Short-term outcomes of neonates admitted in rural tertiary care centre- A retrospective study

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Abstract

Background: In India nearly 67%ofinfant deaths occur in the neonatal period. Half of the neonates die in the first week of life.

Objectives: To assess the outcomes of neonates admitted to NICU in rural tertiary care Centre.

Materials & Methods: This retrospective study was done in rural tertiary care hospital, Kuppam, Andhra Pradesh for 2 months. Data were collected from the hospital records of the neonates admitted in the past 6 months. 200 such records containing data regarding the outcomes and associated factors among neonates were included.

Results: Among total 200 neonates,most common cause of admission was sepsis (33.3%) followed by birth asphyxia (24.8%), Neonatal hyperbilirubinemia (16.7%), Hypoglycemia (16.7%) and respiratory distress syndrome (7.3%) and others (1.2%). Among these neonates the mortality rate was 3.5%. Total deaths were 7 in 200 cases.More deaths seen among babies with sepsis(4 cases),birth asphyxia(2 cases),respiratory distress syndrome(1 case) and others (1 case). Mean length of hospitalstay was 20.33+/-2.8 days and was seen more among babies with sepsis followed by birth asphyxia,respiratory distress syndrome.

Conclusion: Improvements in access to quality facility-based neonatal care are required, to furthersupport thecommunity based interventions for better neonatal outcomes.

Keywords: Birth asphyxia, Neonatalhyper bilirubinemia, Hypoglycaemia,Respiratory Distress Syndrome, NICU

Introduction

Neonatal period i.e. the first 28 days of life are the most vulnerable period for the new-born. According to WHO, in the year 2015 nearly 2.7 million children died globally in the neonatal period, contributing to 45% of the total under five deaths. Of these, almost 1 million neonatal deaths occurred in the first 24 hrs and close to 2 million died in the first week. In India nearly 67% of infant deaths occur in the neonatal period. Half of the neonates die in the first week of life. At global level, the major causes of neonatal deaths are infections (36%), pre-maturity (28%), and birth asphyxia (23%). In India the major causes are pre-maturity (35%); neonatal infections (33%); intra-partum related complications/ birth asphyxia (20%); and congenital malformations (9%). Apart from fatalities, these morbidities have potential to develop lifelong disability among the survivors compromising theirquality of life.[1]

Achieving reductions in neonatal mortality globally has been challenging for a variety of reasons, including limited political prioritization of newborn health, inadequate financial commitment to neonatal care by funding sources, and slow scale up of high impact maternal-child interventions. To further support important community-based interventions and expand life-saving services, improvements in access to quality facility-based neonatal care are required. Neonatal intensive care units (NICUs) have been developed in LMICs and are being utilized to care for high-risk neonates.[2]

Non institutional births constitute a significant proportion of total births in developing country like India and still many deliveries are conducted at home specifically in rural area. Though institutional delivery and in-utero transport of newborn is safest but unfortunately preterm delivery and perinatal illness cannot be always anticipated resulting in continued need of transfer of these babies after delivery. These babies are often critically ill and outcome is also dependent on effectiveness of transport system. Prematurity, asphyxia and sepsis are the most common causes of neonatal mortality in developing countries.[3]

Neonatal mortality forms a large proportion of infant mortality for which several programs have been launched over the last decade. Prominent amongst them are promotion of institutional delivery, creation of SpecialNew-born Care Units (SNCUs) at district level and free national ambulance system (108). Programs like Janani Shishu Suraksha Karyakram and India New-born Action Plan have brought much needed attention to the maternal and neonatal care.[4] Also, one of the major thrust areas of NRHM is the reduction of Neonatal Mortality. The first step in improving early neonatal survival is to document the number and rate of deaths and indentify their common causes.[5]

Objectives of the study

To assess the outcomes of neonates admitted in rural tertiary care centre.

Materials & Methods

This retrospective study was conducted on 200 neonates that were hospitalised to the neonatal intensive care unit (NICU) in the Rural tertiary care hospital, Kuppam, Andhra Pradesh during 2 months (May-June, 2022). After the Institutional Ethical Committee gave the study their approval, a pretested proforma that included standard terminology from the National Neonatology Forum was utilised in order to register the cases. According to a proforma that was already designed, the data of all of the babies who were admitted were listed out and categorised on the basis of their age when they

were admitted, the mode of delivery, the sex, birth weight, gestational age, inborn or out born delivery, the reason for admission, the bacteriological profile, the investigations, and the outcome after they were hospitalised in the NICU. Hospital records having the data regarding the outcomes and associated factors among neonates admitted to the hospital in the past 2 months.

After the Institutional Ethical Committee clearance, Clinical symptoms, a positive blood culture, a complete blood count, and a study of the cerebrospinal fluid (CSF) helped identify the patient with sepsis and meningitis respectively.

A chest x-ray was first used to make the diagnosis of congenital heart disease, and echocardiography was used to verify the diagnosis. Clinical evidence pointed to the presence of birth asphyxia, and Sarnat Staging identified the condition as hypoxic ischemic encephalopathy (HIE).

The World Health Organization's definition[14] of prematurity, which states that live-born neonates must be delivered before 37 weeks from the first day of the woman's most recent menstrual cycle, was used in conjunction with the new Ballard scoring system to make a diagnosis of premature birth.

The presence of one or more of the following symptoms—tachypnea, intercostal muscle retraction, grunting, nasal flaring, and cyanosis—was required to make a diagnosis of neonatal respiratory distress. [9] Babies were considered to have a very low birth weight if their birth weight was less than 1500 grams, and babies were considered to have an extremely low birth weight if their birth weight was less than 1000 grams. Low birth weight was defined as a birth weight of less than 2500 grams at the time.

Inclusion Criteria

All inborn neonates admitted to NICU within 24 hours of birth

Exclusion criteria

Cases whose data were not available were excluded.

Study tools

Pre-designed structured questionnaire for collecting details on socio-demographic and other details of the neonates apart from details regarding outcome of the management among them.

Method of collection of data

After obtaining permission from the hospital authorities, all the records will be checked for details on outcome of the management and associated factors among the neonates and the relevant data will be noted for further analysis.

Statistical Analysis of data

The data will be entered into MS Excel and further analyzed using SPSS version 23. Descriptive statistics will be done by percentages and mean, inferential statistics done by tests of significance like Chi- square, t-test etc, where $p<0.05$ will be statistically significant.

Results

Total number of neonates included in the study was 200. All of them met the inclusion criteria.Out of 200 neonates males were 124 (62%) and 76(38%) were females resulting the ratio 1.6:1.

Among total 200 neonates,most common cause of admission was sepsis (33.3%) followed by birth asphyxia (24.8%),Neonatal hyperbilirubinemia (16.7%),Hypoglycemia (16.7%) and Respiratory Distress Syndrome (7.3%) and others(1.2%).Among these neonates the mortality rate was 3.5%.Total deaths were 7 in 200 cases.More deaths seen among babies with sepsis (4 cases),birth asphyxia(2 cases),respiratory

distress syndrome(1 case) and others (1 case). Mean length of hospital stay was 20.33+/-2.8 days and was seen more among babies with sepsis followed by birth asphyxia,respiratory distress syndrome.

Table 1. Patient Characteristics (n=200)		
Birth Weight(gm)	Number(n=200)	Percentage (%)
<1000 gm	4	2
1000-1500 gm	12	6
1500-2500 gm	32	16
>2500 gm	152	76

Regarding birth weight of the babies 152(76%) had birth weight more than 2500 grams ,32(16%) with birth weight between 1500-2500 grams ,12(6%) babies birth between 1000-1500grams ,4 (2%) had birth weight less than 1000grams. Altogether 24 % had Low birth weight.

Table 2. Neonates regarding length of stay (n=200)		
Age (in Days)	Number(n=200)	Percentage (%)
<1 day	16	8
1-3	46	23
4-7	96	48
8-28	42	21

Regarding the length of the stay, majority of the neonates stayed for 4-7 days were 96 (48%) followed by 46 (23%) stayed for 1-3 days ,42(21%) stayed for 8-28 days and rest of them stayed for<24hours were 16(8%).

Table 3: Neonatal outcome		
Neonatal Outcome	Numbers	Percentage
Sepsis	67	33.3
Asphyxia	49	24.8
Neonatal hyperbilirubinemia	34	16.7
Hypoglycemia	34	16.7
Respiratory Distress Syndrome	14	7.3
Others	2	1.2

Among total 200 neonates,most common cause of admission was sepsis (33.3%) followed by birth asphyxia (24.8%), Neo natal hyperbilirubinemia (16.7%),Hypoglycemia (16.7%) and Respiratory Distress Syndrome (7.3%) and others(1.2%).
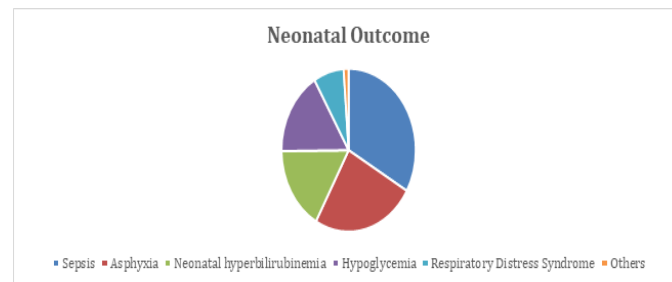
Graph 1:

Table 5: Showing outcome of the neonates who were admitted to NICU	
Outcome	N (%)
Discharged	139(65%)
Expired	7(35%)
Grand total	200(100%)

Discussion

In the present study total 200 new borns were admitted in tertiary centre, Kuppam during the period from May – June 2022. In the present study male to female ratio 1.6:1 and this is correlated with the other studies. Shakya et al[6] in KIST medical college, Lalitpur. Shrestha et al.[7]

This is in accordance with the results of prior research conducted by Shrestha SP and colleagues at the Chitwan Medical College and Teaching Hospital, where they discovered a male to female ratio of 1.83 to 1.13. In addition, Kanodia P. et al [8]research's from the BP Koirala Institute of Health Sciences in Dharan, Nepal, discovered that males were more likely to be affected.

In the present study Regarding birth weight of the babies 152(76%) had birth weight more than 2500 grams ,32(16%) with birth weight between 1500-2500 grams,12(6%) Babies birth between 1000-1500 ,4 (2%)

had birth weight less than 1000grams. Altogether 24 % had Low birth weight,this is correlated with the other studies.

Yudhvir Singh Kotwal et[9] study shows the average weight of the neonates when they were admitted was 2525.7 grams, which was comparable to the results of a study that was carried out by Nahar J, et al,[10] in which the average weight was 2420+/-808 gm. The findings of our research are comparable to those found in a study that was conducted in a similar manner by Hussain S [11].

Regarding the length of the stay, majorityof the neonates stayed for 4-7 days were 96 (48%) followed by 46 (23%) stayed for 1-3 days ,42(21%) stayed for 8-28days and rest of them stayed for < 24 hours were 16(8%). This is correlated with other studies Shresta et al studies shows that the fewest neonates (15.89%) were in the neonatal unit for less than 24 hours, while 55 (36.42%) babies remained there for four to seven days. A study that was carried out by Kanodia P et al at BPKIHS came to a comparable conclusion. This is owing to the fact that the majority of the instances were caused by infections, and neonates who needed their antibiotic doses finished in the hospital. The majority of patients were either referred elsewhere, passed away, or were put on LAMA, therefore the number of patients who stayed for less than 24 hours was at its lowest.

Among total 200 neonates,most common cause of admission was sepsis (33.3%) followed by birth asphyxia (24.8%),Neonatal hyperbilirubinemia (16.7%),Hypoglycemia (16.7%) and Respiratory Distress Syndrome (7.3%) and others(1.2%) and this is correlated with the other studies .Neonatal Hyperbilirubinemia much higher incidences (36.2-54%) have been reported in other studies.[12,13] Shrestha et al shows that,The pattern of neonatal admissions varies

from one location to another; nonetheless, a study of the literature found that premature birth, birth asphyxia, and neonatal infection are the most common causes of morbidity and mortality in newborns, the most common reason for hospital admissions was neonatal sepsis, which accounted for 91 (60.26%), followed by meconium aspiration syndrome, which accounted for 21, and preterm, which accounted for 10. A study that was carried out by Jan and colleagues revealed a significant incidence (41.3% of newborn sepsis), leading to the same conclusion as the previous one. In a study that was carried out by Shakya A et al., sepsis was found to be the leading cause of neonatal hospitalisation at 45.9%, followed by respiratory disorders at 14.7%, newborn jaundice at 12.5%, perinatal asphyxia at 9.3%, and preterm or small for Gestational Age (SGA) at 6.5%. This is due to the fact that neonatal sepsis can develop either during the intrauterine period, while the baby is being delivered, or after the baby has been delivered at the nursery itself. According to the findings of our research, premature birth was another significant reason for hospitalisation. Another study came to a conclusion that was comparable, with a result of 6.7%. This is due to the fact that preterm newborns actually need a great deal of focused attention and sophisticated care due to the inherent challenges and complications that they present.

Among these neonates the mortality rate was 3.5%. Total deaths were 7 in 200 cases.More deaths seen among babies with sepsis (4 cases),birth asphyxia(2 cases),respiratory distress syndrome(1 case) and others (1 case).Mean length of hospital stay was 20.33+/-2.8 days and was seen more among babies with sepsis followed by birth asphyxia,respiratory distress syndrome.This is correlated with other studies.Overall

mortality observed was 4.6% in a study by Kanodia P et al.and shresta et al.

The mortality rate of any neonatal intensive care unit is dependent on various factors in addition to the clinical condition of the newborn. These factors include the infrastructure of the unit, the amount of manpower available, and the number of qualified personnel on duty. As a result, the death rate estimates provided by the many research conducted in the various locations are highly inconsistent with one another.

The prevention of illness and mortality caused by premature birth will result in a sizeable reduction in the overall rates of morbidity and mortality. It has been discovered that excellent antenatal care, good obstetric practises, proper referral, enhancement of facilities for caring for preterm babies, as well as proper newborn care practises, can minimise morbidity and death from prematurity.

Conclusion

In this study, sepsis was the most common reason for admission to the neonatal ICU, followed by meconium aspiration syndrome. The majority of morbidities and, as a result, mortalities can be reduced by enhancing the antenatal care that is provided to pregnant women, implementing timely interventions, and promptly referring high-risk pregnancies to tertiary care institutions for delivery as soon as possible. Additionally, we ought to discuss the potential dangers of premature birth and having a low birth weight, in addition to the management of the issues that these conditions can cause. the majority of the admissions were made within the first twenty-four hours of the patient's existence. Therefore, in order to enhance the prognosis for neonates, the first important 24 hours should be addressed, and timely interventions should be performed, if necessary. In order to reduce morbidity and mortality as well as referrals, it is necessary to establish a centre that provides intensive care.

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