

Cause of Morbidity and Mortality in Neonates Admitted in Tertiary Care Center Almora Uttarakhand India

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Abstract:

To study the morbidity and mortality pattern of the newborns admitted in special care unit in a tertiary institution and analyse the measures which can be taken to reduce it. It was a Prospective observational study of all newborns admitted in neonatal intensive care unit which is located in the Almora Uttarakhand. The study was carried out over a period of 3 years from January 2022 to December 2024. The numbers of 1658 neonates were admitted to the neonatal intensive care unit (NICU) during this period.

The study comprised of all 1658 infants admitted to our tertiary level NICU from Jan 2022 to Dec 2024. Data of newborns admitted to the NICU were analysed retrospectively. Overall, the most prevalent indications for admission to NICU were Prematurity (20.80%) followed by Neonatal jaundice (19.84%), Respiratory distress syndrome (17%), Birth Asphyxia (16.28%). The overall mortality rate was 310 deaths (18.69%). Most common cause is prematurity with respiratory distress syndrome 117 (37.74%). This study identified prematurity, neonatal hyperbilirubinemia, and perinatal asphyxia, neonatal sepsis, as the major causes of the morbidity, Prematurity, RDS, Septicaemia, Perinatal asphyxia as the major contributors to the neonatal mortality. Mortality rate in the NICU still unacceptably high, these results highlight the fact that many causes of neonatal deaths may be preventable.

Keywords: Newborns, Neonatal Intensive Care Unit, Morbidity, Mortality rate.

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Introduction

Neonatal period is the most vulnerable period of life due to different diseases, which in most cases are preventable [1]. In India alone, of the 25 million babies who are born every year, one million die, accounting for 25% of the mortality around the world. According to the National Family Health Survey - 3 (NFHS-3) report, the current neonatal mortality rate (NMR) in India of 39 per 1,000 live births, accounts for nearly 77% of all the infant deaths (57/1000) and nearly half of the under-five child deaths (74/1000) [2]. Every minute seven newborn babies die worldwide (415 newborn babies every hour) [3]. Thirty-seven percent of under-five deaths occur in the neonatal period. Identifying and correcting factors that contribute to neonatal and maternal care are of the utmost importance [4]. In developing countries, death in the newborn period which is from 0 to 28-days, account for 50-70% of infant mortality [5]. In a report which was published in The Lancet, the major direct causes of the deaths were pre-term birth (27%), infection (26%),

asphyxia (23%), congenital anomalies (7%), others (7%), tetanus (7%) and diarrhoea (3%) [6]. There is only scanty data which is available regarding the neonatal morbidity and mortality patterns in the Indian neonatal intensive care units (NICU) and even if it was there, it would be available mainly from the tertiary care level 3 NICUs in the metropolitan cities [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 outcomes [8][9]. Transferring women at risk of very preterm birth to perinatal centres for delivery decreases the neonatal mortality rate considerably [10]. Infants born outside such centres (outborn infants) are at increased risk of developing many major neonatal complications and long-term neurodevelopmental disabilities possibly because of suboptimal resuscitation at birth or poor access to specialist support [11]. After birth, outborn

infants also may be compromised by the speed and efficiency with which eventual transfer to an appropriate tertiary centre is accomplished. In addition, the type of tertiary facility to which the infants are transferred may influence outcomes [12]. Considerable improvement in the survival of the newborn in advanced countries has been made but the morbidity and mortality are still high in developing countries [13]. In advanced countries, the main causes of morbidity and mortality in the neonatal period are unpreventable causes such as congenital abnormalities. But in developing countries preventable causes such as infections, birth asphyxia and prematurity predominate [14].

Materials and Method

This hospital based prospective study was carried out in the neonatal intensive care unit (NICU), Department of Paediatrics, at Soban Singh Jeena Government Institute of Medical Sciences and Research, Almora India over a period of 3 years from Jan 2022 to Dec 2025. Our hospital caters

mainly to hilly region patients. At present the NICU has 8 beds with ventilators, phototherapy units and facilities for exchange transfusion, multipara and apnea monitors. Use of surfactant and parenteral nutritional facility is provided whenever possible. Strict aseptic precautions are taken and septic and aseptic newborns are kept separately. All the admitted neonates were enrolled on a structured protocol, which included the data on antenatal care, maternal morbidity, mode and place of delivery, age, weight at admission, gestational age, diagnosis, relevant investigations, duration of stay and outcome.

Result

During the period of study, a total of 1658 neonates were admitted to the NICU 41.73% babies were inborn and 58.27% were out born. Most of the babies were admitted in early neonatal period i.e during first ten days of life 1418 (85.53%).

Table 1: Age at admission of new born

Age at admission (Days)	Number of new borns	Percentage (%)
0-10	1418	85.53
11-20	0156	09.40
21-30	0084	05.07
Total	1658	100.00

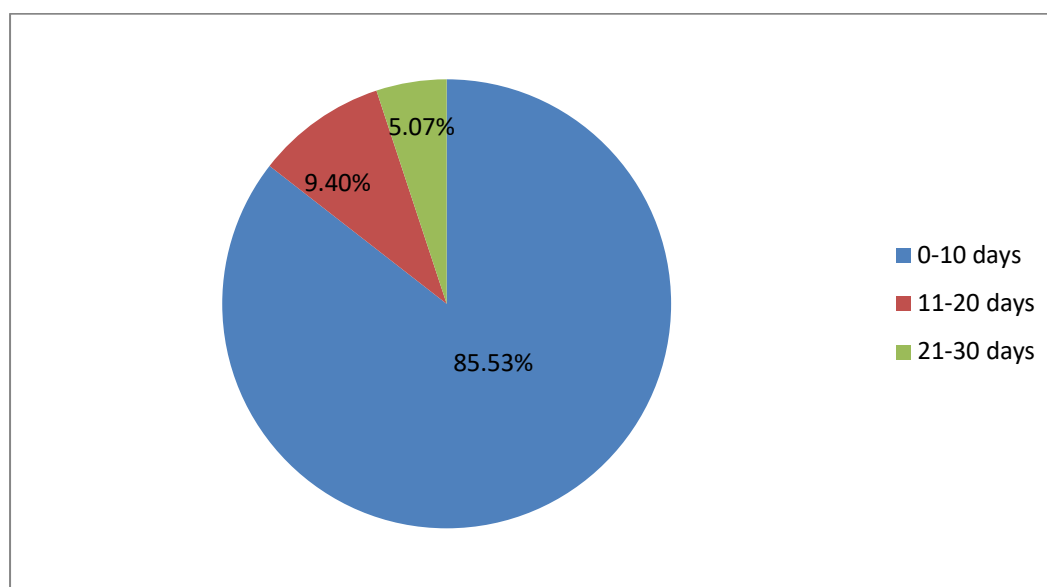


Figure 1: Graphical representation of percentage of new borns admitted in 0-30 days.

Table 2: Weight wise admissions and deaths

Weight	Number of new borns admitted	Percentage (%)	No. of deaths	Percentage
<1kg	38	02.29	24	7.74
1-1.5kg	325	19.62	102	32.90
1.6-2.0kg	298	17.97	69	22.26
2.1-2.5kg	427	25.75	54	17.42
>2.5kg	570	34.37	61	19.68
Total	1658	100.00	310	100.00

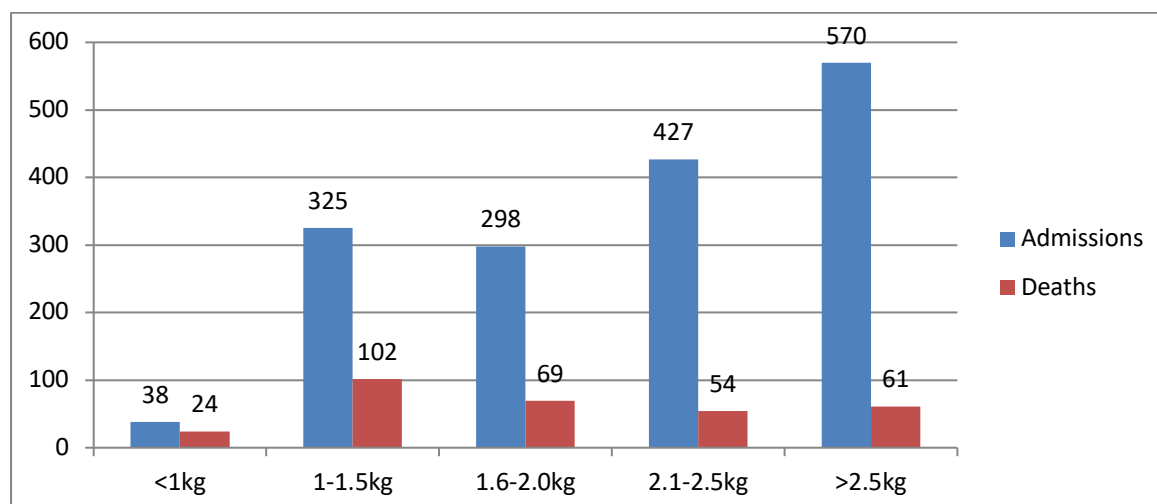


Figure 2: Graphic representation of number of new borns admitted & number of deaths

In our study group, 1088 babies (65.62%) had low birth weight less than 2.5 kg out of which 249 died (80.3% of total deaths).

Table 3: Morbidity profile

Morbidity Profile	In-born [I]	Out-born [O]	Total	Percentage
Prematurity with RDS	194	151	345	20.80
Neonatal jaundice	165	164	329	19.84
Respiratory distress syndrome	109	173	282	17.00
Birth Asphyxia	83	187	270	16.28
Meconium aspiration syndrome	70	121	191	11.52
Sepsis/ Pneumonia/ meningitis	61	105	166	10.02
Hypothermia	6	29	35	02.14
Hypoglycaemia	6	18	24	01.44
Major Congenital Malformation	5	11	16	00.96
Total	699(42.16%)	959(57.84%)	1658	100.00

The commonest indication for admission was prematurity with respiratory distress syndrome 345(20.80%) followed closely by neonatal jaundice

329 (19.84%), RDS 282 (17%), Birth asphyxia 270 (16.28%), Meconium Aspiration Syndrome 191 (11.52%), sepsis 166 (10.02%).

Table 4: Showing cause of death

Causes of death (Disease)	Number	Percentage
Prematurity with RDS	117	37.74
Septicaemia	52	16.78
Perinatal asphyxia	43	13.87
RDS	35	11.29
MAS	23	07.42
Neonatal seizure	11	03.54
Congenital anomalies	10	03.23
IUGR	08	02.58
Neonatal jaundice	07	02.26
Neonatal tetanus	04	01.29
Total	310	100.00

Of the 1658 neonates admitted, 310 of them died, giving a mortality rate of 18.69%. Of these deaths, Prematurity was the leading cause of death in our study. Most common causes of death were Prematurity with RDS 117(37.74%) followed by septicaemia 52(16.78%), birth asphyxia 43(13.87%), RDS 35(11.29%) while less common

cause were meconium aspiration syndrome (7.42%), neonatal seizure (3.54%), congenital anomalies (3.23%), IUGR (2.58%), neonatal jaundice mainly due to kernicterus (2.58%).

Discussion

In our study, 65.62% of the neonates were low birth weight (LBW). This may be due to the poor maternal health status, poor antenatal check-up and the poor socio-economic status of the families, because our hospital predominantly caters to the population of hilly region with very high degree of unemployment and poverty. Similar findings were reported in earlier studies from other developing countries with a poor socioeconomic status. In our study maximum admissions were due to prematurity with RDS (20.8%). According to the UNICEF "The State of the World's Children 2010" report, 28% neonates are born with low birth weight in India[15]. Study from Bangladesh, Admission due to prematurity to be as high as 60.7%. However the incidence of prematurity in our study was higher than the experience in Pakistan at 16.5% [16].

The other common causes of morbidity were neonatal jaundice(19.84%), respiratory distress syndrome (17%), birth asphyxia (16.28%), MAS (11.52%), neonatal sepsis (10.02%), with Hypothermia (2.14%), Hypoglycaemia (1.44%), Major Congenital Malformation (0.96%).

According to the National Neonatal Perinatal Database (2002-03), the incidence of neonatal sepsis in India was 30 per 1000 live-births. The database which comprised 18 tertiary care neonatal units across India, found sepsis to be one of the commonest causes of neonatal mortality, which contributed to 19% of all the neonatal deaths[17].

The mortality rate in our study is 18.69% which is almost similar but slightly lower than the experience in Pakistan[16] and in Tanzania at 19%. This is about the same experience in Calabar Nigeria where overall mortality was 19.3% [18]. It is slightly higher than the observation in the Sultanate of Omar[19] at 16.3% and at Vermont-Oxford Network in the United States of America at 17% [20].

This is because of inadequacies in the developing countries ranging from lack of manpower to poorly equipped hospitals and infrastructural development. Factors accounting for these differences may include a lack of adequate facilities at the out born centres, ineffective or inappropriate resuscitation and postnatal stabilization, and delay in therapies such as surfactant or artificial ventilation [21].

Conclusion:

The overall mortality in newborns in our setup was 18.69% of total admissions, out of which a larger percentage of admission and deaths were during the early neonatal period.

Sometimes due to increased demand of ventilators, many babies were deprived of ventilator support and moreover the treatment with surfactant and parenteral nutrition being costly is not afforded by many parents. The main causes of mortality and morbidity are preterm with RDS, birth asphyxia

which can be better managed with the use of surfactants, ventilators and parenteral nutrition. Deaths due to birth asphyxia can be decreased by better antenatal care, perinatal monitoring and hospital delivery. An increase in manpower can decrease the mortality by providing better nursing care. In spite of working in deprived conditions ie shortage of staff, equipment and medication our hospital has achieved a commendable survival rate in newborns.

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