Original Article

Pattern of Admission and Related Outcomes in the Neonatal Care Unit of a Tertiary Care Hospital, Kishoreganj

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Abstract

Background*: The neonatal period is a critical phase for a child's survival, with neonatal deaths accounting for approximately half of all under-five mortalities in developing countries. Disease patterns among neonates can vary across regions and over time.*

Objective*: This study analyzing these patterns in healthcare settings helps identify gaps in care and strategies to reduce neonatal morbidity and mortality.*

Methods and Materials*: This hospital-based retrospective study assessed admission patterns and outcomes in the neonatal care unit of President Abdul Hamid Medical College Hospital, Kishoreganj, reviewing medical records from March 2022 to February 2023. Data from all admitted neonates were analyzed for sex, birth weight, gestational age, place and mode of delivery, reasons for admission, outcomes and causes of death.*

Results*: Among Of the 408 neonates admitted, 249(61%) were male and 159(39%) were female, yielding a male-to-female ratio of 1.5:1. Inborn neonates accounted for 190 cases (46.6%), while 218(53.4%) were referred from other facilities. The leading causes of admission were birth asphyxia (35.2%) and prematurity (32.4%), followed by meconium aspiration (14.7%) and sepsis (9.8%). Among the admitted neonates, 250 (61.3%) improved and were discharged home, 35 (8.6%) left against medical advice, 34 (8.3%) werereferred to other institutions and 89 (21.8%) died. Prematurity with low birth weight was the primary cause of mortality (35.9%), followed by sepsis (30.4%) and perinatal asphyxia (24.7%), resulting in an overall mortality rate of 21.8%.*

Conclusions*: Strengthening antenatal care and ensuring prompt neonatal resuscitation at the community and delivery room levels are essential strategies to reduce neonatal mortality and improve survival outcomes.*

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Keywords: *Low birth weight, Morbidity, Mortality, Perinatal asphyxia, Prematurity*

Introduction

The neonatal period, defined as the first 28 days of life, is the most critical phase for a child's survival, with the risk of death during the initial days being 500 times higher than at one month of age[1,2,3,4,5]. Although neonatal mortality rates are gradually declining, significant disparities remain between developed and developing countries and reductions in neonatal mortality have over the past 50 years, since independence, Bangladesh has achieved remarkable progress in health indicators. UNICEF has recognized the country's notable success in reducing under-five mortality. Under Sustainable Development Goal 3 (SDG 3), Bangladesh is tasked with reducing neonatal mortality to 12 per 1,000 live births by 2030. In developing countries, the leading causes of neonatal morbidity and mortality

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include prematurity, sepsis, birth asphyxia, jaundice and pneumonia-many of which are preventable through appropriate antenatal care, early diagnosis and timely treatment[6]. Causes of neonatal illness and death can vary across regions and over time, even within the same location[7]. It has been estimated that effective implementation of proven interventions with full coverage could reduce neonatal deaths by up to 70.0%[8]. Regular assessment of disease patterns and outcomes at healthcare facilities is essential for guiding policymakers indesigning strategies to improve care quality. In light of this, the present study aimed to evaluate the patterns of neonatal disease and the outcomes following admission and management in the Neonatal Intensive Care Unit (NICU) of a tertiary care hospital in Kishoreganj.

Methods

This retrospective observational study was carried out in the neonatal care unit of the Department of Pediatrics at President Abdul Hamid Medical College and Hospital, Kishoreganj. The NICU, operational for the past five years, provides 24-hour services for both inborn and out bornneonates and is equipped with resuscitation facilities, incubators, radiant warmers, phototherapy units, Continuous Positive Airway Pressure (CPAP) machines and trained staff. Medical records of 408 neonates admitted between March 2022 and February 2023 were reviewed for this study. The variables analyzed included gestational age, birth weight, sex, mode and place of delivery, final diagnosis and outcomes, specifically whether the neonate improved and was discharged, left against medical advice, was referred to another facility, or died.

Results

During the study period, a total of 408 neonates were admitted. Among them, 249(61.0%) were male and 159(39.0%) were female, resulting in a male to- female ratio of 1.5:1. Of these, 190(46.6%) were inborn, while 218 (53.4%) were referred from other facilities for further management. Regarding the mode of delivery, 108(26.5%) neonates were born vaginally and 300(73.5%) were delivered via lower segment cesarean section. In terms of gestational age, 214(52.4%) were preterm (<37 completed weeks), 180(44.1%) were term (37-42 weeks) and 14(3.4%) were post-term (>42 weeks). Birth weight analysis revealed that 202 (49.5%) neonates were low birth weight (LBW, <2500 g), 193(47.3%) were appropriate for gestational age (AGA, 2500 - <4000 g) and 13(3.1%) were large for gestational age (LGA, >4000 g) as shown in Table I.

Table I: Socio-demographic distribution of neonates admitted to the NICU (n=408)

Characteristics	Number (n)	Percentage (%)
Place of delivery		
Inborn	190	46.6
Outborn	218	53.4
Gestational age		
Term	180	44.1
Preterm	214	52.4
Post-term	14	3.4
Gender		
Male	249	61.0
Female	159	39.0
Birth weight category		
Appropriate for gestational age	193	47.3
Low birth weight	202	49.5
Large for gestational age	13	03.1
Moge of delivery		
Normal vaginal delivery	108	26.5
Lower unterine cesarean section	300	73.5

The leading causes of admission were birth asphyxia (35.2%) and prematurity (32.4%), followed by meconium aspiration (14.7%) and sepsis (9.8%) as presented in Table II. Outcome analysis indicated that 250 neonates (61.3%) improved and were discharged home, 35(8.6%) were discharged on request, 34(8.3%) were referred to other institutions and 89(21.8%) died, as shown in Table III. Prematurity with LBW was the predominant cause of mortality (35.9%), followed by sepsis (30.4%) and perinatal asphyxia (24.7%), as illustrated in Table IV.

Table II: Outcomes of admitted neonates after management

Outecome	Number (n)	Percentage (%)
Dischaged	250	61.3
Left against medical advice (LAMA)	35	8.6
Referred to higher center	35	8.3
Death	89	21.4

Table III: Major causes of neonatal deaths (n=89)

Cause of death	Nubmer (n)	Percentage (%)
Prematurity with LBW	32	35.9
Sepsis	27	30.4
Perinatal asphyxia	22	24.7
Others	08	08.9

Discussion

As described, this retrospective observational study was conducted in the neonatal care unit of a tertiary care hospital in a semi-urban setting, including detailed data on 408 neonates. Consistent with findings from both developed and developing countries, male neonates 249(61.0%) and females 159(38.9%)[9,10,11]. Previous studies suggest that male infants are genetically and biologically more susceptible to various illnesses and premature death[12,13]. In addition, relatively more developed lungs in female neonates at birth may contribute to their survival advantage[14]. Cultural and social practices may also lead to preferential care of male newborns compared to females[15,16]. Analysis of birth weight indicated that nearly half of the neonates (49.3%) were low birth weight (LBW), while 47.0% were appropriate for gestational age and 3.1% were large for gestational age (LGA), consistent with several earlier studies. Overall, LBW remains one of the leading causes of neonatal admissions in developing countries[17]. Examination of medical records revealed that the most common indications for admission were perinatal asphyxia (35.2%) and prematurity with LBW (32.4%), followed by meconium aspiration syndrome (MAS, 14.7%) and neonatal sepsis (9.8%). These findings align with studies conducted by Elizabeth U. and Modupe O. Oyetunde in Ibadan, Nigeria (54.9%) and Rahim F et al. (53%)[18,19]. Perinatal asphyxia was the primary cause of admission in our NICU. A study from Tanzania reported asphyxia, prematurity and sepsis accounting for 26.8%, 18.4% and 15.4% of admissions, respectively[20]. In contrast, other studies in Nigeria and developing countries found neonatal sepsis to be the leading cause of morbidity, followed by birth asphyxia, jaundice and prematurity. Although patterns vary by center, the main reasons for admission in our NICU, similar to other developing country facilities, were asphyxia, prematurity and sepsis[10,21,22,23,24]. Proper antepartum, intrapartum and postpartum care can reduce morbidity, although irreversible damage, particularly to the brain caused by asphyxia, may not be preventable. Ensuring effective neonatal resuscitation at delivery is therefore critical. In this study, a majority of neonates (73.5%) were delivered via cesarean section. Although we did not analyze the correlation between cesarean delivery and neonatal outcomes, other studies have reported higher morbidity and mortality among infants delivered through emergency cesarean section[25]. Regarding outcomes, 250 neonates

(61.3%) improved and were discharged home, 35(8.6%) left against medical advice (LAMA), 34(8.3%) were referred to other NICUs and 89(21.8%) died. The primary causes of mortality were prematurity with LBW (35.9%), sepsis (30.4%) and perinatal asphyxia (24.7%), consistent with previous studies by Syed R. A. and Tekleab A. M[26,27]. While the causes of neonatal mortality are multifactorial, most deaths could be prevented through a multidisciplinary approach in tertiary care hospitals in semi-urban settings of Bangladesh.

Limitations

This study is a retrospective observational analysis conducted at a single center, with all data extracted from the NICU medical records of a tertiary care hospital. Being hospital-based, the findings may not fully represent the broader community. Furthermore, the outcomes of neonates who were referred to other facilities or discharged against medical advice remain unknown.

Conclusion

Prematurity with low birth weight, sepsis and perinatal asphyxia are the leading contributors to neonatal morbidity and mortality. Careful antenatal monitoring, effective neonatal resuscitation at delivery and timely management of preterm and LBW infantscan prevent most deaths. Therefore, policymakers in developing countries, including Bangladesh, should prioritize the establishment of adequate tertiary care facilities, such as neonatal intensive care units in rural and semi-urban areas, alongside long-term investments in health systems, community awareness, family planning and the empowerment of women.

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