

## Morbidity and Mortality profile of newborns admitted to the neonatal intensive care unit of a tertiary care hospital, Assam, India.

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### Abstract:

**Introduction:** Child health in a population has traditionally been assessed by monitoring two key rates- Infant mortality rate and neonatal mortality rate. There is lack of data in respect to morbidity and mortality pattern in NICU of the state of Assam. Hence, this study was undertaken to know the morbidity and mortality profile of newborns admitted in NICU of a tertiary care hospital.

**Methods:** This retrospective study was conducted in neonatal intensive care unit, Tezpur Medical College Hospital over a period of two years. All newborns who were admitted in neonatal intensive care unit during study period were included in the study. Newborns admitted in pediatrics ward were excluded. Data of the newborns were collected from medical record file and monthly reporting format.

**Result:** In this study, out of 2042 newborns admitted in NICU, 65.8% were inborn babies and 34.2% were out born babies. Low birth weight babies were more (51.9%) than normal birth weight babies. The common morbidities were neonatal jaundice (30.06%), birth asphyxia (26.2%) and sepsis (10.8%) respectively. Birth asphyxia cases were seen more in outborn unit (30.5%). The mortality rate were 9.07% in inborn unit and 11.9% in outborn unit. The overall mortality rate was 10.03%. The commonest cause of mortality was birth asphyxia (43.9%) followed by RDS (19.02%) and sepsis (14.6%) respectively. Out of total deaths, 57.6% babies were low birth weight.

**Conclusion:** Birth asphyxia, low birth weight and sepsis are the leading causes of neonatal mortality. This neonatal mortality can be brought down by providing adequate antenatal care, improving maternal nutritional status, close monitoring of fetal wellbeing in pregnancy, timely intervention of delivery, good neonatal resuscitation care and early referral of sick newborns to neonatal intensive care unit.

**Keywords:** neonatal morbidity, neonatal mortality, NICU, birth asphyxia, low birth weight, sepsis.

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### I. Introduction

Child health in a population has traditionally been assessed by monitoring two key rates- Infant mortality rate and neonatal mortality rate. Each year there are an estimated 26 lakhs babies die worldwide within 28 days of birth. Approximately 7000 neonatal deaths occur every day. [2] The first 28 days of life is the most vulnerable time for a child survival. Most of the neonatal deaths occur in the 1st week of life. As per UNICEF data, March, 2018, global neonatal mortality rate is 18 deaths/ 1000 live birth. Neonatal mortality declined globally in all countries over years but more slowly. Globally, neonatal mortality rate fell by 51 percent from 37 deaths / 1000 live birth in 1990 to 18 deaths/1000 live births in 2017. But, UNICEF observed marked disparities in NMR in different countries, highest among sub African and south Asian countries. A child born in south Asian countries, the risk of dying in neonatal period is more. Neonatal mortality rate (NMR) is highest in Afghanistan, Somalia, Pakistan etc and lowest in Japan, Iceland, Singapore and Finland [3]. Each year there is an estimated 6.4 lakh neonatal deaths occur in India. [2] The current neonatal mortality rate (NMR) in India is 28 / 1000 live births. In India, there are disparities of NMR among the states. Kerala and Goa have low neonatal mortality rate 10 / 1000 live births while Madhya Pradesh, Uttar Pradesh, Bihar and Rajasthan having very high NMR and accounts for 57% of India's total neonatal deaths. [2] The current NMR of Assam is 29 / 1000 live births which is similar to the national neonatal mortality rate. The major causes of neonatal mortality in India are prematurity (35%), neonatal infection (33%), intrapartum related complication birth asphyxia (20%) and congenital malformation (9%). [4]. The causes of neonatal mortality are different in various neonatal intensive

care unit in our country. There is decreasing trend of NMR in our country. This decreasing trend of NMR and better outcome of the survivors is due to advanced neonatal care facilities. There is little data available in respect to morbidity and mortality pattern of the newborns in various neonatal intensive care unit in the state of Assam .It is important to know the morbidity and mortality profile in neonatal intensive care unit because knowledges about spectrum of neonatal diseases and proper management will lead to better outcome of babies. This will help in formulating future health policies for further decrease in neonatal mortality in the state.

## II. Aim Of The Study

To study the morbidity and mortality profile of newborns admitted in neonatal intensive care unit of a tertiary care hospital.

## III. Material And Methods

This retrospective study was conducted in neonatal intensive care unit (NICU) of Tezpur Medical College and Hospital, Assam over a period of two years, from 1st April 2016 to 31st March 2018. Tezpur Medical College and Hospital is a tertiary care hospital located in the middle part of the state of Assam. The NICU having facility of advanced respiratory support- mechanical ventilation, CPAP, phototherapy unit, surfactant therapy and exchange transfusion facility. This hospital mainly caters health care services to people in the rural areas of Assam .viz 5 to 6 districts namely Sonitpur, Darrang, North Lakhimpur, Odalguri and part of Nagaon districts. Newborn babies who need special care are referred to this hospital from these neighbouring districts. All newborns admitted in neonatal intensive care unit both in inborn and outborn units were included in the present study. Inclusion criteria: All newborns who were admitted in neonatal intensive care unit. Exclusion criteria: Newborns admitted in pediatrics ward were excluded from the study. We collected the bed head tickets (medical record files) of all newborns from medical record department of the hospital after taking permission from the concerned hospital authority. All the medical files were evaluated thoroughly. Data was collected from these medical files and the monthly report format files maintained by our NICU data entry assistant. Data was analysed and interpreted accordingly.

## IV. Results

In the study period, total of 2042 newborn babies were admitted in the NICU of which 1344(65.8%) were admitted in the Inborn Unit and 698 ( 34.2% ) were admitted in the Outborn Unit as shown in Table1.

	Inborn unit	Outborn unit	Total admission
Admission	1344	698	2042
Percentage	65.8%	34.2%	100%

**Table 1:** Admission of newborn babies in inborn and outborn unit , NICU.

Sex	No. of Newborns	Percentage
Male	1173	57.4%
Female	869	42.5%

**Table 2:** Distribution of babies according to Sex.

In this study, out of 2042 newborns , 1173 (57.4%) were male and 869 (42.5%) were female babies . The male to female ratio is 1.35 : 1.

Gestation	No. of Newborn babies	Percentage
Term	1186	58.1%
Preterm	856	41.9%

**Table 3:** Distribution of babies according to gestation .

In our study, 1186 (58.1%) were term and 856 (41.9%) were preterm babies.

Birth wt.	Inborn(n=1344)	Outborn(n=698)	Total(n=2042)	Percentage
>2.5 Kg	658	326	984	48.1%
1.5 to 2.49 Kg	564	284	848	41.5%
1Kg to 1.49Kg	105	83	188	9.2%
<1Kg	17	5	22	1.07%

**Table:4:** Distribution of the babies according to birth weight.

Table 4 shows that : In the study period, overall 48.1% babies were normal birth weight above 2.5Kg, 41.5% were low birth wt (1.5 to 2.49Kg), 9 .2% were very low birth wt ( 1 to 1.49 Kg) and 1.07 % were extremely low birth weight (below 1Kg) babies.

Morbidity profile	Inborn (n=1344)	Outborn(n=698)	Total(n= 2042)
RDS	69 (5.13%)	35 (5%)	104 (5.09%)
MAS	74 (5.5%)	40 (5.7%)	114 (5.6%)
Other cause of RDS	72 (5.3%)	32 (4.5%)	104 (5.09%)
HIE/Birth Asphyxia	322 (23.9%)	213 (30.5%)	535 (26.2%)
Sepsis	143 (10.6%)	76 (10.8%)	219 (10.8%)
Jaundice	430 (31.9%)	184 (26.3%)	614(30.06%)
Congenital anomalies	22 (1.6%)	9 (1.2%)	31 (1.5%)
Hypothermia	0	12 (1.7%)	12 (0.6%)
Hypoglycemia	11 (0.8%)	14 (2%)	25 (1.2%)
Others	201 (14.9%)	83 (11.9%)	284 (13.9%)

**Table:5:** Showing the Morbidity profile of the admitted babies in NICU.

In this study, the morbidity pattern are as follows. In inborn unit, Jaundice requiring phototherapy / exchange transfusion was the commonest cause of admission(31.9%) followed by birth asphyxia (23.9%) and sepsis (10.6%) respectively whereas in the outborn unit, birth asphyxia was the commonest cause requiring admission(30.5%), followed by neonatal jaundice (26.3%), and sepsis (10.8%).

Outcome	Inborn (n=1344)	Outborn (n=698)	Total (n=2042)
Discharge	1048 (77.9%)	503 (72.06%)	1551(75.9%)
Referral	88 (6.5%)	84 (12.03%)	172 (8.4%)
LAMA	86 (6.3%)	28 (4.01%)	114(5.6%)
Death	122 (9.07%)	83 (11.9%)	205 (10.03%)

**Table:6:** Showing outcome of the admitted babies.

In this study, outcome of the admitted babies were as follows: In Inborn unit, out of 1344 babies 1048 (77.9%) were successfully discharged, 6.3% were left against medical advice and 6.5% babies were referred to Gauhati Medical College Hospital ,(GMCH) Guwahati. The inborn mortality was 9.07%. In outborn unit, 72.06% babies were discharged, 4.01% were left against medical advice , 12.03% were referred to GMCH.and the outborn mortality was 11.9%. The overall mortality in NICU was 10.03%.

Cause of death	Inborn (n=122)	Outborn (n=83)	Total death (n=205)
RDS	25 (20.4%)	14 (16.9%)	39 (19.02%)
MAS	4 (3.2%)	4 (4.8%)	8 (3.9%)
HIE/Birth Asphyxia	53 (43.4%)	37 (44.6%)	90 (43.9%)
Sepsis	14 (11.5%)	16 (19.3%)	30 (14.6%)
Congenital anomalies	2 (1.6%)	1 (1.2 %)	3 (1.5%)
Prematurity	15 (12.2%)	8 (9.6 %)	23 (11.2%)
Others	8 (6.5%)	3 (3.6%)	11 (5.4%)

**Table : 7:** Showing causes of mortality in the NICU.

In the Inborn unit, the causes of mortality were birth asphyxia 43.4%, RDS (20.4%) , Prematurity (12.2%) and sepsis (11.5%) respectively. In the outborn unit, the commonest cause of death was birth asphyxia (44.6%), followed by sepsis (19.3%), RDS (16.9%) and prematurity (9.6%) respectively.

Birth weight	Inborn (n=122)	Outborn (n=83)	Total (n=205)
>2.5Kg	51 (41.8%)	36 (43.4%)	87 (42.4%)
1.5 to 2.49 Kg	57 (46.7%)	39 (46.9%)	96 (46.8%)
1 Kg to 1.49Kg	12 (9.8%)	7 (8.4%)	19 (9.2%)
< 1Kg	2 (1.6%)	1 (1.4%)	3 (1.5%)

**Table:8:** Showing distribution of death babies according to birth weight

In the present study, as shown in Table 8, out of total deaths ( n=205 ) , 42.4% babies were normal birth weight above 2.5Kg , 46.8% were low birth wt, 9.2% very low birth wt and 1.5% babies were extremely low birth wt.

Gestation	Inborn (n=122)	Outborn (n=83)	Total (n=205)
Term	52 (42.6%)	39 (46.9%)	91 (44.4%)
Preterm	70(57.3%)	44 (53.1%)	114 (55.6%)

**Table:9:** Showing distribution of death babies according to gestation.

In the study, Table 9 shows that out of total deaths (n=205), 44.4% babies were Term and 55.6% were Preterm babies.

## V. Discussion

The present study comprises of total 2042 newborns, in which 1344(65.8%) were in Inborn unit and 698 (34.2%) were in Outborn unit. Out of total 2042 babies, 1173 (57.4%) were male and 869 (42.5%) were females which is similar to study done by Mani kant, Thakur S et al [5] and Nath Roy R et al [6]. It could be explained probably due to social bias, male being more cared for and the biological fragility of male to infection. In this study, 1186 (58.1%) babies were term and 856 (41.9%) were preterm babies. Overall 51.9% babies were low birth weight which are comparable to various studies conducted by many authors time to time in different states of our country, like Mani Kant et al [5] and Veena Prasad et al [7]. This may be explained by poor antenatal checkup, poor literacy rate and poor socioeconomic status of the families in the rural areas as our hospital caters mainly this section of people.

The common morbidity observed in NICU were neonatal jaundice (30.06%), followed by birth asphyxia (26.2%), neonatal sepsis (10.8%) and MAS (5.6%) respectively. Birth asphyxia cases were higher (30.5%) in outborn unit in comparison to inborn unit (23.9%). This observations are similar to other studies conducted in different neonatal intensive care units in India, like Mani kant et al [5], Nath Roy R et al [6] and Chandra et al.[8]. The higher incidence of birth asphyxia observed in outborn unit may be due to poor antenatal care, lack of proper monitoring of fetal wellbeing in the rural hospital, delayed referral of high risk pregnancy, lack of timely intervention of delivery and inadequate resuscitation care are the contributing factors. Again, neonatal jaundice was the commonest morbidity requiring admission for phototherapy or exchange transfusion due to referred cases from the peripheries as there is lack of facility of newborn care in rural primary health centre.

In inborn unit, out of 1344 babies 1048 (77.9%) were successfully discharged and inborn mortality was 9.07%. In outborn unit, 72.06% babies were discharged and the outborn mortality was 11.9%. The overall mortality in NICU was 10.03% which is almost similar with the study conducted by Mani kant et al [5]. The out born mortality was higher may be related with poor obstetric care at peripheral health centre, poor neonatal resuscitation care, poor neonatal transport system and delayed referral of sick newborns to NICU.

In the present study, the common causes of mortality was birth asphyxia (43.9%), followed by RDS (19.02%) and sepsis (14.6%) respectively. Birth asphyxia with HIE was the leading cause of mortality in NICU observed by many authors in their studies. Like Mani kant et al [5] and Chandra et al.[8]. Again, this is related to inadequate antenatal and natal care, poor resuscitation care etc. It was also observed that among the death babies most of the babies were low birth weight (57.6%). This observations were similar with the findings of Mani kant et al[5] and Kumar M et al [9]. The higher incidence of low birth weight and prematurity most probably due to poor nutritional status of pregnant women in rural area, early marriage and teenage pregnancy, poor obstetric care etc.

## VI. Conclusion

This study showed that neonatal jaundice, birth asphyxia, neonatal sepsis and low birth weight are the common causes of neonatal morbidity in NICU. Birth asphyxia, low birth weight and sepsis are the leading causes of neonatal mortality. This neonatal mortality can be brought down by providing adequate antenatal care, improving maternal nutritional status, close monitoring of fetal wellbeing in high risk pregnancy, timely intervention of delivery, good neonatal resuscitation care, timely referral and quality newborn care in the neonatal intensive care unit.

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Conflict of interest: None

Limitation of the Study : This study was a retrospective study, hence the morbidity and mortality data were dependent of the extent of data available in the case record file and monthly reports. Further, as the study is hospital based study, so the results inferred from the study was not the true reflection of the burden of the community.

## References:

- [1]. Lawn JE, Cousens S, Zupan J; Lancet: Neonatal Survival Steering Team: 4 million deaths: When? Where? Why? : The Lancet ,5 March 2005; 365:891-900.
- [2]. UNICEF data:2018 : [www.data.unicef.org](http://www.data.unicef.org)
- [3]. UNICEF Global databases; child mortality estimates, country specific neonatal mortality rate; Estimates generated by the UN Inter-agency group for child mortality estimation (UNIGME) in 2018; [www.data.unicef.org](http://www.data.unicef.org)
- [4]. Source: Neonatal Health- Unicef India; [www.unicef.in](http://www.unicef.in)

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- [5]. Mani Kant Kumar, Thakur S, Singh B : Study of morbidity and the mortality pattern in the neonatal intensive care unit at a tertiary care teaching hospital in Rohtas district, Bihar, India: Journal of clinical and Diagnostic Research,2012, April 6(2): 282-5
- [6]. Nath Roy R et al : The mortality pattern of hospitalized children in a tertiary care hospital of Kolkata: Indian journal of community medicine 2008; 33 (3): 187-89.
- [7]. Prasad V, Singh N: Causes of morbidity and mortality in the neonate admitted in Government Medical College,Haldwani in kumaun region , Uttarakhand, India: Journal of pharmaceutical and biomedical science, 2011; 8(8): 1-4.
- [8]. Chandra S,Ramji S, Thirpuram S : Perinatal asphyxia: multivariate analysis of the risk factors in hospital births: Indian J. Pediatrics, 1997;34:206-12
- [9]. Kumar M et al: The neonatal outcome at a sub district hospital in north India: J, Tropical Peditrics2002;48:43-48

Dr. Dulal Kalita. "Morbidity and Mortality profile of newborns admitted to the neonatal intensive care unit of a tertiary care hospital, Assam, India." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 8, 2019, pp 58-62.