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Reason for Admission and Neonatal Outcome in the Neonatal Intensive Care Unit of a Private Medical College Hospital, Rangpur

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Abstract **Original Research Article**

Background: The neonatal period is a critical phase during which a newborn undergoes numerous physiological adaptations necessary for survival outside the womb. Consequently, there are elevated levels of morbidity and mortality. In order to mitigate morbidity and death rates, it is imperative to possess a comprehensive understanding of the newborn illness pattern. The pattern of neonatal diseases exhibits temporal and spatial variations. ***Objectives:*** The objective of this study was to ascertain the illness patterns and outcomes of patients who were hospitalized to the Neonatal Intensive Care Unit (NICU). ***Methods and Materials*:** The present retrospective study was carried out within the Neonatal Intensive Care Unit (NICU) of the Department of Pediatrics at Prime Medical College Hospital in Rangpur, Bangladesh, spanning from January 2016 to December 2017. This study included a cohort of 481 newborns who were admitted to the Neonatal Intensive Care Unit (NICU) at Prime Medical College Hospital. The cohort consisted of both inborn and out born neonates throughout the specified period. ***Results*:** The most prevalent complications observed in preterm neonates were perinatal asphyxia with hypoxic-ischemic encephalopathy (HIE) accounting for 38.88% (n=187), preterm low-birth-weight newborns comprising 22.87% (n=110), and neonatal septicemia representing 12.68% (n=61). The prevalence rates of Meconium Aspiration Syndrome and Neonatal Jaundice were found to be 6.65% and 5.82%, respectively. 92.52% shown improvement in their health conditions and were subsequently discharged, while 7.48% unfortunately succumbed to mortality. The leading cause of death were perinatal asphyxia accompanied with hypoxic-ischemic encephalopathy 21, which accounts for 58.33% of the total death, followed by neonatal septicemia is 9(25%) ARDS 3(8.33%). ***Conclusion*:** The investigation found neonatal infection, birth asphyxia, and preterm low birth weight as primary factors for neonatal hospitalizations. Neonatal infection and perinatal asphyxia were identified as causes of mortality. Death rate variations provide insights into healthcare quality and care delivery efficiency.

Keywords: Neonatal septicemia, Perinatal asphyxia with HIE, PLBW babies.

INTRODUCTION

The 28 days of a newborn baby's existence are the most critical for its survival. In spite of the progress that has been made over the course of the last twenty years, it is predicted that in 2017 alone, 6.3 million children and young adolescents passed away, and 2.5 million of those children passed away during the first month of their lives. During the first month of a person's life, the probability of passing away is at its highest. An estimated 2.5 million infants did not survive their first month of life in 2017, which is equivalent to nearly 7,000 deaths every day. Of these, about 36 percent passed away on the same day that they were born, and close to three-quarters of all newborns did not survive their first week of life [1]. According to estimates made in 2017, neonatal mortality, also known as the risk of passing away within the first 28 days of a person's existence, stood at 18 fatalities for every 1,000 live births around the world. The infant mortality rate in Bangladesh has been steadily decreasing since 1968, when it stood at 93.7 deaths per 1,000 live births. In 2017, the infant mortality rate stood at 18.4 deaths per 1,000 live births [2]. Even though there has been a significant leap forward in terms of health outcomes in Bangladesh, the achievement is still at risk. The international community is aware of the critical importance of putting an end to deaths in children that could have been prevented. As a result, this issue has been incorporated into the Global Strategy for

Women's, Children's, and Adolescent's Health (2016-2030) [3] and the third Sustainable Development Goal (SDG) [4] to ensure healthy lives and promote wellbeing for all people at all ages. The reduction of the newborn mortality rate (NMR) to 12 per 1000 live births by the year 2030 is one of the targets of Sustainable Development Goal (SDG) 3, and it will be difficult for Bangladesh to reach this goal and keep up the momentum it has been gaining [5]. It is essential to have a good understanding of the newborn illness pattern in order to reach the aim of Sustainable Development Goal (SDG) 3. In industrialized nations, the leading causes of mortality and morbidity in the neonatal period are non-avoidable causes such as congenital defects. On the other hand, in developing countries, the leading causes of mortality and morbidity in the neonatal era are preventable causes such as infections, jaundice, birth asphyxia, and pneumonia [6, 7]. A sensitive measure of the availability, utilization, and effectiveness of mother and child health services in the community is the disease pattern in a neonatal intensive care unit (NICU). The pattern of the disease varies from place to place, and even within a single location, it might shift over time [8]. Therefore, maintaining a consistent evaluation of the illness pattern in any given context is essential in order to provide superior care for the patients. In order to document the disease pattern and outcome of patients hospitalized to our newborn critical care unit, we conducted this study. If we are aware of the disease pattern in the neonatal intensive care unit (NICU) and the mortality rate for each disease, we will be able to make the most efficient use of the resources at our disposal and will be able to take the necessary steps to reduce morbidity and mortality.

OBJECTIVE

The objective of this study was to ascertain the illness patterns and outcomes of patients who were hospitalized to the Neonatal Intensive Care Unit (NICU).

METHODS AND MATERIALS

The present retrospective study was carried out within the Neonatal Intensive Care Unit (NICU) of the Department of Pediatrics at Prime Medical College Hospital in Rangpur, Bangladesh, spanning from January 2016 to December 2017. This study included a cohort of 481 newborns who were admitted to the Neonatal Intensive Care Unit (NICU) at Prime Medical College Hospital. The cohort consisted of both inborn and outborn neonates throughout the specified period.

Inclusion Criteria

- Neonates, who were kept under observation,
- Those referred from other facilities with suspected disease.

Exclusion Criteria

- Those who labeled healthy after evaluation in NICU were excluded from the study.

Data Collection and Analysis

The data pertaining to all newborns who were admitted to the neonatal unit were gathered from the admission, discharge, and death registries. This was done by utilizing a pretested structured questionnaire that had been produced in the English language. The data extracted encompassed various variables, such as the age of neonates upon admission, their sex, weight at admission and birth, gestational age, mode and location of delivery, history of birth asphyxia, primary final diagnosis, date of discharge, and outcomes (including discharge, death, or leaving against medical advice), as well as the cause of death. The data underwent statistical analysis using established procedures. The data recording and analysis in this study were conducted using SPSS version 23 for Windows software, developed by SPSS Inc, based in Chicago, IL, USA. As this study employed a descriptive research design, the analysis involved the determination of percentages and frequencies. The study received approval from the hospital's ethics committee.

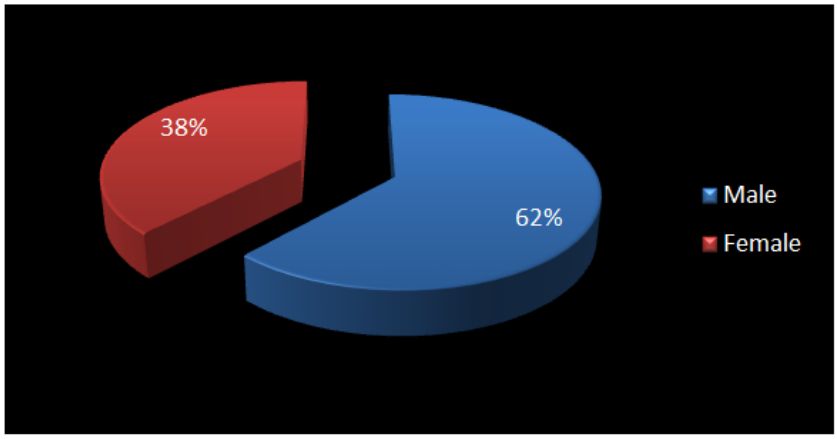

Figure 1: Gender distribution of the Patients, (N=481)

RESULTS

A total of 481 neonates were admitted during the study period. Out of the total population, 303 individuals (62%) were identified as males, while 178 individuals (38%) were identified as females infants. The male infants had a numerical superiority over their female counterparts, with a ratio of 1.63 males for every female. Both neonates born within the hospital and those born outside of the hospital were admitted (Figure 1).

The most prevalent complications observed in preterm neonates were perinatal asphyxia with hypoxic-ischemic encephalopathy (HIE) accounting for 38.88% (n=187), preterm low-birth-weight newborns comprising 22.87% (n=110), and neonatal septicemia representing 12.68% (n=61). The prevalence rates of Meconium Aspiration Syndrome and Neonatal Jaundice were found to be 6.65% and 5.82%, respectively (Table 1). The subsequent table provides a description of the rest.

Table 1: Disease Profile of Neonatal Admission Cases, (N=481)

Name of disease	Frequency (N)	Percentage (%)
Perinatal asphyxia with HIE	187	38.88%
Neonatal septicemia	61	12.68%
PLBW babies	110	22.87%
IUGR	08	1.66%
Neonatal Jaundice	28	5.82%
ARDS	13	2.70%
Meconium aspriration syndrome	32	6.65%
Infant of diabetic mother	15	3.12%
Spina bifida	01	0.21%
Birth injury	01	0.21%
Baby of Rh (-) mother	02	0.42%
Baby of HBs Ag positive mother	02	0.42%
Congenital hypothyroidism	01	0.21%
Baby for observation	15	3.12%
Diaphragmatic hernia	01	0.21%
Neonatal tetanus	01	0.21%
Congenital hypertrophic pyloric stenosis	02	0.42%
Neonatal hepatitis syndrome	01	0.21%
Total	**481**	**100%**

Out of the whole cohort of 481 neonates admitted to the Neonatal Intensive Care Unit (NICU), 92.52% shown improvement in their health conditions and were subsequently discharged, while 7.48% unfortunately succumbed to mortality (Figure 2).

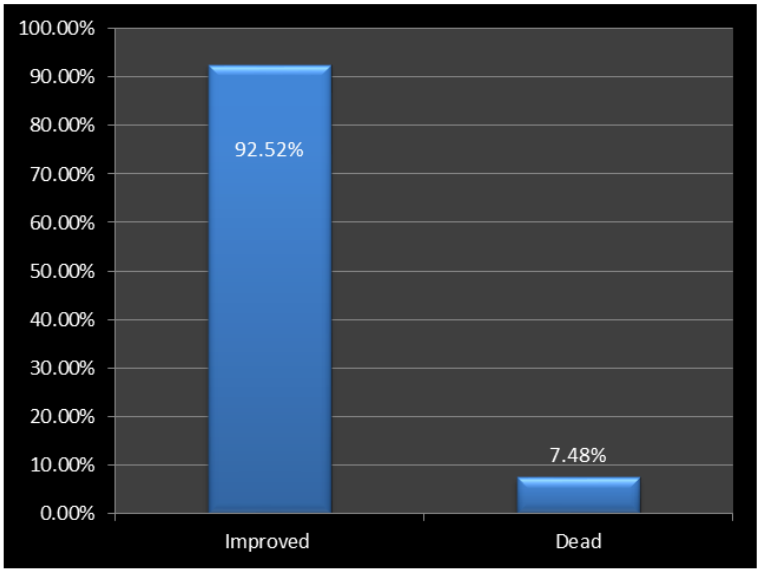

Table 2: Neonatal Outcome of the Admitted Cases

The leading cause of death were perinatal asphyxia accompanied with hypoxic-ischemic encephalopathy 21, which accounts for 58.33% of the total death, followed by neonatal septicemia is 9(25%) ARDS 3(8.33%) (Table 2).

Table 2: Major Causes of Neonatal Death, (n=36)

Name of disease	Frequency	Percentage
Perinatal asphyxia with HIE	21	58.33%
Neonatal septicemia	09	25.00%
PLBW babies	02	5.56%
ARDS	03	8.33%
Meconium aspriration syndrome	01	2.78%
Total	**36**	**100%**

The Neonatal septicemia had the greatest case fatality rate 14.75% followed by Perinatal asphyxia with HIE 11.23% (Table 3).

Table 3: Case Fatality rate

Name of disease	Frequency	Percentage
Perinatal asphyxia with HIE (n=187)	21	11.23%
Neonatal septicemia (n=61)	09	14.75%
PLBW babies (n=110)	02	1.81%
ARDS (n=113)	03	2.65%
Meconium aspriration syndrome (n=32)	01	3.12%
Total	**36**	**7.48%**

DISCUSSION

In order to attain the ambitious objectives for newborn survival, it is imperative to provide widespread availability of safe, efficacious, high-caliber, and cost-effective neonatal care. In addition, a comprehensive grasp of the levels and patterns of newborn mortality, together with a comprehension of the fundamental factors contributing to neonatal fatalities, is crucial. The present study aimed to evaluate the etiology and consequences of neonatal admissions at the Prime Medical College Hospital. The findings of the study indicated that a higher proportion of male newborns (62%) were hospitalized in comparison to female neonates (38%), resulting in a male to female ratio of 1.63:1. Several investigations have documented a comparable finding [9-11]. While others have documented the opposite [12].

LBW has been identified as a significant risk factor for newborn hospitalizations in numerous studies conducted across various developing nations for a period exceeding 25 years [13]. The present investigation revealed that a total of 110 neonates, accounting for 22.87% of the sample, were diagnosed with low birth weight (LBW). The prevalence of extremely low birth weight (ELBW) was found to be 2.7%, while very low birth weight (VLBW) and low birth weight (LBW) were observed at rates of 21.5% and 32% respectively. These results align well with the findings reported in previous studies conducted by Veena Prasad, Nutan Singh [14] and Bhagat Baghel, Anurup Sahu [15].

The primary problems found in preterm neonates were perinatal asphyxia accompanied by hypoxic-ischemic encephalopathy (HIE), which accounted for 38.88% (n=187) of cases. Additionally, preterm low-birth-weight newborns constituted 22.87% (n=110) of cases, while neonatal septicemia represented 12.68% (n=61) of cases. The study conducted by Preety Raikware *et al*., [16] and Sridhar PV.34 [17] reported prevalence rates of 6.65% for Meconium Aspiration Syndrome and 5.82% for Neonatal Jaundice, respectively. Neonatal sepsis is a pervasive issue with a worldwide impact, transcending geographical boundaries. The disparity in newborn sepsis rates between developed and developing nations is primarily characterized by the degree of prevalence, with developing countries exhibiting greater prevalence rates [18]. The study conducted in Hyderabad, India identified several significant risk factors for birth asphyxia. These factors include inadequate utilization of antenatal care services, suboptimal nutritional status, occurrence of antepartum hemorrhage, maternal toxaemia, and opting for home delivery [19].

Among the entire cohort of 481 neonates who were admitted to the Neonatal Intensive Care Unit (NICU), a majority of 92.52% exhibited positive progress in their health status and were later discharged, while a minority of 7.48% regrettably experienced mortality. The primary causes of mortality among neonates who did not survive were prenatal asphyxia accompanied by hypoxic-ischemic encephalopathy, accounting for 58.33% of all deaths. This was followed by newborn septicemia, which accounted for 25% of deaths, and acute respiratory distress syndrome

(ARDS), which accounted for 8.33% of deaths, as reported by Syed R A [20]. The study conducted in many developing nations found that prematurity emerged as the primary cause of newborn mortality [21]. The present study found that Neonatal septicemia had the highest case fatality rate at 14.75%, whereas Perinatal asphyxia with HIE had a slightly lower rate of 11.23%. Perinatal asphyxia imposes a significant burden, given its association with more over 42 million disability adjusted lifetimes [22]. According to the cited source, it has been observed that over 23% of deaths related to birth asphyxia are reported in newborns, whereas approximately 8% occur in children under the age of five [23]. Upon careful examination of these studies, it becomes evident that preterm, birth asphyxia, and sepsis are prominent factors contributing to neonatal hospitalization. These findings align closely with the prevailing global trends in newborn mortality [24]. These findings underscore the potential preventability of numerous causes of newborn mortality. The causes of these disorders are undoubtedly multifactorial, necessitating a comprehensive approach to mitigate their impact on newborn mortality.

CONCLUSION

In our investigation, it was observed that neonatal infection, birth asphyxia, and preterm low birth weight (PLBW) were the primary factors leading to neonatal hospitalizations. Additionally, prematurity and perinatal asphyxia resulting in hypoxia ischemic encephalopathy were identified as the primary causes of mortality among neonates. The significance of death rate variations is in their ability to provide valuable conclusions regarding the quality of healthcare and offer valuable insights towards enhancing the effectiveness and efficiency of care delivery.

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