

Original Research Article

A profile on the spectrum of neonatal mortality and morbidity pattern of extramural neonates in the Specialised Neonatal Care Unit (SNCU) in a tertiary care hospital

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ABSTRACT

Background: Every year, nearly four million newborn babies die in the first month of life. India carries the single largest share (around 25-30%) of neonatal deaths in the world. Neonatal deaths constitute two thirds of infant deaths in India. 45% of the deaths occur within the first two days of life. It has been estimated that about 70% of neonatal deaths could be prevented if proven interventions are implemented effectively at the appropriate time. It was further estimated that health facility-based interventions can reduce neonatal mortality by 23-50% in different settings. Facility-based newborn care, thus, has a significant potential for improving the survival of newborns in India. This research has been planned with an aim to study the profile of pattern of admissions in a SNCU and their outcomes following admission and management in the unit.

Methods: All babies referred for neonatal problems (less than 28 days) and admitted in NICU will be included. Both term and preterm babies will be considered. The criteria for admission includes various causes like low birth weight, preterm, birth asphyxia, respiratory distress, hyperbilirubinemia, congenital anomalies, risk factors (maternal, neonatal, prenatal), infections and outcome will be analysed.

Results: Among the 2927 admissions term babies and boys outnumbered. The common causes for admission were birth asphyxia, respiratory distress, low birthweight and preterm. Most babies had an uncomplicated stay. The mortality in the extramural neonates was due to neonatal sepsis, extreme preterm and congenital malformations.

Conclusions: Intensive and interventional management, along with good neonatal monitoring and care can reduce the mortality and improve the survival of low birth weight babies and other treatable problems. Thus, a combined effort of management by pediatricians, nursing care, neonatal intensive care unit can improve the survival rates of neonates.

Keywords: Birth asphyxia, Extramural admissions, Low birth weight, Neonatal mortality, Neonatal sepsis, Respiratory distress

INTRODUCTION

Every year, nearly four million new-born babies die in the first month of life. India carries the single largest share (around 25-30%) of neonatal deaths in the world. Neonatal deaths constitute two thirds of infant deaths in India; 45% of the deaths occur within the first two days

of life. Over the years, the IMR has reduced worldwide, as well as in India, but neonatal mortality rate has not decreased proportionately.¹ The neonatal mortality rate (NMR) in India is 29 per 1000 live births². The Millennium Development Goals (MDGs) 2015 have not been achieved which focused on decreasing NMR of India to <10. Although the time frame to achieve the

MDGs has been extended, a significant work has been done in the area of improving neonatal mortality in India.²⁻⁴ We have taken up this study so as to ascertain the causes of morbidity and mortality prevalent in the neonates admitted in Neonatal Intensive Care Unit (NICU) of a teaching hospital that caters to a large referral population from the surrounding government and private obstetric centres. It has been estimated that about 70% of neonatal deaths could be prevented if proven interventions are implemented effectively with high coverage.⁵ It was further estimated that health facility-based interventions can reduce neonatal mortality by 23-50% in different settings. Facility-based newborn care, thus, has a significant potential for improving the survival of newborns in India. SNCU is a unit of hospital with special in care of ill and/ or pre-mature newborn infants. These units have reduced the mortality and increased the survival of sick newborns.

This research has been planned with an aim, to study the profile of pattern of admissions in a SNCU and their outcomes following admission and management in the unit.

The present study was a retrospective observational study for the last 4.5 years in the Neonatal Intensive Care Unit (NICU) of Department of Pediatrics, Institute of Social Paediatrics, Government Stanley Medical College, Chennai.

All neonates admitted to NICU (referred from other government and private nursing hospitals) in Institute of Social Paediatrics, Government Stanley Medical College, Chennai

METHODS

The study was initiated after a consent from the hospital ethical committee. All babies referred for neonatal problems (less than 28 days) and admitted in NICU will be included. Both term and preterm babies will be considered. The criteria for admission, various causes like low birth weight, preterm, birth asphyxia, respiratory distress, hyperbilirubinemia, congenital anomalies, risk factors (maternal, neonatal, prenatal), infections and outcome will be analysed. Data of all the admitted babies were analyzed and categorized on the basis of sex, gestational age, weight for gestation, age at presentation, indications for admission, duration of hospitalization, complications encountered, bacteriological profile, procedures done during hospitalization. Babies who were admitted to NICU for low birth weight but who were above 30 days old were excluded from the study. Data recorded in Excel spread sheets were analysed Microsoft excel and SPSS software was used for statistical analysis.

RESULTS

During the period of study, from January 2013 to April 2017 there were total of 2927 neonates admitted to the NICU (Tables 1 and 2). Maximum number of babies admitted were referred from the surrounding government maternity hospitals, district hospitals, urban primary health centres, and some from the private nursing homes and clinics directly (Figure 1). Neonates with surgical problems were also admitted. The mode of transport was through the government regular and neonatal ambulances and self-arranged vehicles for the private hospital referrals.

Table 1: Depicts the year wise pattern of admissions and mortality with a reduction in the deaths.

Year	Admission	Discharge	Death	Discharge percentage (%)	Death percentage (%)
2013	589	469	36	79.62	6.11
2014	671	485	34	72.28	5.06
2015	698	532	36	76.21	5.15
2016	741	673	23	90.82	3.10
2017 (April)	228	215	3	94.29	1.31

Table 2: Statistical data of the outpatient and well-baby clinic.

Month	Well baby clinic	OP	Ventilator	CPAP
2013	545	2048	47	37
2014	865	1241	52	88
2015	787	1011	56	103
2016	1254	881	43	2
2017	496	261	5	3

There were 1651(56.5%) males and 1276 (43.5%) females (Figure 2). Majority of the babies were term, babies (Figure 3 and 4). Babies admitted during the first

day of life presented with respiratory distress, perinatal asphyxia, preterm, low birthweight, life threatening congenital malformations needing medical or surgical

interventions. The commonest indication for admission between second to fifth days of life was neonatal jaundice, followed closely by sepsis /complications.

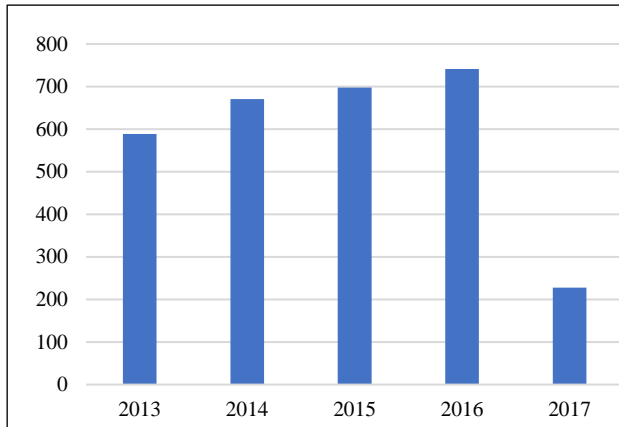


Figure 1: Admissions each year with an increasing trend for an institutional neonatal care.

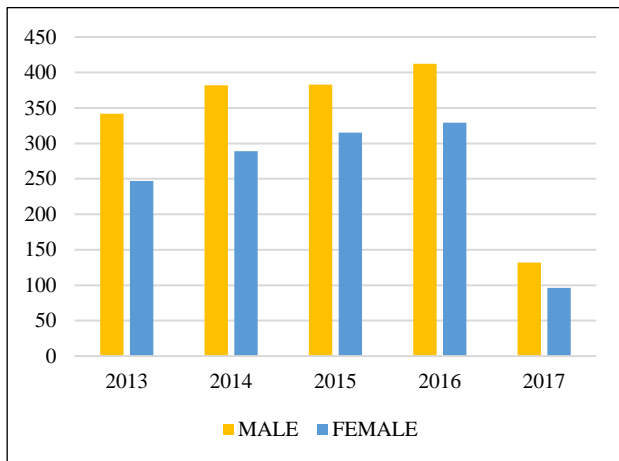


Figure 2: Gender wise distribution of the admissions with a male preponderance.

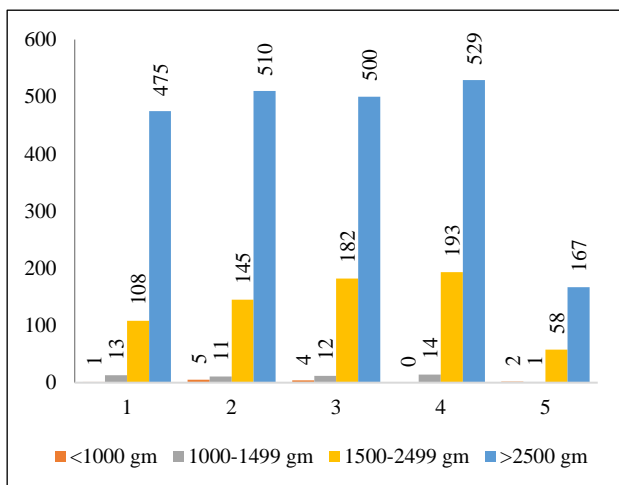


Figure 3: Distribution of neonates according to the birthweight, with more admissions above 2500 gm.

All the babies were clinically examined, and the vital signs were monitored through pulse oximetry and multipara monitors. Babies who needed a level 3 care were kept in the intensive care unit which is equipped with warmers, phototherapy units, CPAP and neonatal ventilators.

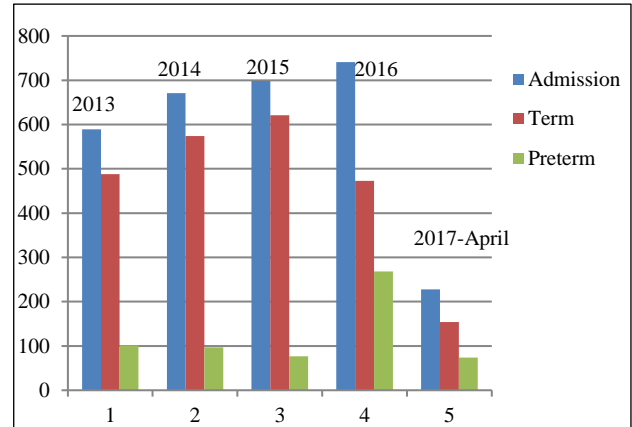


Figure 4: The figure depicts the total admissions with the gestational wise distribution pattern-term babies showed a preponderance in the extramural admissions.

Basic investigations like clinical blood count, sepsis screening, radiography, ultrasonogram, CSF analysis were done. The commonest indication for admission was respiratory distress, followed closely by sepsis and then perinatal asphyxia (Figure 5).

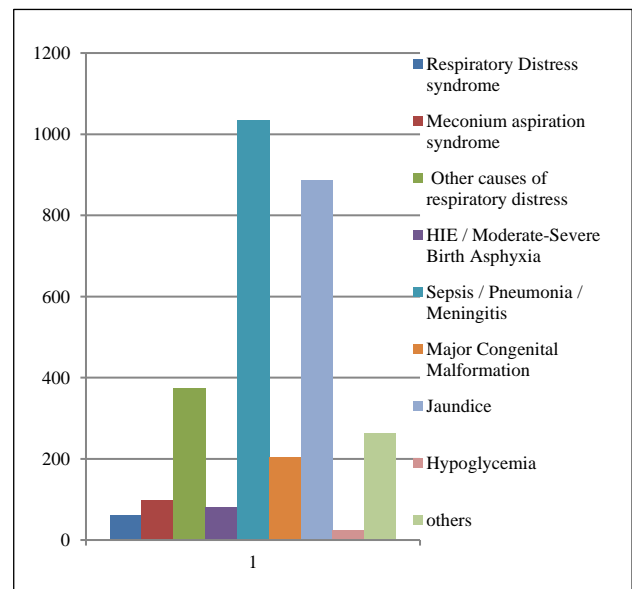


Figure 5: Causes for extramural admission with respiratory distress syndrome and neonatal sepsis being the commonest.

Low birth weight with complications was found in 83 babies (45.6%); however only low birth weight was found in 9 babies (4.9%). Out of the total admissions, 107

babies (58.7%) had an uncomplicated course during hospitalization while 75 babies (41.2%) developed complications during their stay in the hospital. Procedures like phototherapy, blood transfusions, double volume exchange transfusion, positive pressure ventilation, surfactant therapy were provided for babies who required interventions.

12 (0.4%) babies were less than 1000 gm, 50 (1.7%) had a weight between 1000-1499 gm, 585 (19.9%) were between 1500-2499 gm and 2171 (74.2%) babies were above 2500 gm (Figure 3). Considering the duration of hospital stay, 9% stayed for less than one day, 2-5 days (48%), 6-10 days (24%), 11-14 days (10%), and 9% for more than 14 days. Out of the total admissions, most of the neonates had an uncomplicated course during hospitalization while some developed complications and there were 132 deaths throughout the study period (Figure 6).

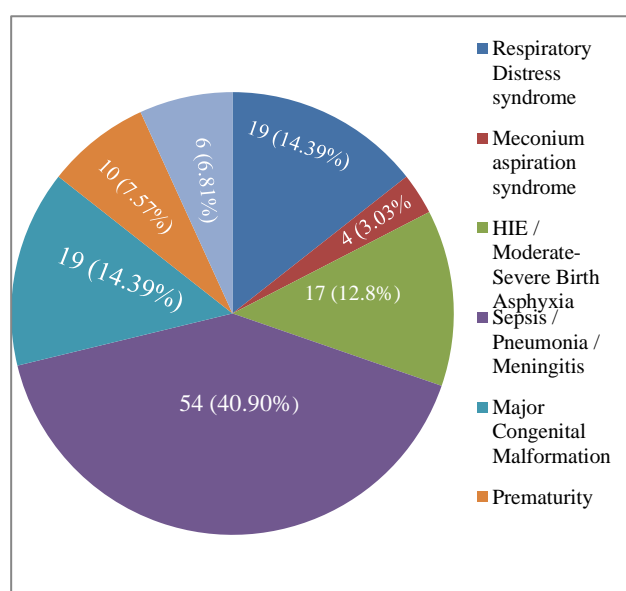


Figure 6: Depicts the disease-wise fatality rates in the extramural babies with neonatal sepsis predominating.

Mortality was seen most frequently in the babies born as extreme preterm followed by clinical and proven sepsis. Mortality rate was seen more in the male babies as compared to the female neonates (68% versus 32%). Similarly, mortality was observed more in the babies having birth weight appropriate for gestational age (61.5%) as compared to small for gestational age (38.5%). The discharged babies were regularly followed until 1 year in the well-baby clinic with counselling, immunization, developmental assessment and screening for hearing and retinopathy of prematurity.

DISCUSSION

In the present scenario as most of the deaths in infancy take place within first 28 days and achieving MDG 4 still

seems to be a distant dream for India the importance of neonatal care should be emphasized. Although based on hospital records, the present study provides insight into neonatal health in a tertiary care hospital referred from its wide catchment area, the morbidity and mortality pattern give an insight of the status and the ways to modify the pattern to reduce the problems in a well-equipped set-up. From the analysis of the data there is a decrease in the number of deaths yearly. Use of government ambulance for referral was higher than what was observed by another hospital in Delhi.⁶ Newborn transport in a well-equipped ambulance could play a vital role in reducing death during transport. A relevant point in this regard is prior communication to NICU/SNCU.^{7,8}

The overall mortality rate was 5.56% in the present study, which is similar to Kumar et al, and lower than other observations focused on transported neonates.^{9,10} Being a tertiary center, this hospital is equipped with better manpower and equipments which are not available at referring ones which could be the reason for better survival. In our study, babies died within the first 24 hours and mortality was more in first week of life, consistent with the range noted by Lawn et al.¹¹ As ante and intra natal complications could increase the chance for early neonatal death, strengthening these aspects of care along with effective resuscitation are the need of the hour.¹² A study from rural India emphasized on improving health-seeking behavior and enhancing link between community and health care providers.¹²⁻¹⁴ This can be considered even in a urban setup for ensuring a better outcome.

Previous data suggested that sepsis is responsible for a major chunk of death in late neonatal period (Kumar et al).¹⁴ Study report by ICMR states that sepsis is the major cause 32.8% followed by birth asphyxia and prematurity 16.8% and in a tertiary care center in south India states that sepsis (52.3%) followed by birth asphyxia and injuries as the major cause of mortality.^{15,16} Present findings are also consistent with the previous data. Bad child rearing practices followed at home, environmental exposure and social and family taboos could be responsible for neonatal especially late onset sepsis. Adequate anticipation, early diagnosis and treatment, practice of giving antibiotic in selected cases before referral could reduce the risk of death due to sepsis in extramural babies.

Creating awareness about the importance of simple handwashing can minimize the risk of sepsis. Avoidance of cot sharing, use of routine antiseptic measures and rational usage of antibiotics will significantly reduce the incidence of culture positive sepsis and antibiotic resistance.

Major congenital malformations and inborn errors of metabolism also contributed significantly to neonatal mortality. The prevalence of congenital anomalies may differ geographically, there by reflecting a complex

interaction of known and unknown genetic/environmental factors including sociocultural, racial and ethnic variables.¹⁷

CONCLUSION

Training programs for health workers, for an early and proper referral, with adequate skilled staff in NICU can decrease the mortality and improve the neonatal outcomes. To analyse a better neonatal morbidity and mortality pattern in an extramural SNCU, conducting similar studies in all the tertiary care hospitals for a larger sample size in the city and setting a good statistical database will be beneficial.

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