



Morbidity and mortality profile of neonates admitted in special newborn care unit of a tertiary care hospital in the Sub-Himalayan region

Nilay Ranjan Bagchi¹, Goutam Das¹, Aritra Guha^{1*}

¹Department of Pediatrics, North Bengal Medical College, Darjeeling, West Bengal, India

Department of Pediatrics, North Bengal Medical College, Darjeeling, West Bengal, India

*Corresponding author: Dr. Aritra Guha

Date of Submission: 25-09-2020

Date of Acceptance: 5-10-2020

ABSTRACT: Background: The neonatal period accounts for very high morbidities and mortalities across all over India. Neonatal mortality statistics are sensitive indicators of the availability, utilization, and effectiveness of maternal child health service in the community. Our study therefore, was done to see the morbidity and mortality pattern of neonates at the Special Newborn Care Unit (SNCU) of tertiary care hospital in the Sub Himalayan region and also the modifications that can lead to better outcomes.

Methods: This was a retrospective record-based study which reviewed the admissions in to the SNCU of tertiary care centre in the Sub Himalayan region of North Bengal for a period of 2 years (1st January 2018 to 31st December 2019) with neonates admitted before 28 days of life. Data of the admitted babies were collected by analysing the case sheets from the records section of the hospital and the centralised SNCU online software database. Data collected in pre-designed proforma. Descriptive study analysis was done.

Results: Out of the total of 4762 inborn and 4397 outborn neonates during the study period male and female babies were 53% (inborn), 63% (outborn) and 46% (inborn), 37% (outborn) respectively. Jaundice requiring phototherapy comprised of maximum percentage of cases followed by HIE/moderate-severe birth asphyxias comprised of 10.7% cases respectively. In comparison others (28.2%), jaundice requiring phototherapy (20.7%) and HIE/moderate-severe birth asphyxias (17.5%) formed the majority of the outborn babies. Majority inborns (86.8%) and outborns (68.4%) were discharged while 9.4% inborns and 19.5% outborns expired. HIE/moderate-severe birth asphyxia (41.2%) was the major cause of death in inborns

but in outborns the most common cause of death were sepsis/pneumonia/meningitis (34.8%).

Conclusions: Our study is the first of its kind depicting the morbidity and mortality patterns of neonates at a SNCU in a tertiary care hospital in the Sub Himalayan region. Outcome analysis showed that SNCU mortality rate for outborn babies was higher than in relevant recent studies.

Keywords: Morbidity, Neonatal mortality, Birth asphyxia, Prematurity

I. INTRODUCTION

The neonatal period accounts for very high morbidities and mortalities across all over India. An estimated 130 million neonates are born each year, 4 million of these die in first 28 days of their life.¹ The neonatal mortality rate (NMR) in India has decreased from 38.0 deaths (34.2–41.6) in 2000 to 23.5 deaths (20.1–27.8) per 1000 live births in 2017.² This can be attributed to the umbrella of NRHM immediate care that is being given to the newborn at different health facilities through Newborn Care Corners (NBCCs), Newborn Stabilization Units (NBSUs) and Special Care Newborn Units (SCNUs). Neonatal mortality statistics are sensitive indicators of the availability, utilization, and effectiveness of maternal child health service in the community.³ However despite the efforts, neonatal mortality in India continues to be quite high still and we are still quite far away from our NMR goal in keeping with the Sustainable Development Goal 2030. In view of the significance of SNCU and its role in reducing neonatal deaths, it is imperative to find out missing links in order to provide a more structured and better care. Sick neonates from multiple districts of West Bengal, Assam, Bihar, Sikkim including adjacent countries of Bangladesh and Nepal depend on our tertiary medical college situated in the Sub-



Himalayan region of West Bengal, India. On this backdrop, a study on the morbidity and mortality profile of neonates in this SNCU has been taken up with the objective to understand the patterns of neonatal mortality in the existing infrastructure.

II. METHODS

This was a retrospective record-based study which reviewed the admissions in to the SNCU of tertiary care centre in the Sub Himalayan region of North Bengal for a period of 2 years (1st January 2018 to 31st December 2019).

Inclusion criteria included: All neonates admitted before 28 days of life. Data of the admitted babies were collected by analysing the case sheets from the records section of the hospital and the centralised SNCU online software database. The data was collected as inborn or outborn, sex, gestational age, birth weight, age at presentation, indications for admission, duration of stay, and outcome. The Primary disease was considered to be the final diagnosis and WHO definitions were used for Term, Preterm, Low Birth Weight (LBW), Very Low Birth Weight (VLBW), Extreme Low Birth Weight (ELBW) and congenital malformation. Data were collected by the Pediatric residents working in the SNCU under the supervision of the faculty. Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Data was thereafter summarized by routine descriptive statistics, namely mean and standard deviation for numerical variables and counts and percentages for categorical variables. Ethical permission has been sought from the institutional ethics committee.

III. RESULTS

A total of 4762 inborn and 4397 outborn neonates were admitted to the SNCU during this period with male and female babies being 53% (inborn), 63% (outborn) and 46% (inborn), 37% (outborn) respectively. A detailed demographic profile is shown in Figure 1. Majority of the babies were more than 2500gm (63.4% inborn, 50.7% outborn), while 49.3% of the outborn babies were low birth weight compared to 36.6% inborns. Diagnosis included respiratory distress syndrome, meconium aspiration syndrome, HIE/moderate-severe birth asphyxia, sepsis/pneumonia/meningitis, major congenital malformation, jaundice requiring phototherapy, hypothermia, hypoglycemia & others. Jaundice requiring phototherapy comprised of maximum percentage of cases 64.8%, followed by others (14.3%) and HIE/moderate-severe birth asphyxias comprised of 10.7% cases respectively depicted in

Fig 1. In comparison others (28.2%), jaundice requiring phototherapy (20.7%) and HIE/moderate-severe birth asphyxias (17.5%) formed the majority of the outborn babies that were admitted. The duration of stay in SNCU varied as 4.6% (Inborn), 9% (outborn) stayed for less than 1 day in SNCU, while 69.7% (inborn), 44.9% (outborn) stayed for 1-3 days, and 7.5% (inborn) and 18.1% (outborn) stayed for more than 7 days. Majority inborns (86.8%) and outborns (68.4%) were discharged while 9.4% inborns and 19.5% outborns expired. HIE/moderate-severe birth asphyxia (41.2%) was the major cause of death in inborns but in outborns the most common cause of death were sepsis/pneumonia/meningitis (34.8%). The mortality profile is illustrated in Fig 2. A demographic profile of the newborn deaths has been depicted in Table 2. Majority of the deaths were in preterms - 62.4% inborns and 51.4% outborns. In both inborn and outborn babies maximum deaths occurred within 1-3 days of admission and the majority of the neonates were within 1-6 days of age.

IV. DISCUSSION

Our study is the first of its kind from the Sub Himalayan region. Our tertiary care hospital caters to a population spanning across the North Eastern states and even countries like Nepal, Bangladesh and Bhutan.

In a study conducted by Dr. Komal Uppal et al in the SNCU of the District Hospital, Nalgonda, the authors studied a total of 958 neonates. They showed that prematurity was the most common morbidity 33.61% in the admitted neonates. The mortality rate shown in their study was 5.53% and the major contributors to the neonatal mortality were RDS (47.16%), prematurity (16.98%), and birth asphyxia (11.32%).⁴

Another study from Sambalpur, Odisha conducted by Ashish Kumar Mishra et al also found the majority of morbidity were of prematurity (44%) followed by birth asphyxia (38.4%) and infections (35.2%) and in their study the leading cause of death was infection.⁵

Rakesh Kumar et al in his study titled "Morbidity and mortality profile of neonates admitted in special newborn care unit of a teaching hospital in Uttarakhand, India" also showed major causes of admission were jaundice (24.72%), sepsis (20.48%), birth asphyxia (18.52%), meconium aspiration syndrome (10.11%). Birth asphyxia was the major cause of mortality,

followed by sepsis and prematurity. Mortality was more in outborn babies 14.67%



compared to inborn babies 9.80%.⁶ According to ICMR reports, sepsis (32.8%) is the major cause for neonatal mortality followed by birth asphyxia (22.3%) and prematurity (16.8%).⁷ Even foreign studies show that proportion of facility-based neonatal mortality was 20% (95% CI:16.7–23.8%), where the causes of death were primarily due to complications of preterm birth (28.58%), birth asphyxia (22.45%), neonatal infection (18.36%), meconium aspiration syndrome (9.18%), respiratory distress syndrome (7.14%), and congenital malformation (4.08%).⁸ The disease profile for morbidity remained more or less same worldwide.^{9,10}

We found that the major causes of morbidity in our study jaundice requiring phototherapy in inborn babies whereas in outborn babies miscellaneous causes formed the majority followed by jaundice and birth asphyxia. Mortality in inborns was 9.4% that corroborated with the study by Rakesh Kumar et al⁶, but outborn were higher in comparison.

Limitations of our study include that we were not able to follow up all the babies after discharge regarding their long term morbidity.

Our study is the first of its kind depicting the morbidity and mortality patterns of the disease at a SNCU in a tertiary care hospital in the Sub Himalayan region. The demographic profile of our patients showed that although age, sex, and duration of SNCU stay follow the general pattern of SNCU patients nationwide, also there are not much differences in the disease patterns. Birth asphyxia and HIE contributed to a major portion of mortality probably suggesting to a need for availability of better resuscitation facilities at the time of delivery or judiciously timed Caesarean sections. Outcome analysis showed that SNCU mortality rate was higher than in relevant recent studies. Thus emphasising on the importance timely referral and the need more such set ups in the region.

V. ACKNOWLEDGEMENTS

The authors acknowledge the help of The Head of the Department, Department of Pediatrics, North Bengal Medical College Hospital, Darjeeling, West Bengal, India and The Medical Superintendent Cum Vice-Principal, North Bengal Medical College Hospital, Darjeeling, West Bengal, India

DECLARATIONS

Funding: No funding sources

Conflict of interest: None declare

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES:

- [1]. Saini N, Chhabra S, Chhabra S, et al. Pattern of neonatal morbidity and mortality: A prospective study in a District Hospital in Urban India. *J Clin Neonatol* 2016;5:183-8.
- [2]. Kumar P, Singhal N. Mapping neonatal and under-5 mortality in India. *The Lancet*. 2020;395(10237):1591–3.
- [3]. Ugwu GI. Pattern of morbidity and mortality in the newborn special care unit in a tertiary institution in the Niger Delta region of Nigeria: A two year prospective study. *Glob Adv Res J Med MedSci* 2012; 1:133-8.
- [4]. Uppal K, Ashwani N, Jeelani K et.al. Profile of neonatal mortality in SNCU district hospital. *Galore International Journal of Health Sciences & Research*. 2019; 4(1): 6-8
- [5]. Mishra AK, Panda SC. Status of neonatal death in sick newborn care unit of a tertiary care hospital. *Int J Contemp Pediatr* 2017;4:1638-43.
- [6]. Kumar R, Mundhra R, Jain A, et al. Morbidity and mortality profile of neonates admitted in special newborn care unit of a teaching hospital in Uttarakhand, India. *Int J Res Med Sci* 2019;7:241-6.
- [7]. ICMR Young Infant Study Group. Age profile of neonatal deaths. *Indian Pediatr* 2008;45:991-4.
- [8]. Desalew A, Sintayehu Y, Teferi N, et al. Cause and predictors of neonatal mortality among neonates admitted to neonatal intensive care units of public hospitals in eastern Ethiopia: a facility-based prospective follow-up study. *BMC Pediatrics*. 2020;20(1).
- [9]. Shah GS, Yadav S, Thapa ASL. Clinical profile and outcome of neonates admitted to neonatal intensive care unit (NICU) at a tertiary Care Centre in Eastern Nepal. *J Nepal Paediatr Soc*. 2013;4(3):1511–6.
- [10]. Miles M, Dung KTK, Ha LT, et al. The cause-specific morbidity and mortality, and referral patterns of all neonates admitted to a tertiary referral hospital in the northern provinces of Vietnam over a one year period. *PLoS One*. 2017;12(3):1–12.



Table 1. Demographic Profile of Neonates admitted in the SNCU

	INBORN		OUTBORN	
	Number	Percentage	Number	Percentage
Total Admission in the Unit	4762		4397	
Male	2582	54.2	2768	63.0
Female	2180	45.8	1629	37.0
Birth Weight				
>= 2500 gm	3019	63.4	2228	50.7
1500-2499 gm	1351	28.4	1627	37.0
1000-1499 gm	311	6.5	440	10.0
< 1000 gm	81	1.7	102	2.3
Gestation				
> 37 weeks	3533	74.2	2385	54.2
34- 37 weeks	553	11.6	954	21.7
< 34 weeks	676	14.2	1058	24.1
Morbidity Profile				
Respiratory Distress syndrome	194	4.1	656	14.9
Meconium aspiration syndrome	30	0.6	43	1.0
Other causes of respiratory distress	7	0.1	2	0.0
HIE/Moderate-Severe Birth Asphyxia	511	10.7	769	17.5
Sepsis/Pneumonia/Meningitis	158	3.3	501	11.4
Major Congenital Malformation	75	1.6	227	5.2
Jaundice requiring phototherapy	3087	64.8	911	20.7
Hypothermia	10	0.2	21	0.5
Hypoglycemia	11	0.2	27	0.6
Others	679	14.3	1240	28.2
Outcome				
Discharge	4132	86.8	3007	68.4
Referral	15	0.3	89	2.0
LAMA	168	3.5	445	10.1
Died	447	9.4	856	19.5
Duration of Stay				
< 1 day	220	4.6	397	9.0
1-3 days	3320	69.7	1976	44.9
4-7 days	863	18.1	1228	27.9
> 7 days	359	7.5	796	18.1
Average Duration of Stay	3.19		4.83	



Table 2. Demographic and mortality profile of the newborn deaths

	In-born [I_D]		Out-born [O_D]	
	Number	Percentage	Number	Percentage
Total number of deaths	447		856	
Mortality profile (Cause of death)				
Respiratory Distress syndrome	49	11.0	122	14.3
Meconium aspiration syndrome	14	3.1	10	1.2
HIE/ Moderate-Severe Birth Asphyxia	184	41.2	268	31.3
Sepsis / Pneumonia/ Meningitis	83	18.6	298	34.8
Major Congenital Malformation	25	5.6	56	6.5
Prematurity	78	17.4	80	9.3
Others	14	3.1	22	2.6
Cause not established	0	0.0	0	0.0
Duration between the time of admission and death				
<1 day	135	30.2	216	25.2
1-3 days	231	51.7	474	55.4
4-7 days	51	11.4	103	12.0
>7 days	30	6.7	63	7.4
Age at death				
<1 day	94	21.0	28	3.3
1-6 days	302	67.6	525	61.3
>= 7 days	51	11.4	303	35.4
Birth weight / Admission weight				
>=2500 gm	120	26.8	351	41.0
1500-2499 gm	153	34.2	327	38.2
1000-1499 gm	107	23.9	122	14.3
<1000 gm	67	15.0	56	6.5
Gestation				
Term	167	37.4	413	48.2
Preterm	279	62.4	440	51.4
Post term	1	0.2	3	0.4



Fig 1. Morbidity Profile of newborn admissions at SNCU

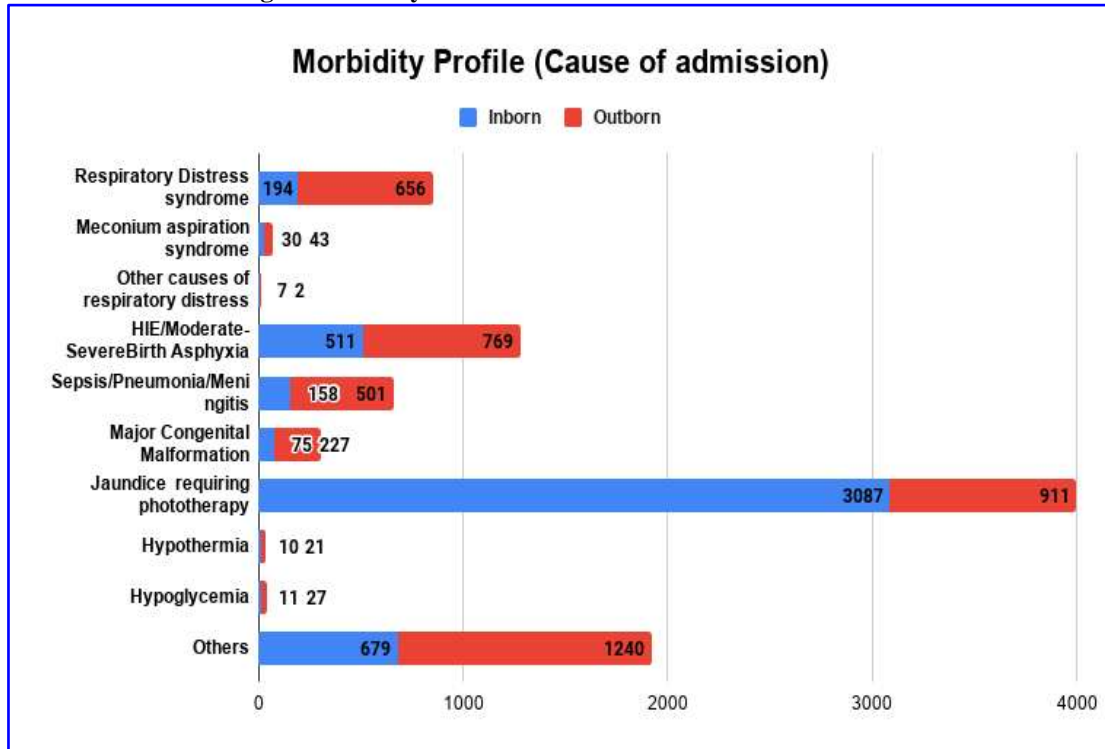


Fig 2. Mortality Profile of newborn deaths at SNCU

