ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 02 | February - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

# INCIDENCE OF HYPOXIC ISCHAEMIC ENCEPHALOPATHY IN TERM NEWBORNS AT A TERTIARY CARE CENTRE

Paediatrics

**Dr Pawan Kumar S*** Associate Professor, Department Of Pediatrics, Raja Rajeswari Medical College And Hospital Banglore *Corresponding Author

**Dr Auti Sharan Kumar** Junior Resident, Department Of Pediatrics Raja Rajeswari Medical College And Hospital Banglore

**Dr Ravali Polepaka** Junior Resident, Department Of Pediatrics Raja Rajeswari Medical College And Hospital Banglore

**Dr Adarsh. E** Hod And Professor, Department Of Pediatrics, Raja Rajeswari Medical College And Hospital Banglore

KEYWORDS

## INTRODUCTION:

According to the World Health Organization (WHO), Perinatal asphyxia is defined as the failure to initiate and sustain breathing at birth.[1] Perinatal asphyxia is a common and serious neonatal problem globally and it significantly contributes to both neonatal morbidity and mortality. According to the World Health Organization (WHO) in 2000, of the 130 million infants born globally each year, approximately 4 million babies die before they reach the age of 1-month.[2] It has been shown that 99% of these neonatal deaths take place in the developing countries where perinatal asphyxia contributes to almost 23% of these deaths.[2] Perinatal asphyxia is estimated to be the fifth largest cause of under-five child deaths (8.5%), after pneumonia, diarrhea, neonatal infections and complications of preterm birth.[3] According to Volpe, hypoxemia is defined as the "diminished amount of oxygen in the blood supply," while cerebral ischemia is defined as the "diminished amount of blood perfusing the brain." Cerebral ischemia is more important of the two forms of oxygen deprivation as it also leads to glucose deprivation. The terms hypoxia-ischemia and asphyxia are often used interchangeably, but from a pathophysiological viewpoint, they are not equivalent.[4] Hypoxic ischemic encephalopathy (HIE) also known as hypoxic-ischemic brain damage (HIBD) and hypoxicischemic reperfusion brain injury is one of the most serious conditions affecting the neonatal central nervous system.[5] . HIE is a syndrome of disturbed neurological function manifested by difficulty in initiating and maintaining respiration, abnormal muscle tone and reflexes, subnormal level of consciousness and often seizures.[6] The American College of Obstetricians and Gynecologists and the American Academy of Pediatrics assign a neonate to be asphyxiated if the following conditions are fulfilled: Umbilical cord arterial pH <7; Apgar score of 0-3 for longer than 5 min; neurological manifestations (e.g., seizures, coma, or hypotonia); and multisystem organ dysfunction, e.g., cardiovascular, gastrointestinal, hematological, pulmonary or renal system.[7] HIE accounts for significant neonatal morbidity and mortality and also results in longterm neurodevelopmental sequelae causing cerebral palsy. Perinatal asphyxia usually leads to multiorgan system damage; other organ systems are affected well before the central nervous system. The main objective of this study was to observe the incidence of perinatal asphyxia in babies born at Rajarajeswari medical college and hospital

## MATERIALS AND METHODS

### Study design

This study design was a prospective study

### Study period

This study was conducted from December 2019 to June 2021

### Place of study

Rajarajeswari Medical College and hospital, Bangalore, Karnataka.

### Inclusion criteria

Full-term asphyxiated newborns with

- With APGAR of less than or equal to 5 at 5 minutes.
- Umbilical vein blood pH <7.1 and base deficit -12
- Requiring ventilation more than 10 minutes.

### Exclusion criteria

- Newborns with any congenital disorders.
- Mothers with thyroid disorders
- Preterm babies

### Methodology

Detailed obstetric history, birth history, risk factors in the pregnancy, type of delivery and need of resuscitation procedure required at birth were recorded. During resuscitation in labor room/operation theatre, Neonatal Resuscitation Program (NRP) guideline 2015 recommended by American Academy of Pediatrics (AAP) were followed and detailed neurological examination of asphyxiated newborns were performed. The New Ballard Score (NBS) was used to estimate gestational age (GA) within 48 hours of birth.

APGAR score was recorded at 1 and 5 minutes after the birth. Babies with asphyxia were assessed by Sarnat and Sarnat staging. They were classified according to Sarnat and Sarnat scoring system. The enrolled babies were assessed by 8 tools in Sarnat and Sarnat scoring criteria. Accordingly, they were classified as mild HIE, moderate HIE, and severe HIE .

## RESULTS

During the study a total of 3507 babies were delivered term babies of about 3130. Among them, 30 babies had birth asphyxia and they are enrolled for our study. The incidence of birth asphyxia among near-term and term babies in our study is 2.7%.

The mean birth weight of asphyxiated babies was 3008.0±1100gms and mean gestational age was 38.83±2.0weeks. Similarly, mean Apgar score at 1 min was 3.97and at 5 min was 6.30

In our study, among the 30 babies, 63.3% (n = 19) are male babies and 36.6% (n = 11) are female babies

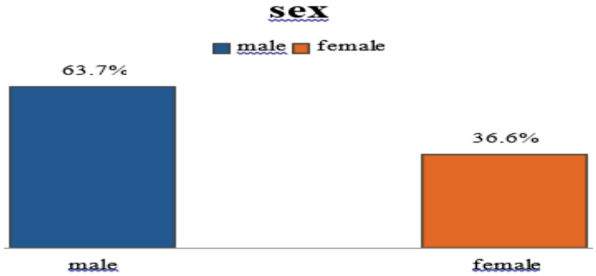


**Figure 1: Gender wise distribution among asphyxiated babies**

Among these 30 babies, the mode of delivery is as follows: 24 babies by normal delivery (80%), 2 babies by instrumental delivery (6.6%), 4 babies by caesarean section (13.3%)

**TABLE 1: Distribution of APGAR score**

| APGAR score | Groups | Mean | p value |
|---|---|---|---|
| 1 min | Cases (asphyxiated) | 3.97 | <0.001 |
| 5 min | Cases (asphyxiated) | 6.30 | <0.001 |

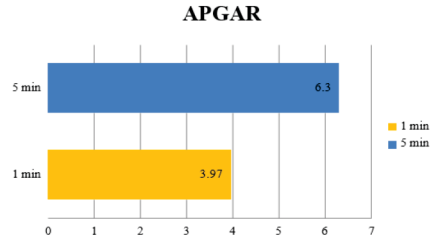


**Figure 2: Distribution of APGAR score**

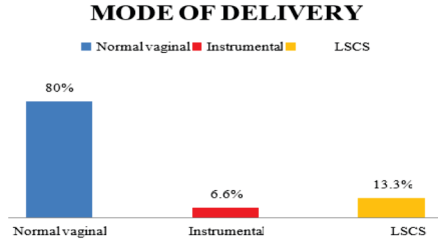


**Figure 3: Distribution of Mode of delivery**

These babies are classified by Sarnat and Sarnat scoring system. Among them 12 (40%) had mild HIE, 17(56.7%) had moderate HIE and 1(3.3%) had severe HIE during the course in NICU.

**Table 2: Distribution of Hypoxic ischemic encephalopathy (HIE) stage**

| HIE Stages | Asphyxiated N (%) |
|---|---|
| Stage 1 | 12 (40) |
| Stage 2 | 17 (56.7) |
| Stage 3 | 1 (3.3) |
| Total | 30 |

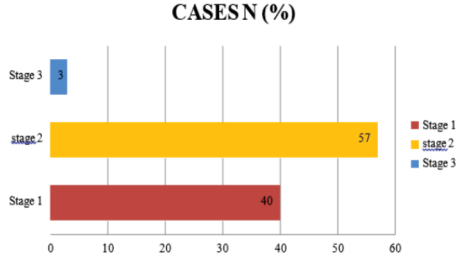


**Figure4: Distribution of Hypoxic ischemic encephalopathy (HIE) Stages**

## DISCUSSION

In our study, the incidence of HIE among term babies is around 2.7%. In our study, 63 % were male babies, male to female ratio is 1.6:1, which is similar to study conducted Be Yelamali et al. showed 65% were males and 35% were females.[8] Another study conducted by Roopa et al. at MahadevappaRampure Medical College, Gulbarga, Karnataka,[9] showed a gender predominance of 56% in males compared to 44% in females.

In our study among the 30 babies, 24 babies (80%) were delivered by normal vaginal delivery and 4 babies (13.3%) were delivered by caesarean section. In a study conducted in Motilal Nehru Medical College, Allahabad, 65% of asphyxiated babies were born through assisted delivery[10]. Chandra et al. also observed caesarean section and breech delivery to be significantly associated with asphyxia.[11]

Most of the babies in our study had mild HIE accounting for 57%. This is similar to the study conducted in The Government Medical College, Kozhikode, Kerala, [12] where 56% of babies had mild HIE and another study conducted in northern Tanzania,[13] where 50.8 % had mild HIE.

## CONCLUSION

Birth asphyxia is one of the most common causes of admission to NICU. This study was conducted in the State Tertiary Centre where many of the high-risk pregnancies are referred and managed. most of the mothers' presented late and there was also delay in obtaining consent for caesarean section by the mother and or her husband, hoping that she may eventually deliver spontaneously Early referral and adequate training regarding complicated labor to the peripheral centres can minimize the birth asphyxia and its related complications. Moreover, effective resuscitation and early intervention of asphyxiated babies will have a good outcome.

## REFERENCES

1. Diaz-Rosello J, Gisore P, Niermeyer S, Paul V, Quiroga A, Saugstad O, et al. Guidelines on basic newborn resuscitation 2012. Geneva: World Health Organization. 2012.
2. Lawn JE, Cousens S, Zupan J, Lancet Neonatal Survival Steering Team. 4 million neonatal deaths: When? Where? Why? Lancet 2005;365:891-900.
3. Bryce J, Boschi-Pinto C, Shibuya K, Black RE, WHO Child Health Epidemiology Reference Group. WHO estimates of the causes of death in children. Lancet 2005;365:1147-52.
4. Volpe JJ. Neurology of the Newborn. 4th ed. Philadelphia, PA: WB Saunders Company; 2001. p. 217-76.
5. Guha DK. Guhas Neonatology Principles and Practice. 3rd ed., Vol. 2. New Delhi: Jaypee Brothers Medical Publishers; 2005. p. 966.
6. Nelson K, Leviton A. How much of neonatal encephalopathy is due to birth asphyxia? Am J Dis Child. 1991 Nov;145(11):1325-31.
7. Stoll JB, Kliegman RM. The fetus and the neonatal infant. In: Berhman RE, Kliegman RM, Jenson HB, editors. Nelson Textbook of Paed. 16th ed. Philadelphia: WB Saunders Company; 2000. p. 454-9.
8. Yelamali BC, Panigatti P, Pol R, Talawar KB, Naik S, Badakali A. Outcome of newborn with birth asphyxia in tertiary care hospital. Med Innov 2014;3:59-64.
9. Mangshetty RB, Tallolli I, Patil S. Cardiac troponin-1 as a marker of myocardial damage in newborns with hypoxic ischemic encephalopathy. J Evol Med Dent Sci 2014;3:15482-6
10. Mohan K, Mishra PC, Singh DK. Clinical profile of birth asphyxia innewborn. Int J Sci Technol 2013;3:1-19.
11. Lally PJ, Price DL, Pauliah SS, Bainbridge A, Kurien J, Sivasamy N, et al. Neonatal encephalopathic cerebral injury in south india assessed by perinatal magnetic resonance biomarkers and early childhood neurodevelopmental outcome. PLoS One 2014;9:e87874.
12. Lally PJ, Price DL, Pauliah SS, Bainbridge A, Kurien J, Sivasamy N, et al. Neonatal encephalopathic cerebral injury in south india assessed by perinatal magnetic resonance biomarkers and early childhood neurodevelopmental outcome. PLoS One 2014;9:e87874.
13. Simiyu IN, Mchaile DN,Katsongeri K, Philemon RN, Msuya SE. Prevalence, severity and early outcomes of hypoxic ischemic encephalopathy among newborns at a tertiary hospital, in northern Tanzania. BMC Pediatr 2017;17:131.