



BIRTH ASPHYXIA, HYPERBILIRUBINEMIA AND MORTALITY AMONG NEONATES ADMITTED IN NICU OF A TERTIARY CARE HOSPITAL OF ASSAM: A DESCRIPTIVE STUDY.

Medical Science

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ABSTRACT

Introduction: Most of the neonatal deaths are related to three preventable and treatable conditions like complications due to prematurity, asphyxia and infections. Globally birth asphyxia is still a major clinical problem and one of the leading causes of perinatal and neonatal mortality and morbidity especially in developing countries leading to lifelong disability. Neonatal jaundice can also cause damages like impaired vision and hearing along with learning disabilities apart from contributing to neonatal deaths. **Methods And Objective:** Therefore, this retrospective descriptive study was planned with the aim to determine the profile of those neonates who developed asphyxia, hyperbilirubinaemia and expired in NICU of a tertiary care hospital in the Mid North Bank region of Assam. **Results:** During the study period, out of 622, 204 neonates had birth/perinatal asphyxia and HIE due to asphyxia and 47 neonates died during the same period. Birth asphyxia accounted for 59.6% of death and 12.8% neonates who died with birth asphyxia also had Serum bilirubin level higher than 10mg/dl.

KEYWORDS

Neonates, Neonatal mortality, Birth asphyxia, Hyperbilirubinaemia.

INTRODUCTION:

Most of the neonatal deaths are related to three preventable and treatable conditions like complications due to prematurity, asphyxia and infections.¹ Globally birth asphyxia is still a major clinical problem and one of the leading causes of perinatal and neonatal mortality and morbidity especially in developing countries with an incidence rate upto 10 times higher than the developed countries.^{2,3} It can lead to lifelong disability and upto 25% of those affected with it, may have to live with permanent neurologic damage.³ Similarly intrauterine and neonatal insults like neonatal jaundice can also cause damages like impaired vision and hearing along with learning disabilities apart from contributing to neonatal deaths.⁴

Regarding neonatal deaths even in 2020, children had the highest risk of dying in the first month of their life with an average global rate of 17 deaths per 1,000 live births.⁵ India's National Health Policy (NHP) 2017 set a target of 16 deaths per 1000 livebirths for neonatal mortality by 2025, the government has also fixed a target of less than ten neonatal deaths per 1000 livebirths to be achieved by 2030 under the India Newborn Action Plan and according to target 2 of SDG 3, India is to achieve 12 or less newborn deaths per 1,000 live births by 2030.^{6,7,8} If the NMR trends up to 2017 were to continue, the projected NMR for India would be 17.6 (14.7–21.4) and 14.7 (11.8–18.4) per 1000 livebirths in 2025 and 2030, respectively, both higher than the respective NHP and SDG targets.⁹

Even if the target is achieved, the existing inequality between states and districts will remain as a challenge before the country. Inequality in NMR between the states and within the states varied widely in 2017. Inequality increased from 2000 to 2017 for NMR in 24 states. Among the low SDI states, the highest increases in inequality were in Assam and Odisha.⁹

Though the rapid scale up of SNCUs in the country has accelerated reduction of neonatal mortality, it has also brought to light socio-cultural barriers in care seeking.⁵

Therefore, this study was planned with the aim to determine the profile of those neonates who developed asphyxia, hyperbilirubinaemia and expired in NICU of a tertiary care hospital in the Mid North Bank region of Assam.

Study Setting:

The present study was done in the Newborn Intensive Care Unit of Tezpur medical College and Hospital after obtaining ethics clearance from the concerned authority. This medical college established in Sonitpur district in the year 2013, was the first medical college on the North bank of Brahmaputra River in the mid region of Assam, serving the population of nearby 3 to 4 districts also.

Study Methodology:

A retrospective case record analysis of all the NICU admissions between January 2021 to March 2021 was done based on both electronic and hard data. The neonates with complete records of clinical presentation, relevant biochemical investigations and other sociodemographic variables, were included in the study. Data collection was done from secondary records of registers maintained in the NICU and Biochemistry laboratory. Digital documents maintained in NICU were also utilised in the study. Data abstraction sheet was used as data collection tool. Diagnoses of the various causes of morbidity and mortality was based on standard definition followed in the paediatrics department. A total of 624 neonates were admitted in NICU during the study period. Out of them 622 were with complete record. During this period 47 neonates expired and 204 neonates were diagnosed with birth asphyxia, HIE and perinatal asphyxia. The analysis of this study is based on these neonates.

Statistical Analysis:

Data was analysed with the help of MS Excel program.

RESULTS:

A total of 622 neonates out of 624 admitted in NICU, were included as study population. During the study period, 204 neonates had birth/perinatal asphyxia and HIE due to asphyxia and out of 622, 47 neonates died during the same period. In the present study analysis of death and birth asphyxia along with hyperbilirubinaemia was done among the neonates.

Table1: Clinical Condition For Admission Of Neonates With Birth Asphyxia.

Clinical conditions for admission	No of neonates (%)
Perinatal Asphyxia	133(65.2)
Meconium Aspiration	17(8.3)
Refusal to Feed	5(2.5)
Hypoglycemia <45 mg%	4(2)
Respiratory Distress (Rate>60 or Grunt/ Retractions)	4(2)
Neonatal Jaundice	3(1.5)
Neonatal Convulsions	2(1)
Apnoea/gasping	2(1)
Others	34(16.7)
Total	204

The commonest clinical condition for which the neonates with asphyxia admitted were perinatal asphyxia followed by meconium aspiration and refusal to feed.

Table2: Distribution of Expired Neonates.

Variables	EXPIRED (%)	Total No
Female	22(8.56)	365
Male	25(6.85)	257
Inborn	25(6.85)	416
Outborn	22(10.7)	206
Full term	36(7.5)	480
Preterm	11(9)	123
<1.5kg	5(23.8)	21
1.5-<2.5 kg	11(5.2)	212
2.5-4	30(8.1)	372
>4kg	1(5.9)	17
With asphyxia	28(13.7)	204
Without asphyxia	19(4.6)	418
Total	47	622

Neonatal deaths were higher in female, outborn, preterm and in neonates with weight less than 1.5kg and with birth asphyxia.

Table 3: Distribution Of Neonatal Deaths According To Age At Death

Age at deaths	Inborn, N=25(%)	Out born, N=22(%)
Within 3 days	14(56)	13(59.1)
Between>3 - 7 days	7(28)	8(36.4)
Between7-28 days	4(16)	1(4.5)

From this analysis it is seen that more than 50% of deaths in neonates occurred within first 3 days (72 hrs) and 80% of inborn and 95% of outborn died within first 7 days.

Table4: Neonatal Deaths With Birth Asphyxia And Hyperbilirubinaemia

Neonatal Deaths,N=47	5-9.9mg/dl	10-14.9mg/dl	>15mg/dl
With Birth Asphyxia	2(4.3)	4(8.5)	2(4.3)
Without Birth Asphyxia,	3(6.4)	2(4.3)	0(0%)
Total	5(10.6)	6(12.8%)	2(4.3)

DISCUSSION:

In the present study the total number of neonates with birth asphyxia were 204(37.79%). The neonates with birth asphyxia were admitted for following clinical conditions such as perinatal Asphyxia 133(65.2%) followed by Meconium aspiration 17(8.3%), refusal to feed 5(2.5%), Hypoglycemia4(2%), respiratory distress 4(2%), Neonatal Jaundice 3(1.5%), convulsion 2(1%). Similar findings were observed by other researchers. Shah et al found birth asphyxia associated with hypoxic ischemic encephalopathy, respiratory distress, shock, congestive cardiac failure, full anterior fontanel. It is also associated with hypoglycaemia and hyperbilirubinemia.¹⁰

Salayman et al also observed a high percentage, 56.9% of perinatal asphyxia with male 60.8% and female 39.2%. The complications seen amongst the asphyxiated neonates were hypoxic ischemic encephalopathy 41.7%, Jaundice 6.7%, Septicemia 6.7%, respiratory distress syndrome 7.5%, feeding intolerance 5.8%, Transient Tachypnoea of neonates 3.3%, hypoglycaemia 1.7% and Caput succedaneum.¹¹ Paul et al in their prospective study of hospital born newborn found prematurity, low birth weight, severity of asphyxia, respiratory distress, hypoxic ischemic encephalopathy and apnoeic spells are associated with birth asphyxia.¹² In the present study 26(21.1%) preterm neonates had birth asphyxia. Babu et al, in a crosssectional study, found the incidence of birth asphyxia 6.6% with a male to female ratio of 1.4:1. Complication associated were hypoxic ischemic encephalopathy 45.1%, convulsion 32.9%, Jaundice 22.5%, apnoea 14.35, septicemia 13.7%, respiratory distress 11.8%, Necrotizing enterocolitis 7.7%, feeding intolerance 7.1%, cardiac arrest 3.6%.¹³ In a prospective hospital-based study done in western Odisha, shah et al found birth asphyxia to be associated with convulsion, oliguria, congestive cardiac failure and hypoglycaemia.¹⁴

In the present study, death in birth asphyxiated neonates was 13.7% and it constituted (28/47) 59.6% of total deaths. While Paul et al found it to be 24.7% and Babu et al found 17.8% mortality in neonates with birth asphyxia. In this study the highest percentage of death was seen in outborn(10.7%), in females(8.56%), in preterm(9%) and in birth weight<1.5kg (23.8%) and more than 50% death occurred within 3days of ages. Maheswari et al found 75% death occurred in preterm and 37.3 % death occurred in < 1kg birth weight.¹⁵ Das et al found

18.49% of death amongst neonates admitted in NICU. Mortality was high in intramural, in preterm and with birth weight < 1000gms.¹⁶ Adikane et al found highest mortality in inborn (53.59%), in males (57.52%), in preterm (59.48%) and in low birth weight (42.27%). According to age the highest mortality occurred between 1-3 days of life 45.97%.¹⁷ Sharma et al found highest death in extramural cases 62.82%, in birth weight 1500-249gms, 44.98%, in preterm 51.55%, and 62.39% died between 1-3days of age.¹⁸

In the study, among neonates who died due to birth asphyxia, 8/28(28.6%) had bilirubin level between > 5 mg/dl to 17.1mg/dl, and this proportion was higher than that in those who died without asphyxia 5/19(26.3%). Six out of 47 neonates (12.8%) who died, had both birth asphyxia as well as higher serum bilirubin level between 10 to >15mg/dl. Islam et al found significant elevation of total serum bilirubin depending on the severity of perinatal asphyxia.¹⁹ Asefa et al found that birth asphyxia was a determinant for neonatal jaundice in a hospital based case- control study.²⁰

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