Pattern of Neonatal Morbidity and Mortality in a Selected Tertiary Level Hospital

Mosharref M[1], Rehnuma N[2], Jahan N[3], Chaudhury HS[4], Zafreen F[5]

Abstract

Background: *Four million newborn babies die worldwide in the neonatal period, Bangladesh 30 per 1000 live birth neonatal deaths every year.[1] The aims of the study were done with the objective to conclude the morbidity and mortality pattern of neonates admitted to a neonatal intensive care unit (NICU) combined military hospital, Cumilla.*

Methods: *Hospital based prospective study was conducted at NICU of Combined Military Hospital, Cumilla. Neonates from admission to discharge folllowed by using a predesigned standardized preform.*

Results: *Total number of 796 Neonates was admitted in the NICU during period July 2018 to June 2019. The data analysis for the morbidity showed that the septicemia were 122 (15.34%), birth asphyxia were 106 (13.30%), hypoxic ischemic encephalopathy (HIE) were 108 (13.59%), neonatal jaundice (NNJ) were 84 (10.57%), prematurity were 65 (8.19%), respiratory distress syndrome (RDS) were 20 (2.54%), meconium aspiration syndrome (MAS)were 67 (8.46%), transient tachypnea of neonate (TTN) were 70 (8.76%), low birth weight (LBW) were 46 (5.77%), intra uterine growth retardation (IUGR) were 20 (2.47%), congenital anomalies were 14 (1.81%), meningitis were 9 (1.15%), seizure disorder were 5 (0.68%) and others. The disease wise mortality among the neonates admitted to NICU was studied and were found that prematurity 7 (35.75%), septicemia were 2 (6.67%), birth asphyxia were 7 (21.70%), meconium aspiration syndrome were 2 (11.44%) and respiratory distress syndrome were 2 (35.87%), low birth weight were 3 (24.40%) congenital anomalies were 1 (23.66%) the top major contributors to the neonatal mortality.*

Conclusions: *The commonest causes of admission were neonatal jaundice (NNJ), sepsis, prematurity, meconium aspiration syndrome, birth asphyxia, low birth weight, congenital anomalies. The most common cause of case fatality was prematurity, meconium aspiration syndrome, birth asphyxia, low birth weight, congenital anomalies in NICU of Combined Military Hospital, Cumilla, Bangladesh.*

Keywords: *Morbidity, Mortality, Neonate*

1. Lt Col Murshida Mosharref, Classified Child Specialist, Combined Military Hospital (CMH), Ghatail.
2. Lt Col Naila Rehnuma, Graded Child Specialist, CMH, Ghatail.
3. Major Nusrat Jahan, Graded Child Specialist, CMH, Ghatail.
4. Prof Dr Habib Sadat Chaudhury, Professor of Biochemistry, International Medical College, Gazipur, Dhaka.
5. Dr Farzana Zafreen, Associate Professor & Head, Department of Community Medicine, Medical College for Women & Hospital, Uttara, Dhaka.

Address of Correspondence: Lt Col Murshida Mosharref, Classified Child Specialist, Combined Military Hospital (CMH), Ghatail.

Introduction

The neonatal period is a highly vulnerable time for an infant completing many of the physiologic adjustments required for life outside the uterus. The neonates are exposed to a host of intrinsic and extrinsic conditions, which make the life vulnerable to either developing permanent deformities and/or morbidity or discontinuation of survival. As a result, there are high rates of morbidity and mortality. World over, four million newborn babies die in the first month of life-99% in low and middle-income countries every year. In Bangladesh, 03 million babies are born every year, and 83,000 die in the first four weeks of life, which

accounts for a quarter of global neonatal deaths. Bangladesh thus faces newborn health challenge in the world[2]. Neonatal deaths occur within the first two days of life[3]. The common cause of neonatal mortality in Bangladesh are asphyxia, prematurity and low birth weight, sepsis, congenital abnormalities, variety of surgical problems. Improved level of newborn care can bring down the mortality rates[4]. Globally, prematurity (29%), infections (29%), asphyxia (23%), congenital malformations (8%), and other (11%) are important causes of neonatal death in low-income country while prematurity and malformation contribute in developed countries[5]. About 44 percent of these childhood deaths occur within the first 28 days of life, thus increasingly accounting for a larger proportion of the under five deaths[2,6]. Moreover, 79 percent of neonatal deaths occur during early neonatal period (0-6days) of which 41 percent is in the first 24 hours of birth where as 21 percent happen in late neonatal period (7-28days) [7].

High neonatal mortality rate in a country reflects the poor availability of quality and quantity of infrastructure and utilization of neonatal care of that country. To determine the burden of neonatal disease, understand patient needs, planning and organization the present study was undertaken at CMH Cumilla, to determine the morbidity and mortality pattern of among the neonates admitted to a NICU. The present study will help us to find out gaps if any in the required infrastructure for NICU. The study was undertaken with the objective to determine the morbidity and mortality pattern of neonates admitted in NICU.

Methods

This study was done at a neonatal intensive care unit in CMH Cumilla. The study was conducted from July 2018 to June 2019. A hospital based prospective study of was done among 796 neonates below the age of 28 days who were admitted in the neonatal intensive care unit.

Data collection technique

The source of data for this study was the NICU Cumilla CMH that includes date of admission, age, weight of the child, status at birth, diagnosis, treatments given, outcome status and records of maternal information like parity, antenatal follow up, gestational age and mode of delivery. All these data were collected using a data-sheet developed by taking into account all the relevant variables.

Statistical analysis

A prospective study was conducted among all admitted neonates in the NICU of combined military hospital, Cumilla, from July 2018 to June 2019. Information was collected during admission from patient's attendant, using a pretested questionnaire. The data were entered and analyzed using SPSS version 20, and p-values <0.05 were considered statistically significant.

Results

The data analysis showed that there were 796 neonates admitted to NICU during one year period of study from July 2018 to June 2019. The age wise distribution of admitted neonates less than 24 hours were 454 (57.07%) and 1-3 days were 235 (29.52%) and 4-7 days were 63 (7.91%) and 8-28 days were 44 (5.48%). Majority of neonates were male 450 (56.46%) and female 346(43.52%). The minimum and maximum gestational age of the neonates was 25 and 43 weeks respectively. Majority 463 (58.22%) of the neonates were born at full term of gestation, preterm 34-37 weeks were187 (23.54%), less than 34 weeks were 145 (18.23%). The minimum and maximum weight of the admitted neonate was 820 and 4350 grams respectively. Majority (56.38%) of the neonates were of normal weight (more than 2500g). Most 779 (97.92%) of the admitted neonates were born in health institution (Table I).

Table-I

Distribution of neonates admitted to NICU.

Characteristic	Variable	Frequency (N=796)	Percentage (%)
Age of the neonate on admission	< 24hours	454	57.07
	1-3 days	235	29.52
	4-7 days	63	7.91
	8-28 days	44	5.48
Neonatal period	Early (0-7 days)	752	94.52
	Late (8-28 days)	44	5.48
Gender	Male	450	56.48
	Female	346	43.52
Gestational age at birth	>37 (weeks)	463	58.22
	34-37 (weeks)	187	23.54
	<34(weeks)	145	18.23
Weight on admission	>2500 g	449	56.38
	1500-2499g	278	34.93
	1000-1499g	56	7.07
	<1000g	13	1.62
Place of delivery	Health institution	779	97.92
	Home	17	2.07

The data analysis for the morbidity showed that the neonatal jaundice (NNJ) were 84(10.57%), septicemia were 122(15.34%), prematurity were 65 (8.19%), birth asphyxia were 106 (13.30%), respiratory distress syndrome (RDS) were 20 (2.54%), hypoxic ischemic encephalopathy (HIE) were 108 (13.59%), meconium aspiration syndrome (MAS)were 67 (8.46%), transient tachypnea of neonate (TTN) were 70 (8.76%), low birth weight (LBW) were 46 (5.77%),Intra uterine growth retardation (IUGR) were 20 (2.47%),congenital anomalies were 14 (1.81%), meningitis were 9 (1.15%), seizure disorder were 5 (0.68%) and others 51 (6.35%) (Table II).

Table-II

Patterns of disease among neonates admitted to NICU.

Disease	Frequency (N=796)	Percentage
Septicemia	122	15.34
HIE	108	13.59
Birth asphyxia	106	13.3
Neonatal jaundice (NNJ)	84	10.57
Transient tachypnea of neonates (TTN)	70	8.76
Meconium aspiration syndrome (MAS)	67	8.46
Prematurity	65	8.19
LBW	46	5.77
others	51	6.35
Respiratory distress syndrome (RDS)	20	2.54
IUGR	20	2.47
Congenital anomalies	14	1.81
Meningitis	9	1.15
Seizure disorder	5	0.68
ELBW	5	0.57
Pneumonia	2	0.28
Hypoglycemia	2	0.17

The data was analyzed for outcome of the total admitted neonates during the study period. It was observed that out of 796 neonates admitted most were discharged 716 (89.95%) whereas 24 (3.02%) expired and Referral were 69 (7.04%) (Table III).

Table-III

Outcome of the neonates who were admitted to NICU.

Outcome	Frequency(N=796)	Percentage
Discharged	716	89.95
Expired	24	3.02
Referral	56	7.04
Grand total	796	100

The disease wise mortality among the neonates admitted to NICU was studied and were found that prematurity 7 (35.75%), septicemia were 2 (6.67%), birth asphyxia were 7 (21.70%), meconium aspiration syndrome were 2 (11.44%) and respiratory distress syndrome were 2 (35.87%), low birth weight were 3 (24.40%) congenital anomalies were 1 (23.66%) the top major contributors to the neonatal mortality (Table IV).

The data was analyzed for the case fatality rate and it was observed that out of discharged and expired neonates (740) it was observed that case fatality rate was more prematurity (43.44%), birth asphyxia (25.12%), septicemia (8.04%), LBW (24.82%).

Table-IV

Disease wise mortality pattern among neonates admitted to NICU.

Disease	Frequency (N=disease)	Death	Mortality rate
Septicemia	122	8	6.67
Birth asphyxia	106	7	21.70
Meconium aspiration syndrome (MAS)	67	2	11.44
Prematurity	65	7	35.75
LBW	46	3	24.40
Respiratory distress syndrome (RDS)	20	2	35.87
Congenital anomalies	14	1	31.29

Table-V

Disease wise case fatality rate of the neonates admitted to NICU.

Disease	Out come				Total 796	
	Discharged		Expired		N	%
	N	%	N	%		
Septicemia	120	98.96	2	1.04	122	100
HIE	108	100	0	0	108	100
Birth asphyxia	99	84.88	7	15.12	106	100
Neonatal jaundice (NNJ)	84	100	0	0	84	100
Transient tachypnea of neonates (TTN)	70	100	0	0	70	100
Meconium aspiration syndrome (MAS)	65	84.36	2	15.64	67	100
Prematurity	58	86.56	7	13.44	65	100
LBW	43	91.18	3	8.82	46	100
Others	47	100	0	0	51	100
Respiratory distress syndrome (RDS)	18	90.00	2	10	20	100
IUGR	20	100	0	0	20	100
Congenital anomalies	13	92.65	1	7.35	14	100

The chi-squared test (÷2) was 89.49585 (df=15) and the two-tailed p-value was less than 0.0001 indicating that disease type is very strongly associated (p<0.0001) with the outcome i.e. discharge or death of a neonate (Table V).

Discussion

This prospective study was done in order to document the most common type of diseases with which the neonates are admitted, treatment and interventions the neonates received, and outcome of those neonates admitted in the neonatal intensive care unit combined military hospital, Cumilla. It was found that a total of 796 neonates were admitted in the NICU during the period of study from July 2018 to June 2019. In born and out born neonates are admitted in combined military hospital, Cumilla.

The age wise distribution of admitted neonates in present study revealed that most the neonates were in the age group of 0-7 days (94.52%) group followed by (5.48%) in 8-28 days age group. Thus, the findings of present study were early neonates are high to the study by Anjum ZM et al.[8] Present study also showed that males (58.48%) female (42.52%). It is consistent with local literature reported by Kumar MK et al.[9] The findings of present study are comparable the findings of whereas Seyal T et al, (60% male versus 40% female) and international studies from Pakistan by Seyal T et al, (59.55% male versus 40.5% female) and by Ugwu GI of Nigeria (54.3% male versus 45.7% female).[10,11] Present study also revealed that most of the admitted neonates were delivered in health institutions (97.92%) and only small number was delivered at home (2.07%). at Sir Ganga Ram hospital Lahore, Pakistan, found that only 3.9% were delivered at home. Nahar J et al, found that most of the babies were born in hospital (83%).[12] The weight parameter analysis revealed that the number of neonates having weight extremely low weight (<1000 grams), very low weight (1000-1499grams) and low weight(1500-2499grams), more than 2500grams was 1.62%, 7.2% and 34.93% and 56.38% respectively. The results of present study are comparable to a similar study done by Hussain S et al, which revealed that 2.25%

were <1000 grams, 12.2% were between 1000-1499gram, 39.35% were between 1500-2499grams, 42.25% between 2500-4000 grams, and 3.95% were more than 4000 g.[13]

In present study it was also revealed that neonatal jaundice (NNJ) were (10.57%) ,septicemia were (15.34%), prematurity were (8.19%), birth asphyxia were (13.30%), respiratory distress syndrome (RDS) were (2.54%), hypoxic ischemic encephalopathy (HIE) were (8.46%), meconium aspiration syndrome (MAS) were (8.46%),transient tachypnea of neonate (TTN) were (8.76%), low birth weight (LBW) were (5.77%), Intra uterine growth retardation (IUGR) were (2.47%), congenital anomalies were (1.81%), meningitis were (1.15%), seizure disorder were (0.68%) common indications for admission to NICU. In Ali SR et al, study prematurity, infections, birth asphyxia and NNJ were the main causes of admission to the neonatal unit, at 27.9%, 20.33%, 13%, and 11.3% respectively.[14] Present study showed that case fatality rate was more in RDS (42.04%), prematurity (43.44%), birth asphyxia (25.12%), LBW (24.83%), MAS (15.64%), HIE (10.89%), congenital anomalies (50.62%), septicemia (8.04%),TTN (0.17%) and pneumonia (9.52%), meningitis (11.9%). The most common cause of neonatal mortality was prematurity in present study which is similar to studies conducted by Seyal T et al, Nahar J et al, Narayan R et al, Prasad V et al, and Ali SR et al.[10,12,14-16]

Conclusion

The commonest causes of admission were neonatal jaundice (NNJ), sepsis, prematurity, meconium aspiration syndrome, birth asphyxia, low birth weight, congenital anomalies. The most common cause of case fatality was prematurity, meconium aspiration syndrome, birth asphyxia, low birth weight.

References

1. Bangladesh Demographic and Health Survey (2017-18 BDHS)

2. National neonatology forum. Washington (DC) national neonatology forum and save the children US 2004. The state of India's newborns; 2004. Available at: https://www.savethechildren.org.

3. United nations children's fund; 2008. Available at: https://nrhm.gujarat.gov.in/images/pdf/unice_scnu_toolkit.pdf.

4. Jain S, Bhakoo ON, Singh M. Neonatal monitoring, recommendations and proceedings of the seminar. Chathram Hospital Res Centre Indore. 1990:6-17.

5. Black RE, Cousens S, Johnson HL, Lawn JE, Rudan I, Bassani DG, et al. Global, regional and national causes of child mortality in 2008: a systematic analysis. Lancet. 2010;375:1969-87.

6. Blackman JA. Neonatal intensive care. Is it worth it? Ped Clin North Am. 1991;38:1497-511.

7. Narang A, Kiran PS, Kumar P. Cost of neonatal intensive care in a tertiary care center. Indian Pediatr. 2005;42:989-7.

8. Anjum ZM, Shamoon M. Pattern of neonatal unit of Allied Hospital Faisalabad Pakistan. Annals Punjab Med Col. 2009;3:129-31.

9. Kumar MK, Thakur SN, Singh BB. Study of the morbidity and the mortality patterns in the neonatal intensive care unit. J Clinic Diag Res. 2012;6:282-5.

10. Seyal T, Husnain F, Anwar A. (2011) Audit of neonatal morbidity and mortality at neonatal unit of Sir Gangaram Hospital Lahore. Annals King Edward Med Coll. 2011;1:9-13.

11. Ugwu GI. Pattern of morbidity and mortality in the newborn special care unit in a tertiary institution in the Niger Delta region of Nigeria: A two-year prospective study. Global Adv Res J Med Med Sci. 2012;1(6):133-8.

12. Nahar J, Zabeen B, Akhter S, Azad K, Nahar N. (2007) Neonatal morbidity and mortality pattern in the special care baby unit of Birdem. Ibrahim Med Coll J. 2007;1:1-4.

13. Hussain S. Neonatal morbidity and mortality pattern in a tertiary care neonatal unit of a teaching Hospital. Ann Pak Inst Med Sci. 2014;10:7-11.

14. Ali SR, Ahmed S, Lohana H. Disease patterns and outcomes of neonatal admissions at a secondary care hospital in Pakistan. Sultan Qaboos Univ Med J. 2013:424-8.

15. Prasad V, Singh N. Causes of morbidity and mortality in neonates admitted in Government Medical College Haldwaniin Kumaon Region (Uttarakhand) India. J Pharm Biomed Sci. 2011; 8:1-4.

16. Narayan R. A study of pattern of admission and outcome in a neonatal intensive care unit at high altitude. Sri Lanka J Child Health. 2012;41:79-81.