A STUDY OF DISEASE PATTERN AND OUTCOME OF NEWBORNS ADMITTED TO NICU IN A TERTIARY CARE HOSPITAL
Siva Saranappa S.B1, Madhu G.N2, Ritesh Singh3

HOW TO CITE THIS ARTICLE:

ABSTRACT: BACKGROUND: Advances in perinatal and neonatal care have significantly reduced neonatal mortality rates and have benefited preterm infants admitted to neonatal intensive care units. Analysis of care practices can provide insights into how care practices might be changed to improve outcomes. OBJECTIVE: 1. To study the disease pattern, outcome and factors contributing to mortality of the newborns admitted to the Neonatal Intensive Care Unit (NICU) of a tertiary care hospital. 2. To compare the mortality rate between inborn and outborn babies. PATIENTS & METHODS: A retrospective case record review and analysis of all the newborn babies including both inborn and outborn (Referred from elsewhere) admitted to the NICU during the period of 2011 to 2013 were included in the study and the data was recorded on the data forms. For comparison between two groups Chi square test was used. RESULTS: Total number of babies admitted to NICU during the study period was 3152, of which inborns were 73.3% (2311) and 26.7% (841) were outborn. 54% were males and 46% were females. 75% were term newborns and 25% were preterm newborns. Majority of babies weighed between 2500-3000 grams. The mortality among the inborn babies was only 1.9% (45/2311) as compared to the outborn which was 5.7% (48/841) which was statistically significant p=0.0003. Although statistically insignificant, the mortality in males was higher at 3.2% (54/1698) than the females which was 2.7% (39/1454) (p=0.4). The major cause of mortality was Preterm with Hyaline Membrane Disease (HMD) (36.5%) followed by neonatal sepsis (34.30%) and other causes like Hypoxic Ischemic Encephalopathy, Congenital Heart Disease, Meconium aspiration syndrome and major congenital malformations. CONCLUSION: Significant mortality in outborn babies as compared to the inborns highlights the need for better transport facilities and early referral of the newborns requiring NICU care. Also, there is a need to establish NICU facilities in the remote areas to reduce the mortality. KEYWORDS: Neonate, Neonatal transport, morbidity, Mortality.

INTRODUCTION: Advances in perinatal and neonatal care have significantly reduced neonatal mortality rates and have benefited preterm infants admitted to neonatal intensive care units (NICU)1-3. There was a large reduction in mortality rate in the recent years, despite the clinically small but statistically significant reductions in birth weight and gestational age which, by themselves, would be associated with a higher mortality rate. The rapid decline in neonatal mortality during the past 4 decades has been attributed to improvements in neonatal intensive care. This decline was attributable to improved condition of the infants on NICU admission (improved birth weight, higher Apgar scores, and better physiologic ability) that reflected improving obstetric and delivery room care. It was also due to more effective newborn intensive care and aggressive respiratory and cardiovascular treatment 4. Recent publications have highlighted these trends but have also reported significant variations in mortality rates among NICUs.5-7 Variations in mortality rates are important
because they permit inferences about quality of care. Examination of care practices associated with variations in mortality rates can provide insights into how care practices might be changed to improve outcome\(^7,8\). This study was undertaken to study the disease pattern and outcome, and to know the factors contributing to the mortality.

**OBJECTIVES:** 1. To study the disease pattern, outcome and factors contributing to mortality of the newborns admitted to the Neonatal Intensive Care Unit (NICU) of a tertiary care hospital. 2. To compare the mortality rate between inborn and outborn babies.

**METHODS:** A retrospective case record review and analysis of all the newborn babies including both inborn and outborn (Referred from elsewhere) admitted to the NICU during the period of 2011 to 2013 were included in the study and the data was recorded on the data forms. the data was analyzed. For comparison between two groups Chi square test was used.

**RESULTS:** Total number of babies admitted to NICU during the study period was 3152 (tab-01). Out of which inborns were 73.3% (2311) and 26.7% (841) were outborn (Born elsewhere and referred). 54% were males and 46% were females. 75% were term newborns and 25% were preterm newborns. Majority of babies weighed between 2500-3000 grams. The major indication for admission was neonatal jaundice (36%), followed by preterm management (14%), neonatal sepsis (11%), transient tachypnea of newborn (8%) and others (tab 1). The overall mortality was 2.95% (93/3152). The mortality among the inborn babies was only 1.9% (45/2311) as compared to the outborn which was 5.7% (48/841). The death in males was higher at 3.2% (54/1698) than the females which was 2.7% (39/1454). 70% (65/93) babies which died required mechanical ventilation. The major cause of mortality was Preterm with RDS (36.5%) followed by neonatal sepsis (34.30%) and others (tab 2).

<table>
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<tr>
<th></th>
<th>No. of babies (n=3152)</th>
<th>Percentage (%)</th>
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<tr>
<td>Out born babies</td>
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<td>Female babies</td>
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<td>mechanical ventilation</td>
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Tab 01: Descriptive Data
Clinical condition | Total no. of babies | Percentage (%) |
--- | --- | --- |
Neonatal Jaundice | 1121 | 35.56 |
Preterm Management | 444 | 14.08 |
Transient Tachypnea of newborn | 254 | 8.05 |
Late onset sepsis | 221 | 7.01 |
Meconium Stained Amniotic Fluid | 178 | 5.64 |
Hyaline Membrane Disease | 140 | 4.44 |
Early onset sepsis | 130 | 4.12 |
Infant of Diabetic Mother | 125 | 3.96 |
Perinatal depression | 118 | 3.74 |
Hypoglycemia | 67 | 2.12 |
Intrauterine Growth Retardation | 62 | 1.96 |
Feeding problems | 59 | 1.87 |
Neonatal seizures | 49 | 1.55 |
Perinatal asphyxia | 46 | 1.45 |
Surgical Conditions | 43 | 1.36 |
Congenital anomalies | 29 | 0.92 |
Congenital Heart Disease | 27 | 0.85 |
Meconium Aspiration Syndrome | 26 | 0.82 |

Tab 02: Distribution of babies based on the clinical condition

Cause of Death | Total no. of deaths (n) | Percentage (%) |
--- | --- | --- |
Hyaline membrane disease | 34 | 36.5 |
Neonatal Sepsis | 32 | 34.3 |
Congenital heart disease | 09 | 9.6 |
Meconium aspiration syndrome | 08 | 8.6 |
Hypoxic Ischemic Encephalopathy stage III | 07 | 7.5 |
Major congenital anomaly | 03 | 3.2 |

Tab 03: Specific cause and mortality

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<td>1.9</td>
</tr>
<tr>
<td>Outborn babies</td>
<td>48</td>
<td>5.7</td>
</tr>
<tr>
<td>Male babies</td>
<td>54</td>
<td>3.2</td>
</tr>
<tr>
<td>Female Babies</td>
<td>39</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Tab 04: Comparison of deaths between inborn/outborn and male/female

DISCUSSION: This study was conducted with the objective to study the disease pattern, outcome and factors contributing to mortality of the newborns admitted to the Neonatal Intensive Care Unit (NICU) of a tertiary care hospital. A total of 3152 newborns were admitted to the NICU during the study period. Majority were inborns (73.3%). Most of them were males (53.9%) and most of them
were term newborns (75.3%). According to birth weight, 33.1% of them were between 2500-3000 grams, 20.2% were between 2000-2500 grams, 17.8% were between 1500-1999 grams, 16.1% were between 3000-3500 grams, 6.9% were between 1000-1499 grams, 3.6% were between 3500-3999 grams. Babies with birth weight of less than 1000 grams and more than 4000 grams constituted 1% each.

Neonatal jaundice was the most common indication for admission to NICU (35.6%) which is similar to that reported by Mcgil ugwu 8. other indications for admission to NICU are shown in table 2.

The specific causes of death in this study have been shown in table 3. The major cause of death was Hyaline membrane disease (HMD) accounting to 36.5% of deaths. Variable rates of death due to HMD have been reported in literature: - 19.2%9, 24%10, 41%11, and 40-60% 12. This variation in the death rates is probably due to the facilities available for management of high risk newborns. Neonatal sepsis was the second most frequent cause of death accounting to 34.3%. Kuruvilla KA13 et al reported that deaths due to neonatal sepsis was 14.4% accounting to 19.1% of total deaths. other authors have also reported variable results accounted to neonatal sepsis.

In our study, it was found that outborn babies (table 4) had a significantly higher mortality of 5.7% when compared to the inborn babies with 1.9% (p=0.0003). This comparison highlights that the babies which have been referred for the requirement of NICU care have higher mortality. This can be due the problems associated with the neonatal transport. Various complications of neonatal transport such as hypothermia, hypoglycemia and others have been reported14. Even intra hospital transports are associated with increased risk of clinical complications 15. Buch Pankaj 16 reported a mortality of 32.2% in transported neonates. Gustavo Goldsmit et al reported that 28 of 160 transported neonates died 17.

CONCLUSION: In spite of many advances in neonatal care, prematurity and neonatal jaundice still continue to be the most common problems in the newborns. Also, HMD and neonatal sepsis are still the most common causes of death. Outborn babies are at higher risk of death due the problems they encounter due to and during the transport. Significant mortality in outborn babies as compared to the inborns highlights the need for better transport facilities and early referral of the newborns requiring NICU care. Hence, there is a need to establish neonatal care facilities especially in rural and remote areas so that the problems of neonatal transport can be minimized. Also, providing meticulous antenatal care and prevention of premature delivery can reduce the morbidity and mortality in newborn.

REFERENCES:


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