery	77	22.45
Full Term Delivery	265	77.26
Post Term Delivery	1	0.29
Neonatal Weight		
NBW Baby	252	73.47
LBW Baby	74	21.57
VLBW Baby	16	4.66
ELBW Baby	1	0.29
Mother's Pre-history		
IDM/DM Mother	31	9.04
Hb.Ag(+ve) Mother	4	1.67
Rh (-ve) of Mother	1	0.29
Premature Rupture Membrane(PROM)	1	0.29
Pre- Eclamptic Toxemia(PET)	1	0.29

Table 3: Disease pattern of neonatal admissions (n=343)

Disease pattern	Frequency(n)	Percentage (%)
Neonatal Jaundice	99	28.86
Pre-Term Low Birth Weight(PLBW)	91	26.53
Perinatal Asphyxia	81	23.62
Pre-Maturity	77	22.45
Neonatal Sepsis(NS)	45	13.11
Respiratory Distress Syndrome(RDS)	38	11.08
Intrauterine Growth Restriction(IUGR)	31	9.04
Transient Tachypnea of Newborn(TTN)	25	7.29
Congenital Heart Disease(CHD)	14	4.08
Pneumonia	13	3.79
Meconium Aspiration Syndrome(MAS)	12	3.50
Cleft Palate	1	0.29
Pierre Robin Syndrome	1	0.29

**Multiple Responses

Table 4: Neonates Death (n=20)

Disease pattern	Frequency(n)	Percentage (%)
Died After Diagnosis	19	95.00
Died Before Diagnosis	1	5.00
Base	20	100

Table 5: Disease Pattern of died neonatal After Diagnosis (n=19)

Disease pattern	Frequency(n)	Percentage (%)
Perinatal Asphyxia	8	42.1
Pre Term Delivery	8	42.1
Low Birth Weight(LBW)	7	36.8
Respiratory Distress Syndrome(RDS)	5	26.3
Neonatal Sepsis(NS)	2	10.5
Infant of Diabetic Mother(IDM)	2	10.5
Congenital Heart Disease(CHD)	1	5.3
Intrauterine Growth Restriction(IUGR)	1	5.3

**Multiple Responses

RESULTS

A total of 343 neonates were admitted in NICU during study period. Out of 343 newborn, 199 (58.0%) were male and 144 (42.0%) were female baby. Age (hrs.) 1 hr. were higher 14 (51.9%) following 3 hrs. 6 (22.2%). Age (days) 1 to 7 days were higher 245 (77.5%) following 8 to 14 days were 50 (15.8%). Regarding stay duration 1to 7 days were higher 274 (79.9%) following 8 to 14 days were 57 (15.8%). In patient outcome 323 (94.2%) were survived & 20 (5.8%) were died.

In table 2 observation of neonatal admission; considering gestational age at delivery, out of total 343 neonatal mother, 265 (77.26%) were in full term delivery following 77 (22.45%) were pre term delivery. Only 1 (0.29%) were post term delivery case. In baby weight calculation 252 (73.26%) were normal weight baby (NBW), 74 (21.57%) were low birth baby (LBW), 16 (4.66%) were very low birth (VLBW) baby and only 1 (0.29%) were in extremely low birth weight (ELBW) baby.

In table-3, about neonatal disease pattern of total 343 neonatal babies, neonatal jaundice was the major causes, which were 98 (28.57%), following preterm low birth weight (PLBW) were 91 (26.53%) perinatal asphyxia 81 (23.62%), preterm delivery 77 (22.45%), neonatal sepsis (NS) 45 (13.11%), respiratory distress syndrome (RDS) 38 (11.08%), intrauterine growth restriction

(IGUR) 31 (9.04%), transient tachypnea of neonatal (TTN) 25 (7.29%) and other three noticeable diseases congenital heart disease, pneumonia, meconium aspiration syndrome (MAS) were equal in percentage that is 13 (3.50%) respectively.

Additional Findings of Neonates

In table-4, 20 neonatal were died. Among them 19 (95%) were died after diagnosis and only 1 (5%) died before any diagnosis.

In table-5, out of total 20 died neonatal 19 were diagnosed as follows. Perinatal asphyxia were 8 (42.1%), pre term delivery 8 (42.1%), low birth weight (LBW) 7 (36.8%), respiratory Distress syndrome (RDS) 5 (26.3%, early onset sepsis (EOS) 2 (10.5%), infant of diabetic mother (IDM) 2 (10.5) and finally others two were congenital heart disease (CSD) & intrauterine growth restriction (IUGR).

DISCUSSION

A total of 343 babies were admitted to NICU. There was a significant male predominance (M: F ratio-1.:0.42) in our study which was also documented by Kant M et al.[9-11] With reference to birth weights of neonates admitted, the utmost number of neonates belonged to LBW (21.57%) followed by normal birth weight (73.47%) and VLBW (4.66%). Similar findings were observed in studies done by Bhagat et al and Prasad V et al.[12,13]

About 22.45% of neonates were preterm, similar observations were found in studies done by Bhagat et al, Elizabeth U et al, and Narayan et al.[12,14,15] commonest indications of NICU admission in our study were neonatal jaundice. An identical observation was found by Techie et al.[16] In Parkash's et al. study, RDS, TTN, pneumonia, and MAS were considered because of the commonest causes of hospitalization for NRD.[17] Neonatal sepsis was the explanation for morbidity in 12.54% of admitted neonates. Different institution-based studies have found the incidence of neonatal sepsis starting from 17.7% to 70%.[18] The death rate in our study is 6% which is comparable to the study done by Narayan R.[15] death rate of any neonatal medical care unit depend upon various factors aside from the clinical condition of the baby like the infrastructure, manpower and trained person on duty, etc. Hence the death rate reports vary widely in several studies from different regions. With reference to the outcomes, this study found that 42. % died of Perinatal Asphyxia. The pre-term delivery percentage was equivalent as neonatal die causes. During this study, we found low birth weight & respiratory distress syndrome (RDS), were playing a crucial role in neonatal mortality rate. Prevention of morbidity and mortality associated with prematurity will significantly reduce overall morbidity and mortality. Appropriate antenatal care, good obstetric practices, proper referral, improvement of facilities for caring for preterm babies also as proper newborn care practices are found to scale back morbidity and mortality from prematurity.

CONCLUSION

In today's scenario, perinatal asphyxia and prematurity are still the most common causes of mortality. Prematurity with sepsis increases the mortality of new-born. So, prevention of sepsis is the most important step in neonatal death. Hand washing and strict infection control in the NICU unit and judicious use of an antibiotic can prevent sepsis in NICU. Such approaches would be safe and cost-effective strategy especially in developing countries like Bangladesh. Good antenatal care, proper nutrition to pregnant women, timely referral, and prevention of preterm delivery are important steps to decrease neonatal morbidity and mortality. In spite of the high number of admission our tertiary care hospital has a good survival rate of new-born

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