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Research Article

Pattern of morbidity and mortality of neonates admitted in tertiary level neonatal intensive care unit in Nalanda Medical College and Hospital, Patna, Bihar, India

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ABSTRACT

Background: The objective of the study was to determine the disease pattern and causes of neonatal mortality in tertiary level neonatal care unit.
Methods: Retrospective, analytic and descriptive study, clinical, hospital based. Divisions of neonatology, NMCH, Patna, during January 2012 to December 2015, total 4 year, all neonates less than 28 days were included. Baseline epidemiological clinical data and outcome were recorded in predesigned format.
Results: Study comprised of total 4457 neonates' morbidity pattern showed maximum share of prematurity 1762 cases, sepsis 1157 cases, birth asphyxia 1162 cases, meconium aspiration syndrome 304 cases, congenital malformations 98 cases, neonatal jaundice 614 cases, and 319 IUGR case. Mortality was 1043 cases. Out-born cases 83%, early neonatal mortality was 638 cases. Case fatality for prematurity was 25.93%, birth asphyxia 20.99%, congenital malformations 14.28%, sepsis 17.98% and MAS 15.46%.
Conclusions: Prematurity, neonatal sepsis and birth asphyxia are leading causes of neonatal mortality in our study. Interventions to reduce preterm delivery, low birth weight and birth asphyxia should be planned and implemented by health care managers at community level. Mortality is still unacceptably high; improvements in neonatal care at different levels will definitely reduce the neonatal deaths.

Keywords: Neonatal morbidity, Neonatal mortality, NICU, Causes of neonatal mortality

INTRODUCTION

According to the National Family Health Survey-3 (NFHS-3) report, the current neonatal mortality rate (NMR) in India of 39 per 1,000 live births, accounts for nearly 77% of all the infant deaths (57/1000) and nearly half of the under-five child deaths (74/1000). One of the millennium development goals (MDG-4) was to reduce child mortality 30/1000 live births by up to two-thirds by 2015. In most developing countries, a higher proportion of neonatal deaths are observed. The rate of the neonatal mortality varies widely among the different states of India, ranging from 11 per 1000 live births in Kerala to 48 per 1000 live births in Uttar Pradesh. The neonatal mortality rate in Bihar 42 per 1000 live birth is more than that of the national figure due to the lack of health infrastructures.[1,2] Bihar has experienced economic growth which was accompanied with improvement in many health indicators, including infant mortality rate. There are few studies that have described the neonatal mortality rates in Bihar. The country has achieved a significant reduction in under-five mortality and infant mortality figures over the past decade.

The aim of this study, therefore, was to define the neonatal mortality rate and the relative importance of

various causes of death among neonates who were admitted at the neonatal intensive care unit (NICU) at NMCH, Patna. This will help to know spectrum of neonatal diseases at developing part of India and to improve management for better outcome.

Objective of the study was to report the patterns and causes of neonatal death from a tertiary care neonatal intensive care unit over a period of four years.

METHODS

This was a retrospective, analytic and descriptive study, clinical, hospital based done at Division of neonatology NMCH, during January 12 to December 15 (4 year). The hospital has an obstetric unit, but also accepts high risk deliveries from other health institutes in the region. The newborn service operates as a referral neonatal intensive care unit for other district of Bihar. Neonates are admitted both inborn and outborn. At present NICU have 24 beds with ventilators, phototherapy, and facility for exchange transfusion. Surfactants are provided when required. Neonatal deaths were thoroughly discussed at the department mortality meetings as part of the morbidity and mortality studies carried out weekly by the hospital.

The inclusion criteria was all the neonates brought alive to neonatal unit. Both inborn and outborn babies were included in the study Neonates brought dead to the neonatal unit were excluded from the study. Diagnosis was mainly clinical and based upon WHO criteria. The birth weight and the gestational age were expressed in mean±SD

Diagnostic support from laboratory and radiology was used to confirm diagnosis.

Primary disease was considered as final diagnosis even the baby developed complications of primary disease or having more than one disease. WHO definitions were used for prematurity, low birth weight (LBW), very low birth weight (VLBW), extreme low birth weight (ELBW) and congenital malformation. Meconium aspiration syndrome was diagnosed on basis of history, clinical and radiological findings.

RESULTS

This study has shown that there is an annual increment in the total number of neonatal admissions to the NICU, from 2012 to 2015, which indicates the increase in demand for perinatal and neonatal services, there was an increasing trend in the number of neonatal admissions gradually over the three year period.

Out of 4457 admitted sick neonates, 2575 were male and 1882 were female. Out of 4457 patients 1746 were inborn and 2711 outborn. The most common causes of the referral from primary health centres and private nursing homes for the out born neonates were prematurity and birth asphyxia.

With 80 percent occupancy, 12% LAMA, neonatal surgical conditions 98 cases, Mortality rate in our study is 1043 (23.40%). Post discharge death rate could not be assessed.

In this study, 14 inborn babies died due to lethal congenital malformations, the commonest cause was found to be multiple dysmorphic features, which did not have a definite diagnosis in spite of extensive investigations. The second most common cause in the same group was inborn errors of metabolism (5 neonates). The most common chromosomal anomalies were trisomy 18 in three patients, and trisomy 21 in one neonate.

Out of 4457 admitted sick neonates, 1043 could not be saved and died giving mortality rate of 23.40 %. Among these deaths, 65.30% were male and 34.70% female. At time of admission, 2718 (60.98%) had age less than 24 hours.

Out of 1762 premature neonates, 475 (25.93%) died. Total neonates with sepsis were 1151 and 207 (17.18%) died. Birth asphyxia accounted for 1162 admissions and 244 (20.84 %) deaths. MAS neonates totaled 304 and 47 (15.46 %) died. Similarly malformations totaled 98 and 14 died (Table 1)The babies who were born outside our hospital had a 2.5 times higher mortality rate as compared to the babies who were born in our hospital.

Table 1: Morbidity and mortality.

Morbidity	N=4457	Inborn	Outborn	Death %
Birth asphyxia + HIE	1162 (26.07%)	251	911	244 (20.99%)
Neonatal sepsis	1151(25.82%)	381	770	207 (17.98%)
Prematurity + LBW	1762 (39.53%)	593	1169	457 (25.93%)
IUGR	319 (7.15%)	109	210	41 (12.85%)
Neonatal jaundice	614 (13.77%)	189	425	14 (2.28%)
Meconium aspiration syndrome	304 (6.67%)	106	198	47 (15.46%)
Congenital anomaly	98 (2.19%)	20	78	14 (14.28%)
Hypothermia	182 (4.08%)	67	115	8 (4.39%)
Others	72 (1.75%)	21	51	11 (15.27%)

Table 2: Birth weight admission and proportion of mortality.

Birth weight	Admission (%)	Death (%)
More than 2.5 Kg	2596 (58.24%)	482 (46.21%)
VLBW (1000-1499 gm)	732 (16.42%)	158 (15.14%)
LBW (1500-2499 gm)	668 (14.98%)	193 (18.5%)
ELBW (<1000 gm)	362 (8.12%)	210 (20.13%)

DISCUSSION

The data from hospitals in the smaller cities and from the NICUs of low resource settings is very limited. In smaller cities, the numbers of NICUs are less and the numbers of level 3 NICUs are even lesser and there are very few published reports from these hospitals.

Mortality pattern

Mortality rate in our study is 1043/4457 (23.40%).In literature it is reported different from different places. Tallat et al has reported 30.9% from Pakistan, it is 20.6%, 20.3%, from Bangladesh and Nigeria respectively.[3-5] LBW and prematurity is the leading cause of death 43.81% out of 1043 death cases. similar to Yasmin et al from Bangladesh who reported that VLBW and lower gestational age (<32 weeks) carried a high mortality risk.[9]

Morbidity pattern

Morbidity data revealed that 1762 (39.53%) of total admissions 4457 were LBW preterm. It is different from Bangladesh 13.25% and Ethiopia 11.02% Tallat et al 49.3% from Pakistan, although these are also developing countries.[3-5]

Birth asphyxia (1162 cases) and neonatal sepsis (1151 cases) are also leading cause of admission in our neonatal unit.

Neonatal mortality is a reliable index for evaluating the overall progress of neonatal and perinatal care in a community, which is a valuable indicator of the standard of a community educational, social and community health system, the nutritional status of the population and the national medical programs in obstetrics and neonatal care.[7]

Main results of our study are consistent with local and international studies with little bit differences. Total sick neonates admitted during study period are comparable with study at Oman indicates that majority were admitted within 24 hours of life.[6] It signifies that main neonatal problems arise in early neonatal period. This study showed male preponderance. Again it is consistent with local literature reported by higher male/female ratio is due to biological, cultural and social factors.[8] More than half sample of our study was brought from peripheral hospitals for neonatal care. The neonatal mortality in babies, who were delivered at NMCH, was only 9.8% as compared to 27.5% in baby born outside.

A possible cause for it may be that no other except our neonatal intensive care facility is available in our vicinity. Rashid et al from Bangladesh (developing country) reported a similar outcome.[10] Garg et al, from a community level NICU, have reported birth asphyxia as the leading cause of death, followed by sepsis.[11] There is a broad agreement that in infants with more than 2500 g of birth weight, the death is influenced by the obstetric management and that in those who are LBW, it was the quality of the neonatal care that had an important bearing on the outcome.

CONCLUSION

This study helps in developing appropriate management protocol. This pattern is different from national data. There is need to obtain regional data too.

Need of the hour is to make people aware of it and augment existing antenatal and neonatal facilities with modern gadgetries and equipment. Neonatal, especially early neonatal, mortality is very high in our region. Prematurity, low birth weight, birth asphyxia and sepsis are the main causes of mortality in our study. All these etiologies are preventable to some extent by adequate antenatal, perinatal and neonatal care. Need of the hour is to make people aware of it and augment existing antenatal and neonatal facilities with modern gadgetries and equipment. Level I and II neonatal care facilities should be established at block/ District level. Moreover community services should be stressed upon for early detection and referral to prevent complications.

Limitations of study

i) Hospital based study and does not represent community data.
ii) We were unable to diagnose inborn errors of metabolism due to lack of diagnostic facilities.

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

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