

Original Research Article

Neonatal morbidity and mortality patterns in NICU at Al-Ameen Medical College and Hospital, Vijayapura

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ABSTRACT

Background: Despite improvements in perinatal care, there is still a high rate of neonatal morbidity and mortality in developing nations like India. Neonatal period is defined as from birth upto first 28 days of life.

Methods: An observational prospective study was done with sample size of 600 babies admitted in NICU at AMCH, Vijayapura during the period from January 2021 to August 2022. During the 18 months period of study, data was collected based on babies admitted with respect to gestational age, weight and day of life.

Results: The data analysis for morbidity showed that respiratory distress syndrome 24.6%, birth asphyxia with HIE 18.7%, jaundice 17.5%, sepsis 12.3%, meconium aspiration syndrome 4.7%, major congenital anomaly 3.4%, respiratory distress (other causes) 1.8%, others 17.3%. The disease wise mortality among neonates admitted to nicu was studied and were found that respiratory distress syndrome 35.5%, birth asphyxia with HIE 25.4%, sepsis 23.3%, major congenital malformations 6.1%, meconium aspiration syndrome 5.5%, others 4.1%.

Conclusions: The most common causes of admission were respiratory distress syndrome, birth asphyxia, jaundice, sepsis, meconium aspiration syndrome and major congenital anomalies. The most common causes of mortality were respiratory distress syndrome, birth asphyxia, sepsis and major congenital malformations.

Keywords: Respiratory distress syndrome, Birth asphyxia with HIE, Sepsis, Neonatal morbidity, Neonatal mortality

INTRODUCTION

Despite improvements in perinatal and neonatal care, there is still a high rate of neonatal morbidity and mortality in developing nations like India. Neonatal period is defined as upto first 28 days of life. It is the most vulnerable time in a person's life because there is a high rate of morbidity and mortality during this time, most of which can be preventable.¹ Prematurity, LBW, sepsis, and birth asphyxia are major global causes of NMR, whereas malformations and premature birth are the main causes of death in developed nations. Neonatal jaundice, premature birth, perinatal asphyxia, sepsis, and respiratory distress were the most common causes of neonatal morbidity.² It is crucial to understand how different factors contribute to

neonatal deaths in order to prioritise resources and plan a strategy to reduce NNM rates. Neonatal mortality (NNM) statistics serve as sensitive indicators of the availability, utilization, and effectiveness of maternal and child health service in the community.³ This study was conducted to assess the morbidity and mortality pattern in NICU at Al-Ameen Medical College and Hospital, Vijayapura and to determine the cause and disease pattern of neonatal morbidity and mortality at Al-Ameen Medical College & Hospital, Vijayapura.

METHODS

The present study is a hospital based prospective study conducted in the department of pediatrics at Al-Ameen

Medical College and Hospital, Vijayapura. A total of 600 babies admitted in the NICU were included in the study from January 2021 to August 2022 for a period of 18 months. This study included both inborn and outborn cases. Prior informed written consent was obtained from the parents and the study was approved by the institutional ethical committee. Data was collected based on babies admitted with respect to gestational age, weight and day of life. Details regarding history, examination and investigation of all the babies in NICU were recorded in predesigned proforma. Various morbidities were noted and analysed, and the babies were discharged as per facility based newborn care (FBNC-NHM) guidelines. Mortality was noted and analysed with respect to gestational age, weight, disease, diagnosis, hospital stay duration. Impact of gestational age, weight and various factors which help to prioritize resources to strengthen the primary care and prevention/reduction of mortality and morbidity was also assessed.

Statistical analysis

With 95% confidence level and margin of error of $\pm 5\%$, a sample size of 600 subjects were allowed to study. Categorical data was represented in the form of frequency and percentage. Association between variables were assessed with chi square test. P value of <0.05 was

considered statistically significant. Data was analysed with IBM SPSS Version 25 for Windows.

RESULTS

Total of 600 neonates were included in the study during period of January 2021 to August 2022. Admitted from (inborn) our hospital delivery were 306 (51%), and 294 (48%) were referred from other hospitals (outborn). Admission profile based on gender, birth weight and gestational age: There were 353 (58.7 %) male babies and 247 (41.2 %) female babies. Weight parameter analysis revealed 287 (47.9%) were $>2.5\text{kg}$, and 226 (37.3%) were between 1500-2499g, 68 (11.5 %) were between 1000 – 1499g, 19 (3.2%) were $<1000\text{g}$. There were 333 (55.4%) babies >37 weeks, 98 (16.6%) babies between 34-37 weeks, 169 (27.9%) babies <34 weeks of GA. Regarding mode of delivery 218 (36.4%) were born by LSCS, and 382 (63.6%) by normal vaginal delivery and instrumental delivery (Table 1). Morbidity profile of neonates admitted in NICU: The data analysis for morbidity showed that respiratory distress syndrome 148 (24.6%), birth asphyxia with HIE 112 (18.7%), jaundice 105 (17.5%), sepsis 74 (12.3%), meconium aspiration syndrome 28 (4.7%), major congenital anomaly 20 (3.4%), respiratory distress (other causes) 11 (1.8%), others 104 (17.3%) (Table 2).

Table 1: Admission profile based on gender, birth weight, gestational age.

Variables	Inborn N (%)	Outborn N (%)	Total N (%)
Gender			
Male	179 (29.6)	174 (29.1)	353 (58.7)
Females	127 (21.1)	120 (20)	247 (41.2)
p=0.567=Non significant			
Birth weight (grams)			
>2500	159 (26.5)	128 (21.3)	287 (47.9)
1500-2499	114 (18.6)	112 (18.7)	226 (37.3)
1000-1499	28 (4.7)	40 (6.7)	68 (11.5)
<1000	5 (0.8)	14 (2.3)	19 (3.2)
p=0.000=Significant			
Gestational age (weeks)			
>37	185 (30.8)	148 (24.6)	333 (55.4)
34-37	25 (4.1)	73 (12.4)	98 (16.6)
<34	96 (15.8)	73 (12.4)	169 (27.9)
p=0.000=Significant			

Respiratory distress syndrome was major cause of morbidity in inborn babies, Birth asphyxia was major cause of morbidity in outborn babies. Mortality profile of neonates admitted to NICU: Out of 600 babies, there were 106 deaths and overall mortality rate was 17.6%. Among 306 inborn babies, 57 (18.6%) babies died and among 294 out born babies 49 (16.5%) babies died. The disease wise mortality among neonates admitted to NICU was studied and were found that respiratory distress syndrome 38

(35.5%), birth asphyxia with HIE 27 (25.4%), sepsis 25 (23.3%), major congenital malformations 7 (6.1%), meconium aspiration syndrome 6 (5.5%), others 5 (4.1%) (Table 3). The major cause of mortality was respiratory distress syndrome 38 (35.5%), followed by birth asphyxia 27 (25.4%) and sepsis 25 (23.3%). Mortality rate due to respiratory distress syndrome were more in inborn 22 (37.5%) than outborn 16 (32.5%).

Table 2: Morbidity profile of neonates admitted in NICU.

Morbidity	Inborn N (%)	Outborn N (%)	Total N	Total %
Respiratory distress syndrome	100 (16.7)	47 (7.8)	147	24.6
Meconium aspiration syndrome	7 (1.1)	21 (3.5)	28	4.7
Respiratory distress (other causes)	2 (0.3)	8 (1.4)	10	1.8
Birth asphyxia with HIE	45 (7.5)	64 (10.6)	109	18.17
Sepsis/pneumonia/meningitis	19 (3.2)	54 (9.0)	73	12.3
Jaundice	79 (13.2)	25 (4.2)	104	17.5
Major congenital anomaly	5 (0.8)	15 (2.5)	20	3.4
Hypothermia	1 (0.05)	2 (0.3)	3	0.3
Hypoglycemia	2 (0.27)	1 (0.16)	3	0.4
Prematurity	27 (4.5)	38 (6.4)	65	10.9
Others	16 (2.7)	137 (2.8)	153	5.6

p=0.000=Significant

Table 3: Mortality profile of neonates admitted to NICU.

Mortality	Inborn N (%)	Outborn N (%)	Total N	Total %
Respiratory distress syndrome	21 (37.5)	16 (32.5)	37	35.5
Meconium aspiration syndrome	4 (6.8)	3 (5.2)	7	5.5
Hypoxic ischemic encephalopathy/ birth asphyxia	15 (26.1)	12 (24.1)	27	25.4
Sepsis/pneumonia/meningitis	12 (19.8)	13 (27.2)	25	23.3
Major congenital Malformations	43 (5.3)	4 (6.9)	47	6.1
Others	2 (4.2)	1 (2.09)	3	4.1
Total	57	49		

p=0.126=non-significant

DISCUSSION

This study shows the pattern of morbidity and mortality in our NICU. The male to female ratio in this study was 1.4:1, which was comparable to the findings of the study conducted by Sridhar et al.¹¹ The major cause of morbidity was RDS which was similar to that in the study conducted by Modi et al. Malik et al conducted study on 1388 newborns admitted within 24 h of birth were included in the study and concluded that respiratory distress, perinatal asphyxia, and sepsis as the predominant causes of neonatal morbidity.^{3,4} The major cause of mortality was RDS which was similar to the findings in the study conducted by Saini et al.⁵ They conducted study on 6509 live births, of which 50 were twin pairs and 6409 were singleton birth. Hyperbilirubinemia, sepsis, and respiratory distress were found to be the leading causes of morbidity in a study conducted by Bharthakur et al.⁶

Birth asphyxia, prematurity, and neonatal sepsis were the leading causes of neonatal mortality in the study done by Ranjan et al.⁸ The preterm and low birth weight babies had significantly high mortality even with standard intensive care which is comparable with the findings obtained in other similar studies.^{9,10,12,13} RDS, birth asphyxia, and neonatal sepsis were found to be the major causes of death, according to the current study.

Limitations

The present study includes all neonates admitted to NICU irrespective of gestational age, birth weight and newborns with congenital anomalies. Such babies are already at a higher risk of mortality and morbidity therefore the study will have higher incidence of morbidity and mortality. Set of issues in each of the vulnerable subgroups are different and are dependent on multiple factors. These factors contribute to a higher morbidity and mortality rates.

CONCLUSION

The most common causes of admission to NICU were respiratory distress syndrome, birth asphyxia, jaundice, sepsis, meconium aspiration syndrome, major congenital anomaly. The most common causes of mortality were respiratory distress syndrome, birth asphyxia, sepsis, major congenital malformation as per the findings obtained in the present study.

Recommendations

Adequate number of antenatal visits, screening and prompt prevention and treatment strategies, the incidence of preterm and LBW deliveries can be reduced thus

improving the neonatal outcome significantly. Also segregation of preterms, LBW and babies with major congenital anomalies would streamline the causes of morbidity and mortality in each of the subgroups. The obstetric and neonatology unit needs to be developed further in order to provide better care while utilising more advanced technologies.

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REFERENCES

- Chintha LP, Bollipo S, Gottumukkala RP, Palepu SP. Morbidity and mortality pattern among babies admitted in special newborn care unit, Nellore, Andhra Pradesh, India. *Int J Contemp Pediatr.* 2019.
- Ravikumar SA, Elangovan H, Elayaraja K, Sunderavel AKK. Morbidity and mortality profile of neonates in a tertiary care centre in Tamil Nadu: a study from South India. *Int J Contemp Pediatr.* 2018;5:377-82.
- Modi R, Modi B, Patel JK, Punitha KM. Study of the Morbidity and the Mortality Pattern in the Neonatal Intensive Care Unit at a Tertiary Care teaching Hospital in Gandhinagar District, Gujarat, India. *J Res Med Den Sci.* 2015;3(3):208-12.
- Malik S, Gohiya P, Khan IA. Morbidity profile and mortality of neonates admitted in Neonatal Intensive Care Unit of a Central India Teaching Institute: A prospective observational study. *J Clin Neonatol.* 2016;5:168-73.
- Saini N, Chhabra S, Chhabra S, Garg L, Garg N. Pattern of neonatal morbidity and mortality: A prospective study in a District Hospital in Urban India. *J Clin Neonatol.* 2016;5:183-8.
- Chinmayi Bharthakur, Julie Sarmah, Niruprabha Saharia. Birth asphyxia, hyperbilirubinemia and mortality among neonates admitted in NICU of a tertiary care hospital of Assam: a descriptive study. *IJSR.* 2022.
- Paul VK, Bagga A. Ghai Essential Pediatrics. India: CBS Publishers and Distributors; 2018.
- Ranjan A, Singh A. Pattern of morbidity and mortality of neonates admitted in tertiary level neonatal intensive care unit in Nalanda Medical College and Hospital, Patna, Bihar, India. *Int J Contemp Pediatr.* 2016; 3(3):854-7.
- Kannan R, Rao S, Mithra P, Rajesh SM, Unnikrishnan B, Rekha T. Neonatal mortality and morbidity in a tertiary care hospital of coastal south India. *J Nepal Paediatr Soc.* 2017;37(3):232-7.
- K M, Sharma N. Morbidity and Mortality pattern in Neonatal ICU in a tertiary care teaching hospital of Puducherry, South India. *Pediatric Rev.* 2020;7(3): 122-8.
- Sridhar PV, Thammanna PS, Sandeep M. Morbidity Pattern and Hospital Outcome of Neonates Admitted in a Tertiary Care Teaching Hospital, Mandya. *Int J Sci Stud.* 2015;3(6):126-9.
- Saharia N, Deka A, Vivekananda MS. Mortality and morbidity pattern of neonatal ICU of Guwhati Medical College and Hospital. *IOSR-JDMS.* 2016;15:73-5.
- Kotwal YS, Yatoo GH, Ahmed Jan FA. Morbidity and mortality among neonates admitted to a neonatal intensive care unit of a tertiary care teaching hospital of Jammu and Kashmir (India). *Neonat Pediatr Med.* 2011;3:136.
- Kumar R, Mundhra R, Jain A, Jain S. Morbidity and mortality profile of neonates admitted in special newborn care unit of a teaching hospital in Uttarakhand, India. *Int J Res Med Sci.* 2018;7(1):241-6.
- Andegiorgish, AK, Andemariam M, Temesghen S. et al. Neonatal mortality and associated factors in the specialized neonatal care unit Asmara, Eritrea. *BMC Public Health.* 2020;20:10.

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