

Association of Birth Asphyxia with Neonatal Mortality: Clinical, Hospital Based Study

Ravishankar Uikey¹, Manish Maran²

¹Assistant Professor, Department of Pediatrics, NSCB Medical College, Jabalpur, Madhya Pradesh, India, 482003.

²Assistant Professor, Department of General Surgery, RKDF Medical College, Bhopal, Madhya Pradesh, India, 462047.

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Corresponding author: Dr Manish Maran

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Abstract:

Background and Objectives: The current newborn mortality rate (NMR) in India is 24.9 per 1,000 live births, according to the National Family Health Survey-5 (NFHS-5) report. With all nations intending to reduce neonatal mortality to at least 12 deaths per 1,000 live births, a proposed Sustainable Development Goals (SDGs) objective for child mortality intends to end the avoidable deaths of newborns and children under the age of five by 2030. In order to improve newborn outcomes and lower the mortality rate, Special Newborn Care Units (SNCUs) should be established in each district. Respiratory distress accounts for significant morbidity and mortality in neonates. It occurs in 4 to 6 percent of neonates. Many of the conditions causing respiratory distress are preventable. Early recognition and prompt management are required. The study's goal was to identify the respiratory illness distribution and contribution to the neonatal death in tertiary neonatal care units. In order to apply measures for reducing avoidable causes of newborn morbidity, the research's goal was to evaluate the common respiratory reasons for admission to the study center's NICU and the outcomes of hospitalized neonates.

Material and Methods: After receiving approval from the institutional ethical committee and the parents' informed written consent, the descriptive, retrospective, clinical, hospital-based study involved 500 out-born neonates who were admitted to the Neonatal Intensive Care Unit (NICU) of the Department of Paediatrics at a Government Medical College and Hospital in central India between August 2014 and September 2016. Data on the admission of out born children, including the gender, age of gestation, weight for gestation, respiratory reasons for admission, length of hospitalization, complications faced, investigations conducted while in the hospital, and outcomes were retrieved. SPSS statistical software version 26 was used to analyze all of the gathered data.

Results: Study comprised of total 500 neonates' morbidity pattern showed maximum share of respiratory distress 329 cases (65.8%) followed by prematurity 17.4% (n=87) and neonatal jaundice 9% (n=45). 40.4% of respiratory distress was due to sepsis, followed by hypoxic ischemic encephalopathy (HIE) (20.9%).

Mortality was 142 cases (28.4%). Case fatality for respiratory distress syndrome was 46.4% (n=60).

Conclusion: According to our research, respiratory distress syndrome was found to be the main cause of newborn death. Health care managers at the community level should plan and carry out interventions to prevent birth asphyxia.

Keywords: Neonatal morbidity; Neonatal mortality; NICU; Causes of neonatal mortality; Respiratory distress.

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Introduction

The most crucial time of life is when a baby is born since they are susceptible to several ailments. Variable nations and regions within one nation have variable rates of newborn mortality and morbidity. Prematurity (35%), neonatal infections (33%), intrapartum-related complications/birth asphyxia (20%), and congenital deformities (9%), are the main causes of newborn fatalities in India. [1] The main reasons babies were admitted to the NICU were sepsis, prematurity, and birth asphyxia. All of these etiologies are, to some extent, avoidable, and if identified earlier, they can be successfully treated to lower morbidity as well as mortality.

The current newborn mortality rate (NMR) in India is 24.9 per 1,000 live births, as per to the National Family Health Survey-5 (NFHS-5) report. With all nations intending to reduce neonatal mortality to at least 12 deaths per 1,000 live births, the proposed Sustainable Development Goals (SDGs) objective for child mortality intends to stop avoidable deaths of newborns and children under the age of five by 2030. In order to improve newborn outcomes and lower the mortality rate, Special Newborn Care Units (SNCUs) should be established in each district. Respiratory distress accounts for significant morbidity and mortality in neonates. It occurs in 4 to 6 percent of neonates. Many of the conditions causing respiratory distress are preventable. Early recognition and prompt management are required. The study's goal was to identify the respiratory illness distribution and contribution to the neonatal death in tertiary neonatal care units. In order to apply measures for reducing avoidable causes of newborn morbidity, the research's goal was to evaluate the common respiratory reasons for admission to the study center's NICU and the outcomes of hospitalized neonates.

Aim and Objectives

The aim of the study was to assess the common respiratory causes for admission in to NICU of study centre and outcome of admitted neonates to implement the strategies for reduction of preventable respiratory causes of the neonatal morbidity.

Material and Methods

This was a descriptive, retrospective, clinical, hospital-based study on 500 out born neonates admitted in the Neonatal Intensive Care Unit (NICU) of the Department of Pediatrics, in a Government medical college and hospital of central India from August 2014 to September 2016. The Ethical Committee approved the study, and the parents gave their full, written consent after receiving information about it.

- **Inclusion criteria:** all the neonates brought alive to neonatal unit were included in the study.
- **Exclusion criteria:** children more than 28 days in age and neonates brought dead to the neonatal unit were excluded from the study.
- **Methods of collection of data:** The information on admission of out born children, gender, gestational age, weight for gestation, respiratory reasons for admission, length of hospitalization, complications faced, investigations conducted while in the hospital, as well as outcomes were retrieved. A thorough prenatal, birth, and postpartum history was elicited and recorded. All the admitted neonates underwent detailed general physical and systemic examination and investigations as per hospital protocol. Final outcome whether discharged, expired, abscond

and LAMA and duration of hospital stay were recorded.

Statistical Analysis:

In an excel sheet, data was gathered, assembled, and tallied. Quantitative information was shown as a number and a percentage. Quantitative information was displayed as mean and standard deviation. Software named SPSS 26.0 (IBM, SPSS, Inc.) was used for the statistical analysis. Values with $p < 0.05$ are regarded as statistically significant.

Results

In present study, we observed 500 out born neonates admitted in the Neonatal Intensive Care Unit (NICU) of the Department of

Pediatrics, in a government medical college and hospital of central India from August 2014 to September 2016.

Proportional mortality was found to be significantly high ($p = > 0.05$) in-

- > 37 weeks newborns (65.17%)
- Extreme low birth weight babies (100%)
- Neonate admitted in within 24 hour of life (34.39%)
- Vaginal delivery (29.51%)

Main complaints for hospitalization of newborn were respiratory distress constitutes (65%), followed by prematurity (17.4%). [Table 1]

Table 1: chief complaints on admission

Chief Complaints	N	%
Respiratory distress	329	65.8
Jaundice	45	9
Meconium Aspiration	13	2.6
Prematurity	87	17.4
Not accepting feed	4	0.8
Congenital Malformation	22	4.4
Total	500	100

40.4% of respiratory distress was due to sepsis, followed by hypoxic ischemic encephalopathy (HIE) (20.9%). [Table 2]

Table 2: Causes of respiratory distress.

Etiological cause	N	%
Prematurity (HMD)	13	3.4%
Meconium Aspiration	26	6.9%
Pneumonia	8	2.1%
HIE	78	20.9%
Sepsis	151	40.4%
Congenital malformation	8	8.8%
TTN	33	2.1%
Miscellaneous (hypoglycemia, hypothermia, etc)	58	15.5%
Total	373	100%

13.95% (12/86) and 18.60% (16/86) newborns had birth asphyxia stage I and III, respectively, while HIE II constituted 67.44% (58/86) newborns which was the maximum proportion of birth asphyxia. [Table 3]

Table 3: Birth asphyxia according to gestational age

Gestational age wise	Admission	Stage of Birth Asphyxia		
		I	II	III
<28 wk.	16	0	2	0
29-32 wk.	120	0	0	0
33 -36 wk.	252	7	52	14
>37 wk.	112	5	4	2
Total	500	12	58	16

Newborns with birth weight >2.5 kg constituted 39.53% (34/86) cases of HIE II as compared to newborns born with <2.5 kg birth weight which constituted 32.55% (28/86) cases of HIE II. [Table 4]

Table 4: Birth asphyxia according to birth weight

Gestational age wise	Admission	Stage		
		I	II	III
< 1	17	0	4	0
1 - 1.5	83	0	2	2
1.5 - 2.5	250	7	22	6
>2.5 kg.	150	4	34	9
Total	500	11	58	17

Major cause of death in this study was RDS 46.4% followed by NNS 21.9%, ELBW 4.2% and MAS 1.4 %. [Table 5]

Table 5: Cause Wise Mortality

Cause wise Mortality	N	%
Respiratory Distress Syndrome (RDS)	60	46.4
Non-Nutritive Sucking (NNS)	30	21.49
Prematurity	22	15.49
Hypoxic Ischemic Encephalopathy (HIE)	13	9.2
Extremely Low Birth Weight (ELBW)	6	4.2
Meconium Aspiration syndrome (MAS)	2	1.4
Congenital pneumonia	1	0.7
Congenital Heart Disease (CHD)	1	0.7
Congenital Malformation	1	0.7
Total	142	100

Discussion

Each year, thousands of potential citizens are lost due to neonatal mortality. In addition to being a terrible economic and societal loss, this causes thousands of parent's unimaginable anguish. Therefore, pediatricians find this sector to be filled with difficult mysteries. Respiratory distress accounts for significant morbidity and mortality in neonates. It occurs in 4 to 6 percent of neonates. Many of the conditions causing respiratory distress are

preventable. Early recognition and prompt management are required. Out of 500 newborns, the majority were hospitalized within a day of delivery. Neonatal patients hospitalized within 24 hours of birth had a higher proportional death rate (chi square=16.9; p 0.05). The fact that so many really ill newborns are admitted to hospitals soon after delivery may be the explanation of this high fatality rate. In the current study, 94.2% of infants were born vaginally, whereas 5.8% were delivered

using LSCS. Proportional mortality rate was higher 29.51% in vaginal delivery (chi square=4.93) ($p = >0.05$).

M. Singh et al [6] reported that 63.6% were spontaneous vaginal delivery while 28.7% babies were delivered by caesarean section and 10% by assisted vaginal delivery.

J. P. Singh et al [7] in their study found the 31.4% LSCS and 45.7% of unassisted vaginal delivery.

In present study, the main complaints for hospitalization of newborn are respiratory distress (65.8%), prematurity (17.4%), jaundice (9%), congenital malformations (4.4%) and meconium aspiration (2.6%). Nearly 40% babies had two or more problem at time of admission and most of the morbidities in newborn occurred due to neonatal septicemia (32.8%) and Prematurity (31.8%), and other causes includes meconium aspiration (17.35%), birth asphyxia (15.2%) and neonatal hyperbilirubinemia (9%).

M. Singh et al [6] reported morbidity pattern at AIIMS in 7015 live births, out of which, 414 (5.9%) babies had birth asphyxia II and III, 400 (5.6%) had RDS, 2 (5.9%) had hyperbilirubinemia and 125 (1.8%) babies had culture positive neonatal septicemia.

J. P. Singh et al [7] demonstrated that birth asphyxia was found in 75% of cases in their study group. Neurological complication reported in 51% of cases, followed by, pulmonary complications (36%), neonatal septicemia (18%), and major congenital malformation (11.19%).

G. K. Mukasa et al [8] reported that morbidity pattern in low birth weight (<2.5 kg) babies were prematurity (48.4%), birth asphyxia (24.2%), respiratory distress syndrome (15.2%). In babies with >2.5 kg birth weight, causes of morbidity were birth asphyxia (53.1%), birth injuries (21.1%), and meconium aspiration (2%).

According to J. N. Bhall et al [9], hypoxia (27.4%) and newborn infection (31.4%)

were the two causes of the greatest morbidity.

It was found that the major etiological cause of death in present study was RDS (46.4%) followed by NNS (21.12%), ELBW (4.2%) and MAS (1.4%).

In present study, 13.95% (12/86) and 18.60% (16/86) newborns had birth asphyxia stage I and III, respectively, while HIE II constituted 67.44% (58/86) newborns which was the maximum proportion of birth asphyxia. Newborns with birth weight >2.5 kg constituted 39.53% (34/86) cases of HIE II as compared to newborns born with <2.5 kg birth weight which constituted 32.55% (28/86) cases of HIE II.

M.S. Sarna et al [10] reported that respiratory distress and prematurity (29.3%), sepsis (24.4%) and asphyxia (16.2%) contributed to neonatal deaths.

M. Singh [6] found that HMD (33.5%) was the major cause of respiratory distress followed by TIN (21%), MAS (17.5%) and pneumonia (17.5%).

In contrast to our study Hugh M. Macdonald et al [11] reported 62.3% of < 37-week babies had asphyxia while only 0.4-0.7% of term babies.

Whereas similar results were seen by L. Das et al [12], he reported 72.1% case of birth asphyxia case were term babies and remaining 19.4% and 8.8% were preterm and post-term, respectively. Similar observations were also found by M. Singh et al [13] 36.5% of birth asphyxia babies where preterm 63.5% babies were term. But N. N. Finner et al [14] reported that 35% of term infant had moderate severe birth asphyxia. As contrast to this study 20% term babies had moderate to severe birth asphyxia in present study.

In present study, 62% of all the admitted newborns were discharged, 28.4% newborns expired, and 9 % newborns leave against medical advice (LAMA).

Conclusion

According to our research, respiratory distress syndrome was found to be the main cause of newborn death. Health care managers at the community level should plan and carry out interventions to prevent birth asphyxia. The "Risk Approach" is the most realistic and feasible approach for offering community members basic perinatal care.

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