

## Original Research Article

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# Assessment of epidemiological profile of neonatal seizure cases admitted to a tertiary health center of Odisha, India: a cross-sectional study

Geetanjali Sethy<sup>1</sup>, Dhaneswari Jena<sup>2\*</sup>, Pullakranjan Mallik<sup>1</sup>,  
Sithun Kumar Patro<sup>2</sup>, Biswakalyan Mishra<sup>2</sup>

<sup>1</sup>Department of Pediatrics, <sup>2</sup>Department of Community Medicine, MKCG Medical College Brahmapur, Odisha, India

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**\*Correspondence:**

Dr. Dhaneswari Jena,  
E-mail: drdlena@rediffmail.com

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## ABSTRACT

**Background:** Neonatal seizures are common manifestations of neurologic dysfunction in newborns. The incidence of seizures in neonatal period is higher than any other period of life. It is one of the common causes of admission to special newborn care unit. Therefore, it has been decided to assess the epidemiological profile of neonatal seizure.

**Methods:** A cross-sectional study was conducted from January 2017 to June 2018, in the SNCU of MKCG Medical College and Hospital, Berhampur. A total of 300 neonates admitted to SNCU with clinically apparent seizure were the study population and convenient sampling method was used for selecting them. The approval was taken from IEC MKCG Medical College to carry out the study. The data was collected by using a pretested proforma from parents and hospital records. Verbal informed consent was taken from parents. The data so collected was analysed in the department of Pediatrics.

**Results:** Out of the total 300 babies, 66% were males, 61.34% were early neonates, 77% babies were of primi mothers, 76% of babies were outborn. 62.12% of babies were born by vaginal route. HIE was most common (88%) cause of seizure. Out of the all seizure types, subtle seizure was most common (87.67%), followed by clonic seizure (35.67%). Various maternal risk factors were present in 81.81 % of cases. Most common risk factor was anemia (50.57%). 18.93% of cases were born with history of obstructed labor/prolonged labor. Overall mortality was 8%.

**Conclusions:** Neonatal seizures are important causes of morbidity and mortality in newborns. Prevention of HIE and maternal risk factors along with early use of an effective drug with minimum side effects are the ways to overcome this problem.

**Keywords:** HIE, Morbidity, Neonates, Risk factors, Seizure

## INTRODUCTION

Neonatal seizure is the frequent and distinctive manifestations of neurologic dysfunction in newborn period. Incidence of seizure in neonatal period is higher than any other period in life.<sup>1</sup> According to NNPD 2002-2003 data from 18 tertiary care centre across India, incidence of neonatal seizure was 10.3 per 1000 live birth.<sup>2</sup> The incidence of neonatal seizure in developed countries is 2.8 per 1000 in infants with birth weight of

more than 2500 gm. It is higher in preterm low birth weight neonates – as high as 57.5 per 1000 in very low birth weight infants. Incidence increases with decreasing gestational age and birth weight.<sup>1</sup>

Reasons why neonatal seizure should be recognized and managed early are many folds. Seizures contribute to significant cause mortality and morbidity. They are detrimental to the developing brain. Presence or absence of seizure modify the treatment plan in a particular baby.

The objective of the present study was to assess the epidemiological profile of neonatal seizure

## METHODS

A cross-sectional study was conducted from January 2017 to June 2018 in the special newborn care unit of MKCG Medical College and Hospital, Berhampur. A total of 300 neonates admitted to special newborn care unit (SNCU) with clinically apparent seizure were the study population. They were selected by using convenient sampling method.

**Methodology:** Babies admitted for subtle seizure, tonic seizures, clonic seizures, myoclonic seizures who were clinically diagnosed, were taken as study group. Data was collected by using scientifically designed pretested proforma, from medical record as well as interview of parents. Written informed consent was taken from parents in a pre-structured proforma. Approval by institutional ethical committee was taken prior to the beginning of the study.

### Inclusion criteria

- Sampling units was-term neonates admitted to SNCU with clinically apparent seizure.

### Exclusion criteria

- Babies older than 28 days, seizure due to hypoglycaemia or hypo-calcemia.

## RESULTS

Neonatal seizure is one of the common causes of admission to SNCU. However, the etiology of neonatal seizure is quite different in term and preterm babies. Out of the total 300 study population, 198 (66%) were male babies. Maximum number of babies were between 0-7 days of life in which male and female were 61.34% & 32% respectively. Among age group of 8 to 14 days also prevalence of male gender was more. Only 2.34% children were in age group of 15 to 28 days. Overall prevalence of seizure decreases with age among the neonates (Table 1).

**Table 1: Age and sex distribution of study participants.**

Age	Gender		Total	
	Male	Female	No.	%
0-7 days	184	61.34	96	32
8-14 days	10	3.34	3	1
15-28 days	4	1.34	3	1
Total	198	66	102	34
			300	100

Also, maximum number of babies belonged to primi gravida (77%).

Mothers below 30 years of age (90.7%) predominated in this study followed by 30-40 years (8%). In all age group prime mothers were maximum. The cause may be more difficult delivery process and inexperienced mother which were the contributory factor of neonatal seizure (Table 2).

**Table 2: Age and order of pregnancy of mothers of study group.**

Age of mother	Gravida of mother		Total	
	1	≥2	No.	%
<30 years	214	58	272	90.67
30-40 years	16	8	24	8
>40 years	1	3	4	1.33
Total	231 (77%)	69 (23%)	300	100

Assessing the modes of delivery in HIE babies. 62.12% of babies were born by vaginal route and 37.88% of babies were born by caesarean section. In total study population, 228 (76%) babies were born outside and referred to the special newborn care unit, while 72 (24%) were born in MKCGMCH. 177 (77.63%) of outborn babies were delivered by vaginal route and in contrast, more number of babies 51 (70.83%) were delivered by caesarean section in MKCH MCH. More prevalence of Cesarean section among the study population may be due to complicated deliveries in tertiary healthcare level which might have contributed to seizure in neonates. More outborn prevalence might be due to mismanagement at periphery or home during conduction of delivery (Table 3).

**Table 3: Study participants according to place of delivery and mode of delivery.**

	Mode of delivery		Total
	NVD	LSCS	
Inborn	21 (29.17)	51 (70.83)	72 (24)
Outborn	177 (77.63)	51 (22.37)	228 (76)
Total	198 (66)	102 (34)	300 (100)

Hypoxic Ischemic Encephalopathy (HIE) was the commonest cause of neonatal seizure constituting 88% of total study population.

Next common cause of seizure in this study group was sepsis/meningitis (10.7%). In HIE babies, 65.9% were male and female 34.09% (Table 4).

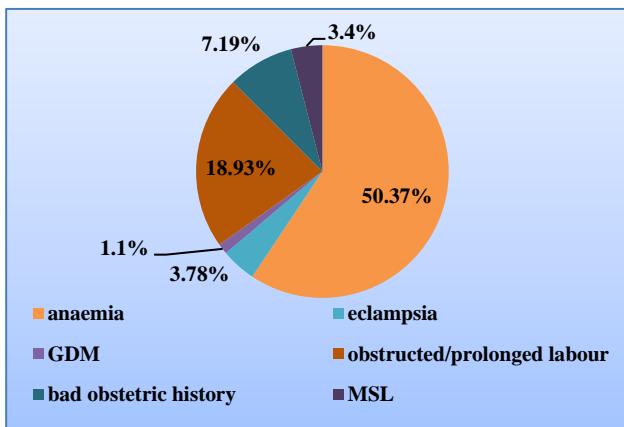
2 cases of benign neonatal seizure and 1 case of structural mal formation were observed in male babies. Only 1 case of benign seizure seen among female.

81% of cases of HIE babies were associated with maternal risk factors. Most frequently encountered risk factor (50.57%) was maternal anemia, whereas next common cause (18.93%) was obstructed / prolonged

labour. Other causes were bad obstetric history, eclampsia, MSL and GDM.

**Table 4: Causes of seizure among both the sex group of study population.**

Cause of seizure	Gender		Total No. (%)
	Male No. (%)	Female No. (%)	
HIE	174 (65.90)	90 (34.09)	264 (88)
Sepsis/meningitis	20 (62.5)	12 (37.5)	32 (10.67)
Structural brain malformation	1 (100)	0	1 (0.33)
Benign neonatal seizure	2 (66.5)	1 (33.5)	3 (1)
Total	197 (65.67)	103 (34.34)	300 (100)



**Figure 1: Maternal risk factors in case of HIE babies.**

## DISCUSSION

Out of the total 300 babies, male constituted two third of the study population. As per national data, sex ratio in India is 940 females for every 1000 males.<sup>3</sup> More number of male babies in the study population might be due to prevalent sex ratio. This observation was nearly similar to the study conducted by Sedighi M et al where predominance of male babies were observed (58 % male babies and 42 % female babies).<sup>4</sup> Another study done by Malihe and Mohammadi et al who found that 85 % of their study population were male and 15 % were female babies.<sup>5</sup>

In this study, 77% of babies were born to 1st gravida while only 23% of babies were born to >2nd gravida mothers. Mothers of age less than 30 years predominate in this study(90.67%) followed by mothers of age 30-40 years(8%). This observation might be due to maximum number of babies in this study belonged to HIE. Primigravida mothers were most likely to have difficult labour and delivery than multipara mothers. This observation was similar to Singh KS et al, who found that 68.7% of

babies in their study were born to 1st gravida mother.<sup>6</sup> Another study by Patra et al found that 57.3 % of babies with neonatal seizure were born to primigravida mother.<sup>7</sup>

When place of delivery was considered, maximum number of babies (76%) were out born. More number i.e. 77.63% of out born babies were delivered by vaginal route in contrast to number (70.83%) of inborn babies born by caesarean section. This observation may be due to the fact that the study center is a referral hospital to which, all complicated cases are referred requiring emergency caesarean section. More number of vaginal deliveries in babies born outside, might be due to lack of caesarean section facility in peripheral institutions. This observation is similar to study conducted by Sugunakar Reddy et al. who found that 70.70% of HIE babies to be outborn.<sup>8</sup> Chaitali Patra et al. found out that the 68% of HIE babies are inborn babies which is contradictory to present study.<sup>7</sup> Vemuri and Lalwaniet et.al. found that 37 % of the HIE babies born as out-born.<sup>9</sup>

Maximum number of babies (88%) admitted due to seizure in this study belong to perinatal asphyxia& HIE. Next common cause of seizure was sepsis/meningitis (10.6%). Among HIE babies male predominated (65.9%) as compared to female (34.09%). Malihe Kadivar et al. found similar result. In their study HIE (45%) was the major cause of neonatal seizure followed by congenital malformation of brain (20%) and sepsis/meningitis (10%).<sup>5</sup>

More number of babies born by vaginal route (62.12%) were suffering from HIE than the babies born by LSCS (37.88%). Singh KS and Sengar et al. described 71.6 % delivered by vaginal route and 28.4 % of babies delivered by caesarean section developed HIE.<sup>[6]</sup> Patra and Sarkar et al. found that 69.3 % babies delivered by vaginal route and 30.7% of babies delivered by LSCS were suffering from HIE.<sup>7</sup>

Higher percentage of out born babies in this study were suffering from HIE. This was most probably due to a greater number of babies are born by vaginal route at places where caesarean section facility was not available.

Maternal risk factors were found to be present in 81.81% of HIE babies and common maternal risk factor associated was maternal anemia in 50.37% of babies, followed by obstructed/prolonged labour (18.9%) and bad obstetric history (7.19%). Singh. KS et.al. documented eclampsia in 9.7%, obstructed labor in 7.3% of cases.<sup>6</sup> Laila H. Mohammed, et al also reported obstructed labour associated with 19 % of cases seizures.<sup>10</sup>

## CONCLUSION

Neonatal seizures are important causes of morbidity and mortality in newborns. From this study it is observed that seizures frequently present in first 7 days of life. HIE and

early gestational age are the most common risk factor for seizure. Seizures are detrimental to immature and developing brain which may lead to significant cognitive impairment. Risk of future epilepsy is also higher in these babies. Control of maternal and neonatal factors associated with seizures and timely use of an effective drug with minimum side effects are the two important cost-effective measures to prevent immediate complication and future intellectual disability, motor delay & cognitive impairment.

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