

Assessment Of Clinical Profile And Outcome Of Newborn Babies Admitted To The Hospital, A Level 2 Neonatal ICU: A Tertiary Care Centre At Northern India.

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Abstract:

Background: The neonatal period is the most vulnerable time for a child's survival. There is a high risk of mortality in their first month of life at a global rate of 18 deaths per 1,000 live births in 2017. 47% of deaths among children under five were newborns in 2017. In 2016, 1 million children died from preterm birth complications. The neonatal mortality rate in India is 28 per 1000 live birth and In 2020, the infant mortality rate in the state of Uttar Pradesh in India was 38 deaths per 1,000 live births. Infant mortality is measured by the number of deaths of children under one year of age per 1,000 live births.

Aims and Objectives: To assess the clinical profile and outcome of newborn babies admitted to the hospital, a level 2 neonatal ICU.

Materials and Methods: The present study is a retrospective descriptive study. The study was conducted at S.M.M.H. Government Medical College, Saharanpur, Uttar Pradesh, and F.H Medical College Agra, Uttar Pradesh, Bharat. The data was taken from the our hospital records over a period of one year May 2022 to April 2023 all newborn admitted during the study period were included. Data regarding the place of delivery, inborn delivery or out born, gender, gestational age, weight on admission, Indication for admission, mode of delivery, final diagnosis, duration of stay and treatment outcome were collected.

Results and Observations: Data regarding a total of 880 neonates were admitted to our hospital during the study period of one year between May 2022 to April 2023 was analyzed. Study showed the number of male babies was more than female babies. 79.6% of babies were term babies and 20.3% of babies were preterm among them 2.1% of babies were below 32 weeks. 61.8% of babies were more than 2500 gm, 36.3 %babies were in low birth weight, 1.7% were in very low birth weight and 0.2 % were in extremely low birth weight.

Conclusion: The present study showed high proportions of inborn infants (89.5%). There were more number of male infants admitted to our hospital. The commonest cause for admission was neonatal jaundice 31.5%.The incidence of LBW was 38.2 % higher than the national average. The percentage of preterm babies admitted was 20.6%. The mode of delivery by caesarean section was 46.2%.The incidence of Respiratory distress syndrome 15.6%, birth asphyxia 12.8%, Neonatal sepsis 7.42%, Meconium aspiration was6.6% and hypoglycaemia was 2.2% respectively. The mortality rate in our hospital was 0.9%. The referral rate was 13.5% in the present study

Key Words: Newborn, Neonatal, NICU, LBW, preterm babies, Neonate, Clinical profile, Outcome, Secondary-level neonatal intensive care unit.

Introduction:

Most term neonates can be managed at home under the guidance and supervision of mother or health-care professional. On the other hand, low birth weight and preterm neonates are fragile and vulnerable and they demand high level of skills and technology in a special care nursery or neonatal intensive care unit (NICU) for their intact survival. Apart from high mortality, many avoidable disabilities such as cerebral palsy, mental subnormality, learning disabilities, and recurrent seizures have their origin in perinatal period ^{1,2}. It is encouraging to note that neonates with a birth weight of 1 kg had a mortality of 95% in 1960 and now have 95% chances of survival. In India where a large number of deliveries are non-institutional, secondary- and communitylevel hospitals form important pillars of health-care delivery. The data from secondary-level newborn care units are sparse, and most of the data on neonatal mortality and morbidity are from

tertiary level care centers^{3,4,5}. The purpose of this study was to evaluate the performance of a secondary-level hospital and stress the importance of neonatal care at this level. The neonatal period is the most vulnerable time for a child’s survival. There is a high risk of mortality in their first month of life at a global rate of 18 deaths per 1,000 live births in 2017⁶. 47% of deaths among children under five were newborns in 2017⁶. In 2016, 1 million children died from preterm birth complications⁷. The neonatal mortality rate in India is 28 per 1000 live birth and in Karnataka it is 22 per 1000 live birth⁸. Our Hospitals special newborn care units were set up in district hospitals to provide level II neonatal intensive care in India to reduce the neonatal mortality. Our study hence was aimed to find out the common clinical conditions leading to newborn admission, and the new born outcome in our hospital.

Materials And Methods :

The hospital has a neonatal care unit attached to it that can be compared to a secondary-level NICU. At the time of study, it was a 25-bedded nursery cum NICU with 15 radiant warmers, 3 phototherapy units, 15 infant trolleys, 4 ventilators, and central oxygen supply. However, these ventilators were less often used due to lack of adequately trained personnel present round the clock. One consultant (pediatrician), one senior resident (MD/DCH Pediatrics), 4 junior residents (MBBS), 4 nurses, The present study is a retrospective descriptive study. The study was conducted at S.M.M.H. Government Medical College, Saharanpur, Uttar Pradesh, and F.H Medical College Agra, Uttar Pradesh, Bharat. The data was taken from the our hospital records over a period of one year May 2022 to April 2023 all newborn admitted during the study period were included. Data regarding the place of delivery, inborn delivery or out born, gender, gestational age, weight on admission, Indication for admission, mode of delivery, final diagnosis, duration of stay and treatment outcome were collected.

Definitions Used in Our Study

Term baby is defined as babies born 37- 42 weeks of gestational age. Preterm baby is defined as born before 37 weeks of pregnancy are completed.⁴ Low birth weight (LBW) is defined as birth weight of less than 2500 g (up to and including 2499 g), as per the World Health Organization (WHO).⁹ Low birth weight is further categorized into very low birth weight (VLBW, <1500g) and extremely low birth weight, (ELBW, <1000g) Meconium aspiration syndrome is diagnosed based on basis of history, clinical examination and chest X ray¹⁰. Birth Asphyxia was diagnosed APGAR <7 at 1mm⁵. Neonatal infections were diagnosed based on clinical findings together with necessary tests like sepsis screening, blood culture, chest X ray, and cerebrospinal fluid biochemical analysis and culture. Congenital malformations-These were diagnosed on clinical features and diagnostic facilities like Ultrasound, Echocardiography, X rays, and Electrocardiography (ECG). Neonatal jaundice-This was diagnosed based on serum bilirubin level and which was found to be high and in phototherapy zone or exchange transfusion zone as per the weight age and gestation specific range taking into the account risk factors as per AAP protocol 5 Primary disease was considered as final diagnosis even if the baby developed complications of primary disease or having more than one disease. Data was entered in Microsoft excel and analyzed.

Results and Observations:

Table 1: Showing data Inborn Versus out born admissions

	Number	%
Inborn	788	89.5
Outborn	92	10.5

There was high admission in inborn group as compared to out born group.

Table 2: Showing the admission classification based on gender, gestational age, maturity and birth weight.

		Number	%
Gender	Male	509	57.8
	Female	371	42.2
Gestational age	Less than 28 weeks	2	0.2
	28-32 weeks	16	1.9
	32-34 weeks	42	4.8
	34-37 weeks	120	13.7
	37 weeks and above	700	79.6
Maturity	Preterm	179	20.3

	Term	700	79.6
	Post term	1	0.1
Weight on admission	>2500gms	544	61.8
	1500-2499gms	319	36.3
	1000-1499gms	15	1.7
	<1000gms	2	0.2

Study showed the number of male babies were more than female babies. 79.6% of babies were term babies and 20.3% of babies were preterm among them 2.1% of babies were below 32 weeks. 61.8% of babies were more than 2500 gm, 36.3 %babies were in low birth weight, 1.7% were in very low birth weight and 0.2 % were in extremely low birth weight.

Table 3: Mode of delivery

	Number	%
Vaginal	464	52.8
LSCS	406	46.2

The percentage of normal delivery (52.8%) was higher than the LSCS delivery (46%),as in table 1 and figure 1.

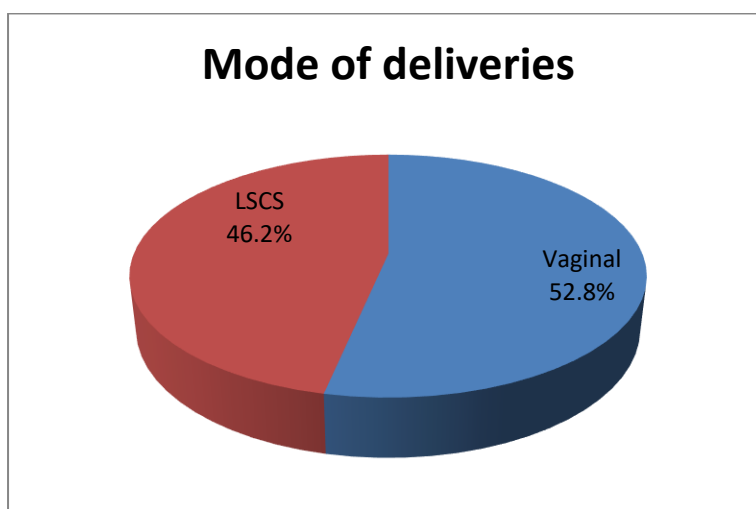


Figure 1: Mode of deliveries

Table 4: Final diagnosis

	Numbers	%
Neonatal convulsions	18	2
Environmental hyperthermia of newborn	65	7.4
Hypothermia	26	3
Hypoglycaemia	19	2.2
Neonatal jaundice	277	31.5
Other lbw	48	5.4
Preterm	66	7.5
Birth asphyxia	113	12.8
RDS	136	15.4
Transient tachypnea of newborn	11	1.2
Meconium aspiration syndrome	58	6.6
Neonatal sepsis	37	4.2
Others	20	2.2

The highest admissions were found due to neonatal jaundice (31.5%) followed by RDS (15.4%), Birth asphyxia (12.5%) and prematurity (7.5%) respectively

Table 5: Duration of stay in the hospital

Duration of stay in hospital(in days)	Number	%
<1	72	8.2
1-3	418	47.4
4-7	322	36.5
>7	68	7.6

The average duration of stay was highest in between 1 to 3 days 47.4 % babies.

Table 6: The outcome

	Number	%
Discharged	718	81.6
Left against medical advice	35	4
Referred	119	13.5
Expired	8	0.9

The above table shows 81.6% of babies admitted were discharged, 13.5 % were referred and 0.9 % of babies expired. Out of the 8 babies that expired.2 babies died due to RDS, 2 babies due to other causes, 1each due to extreme prematurity, extremely low birth weight, sepsis and major malformation (trachea-esophageal fistula), as showed in Table 6 and figure 2.

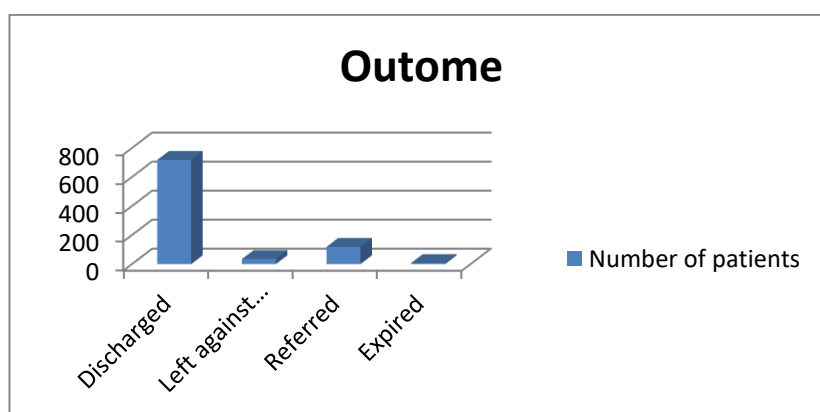


Figure 2- Outcome of admitted patients.

Discussion:

Previous studies done in India have diverse results with sepsis, perinatal asphyxia, prematurity and neonatal jaundice being the commonest causes of admission. This study was undertaken with the objective to determine the spectrum of neonatal diseases and its outcome in a level two Neonatal Intensive Care Unit (NICU) at a teaching hospital in India. Our study showed a high proportion of inborn admissions (89.5%). This may be due to the referred mothers from periphery with fetal compromise and also the geography of the district being situated in border of state and is being considered backward and all the outborn babies may not be referred to district hospital, may be sent to closer hospitals. Our study correlates with study of Shazia et al¹¹. who also had higher incidence of inborn admissions. Our study correlates with other studies where male babies predominate the admissions at our hospital ¹² The incidence of LBW in Asia as a whole is 19.7%. According to UNICEF LBW incidence in India is 28% and in our study it was 38.2% which was higher than the national statistics which may be because of the poor socio economic status and malnutrition among mothers. The overall rate of caesarean section delivery in 2015–16 is around 17.2% in India ¹³ and in our study it was found to be higher 46.2% because our hospital catered for referral from large area. 20.6% of babies in the present study were preterm, similar to the incidence reported by national neonatal perinatal database¹⁴ similar incidence is reported from other study by Hoque M et al.¹⁵ . In our study the most common cause of morbidity was due to neonatal jaundice, it was 31.5%. A similar incidence of 35% was also observed in a study by Simiyu¹⁶.The incidence of RDS was 15.4% were as in the study by shazia et al in similar settings was 20 percent . The National Neonatal Perinatal Database shows sepsis (36%) as the most common morbidity responsible for admission followed by prematurity (26.5%) and perinatal asphyxia (10%) . In the present study the incidence of birth asphyxia was 12.8 % similar to national neonatal perinatal database. Neonatal sepsis was the cause of morbidity in 19.27% of admitted neonates. Different hospital-based

studies have found the incidence of neonatal sepsis ranging from 17.7% to 70%^{17,18}. In the present study, we observed an incidence of 7.42% Neonatal sepsis admissions. Various other studies reported incidence ranging from 12.7% to 38.7%^{19,20}. Meconium aspiration Syndrome incidence in the present study was 6.6% lesser than the studies done by Gauchan et al and Swain et al in which the incidence of meconium aspiration syndrome was 8.4% and 8.5% respectively^{21,22}. The incidence of neonatal hypoglycaemia in the present study was 2.2% lower than studies done by Dias E et al and Jonas D et al who reported incidence of 17% and 11.7% respectively. But they considered a lower cut off blood glucose < 40mg/dl, in the present we considered <45 mg/dl^{23,24}. In this study we observed 0.9% mortality. The mortality in various other studies range from 1.4% to 20.5%^{11,25,26}. The lower mortality rate may be due to the early referral, which is showing as a 13.5% referral rate. High referral rate is due to lack of mechanical ventilation, laboratory support and infrastructure. The leading cause of admission into the neonatal care unit at our center was neonatal jaundice (31.5%), which was higher than other centres in India²⁷⁻²⁹. The probable cause of this is twofold. For one, what we have labelled as infection was inclusive not only of neonatal sepsis (suspected and culture proven, along with pneumonia and meningitis) but also of other forms of infections such as intrauterine infections and local infections.

Conclusion:

The present study showed high proportions of inborn infants (89.5%). There were more number of male infants admitted to our hospital. The commonest cause for admission was neonatal jaundice 31.5%. The incidence of LBW was 38.2% higher than the national average. The percentage of preterm babies admitted was 20.6%. The mode of delivery by caesarean section was 46.2%. The incidence of Respiratory distress syndrome 15.6%, birth asphyxia 12.8%, Neonatal sepsis 7.42%, Meconium aspiration was 6.6% and hypoglycaemia was 2.2% respectively. The mortality rate in our hospital was 0.9%. The referral rate was 13.5% in the present study

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