Original Article

Pattern of Neonatal Morbidity and Mortality Admitted in Combined Military Hospital, Cumilla 🔓

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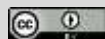
ABSTRACT

Introduction: *Four million newborn babies die worldwide in the neonatal period. In Bangladesh 30 per 1000 live birth neonatal deaths occur every year. The aim of this study was to identify the morbidity and mortality patterns of neonates admitted to the Neonatal Intensive Care Unit (NICU) at Combined Military Hospital (CMH), Cumilla.* ***Methods & meterials:*** *A cross-sectional study was carried out on 796 neonates admitted to the NICU at Combined Military Hospital, Cumilla, from July 2018 to June 2019. Informed written consent was obtained from the legal guardians of the neonates.* ***Results:*** *Majority i.e. 122(15.34%) developed septicemia followed by birth asphyxia 106(13.30%), hypoxic ischemic encephalopathy (HIE) 108(13.59%), neonatal jaundice (NNJ) 84(10.57%), prematurity 65(8.19%), respiratory distress syndrome (RDS) 20(2.54%), meconium aspiration syndrome (MAS) 67(8.46%), transient tachypnea of neonate (TTN) 70(8.76%), low birth weight (LBW) 46(5.77%), intra uterine growth retardation (IUGR) 20(2.47%), congenital anomalies 14(1.81%), meningitis 9(1.15%), seizure disorder 5(0.68%) and others. The disease-specific mortality among neonates admitted to the NICU revealed that prematurity accounted for 7 (35.75%) cases, septicemia 2 (6.67%), birth asphyxia 7 (21.70%), meconium aspiration syndrome 2 (11.44%), respiratory distress syndrome 2 (35.87%), low birth weight 3 (24.40%), and congenital anomalies 1 (23.66%). These were the primary contributors to neonatal mortality.* ***Conclusion:*** *The most frequent causes for admission were neonatal jaundice (NNJ), sepsis, prematurity, meconium aspiration syndrome, birth asphyxia, low birth weight, and congenital anomalies. The leading causes of case fatality were prematurity, meconium aspiration syndrome, birth asphyxia, low birth weight, and congenital anomalies.*

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INTRODUCTION

The neonatal period is a critical phase for an infant, as it involves completing many of the physiological adjustments necessary for life outside the womb. During this time, neonates are exposed to a range of internal and external factors that can put their lives at risk, potentially leading to permanent deformities, morbidity, or even death. Consequently, there are elevated rates of both morbidity and mortality. Worldwide, four million newborn babies die in the first month of life-99% in low and middle-income countries every year. In Bangladesh 30 per 1000 live birth neonatal deaths occur every year[1]. 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 during the first two days of life[3]. In Bangladesh, common causes of neonatal mortality include asphyxia, prematurity, low birth weight, sepsis, congenital abnormalities, and various surgical issues. Enhancing the quality of newborn care can reduce mortality rates[4]. Globally, in low-income countries, key causes of neonatal death include prematurity (29%), infections (29%), asphyxia (23%), congenital malformations (8%), and other factors (11%). In developed countries, prematurity and congenital malformations are the primary contributors [5]. Approximately 44 percent of these childhood deaths happen within the first 28 days of life, thus representing an increasing share of under-five mortality[2,6]. Additionally, 79 percent of neonatal deaths occur during the early neonatal period (0-6 days), with 41 percent occurring within the first 24 hours of birth, while 21 percent occur during the late neonatal period (7-28 days)[7].

A high neonatal mortality rate in a country indicates inadequate quality and quantity of infrastructure and the utilization of neonatal care services. To assess the burden of neonatal disease, understand patient needs, and improve planning and organization, the present study was conducted at CMH Cumilla to analyze the morbidity and mortality patterns among neonates admitted to the NICU. This study aims to identify any gaps in the necessary NICU infrastructure. The objective of the study was to determine the morbidity and mortality patterns of neonates admitted to the NICU.

METHODS & MATERIALS

This study was conducted at the neonatal intensive care unit of CMH Cumilla from July 2018 to June 2019, involving 796 neonates under 28 days of age who were admitted to the NICU. Informed written consent was obtained from the neonates' legal guardians. Data were gathered through face-to-face interviews using a pre-tested semi-structured questionnaire and a checklist. A purposive sampling method was employed to collect the data. The information collected included the neonates' age at admission, birth weight, birth status, diagnosis, treatments administered, outcome status, and maternal details such as parity, antenatal care, gestational age, and mode of delivery. All data were recorded using a data sheet designed to cover all relevant variables. Analysis was performed using the Statistical Package for Social Sciences (SPSS version 24), with p-values <0.05

considered statistically significant. Ethical considerations were properly addressed.

RESULTS

This cross-sectional study was undertaken among 796 neonates who were admitted to NICU, CMH, Cumilla during one year period of study from July 2018 to June 2019. All the information was collected by face-to-face interview and check list.

Table I: Distribution of neonates admitted to NICU (*n*=796)

Characteristics		Frequency	Percent
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

Table I showed that out of 796 neonates, age of the majority i.e. 454(57.07%) were less than 24 hours and only 44(5.48%) were in the age group 8-28 days. Majority of the neonates were male 450(56.46%) and 346(43.52%) were female. 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 were 187(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 II: Patterns of disease among the neonates (*n*=796)

Disease	Frequency	Percent
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

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

Table III: Outcome of the neonates who were admitted to NICU (n=796)

Outcome	Frequency	Percent
Discharged	716	89.95
Expired	24	3.02
Referral	56	7.04
Grand total	796	100

Table III showed that among all the admitted neonates majority 716(89.95%) were discharged whereas 24(3.02%) expired and referral were 69(7.04%).

Table IV: Disease wise mortality pattern among the neonates (n=796)

Disease	Frequency	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 IV depicted that out of all the neonates disease wise mortality were found prematurity 7(35.75%), septicemia 2(6.67%), birth asphyxia 7(21.70%), meconium aspiration syndrome 2(11.44%) and respiratory distress syndrome 2(35.87%), low birth weight 3(24.40%), congenital anomalies 1(23.66%).

Table V: Disease wise case fatality rate of the neonates (n=796)

Disease	Out come			
	Discharged	Expired	Total 796	Statistics
	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)	χ2=89.49585 df=15 *p*<0.0001
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)	

Table V showed that among the discharged and expired neonates (740) less referral (56), case fatality rate was more among the prematurity (43.44%), followed by birth asphyxia (25.12%), septicemia (8.04%) and LBW (24.82%). The chi-squared test ($\chi2$) 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 cross-sectional study aimed to document the most prevalent diseases among neonates admitted to the neonatal intensive care unit (NICU) at Combined Military Hospital, Cumilla, including the treatments and interventions received and the outcomes of these neonates. During the study period from July 2018 to June 2019, a total of 796 neonates were admitted to the NICU. Both in-born and out-born neonates were admitted to the hospital.

The age distribution of admitted neonates showed that the majority were in the 0-7 days age group (94.52%), with a smaller percentage in the 8-28 days age group (5.48%). This finding indicates a higher proportion of early neonates, consistent with the study by Anjum ZM et al. [8]. The study also revealed that 58.48% of the neonates were male and 42.52% were female, which aligns with local literature reported by Kumar MK et al. [9]. These results are comparable to those reported by Seyal T et al. (60% male vs. 40% female) and international studies from Pakistan by Seyal T et al. (59.55% male vs. 40.5% female) and Ugwu GI from Nigeria (54.3% male vs. 45.7% female) [10,11]. The study further showed that the majority of neonates were delivered in health institutions (97.92%), with only a small number born at home (2.07%). In a similar study at Sir Ganga Ram Hospital, Lahore, Pakistan, only 3.9% of deliveries were at home. Nahar J et al. found that most babies were born in hospitals (83%) [12].

Weight parameter analysis indicated that the proportion of neonates with extremely low weight (<1000 grams), very low weight (1000-1499 grams), low weight (1500-2499 grams), and more than 2500 grams were 1.62%, 7.2%, 34.93%, and 56.38%, respectively. These results are comparable to a similar study by Hussain S et al., which found that 2.25% were <1000 grams, 12.2% were between 1000-1499 grams, 39.35% were between 1500-2499 grams, 42.25% were between 2500-4000 grams, and 3.95% were over 4000 grams [13]. The present study also found that the common reasons for NICU admission included neonatal jaundice (NNJ) (10.57%), septicemia (15.34%), prematurity (8.19%), birth asphyxia (13.30%), respiratory distress syndrome (RDS) (2.54%), hypoxic ischemic encephalopathy (HIE) (8.46%), meconium aspiration syndrome (MAS) (8.46%), transient tachypnea of the newborn (TTN) (8.76%), low birth weight (LBW) (5.77%), intrauterine growth retardation (IUGR) (2.47%), congenital anomalies (1.81%), meningitis (1.15%), and seizure disorders (0.68%). A study by Ali SR et al. found that the main causes of admission to the neonatal unit were prematurity (27.9%), infections (20.33%), birth asphyxia (13%), and NNJ (11.3%) [14]. The present study revealed that the highest case fatality rates were associated with prematurity (43.44%), followed by RDS (42.04%), birth asphyxia (25.12%), LBW (24.83%), MAS (15.64%), HIE (10.89%), congenital anomalies (50.62%), septicemia (8.04%), TTN (0.17%), pneumonia (9.52%), and meningitis (11.9%). Prematurity was identified as the most common cause of neonatal mortality in this study, consistent with findings from studies 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 most frequent reasons for admission included neonatal jaundice (NNJ), sepsis, prematurity, meconium aspiration syndrome, birth asphyxia, low birth weight, and congenital anomalies. The leading causes of case fatality were prematurity, meconium aspiration syndrome, birth asphyxia, and low birth weight.

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