



Clinical assessment of the outcomes of the neonates admitted to SNCU in Anugrah Narayan Magadh medical College Gaya, Bihar

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Abstract

Every year, nearly four million new-born babies die in the 1st 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 1st 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. The neonatal mortality rate (NMR) in India is 29 per 1000 live births. 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. Hence based on above findings the present study was planned for Clinical Assessment of the Outcomes of the Neonates Admitted to SNCU in Anugrah Narayan Magadh medical College Gaya, Bihar.

The present study was planned in Department of Pediatrics, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India. The study was conducted from the Feb 2018 to Nov 2018. In the present study 50 cases of neonates admitted to sick neonatal intensive care unit (SNCU) were enrolled. Data regarding the place of delivery, inborn delivery or out born, gender, gestational age, weight on admission, Indication for admission, mode of delivery, final diagnosis, duration of stay and treatment outcome were collected.

The data generated from the present study concluded that birth asphyxia, RDS and neonatal sepsis are leading causes of mortality in newborns. In spite of many advances in neonatal care above factors still continue to be the leading causes of mortality in neonates. The majority of morbidities and subsequently the mortalities can be prevented by improving antenatal care, maternal health, timely intervention, referring at appropriate time to tertiary care centres for high risk cases, preventing preterm deliveries and care of neonates at centres with facility.

Keywords: SNCU, sick neonatal intensive care unit, Bihar region, etc

Introduction

Facility Based Newborn Care (FBNC) programme is one of the key initiatives launched by the Government of India under the National Rural Health Mission and RMNCH+A Strategic programme to improve the status of newborn health in the country. Under the programme, efforts are being made to provide different level of newborn care at the health facilities. While Newborn Care Corners (NBCCs) have been established at all delivery points to provide essential newborn care, Newborn Stabilization Units (NBSUs) have being established at all Community Health Centers/First Referral Units for management of selected newborn conditions and to stabilize serious and sick newborns before referral to higher centres. Special Newborn Care Units (SNCUs) have been established at district hospitals and subdistrict hospitals with annual delivery load more than 3000 to provide care for sick newborns, that is, all type of neonatal care except assisted ventilation and major surgeries. It is a separate unit in close proximity to the labour room with 12 or more beds, and managed by adequately trained doctors, staff nurses and support staff to provide 24x7 services.

India has a formidable task of providing care to newborn against a background of the world's largest share of births (20%) and neonatal deaths (30%). Meeting the commitment of reaching the Millennium Developmental Goal of reducing infant mortality rate to about 27 from its present

value of 57(NFHS 3) in India is only possible through improved neonatal survival. 66% of infant deaths in the country at present occur during the first 28 days after birth. About 40% of these neonatal deaths occur on the first day of life, almost half within three days and nearly three-fourth in the first week of life. Nearly 50% of the neonatal deaths occur among the LBW newborn. Neonatal mortality in India after an initial decline has been static with barely a point decline every year. Preventable factors like Hypothermia, Asphyxia, Sepsis, Pneumonia etc. contribute significantly to the NMR.

The commonest causes of Neonatal mortality in our country are infections including Sepsis and Pneumonia (33%), Asphyxia (21%), Prematurity (15%), Low Birth Weight, varieties of congenital malformations and surgical conditions. For most of the Term Newborn and a proportion of the Preterm and Low Birth Weight Newborn, Neonatal Mortality Rate (NMR) can be reduced by spreading the care to the communities with Skilled Health Workers. However, to bring 30 per 1000 Live Births, neither community nor Outpatient based care is adequate. This requires Facility Based Newborn care without which we cannot deliver the Community or Outpatient Based Care of the Newborn effectively^[1].

Unfortunately proper basic newborn care (Level I) are still not adequately available at many of the facilities where newborn are delivered and admitted. Till recent past, barring

a few medical colleges, we hardly had any adequately functioning and appropriately equipped facility dedicated for newborn in the public sector. The non-availability of adequately sick newborn care at fixed facilities such as the district hospitals and below largely negates the value of early referral of sick neonates. It has long been concluded that emergency Newborn Care is required apart from Essential Newborn Care to bring down the neonatal mortality rate (NMR). However strengthening of clinical services to deliver such emergency care, a much-needed component, had traditionally been largely ignored by health planners.

Our country requires Level 1 care for all deliveries as this provides basic care for all uncomplicated neonatal patients. Level 2 (Sick Newborn care unit) is for those sick newborn who require special care and level 3 care or Neonatal intensive care unit is earmarked for those extremely sick or grossly premature babies who would need mechanical ventilation. These babies are usually less than 1500gm or less than 28 weeks. It has been assessed that 85% of the newborn would require Level 1 care, while Level 2 and Level 3 (NICU) is required by 10% and 5% of the newborn respectively resulting in requirement of minimum of 3 lac level II beds and 40,000 level III beds for our country. Ideally, there should be supervised neonatal care facilities (level I) at all the primary and community health centres. Similarly, each district hospital should have 20 bedded level III care neonatal units and each teaching hospital should have a 20 bedded neonatal 2 ICU (level III) [2].

Development of proper coordination between level I, level II and level III units through a proper referral, transport and feedback system supplemented by outreach education program would be a prerequisite for effective neonatal care. Newborn intensive Care Units like any other Intensive Care Units requires significant investment. Hence, a trade-off needs to be done to bring about the balance between the need and the resource available. A substantial reduction in neonatal mortality can be achieved by improving the components of newborn care that do not require highest level of sophistication and technology. These include clean care at delivery, prevention and management of birth asphyxia, feeding of newborn including breastfeeding, early detection and treatment of common neonatal illnesses [3].

The need of the hour is to improve the quality of newborn care both at the block and district level where most of the deliveries take place and the illnesses are encountered. This felt need was transferred into action by building up a network of Newborn corners at all places where childbirth occurred, sick newborn stabilisation units (SNSU functioning as level I units) at BPHCs and sick newborn care units (SNCU functioning as level II units) in the district hospitals with provision of optimum transportation of sick neonates. The SNCU concept evolved from a pioneering work of department of neonatology, SSKM Kolkata headed by Dr. A.K. Singh and Society for Applied Sciences, represented by Dr. Amitava Sen, who played a stellar role in establishment of the first Sick New Born Care Unit at Purulia in 2003. Before the establishment of SNCU in Purulia, people's confidence in primary health care based programs was low, as the sick neonates referred to health care facilities did not survive [4].

The limited number of nursing staff has led to the concept of "Nursing Aides" or the "Neonatal Aides" or "Newborn Aides" from the local community and this measure

substantially alleviated the human resource constraint for SNCU and SNSU in smaller peripheral hospitals for care of newborn at an affordable cost. After the SNCU in Purulia was established, it was shown that the NMR in the district had decreased by 10/1000 Live Births for three consecutive years. No other single intervention could decrease the NMR. It also became the centre for capacity building (esp. hands-on training) of various district level health programs related to newborn, e.g. newborn component for IMNCI, ASHA, ANM, AWW and other health workers. Thus, SNCU will provide both service and capacity building related to newborn health. This pioneering work, called the "PURULIA MODEL", was acknowledged by Planning Commission, GOI in "Good Practises Resource Book", as well as a replicable model by Goldsmith and Karotkin in their book named "Assisted Ventilation of the Neonate". Owing to their pioneering work and immense experience in all aspects of facility based newborn care, both in terms of infrastructure planning and in human resource training, Department of neonatology, SSKM was selected as a newborn care resource centre by NIPI-UNOPS. This high toll of a million infant deaths per year has made all stakeholders, including the governments aware of the daunting challenge and impetus have been given to building neonatal health care infrastructures in form of sick newborn care units, but training and building up human resources in field of neonatology have been lagging behind [5].

Every year, nearly four million new-born babies die in the 1st 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 1st 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 [6]. The neonatal mortality rate (NMR) in India is 29 per 1000 live births. 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 [7].

Hence based on above findings the present study was planned for Clinical Assessment of the Outcomes of the Neonates Admitted to SNCU in Anugrah Narayan Magadh medical College Gaya, Bihar.

Methodology

The present study was planned in Department of Pediatrics, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India. The study was conducted from the Feb 2018 to Nov 2018. In the present study 50 cases of neonates admitted to sick neonatal intensive care unit (SNCU) were enrolled. Data regarding the place of delivery, inborn delivery or out born, gender, gestational age, weight on admission, Indication for admission, mode of delivery, final diagnosis, duration of stay and treatment outcome were collected.

All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

Following was the inclusion and exclusion criteria for the present study.

Inclusion criteria: All neonates admitted to SNCU.

Exclusion criteria: Neonates who left hospital against medical advice (LAMA) and neonates who were referred due to non-availability of ventilator support and surgical intervention

Results & Discussion

The neonatal period is the most vulnerable time for a child’s survival. There is a high risk of mortality in their first month of life at a global rate of 18 deaths per 1,000 live births in 2017. 1.47% of deaths among children under five were newborns in 2017 [8]. In 2016, 1 million children died from preterm birth complications. [9]. The neonatal mortality rate in India is 28 per 1000 live birth and in Bihar it is 22 per 1000 live birth [10]. SNCU special newborn care units were set up in district hospitals to provide level II neonatal intensive care in India to reduce the neonatal mortality. Every year, an estimated 26 million children are born in India [11] and reducing neonatal mortality is one of the thrust areas in public health for India. Four states including Bihar contribute to 56% of total neonatal deaths in India and 14% of the global neonatal deaths [12]. From the National Family Health Survey-4 (NFHS-4) data, it is estimated that India’s neonatal mortality rate is on average 2.4 times higher than the target for Sustainable Development Goal 3. However, district-wise estimates show wide disparities with some areas already having achieved much lower levels than the target whereas districts such as in Bihar requiring five times the current reduction level to reach the target by 2030 [13]. Improvement of the neonatal survival demands the availability and adequacy of trained personnel providing quality neonatal care at sick newborn care units (SNCUs) in secondary and community level hospitals which are accessible to populations at risk in remote areas [14].

community-based 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 [15]. 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.

The SCNU is largely driven by human resources. In these units, most doctors were transferred from the PHCs. This approach may help address shortages in specific circumstances but are not likely to resolve the problem in the long run. Amount of nursing care that an infant needs is somewhat unrelated to how sick that infant is [17]. The number of nursing staff is a critical parameter to ensure the quality of care. The Special Care Baby Unit, Kampala in Uganda, lacked nursing staff qualified in neonatal care [16]. In a neonatal special care unit in the USA, the infant: nurse ratio and infant census were the key determinants of nosocomial infections [18]. In a neonatal unit in Barbados, the shortage of staff had fostered deterioration in hand washing technique leading to outbreaks of nosocomial infections. Maintaining an ideal bed: nurse ratio is a challenge as observed in Uganda, Greece, and Ghana [23, 19, 20].

African countries show higher death rates due to jaundice and tetanus [22, 24]. The results are in contrast to developed countries, where extreme prematurity, gastrointestinal complications and congenital malformations are the main causes, as better neonatal care ensures lesser sepsis and better survival of children with RDS and MAS [21]. Most of the neonates died within 1st week of life. It is mainly due to preventable causes like prematurity, birth asphyxia and MAS rather than sepsis related deaths occur after 1st week. Also, very low birth weight and extremely low birth weight babies are more prone to death, where our focus is very much needed. In our study, death among preterm decreased from 23% in 2011 to 14.2% in 2014. It is mainly due to NRHM’s initiative to improve our SNCU with more staffs and facilities like surfactant therapy, CPAP and ventilators. 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 ratio in admissions which requires in-depth community-based 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 [25, 28]. 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.

The maintenance of equipment was a major challenge in most districts. The equipment-providing companies had their offices at the state level or sometimes these were not there in every state. Service engineers preferred to plan their route map in a way that the districts falling on a particular route got covered all together, or they had a tendency to wait for the adequate number of complaints from districts on a particular route. This made economic sense to the equipment-providing company but it actually delayed in

Table 1: Basic Details

Parameters	No. of Cases
Sex	
Males	33
Females	17
Delivery	
Inborn	36
Outborn	14
Weight on Admission	
Less than 1000 gm	4
1000 – 1499 gm	11
1500 – 2499 gm	27
More than 2500 gm	8
Mortality	
Admission	50
Mortality	6

Table 2: Causes of Mortality

Parameters	No. of Cases
HIE / Moderate-Severe Birth Asphyxia	2
Meconium Aspiration Syndrome	0
Respiratory Distress Syndrome	1
Prematurity (<28 weeks of Gestation)	1
E.L.B.W. (Wt. less than 1000g)	0
Sepsis	1
Any Other	1
Total	6

Demographic profile of SNCU admissions showed high male: female ratio in admissions which requires in-depth

attending to complaints as by the time the turn of the particular SCNU came in the roster, it had already been quite late. This is a critical issue, and the situation would worsen in near future as the equipment would near their shelf-lives, and the frequency of breakdown would further increase.

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.

Conclusion

The data generated from the present study concluded that birth asphyxia, RDS and neonatal sepsis are leading causes of mortality in newborns. In spite of many advances in neonatal care above factors still continue to be the leading causes of mortality in neonates. The majority of morbidities and subsequently the mortalities can be prevented by improving antenatal care, maternal health, timely intervention, referring at appropriate time to tertiary care centres for high risk cases, preventing preterm deliveries and care of neonates at centres with facility.

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