

Original Research Paper

Neonatology

STEP TO ACHIEVE- MELLENNIUM DEVELOPMENT GOALS: AN ASSESSMENT OF 1 YEARS' ADMISSION PATTERN AND TREATMENT OUTCOMES OF NEONATES ADMITTED IN SPECIAL NEWBORN CARE UNITS OF JHARKHAND

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ABSTRACT

Background: Every year, nearly four million newborn babies die in the first month of life. India carries the single largest share (around 25-30%) of neonatal deaths in the world. Neonatal deaths constitute two thirds of infant deaths in India. 45% of the deaths occur within the first two days of life. It has been estimated that about 70% of neonatal deaths could be prevented if proven interventions are implemented effectively at the appropriate time. It was further estimated that health facility-based interventions can reduce neonatal mortality by 23-50% in different settings. Facility-based newborn care, thus, has a significant potential for improving the survival of newborns in India. This research has been planned with an aim to study the profile of pattern of admissions in a SNCU and their outcomes.

Methods: All babies referred for neonatal problems (less than 28 days) and admitted in SNCU will be included. Both term and preterm babies will be considered. The criteria for admission includes various causes like low birth weight, preterm, birth asphyxia, respiratory distress, hyper bilirubinemia, congenital anomalies, risk factors (maternal, neonatal, prenatal), infections and outcome will be analysed. Results: Among the 8850 admissions term babies and boys outnumbered. The common causes for admission were birth asphyxia,

respiratory distress, low birth weight and preterm. Most babies had an uncomplicated stay. The mortality in the extramural neonates was due to neonatal sepsis, extreme preterm and congenital malformations.

Conclusions: Intensive and interventional management, along with good neonatal monitoring and care can reduce the mortality and improve the survival of low birth weight babies and other treatable problems. Thus, a combined effort of management by pediatricians, nursing care at SNCU can improve the survival rates of neonates.

KEYWORDS : Birth asphyxia, Extramural Admissions, Low birth weight, Neonatal mortality, Neonatal sepsis, **Respiratory distress**

INTRODUCTION

Every year, nearly four million new-born babies die in the first month of life. India carries the single largest share (around 25-30%) of neonatal deaths in the world. Neonatal deaths constitute two thirds of infant deaths in India; 45% of the deaths occur within the first two days of life.. Over the years, the IMR has reduced worldwide, as well as in India, but neonatal mortality rate has not decreased proportionately.1 The neonatal mortality rate (NMR) in India is 29 per 1000 live births2. The Millennium Development Goals (MDGs) 2015 have not been achieved which focused on decreasing NMR of India to <10. Although the time frame to achieve the MDGs has been extended, a significant work has been done in the area of improving neonatal mortality in India.2-4 We have taken up this study so as to ascertain the causes of morbidity and mortality prevalent in the neonates admitted in SNCU that caters to a large referral population from the surrounding government and private obstetric centres. It has been estimated that about 70% of neonatal deaths could be prevented if proven interventions are implemented effectively with high coverage.5 It was further estimated that health facility-based interventions can reduce neonatal mortality by 23-50% in different settings. Facility-based newborn care, thus, has a significant potential for improving the survival of newborns in India. This research has been planned with an aim, to study the profile of pattern of admissions in a SNCU and their outcomes.

Study period April 2018 to March 2019 was the study period and aggregated yearly data were taken for study.

Materials and Methods

FBNC is composed of three-tier structure, namely, Newborn Care Corners at all delivery points for essential newborn care, Newborn Stabilization Units (NBSUs) at secondary care, and SNCUs at tertiary care facilities. The SNCUs are advanced newborn care centers located in tertiary care hospitals, district hospitals, and medical colleges.[6] These SNCUs have radiant warmers, phototherapy units, and advance life support care machines if required. In Jharkhand, tertiary care hospitals provide all maternal health services including newborn care support to those who are admitted within the hospitals, i.e., inborn and those who are referred from peripheral

health facilities, i.e., outborn. These SNCUs are financially supported by Jharkhand State Health and Family Welfare Department and National Health Mission.

Study design and settings

A cross sectional descriptive study was conducted based on secondary data collected from SNCUs of Jharkhand. The study includes all Government-supported SNCUs which are in medical college attached hospitals, district hospitals, and trust hospitals. In Jharkhand, there were 19 designated SNCUs during the year April 2018–March 2019

Study population

Newborns and neonates admitted in SNCUs were considered as study participants. These were categorized into two sections as inborn, who have delivered in same facility and outborn, who have referred to the facility from peripheral health facilities.

Data collection

The source of information was SNCU monthly reports generated from admitted neonates (Indoor cases only). In SNCUs, neonates are referred from MCH level facilities 1-2, private health facilities and from community by direct contact admission or by frontline health workers : Accredited . Social Health Activist, Auxiliary Nurse Midwife, or Multi-Purpose Worker. Accredited Social Health Activist, Auxiliary Nurse Midwife, or Multi-Purpose Worker. The primary data have been recorded in predefined registers and case sheets of SNCUs filled up by pediatricians and staff nurses. Inclusion Criteria include all babies who had ≤28 days of life (neonates) admitted in SNCUs. Exclusion Criteria include babies who had life of more than 28 days (postneonates) and neonates who were not admitted in SNCUs. The SNCU monthly report is predefined format from Ministry of Health and Family Welfare, Government of India, which includes data on admission, information, reasons of admission, course of admission, and mortality reasons (if any) with treatment outcomes. It also includes information on gender, birth weights, gestation age, and duration of stay. The aggregated data of SNCU reports were analyzed and due efforts were made to conceal identity of hospitals and patients.

Limitation of analysis

Detailed information of each neonates had not been collected. The aggregated data of indicators was taken into the study. Only Government-supported SNCUs were studied, as system to collect private hospitals' data is not in place. The follow-up on discharged, leaving against medical advice (LAMA), and referred neonates were not done during the study.

Results

Overview of Special Newborn Care Units in Jharkhand

Jharkhand has population of 32.98 million as per census 2011 with 76.0% rural and 24.0% urban population; located in 24 districts, Jharkhand has considerable growth in operationalization of SNCUs by saturating each district with at least one SNCU. The numbers of SNCU functional during 2018-2019 is 19.

Neonatal characteristics of Special Newborn Care Unit admission

During the study period, there were 8850 neonates admitted in SNCUs across the State, and out of which, 58% were inborn and 42% were outborn admissions. Out of total admissions, 59% were males and 41% were females.





Birth weight and gestation age characteristics

The progress of management and prognosis are different for each neonates based on their birth weight and gestational age. Study showed birth weight of admitted neonates were more than 2500 g 47%, less than 2500g were 54%. The neonates had gestational age of <34 weeks (33%), 34 weeks to 37 weeks (66%), and more than 37 weeks (1%). These categories of neonates are critical on survival to reach the health facility also after birth.





Morbidity profile of admitted neonates

The neonates were admitted in SNCU through in-facility transfer and from referrals to SNCUs either from the community or from the lower health facility centers; Primary Health Centres, Community Health Centres, subdistrict hospitals, few district hospitals, and private hospitals. The study revealed that major criteria for admission were respiratory distress syndrome (RDS) (3.9%) along with infection (6.7%). Rest of the reasons were jaundice (13.7%), meconium aspiration syndrome (4.4%), perinatal asphyxia as moderate or severe Birth asphyxia/hypoxic-ischemic encephalopathy (29.5%), and other causes of respiratory distress (1.6%) which involve transient tachypnea, congenital pneumonia, and aspiration pneumonia. Morbidity due to congenital malformation, hypoglycemia, and hypothermia were observed in lesser percentage.



Outcome of the admitted neonates

The outcome was categorized into four sections as successfully discharged, referred to higher centers, LAMA, and died. The analysis showed that 62% neonates were successfully discharged, 20% were referred to higher centers, 10% were left against medical advice, and 8% were died during the study period. The analysis found that every second neonates was about to discharge successfully during the course of management. The study had not explored the reasons behind the LAMA and referred to higher centers: district hospitals to medical colleges as a limitation.







Mortality profile of neonates

Final diagnosis on causes of death were RDS (9.1%), infection (8.3%), perinatal asphyxia 20% and followed by prematurity, meconium aspiration syndrome, and major congenital malformation. It was found that neonates admitted with low birth weight had less chances of survival. Study identified that the difference between weight at birth and mortality of newborn had significant association (P < 0.0001). Table shows that chances of mortality were more in neonates with lower birth weight. Here, alive neonates were considered those who were discharged alive, LAMA, and referred to higher centers.



Discussion

In Jharkhand, SNCUs have been increased in numbers by creation of infrastructure in district hospitals and medical colleges, but reduction in child morbidity and mortality depends on availability of wide range of interventions. Among them, facility-based interventions are high impact intervention, especially in India. The three-tier structure of FBNC prevents major preventable deaths of newborn, and maximum reduction in child mortality can be met if it links with community-based interventions. Improvement of newborn health aimed at comprehensive continuum of care from facility to community with context-specific investments. Demographic profile of SNCU admissions showed high male:female observations to identify gender-specific issues. These findings were similar to previous studies of National-Neonatal-Perinatal Database, Rakholia *et al.*

and other rural India studies.[7-10] During the study, the outborn admissions were less in number compared to inborn admissions. The low outborn admission directs the need to strengthen referral system with community-based interventions. The demand generation is another key area where gender bias and equity are major concerns. In the present study, RDS (HMD)(3.9%), infections (6.7%), and perinatal asphyxia (29.5%) were the major causes of neonatal admissions. The pattern of morbidity is different in developed countries as major causes were admissions due to extreme prematurity, asphyxia, and congenital malformations.[11-12] Table shows that causes and mortality rate were similar to other studies where findings are in concordance with present study findings. This study found lower rate of neonatal mortality compared to other studies conducted in India but the rate appears higher while comparing with developed countries where health facilities have better equipped infrastructure and higher doctorpatient ratio. Here, high mortality in outborn admission needs specific attentions on programmatic delay factors. While analyzing treatment outcome, it was observed that referral rate was high among admissions. The reason could be that SNCUs of

district hospitals used to refer neonates to hospitals attached with medical colleges for advanced treatment. The rate of LAMA was similar to or near to other studies. Universal implementation of antenatal corticosteroids in preterm labor and use of injection gentamycin along with syrup amoxicillin in infection will prevent the respiratory distress and infections among most of neonates. In jharkhand, there could be several possibilities for higher rate in outborn deaths as follows:

- Lack of demand generation in community for timely treatment of neonates. Equity issues have to be dealt to ensure that girl children receive attention
- Poor doctor-patient and nurse-patient ratio in health

facilities in hard to reach and hilly areas. Private sector is not equipped for provision of proper care in these areas

- Lack of trained staff for management of small and critical neonates; low number of first referral units equipped to manage high-risk pregnancy and established NBSUs
- Poor referral linkage between communities to facility for neonates; difficulty in transport for very severe low birth weight babies.

Recommendations

Based on the present study, the following recommendations can be taken into consideration:

- Strong implementation framework of community-and facility-based interventions is essential in support with robust referral system. Use of IT enable monitoring software such as Mother Child Tracking System and SNCU Online Software can play vital role for linkages and monitoring of health programs
- Comprehensive human resource policy with inbuilt structure of capacity building and supportive supervision.

Involvement of private sectors for the promotion of high-impact interventions

- A detailed community-based study can support to identify the gaps in demand generation and program implementation framework
- To summarize, meaningful actions have been taken to reduce neonatal morbidity and mortality, but still, state has to ensure the strong implementation of available strategies. Scaling up neonatal health interventions, securing financial infrastructure, rational deployment of skilled human resources, strong policy support for free entitlements, and continuous monitoring framework are some of the steps in the direction to have a healthy child for future.

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REFERENCES

- Malik S, Gohiya P, Khan IA. Morbidity profile and mortality of neonates admitted in Neonatal Intensive Care Unit of a Central India Teaching Institute: a prospective observational study. J Clin Neonatol. 2016;5(3):168.
- Oestergaard MZ, Inove M, Yoshida S, Mahanani WR, Gore FM, Cousins S, et al. United Nations inter-agency group for child mortality estimation and the child health epidemiology reference Group. Neonatal mortality levels for 193 countries in 2009 with trends since 1990: A systematic analysis of progress, projections, and priorities. PLoS Med. 2011;8:e1001080.
- The UN inter-agency group for child mortality estimation. Levels and trends in child mortality, 1990-2010; 2011. Available at http://www.healthy newbornnetwork.org/resource/levels-andtrends-child-mortality-2011-report
- Bhutta ZA, Black RE. Estimating number of beds required for SCNU Toolkit. Global maternal, newborn, and child health: so near and yet so far. New Eng J Med. 2013;369:2226-35.
- Baqui AH, Darmstadt GL, Williams EK, Kumar V, Kiran TU, Panwar D, et al. Rates, timing and causes of neonatal deaths in rural India: Implications for neonatal health programmes. Bull World Health Organisation. 2006;84:706-13.
- Sample Registration System 2014. Vol. 50. Registrar General of India. New Delhi; 2014. A v a i l a b l e f r o m : h t t p ://w w w.c e n s u s i n d i a.g o v.i n / v i t a l_ statistics/SRS_Bulletin_2014.pdf. [Last accessed on 2016 Aug 05].
- Bhatia BD, Mathur NB, Chaturvedi P, Dubey AP. Neonatal mortality pattern in rural based medical college hospital. Indian J Pediatr 1984;51:309-12.
- Morbidity and mortality among outborn neonates at 10 tertiary care institutions in India during the year 2000. J Trop Pediatr 2004;50:170-4.
- Rakholia R, Rawat V, Bano M, Singh G. Neonatal morbidity and mortality of sick newborns admitted in a teaching hospital ofUttarakhand. CHRISMED J Health Res 2014;1:228-34.
- Sridhar PV, Thammanna PS, Sandeep M. Morbidity pattern and hospital outcome of neonates admitted in a tertiary care teaching hospital, Mandya. Int J Sci Stud 2015;3:126-9.
- Simpson CD, Ye XY, Hellmann J, Tomlinson C. Trends in cause-specific mortality at a Canadian outborn NICU. Pediatrics 2010;126:e1538-44.
- Callaghan WM, MacDorman MF, Rasmussen SA, Qin C, Lackritz EM. The contribution of preterm birth to infant mortality rates in the UnitedStates. Pediatrics 2006;118:1566-73.