

## Original Research Article

# Morbidity and mortality profiles and outcomes of neonates admitted in the special newborn care unit of tertiary care hospital of Government Medical College Rajouri of district Rajouri of union territory of Jammu and Kashmir: a hospital-based study

Javaid Iqbal<sup>1\*</sup>, Sudekshan Sharma<sup>1</sup>, Balqies Naaz<sup>2</sup>

<sup>1</sup>Department of Paediatrics, Government Medical College, Rajouri, Jammu and Kashmir, India

<sup>2</sup>Department of Health Services, Public Health Centre, Jammu and Kashmir, India

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### \*Correspondence:

Dr. Javaid Iqbal,

E-mail: [drjavaidiqbalch786@gmail.com](mailto:drjavaidiqbalch786@gmail.com)

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## ABSTRACT

**Background:** Neonatal deaths constitute major portion of under-five mortalities in India. Neonatal period is very important and precious period because most of the preventable morbidities and mortalities occur in this period. In our country, prematurity, infection and prenatal asphyxia are three major causes for neonatal mortality. Various special newborn care unit (SNCU) are established in different district Hospitals to provide neonatal care which further decrease neonatal mortality.

**Methods:** This observational retrospective study was planned to determine the clinical profile and outcome of various neonatal admissions at SNCU, of department of paediatrics Government Medical College Rajouri, Jammu and Kashmir a newly established medical college in the rural setting of northern India which is a tertiary care hospital. The data was collected for a period of 1 year from 01 April 2021 to 31 March 2022. Detailed information was collected from files and registered onto the preset proformas and results were compiled.

**Results:** A total 2495 newborns were enrolled for the study. 1796 (71.98%) were inborn and 699 (28.01%) were out born. Total male babies were 1569 (62.88%) and female babies were 926 (37.12%). Majority of patients were full term and weight  $\geq 2.5$  kg (86.05%). major indications for admission were sepsis 557 (22.32%), prenatal asphyxia 532(21.32%), neonatal hyperbilirubinemia 387 (15.5%), Low birth weight 348 (13.94%) and respiratory distress 308 (12.34%). Out of total, 1879 (75.3%) newborn were discharged successfully after treatment. 192 newborns were referred to higher centre for specialized care. 174 (7%) newborns died during the treatment.

**Conclusions:** Neonatal period is a very crucial period for development of morbidity and mortality. SNCU with skilled staff can prevent the worst outcomes by early interventions.

**Keywords:** SNCU, Neonate, Morbidity, Mortality, Outcome

## INTRODUCTION

Neonatal period is very crucial time for a neonate as it has to survive on its own extra uterine life. Children face the highest risk of dying in their first 28 days of life (neonate period). At a global rate of 17 deaths per 1,000 live births and approximately 6,700 neonatal deaths every day in

2019, the neonatal period (the first 28 days of life) is the most vulnerable time for children under age 5 years.<sup>1</sup>

Simple interventions have been tested and found to be effective in reducing the neonatal mortality. Estimate have suggested that more than 70% of neonatal mortality can be reduced by existing evidences-based practices, but

coverage of these interventions is low and uneven in geographic areas with highest burden of mortality. Facility based newborn care (FBNC) program is one of the key initiatives launched by the government of India under the national rural health mission and RMNCH+A strategic program to improve the status of newborn health in the country. Under the program efforts are being made to provide different level of newborn care at the health facilities. FBNC has a significant potential for improving newborn survival.<sup>2</sup>

Provision of newborn care facilities at various level at health facilities will not only increase the confidence in the health care delivery system but also increase the coverage of services at the time of greatest risk at birth and the first few days of life and thus mortality in the country. Newborn care corner (NBCC), newborn stabilization unit (NBSU) and special newborn care unit (SNCU) are newborn care facilities at MCH level I (PHC/SC), MCH level II (CHC/FRU) and MCH level III (DH/medical college/tertiary care hospital) respectively. SNCU is a neonate unit in the vicinity of labor room which is to provide special care for sick newborn except assisted ventilation and major surgery. As FBNC including SNCU is relatively new implementation for neonatal survival and neonatal health, operational research in this area is very less till date, though various studies documenting admission and mortality profile of neonates admitted in SNCU are conducted.<sup>3,4</sup>

SNCU is expected to provide various services like resuscitation of asphyxiated newborns, management of sick newborns, postnatal care, follow up of high-risk newborn, referral and immunization services. These SNCU are equipped with life-saving equipment like radiant warmer, phototherapy unit, oxygen concentrator, pulse oximeter, intravenous infusion pump and now in SNCU are added incubators, C-PAP and ventilators. SNCU is a separate unit in close proximity to the labor room with ten or more beds and managed by adequately trained doctors, trained staff nurses and support staff to 24x7 services.<sup>5</sup>

There are very few studies revealing trend of neonatal admission and their outcome in SNCU in the northern India. This study was undertaken to study the disease pattern and outcome of neonates admitted to the SNCU of tertiary care teaching hospital located in Rajouri district a rural area in Jammu division of Jammu and Kashmir Union Territory of India to provide facility-based view of morbidity and mortality profile of rural area for further evaluation, assessment, planning of future program and to strengthen the existing SNCU.

#### ***Aims and objective to study***

The presentation and outcome of neonates admitted in one such SNCU to guide us to improve and strengthen the existing SNCU's.

## **METHODS**

The present retrospective observation study was conducted in the SNCU of the department of paediatrics, Government Medical College Rajouri, Jammu and Kashmir is a tertiary care newly established medical college in the rural setting of northern India over a period of 1-year w.e.f. 01 April 2021 to 31 March 2022. The SNCU is a 20 bedded unit catering to a population of around 6,42,415 district Rajouri and also catering adjoining districts of Rajouri i.e., district Poonch and district Reasi, but SNCU is mainly catering to district Rajouri and some neonates from other districts like district Poonch and district Reasi. The SNCU is equipped with radiant warmers, phototherapy units, single surface and double surface, phototherapy unit, ventilation facilities like C-PAP and ventilators, centralized oxygen, KMC support, bio chemical and pathology laboratory support, X-ray and ultrasound and computed tomography (CT)-scan facilities. Trained main power including consultants' pediatricians, medical officers, junior residents, senior residents, nurses, data entry operators, supportive staff etc. are posted. All services including stay, investigations and treatments are provided free of cost to the admitted neonates.

Standard national level guide lines and protocols are practiced for the diagnosis and management of neonates as well as recording and reporting of the information.

All the neonates admitted in SNCU were considered as the study participants. The study was conducted by analyzing case records admissions for a period of one year (April 2021- March 2022). In a predesigned proforma which include identity, demographical and clinical variables, complains at admissions, diagnoses, treatment, hospital stay and outcome.

Admission criteria includes baby born less than 34 weeks, birth weight less than 1.5 kg, evidence of birth anoxia which include a APGAR score less than 6 at one minute or prolonged resuscitation requiring bag and mask ventilation or intubation, respiratory distress, shock, central cyanosis, persistent vomiting, feeding problems, neonatal apnea, jaundice, letharginess, seizures or any other neonate who is felt to be at risk by the staff posted in the SNCU.

Ethical approval was sought from the institutional ethical committee of Government Medical College Rajouri; permission from the head of institution was obtained before the start of the study.

The SNCU monthly report is in a predefined format from the ministry of health and family welfare, Government of India which includes data on admission, information, reason of admission, course of admission and mortality reason (if any) with treatment outcomes. It also includes information on gender, birth weights gestational age and duration of stay.

These participants were categorized into two sections as inborn which have delivered in same facility i.e. Government Medical College Rajouri have referred from peripheral facilities or from the communities (born at home) of district Rajouri and adjoining districts i.e. Poonch and Reasi. The outcomes were classified into four groups, expired (died during management), discharge (after successful treatment), left against medical advices (LAMA) and referred (referred to higher centre for further management).

The collected data was entered Microsoft excel and analyzed by using statistical package for the social science (SPSS).

**RESULTS**

A total of 2495 neonates were admitted during the study period. Out of this 1796 (71.98%) were inborn and 699 (28.01%) were outborn. Total male babies were 1569 (62.88%) and female babies were 926 (37.12%). Term and pre term babies were 2187 (87.65%) and 308 (12.34%) respectively.

Among the babies admitted 1996 (80%) did not require any kind of interaction at birth while resuscitation measures for remaining includes chest compression 25 (1%) intubation 12 (0.5%) and 461 (18.5%) only require oxygen supplementation at the time of delivery.

**Table 1: Clinical profile of neonates’ admission in the SNCU.**

Diagnoses	No. of patients	Percentage
Sepsis	557	22.32
Birth anoxia	532	21.32
Neonatal hyperbilirubinemia	387	15.50
Low birth weight	348	13.94
Respiratory distress syndrome	308	12.34
Brochopneumonia	89	03.56
Neonatal seizures	82	03.28
MSAF/MAS	56	02.24
Hypoglycemia	52	02.08
TTNB	36	01.44
Hypothermia	19	00.76
Congenital malformation	17	00.68
Hypocalcemia	12	00.48

Major cases of morbidity admission were sepsis 557 (22.32%), birth anoxia 532(21.32%), hyperbilirubinemia 387 (15.51%), low birth weight 348 (13.94%) and respiratory distress syndrome 308 (12.3%), bronchopneumonia 89 (3.56%), neonatal seizures 82 (3.28%), MSAF/MAS 56 (2.24%), hypoglycemia 52 (2.08%), TTNB 36 (1.44%), hypothermia 19 (0.76%), congenital malformation 17 (0.68%), and hypocalcemia 12

(0.48%). If respiratory distress is taken as morbidity of admission, it includes RDS, MAS, birth anoxia and TTNB is a major cause of morbidity of almost 29.96% of all admissions.

**Table 2: Outcomes of admitted neonates.**

Diagnoses	No. of patients	Percentage
Discharged	1879	75.31
Referral	192	07.70
LAMA	250	10.00
Died	174	07.00

**Table 3: Distribution of neonates according to birth weight.**

Diagnosis (kg)	No. of patients	Inborn/outborn
>2.5	2147	1575 inborn, 572 out born
2.4-1.5	224	144 inborn, 80 out born
1.4-1.0	94	55 inborn, 39 out born
<1	30	22 inborn, 08 out born

**DISCUSSION**

Data pertaining to disease pattern and mortality are useful for health care providers and policy makers to modify and plan treatment interventions and evaluate the effectiveness of health care initiatives respectively. In our study a total of 2495 neonates were admitted out of which 1796 (71.98%) neonates were inborn and rest were out born babies 699 (28.01%) significantly higher number of inborn babies (71.98%) were admitted compared to out born (28.01%) babies, as ours is the only referral centre in the district for higher risk pregnancies the admission is more of inborn babies which is similar in other studies. There is male preponderance in the admission with 62.88% were male babies and 37.11% were female. Similar findings were reported from various studies conducted in different parts of India.<sup>6,9</sup>

Average stay duration of babies in SNCU is 6.9 days with early interventions and appropriate use of non-invasive continuous positive airway pressure and mechanical ventilations and reduction of exposure to NICU environment with early shifting of baby to KMC which reduced further morbidity and duration of the stay of the babies were significantly reduced along with effective implementation of breast feeding. All high-risk babies were screened for retinopathy of prematurity and hearing test as per standard guidelines at our institute. According to the united nation children’s fund the state of world’s children’s report, 28% of neonates were born with LBW in India. However, in our study overall 13.94% of neonates were LBW. In other studies, LBW admissions are higher than our study. This may be due to poor maternal health condition, low socioeconomic status and less visit to health care facility.<sup>10,12</sup>

Neonate jaundice (NNJ) is also one of the important neonatal morbidities which requiring phototherapy, as in our study 15.5% similar results are seen in some other studies, while in some other studies lower incidence of NNJ than our study.<sup>13,14</sup>

In our study clinical sepsis 22.32% is comparable with other studies. At our SNCU rational antibiotic policy is followed and adopted guidelines of AIMS antibiotics policy for our unit. Strict hand hygiene is being maintained before touching each baby, hand sanitizers are used at every next hand touch.

Birth asphyxia is important cause of morbidity and mortality. At our hospital morbidity of birth asphyxia is 21.32% which is higher than in other studies due to less coverage of maternal child health services through PHCs, accredited social health activities and Anganwadi centers. Most of the high risk and at-risk pregnancies are not being identified and followed at community level, due to which cases of still birth and asphyxia are still high in our institution and also hilly terrain of our area and late referral and late self-reporting are some other contributory factors for high birth asphyxia in our institution.<sup>15</sup>

Our SNCU has discharge rate of 75.31%. Discharge rate of 60% to 85% as been reported in various studies. Referral rate of 7.70% and mortality rate of 7% have been reported. Referral rate from SNCU's is varies across the country from 4% to 25% across various studies. Mortality in some other SNCU's is between 5% to 15% in various studies.<sup>16</sup>

### Limitations

This study is retrospective observation study and is subjected to lack of accuracy due to documentary error.

### CONCLUSION

Neonatal period is most vulnerable time for development of morbidity and mortality. Neonatal jaundice, prematurity, low birth weight, primal asphyxia and sepsis are major cases for SNCU admissions and also for morbidity and mortality. SNCU with skilled staff can reduce birth morbidity and mortality by early interventions, neonatal sepsis can be prevented by enforcing strict hand hygiene and aseptic protocols. Low birth weight and prematurity were significant contributions to mortality. Hence, neonatal programs to prevent prematurity and low birth weight babies should be strengthened like FIMNCI and FBNC programs.

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### REFERENCES

1. Kumar P, Singhal N. Mapping neonatal and under-5 mortality in India. *Lancet*. 2020;395:1591-3.
2. United Nations Inter-agency Group for Child Mortality Estimation (UN IGME). Levels and Trends in Child Mortality Report. 2019;4. Available at: <http://www.unicef.org/reports/levels-and-trends-child-mortality-report-2019>. Accessed on 14 December 2022.
3. Darmstadt GL, Bhutta ZA, Cousens S, Adam T, Walker N, de Bernis L; Lancet Neonatal survival steering team. Evidence-based cost effective interventions. How many newborn babies can be save? *Lancet*. 2005;365:977-88.
4. Facility Based Newborns Care (FBNC) operational guide. Guidelines for planning and implementation Ministry of Health and Family Welfare. Government of India. 2011.
5. MOH&FW, GOI. Care of Small and sick Newborn in SNCU of India in Two Year April 2013 to March 2015. 2015;1-2. Available at: <http://www.healthynewbornnetwork.org/hnn-content/uploads/care-of-small-sick-newborns-in-sncu-of-india-two-year-report.pdf>. Accessed on 14 December 2022.
6. Kumar R, Mundhra R, Jain A, Jain S. 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. Randad K, Choudhary D, Garg A, Jethaliya R. Pattern of neonatal morbidity and Mortality: A retrospective study in a special newborn care unit, Mumbai. *Indian J Child Health*. 2020;7(7):299-303.
8. Mundlod S, Thakkarwad S, Mortality profile and outcome analysis in level two SNCU in tribal medical college district Adilabad Telangana IP. *Int J Med Paediatr Oncol*. 2019;5:125-8.
9. Prasanna CL, Suneetha B, Prabhu GR, Prakash PS. Morbidity and mortality pattern among babies admitted in special newborn care unit, Nellore Andhra Pradesh, India. *Int J Contemp Pediatr*. 2019;6:1898-903.
10. Sharma AK, Caur A. Profile of neonatal mortality in special newborn care unit of tertiary care hospital *Int J Contemp Pediatr*. 2019;6:4205.
11. Modi R, Modi B, Patel JK, Punitha KM. Study of the morbidity and mortality pattern in the neonatal intensive care unit at a tertiary care teaching hospital in Gandhinagar District, Gujarat, India. *J Med Den Sci*. 2015;3:208-12.
12. Aupama D, Bidyut BN, Anjana TN. Morbidity and mortality profile of newborns admitted to the neonatal intensive care unit of a tertiary care teaching hospital of Assam. *J Med Sci Clin Res*. 2020;8:697-702.
13. Care of small and sick newborns in SNCU of India – Healthy Newborn. Network. Available at: <https://www.healthynewbornnetwork.org/resource/care-of-small-sick-newborns-in-india>. Accessed on 14 December 2022.

14. Ravikumar SA, Elangovan H, Elayaraja K, Sunderavel AKK. Morbidity And Mortality profile of neonates in a tertiary care centre in Tamil Nadu: a study from South India. *Int J Contemp Pediatr.* 2018;5:377-82.
15. Som M, Nayak C, Padhi BK, Ashwan N. Pattern of morbidity among newborns admitted in SNCUs of Odisha, India. *Int J Health Sci Res.* 2018;8:10-9.
16. Verma J, Anand S, Kapoor N, Gedam S, Patel U. Neonatal outcome in newborns admitted in NICU of

tertiary care hospital in central India: a 5-year study. *Int J Contemp Paedtr.* 2018;5:1364-7.

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