



## INCIDENCE AND RISK FACTORS OF NEONATAL SEIZURES IN LOW BIRTH WEIGHT NEONATES BORN IN RURAL TERTIARY CARE CENTRE.

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### ABSTRACT

**BACKGROUND:** To study the incidence and risk factors of neonatal seizures in low birth weight neonates born in rural tertiary care centre.

**METHODS:** This is a prospective observational study. It was carried out in neonatal division of department Of pediatrics MMIMSR, Mullana. The study included 200 low birth weight neonates born during the study period.

**RESULTS:** Out of 200 neonates the incidence of neonatal seizures was 4%. According to weight distribution 181(90.5%) were LBW(2499gm - 1500gm) , 14(7%) were VLBW(1499gm-1000gm) , 5(2.5%) were ELBW(<1000gm) and the incidence of neonatal seizure among LBW was 3.31% , VLBW 7.1% and ELBW 20%. The incidence of neonatal seizure among term was 3.09% and preterm was 4.95%. The most common cause of neonatal seizure was birth asphyxia (37.5%) followed by meningitis (25%), hypocalcemia(12.5%), intracranial hemorrhage(12.5%) and RDS(12.5%).

**CONCLUSION:** Low birth weight and preterm deliveries are at higher risk for morbidity during and after the birth. Early referral of high-risk pregnancies to the tertiary care centers will greatly reduce the incidence of neonatal seizures in neonates. The incidence increases as birth weight and gestation decreases in neonates. The co morbidities causing hypoxic damage and other CNS insults should be controlled at the earliest to avoid occurrence of seizures in neonates.

**KEYWORDS :** Respiratory distress , low birth weight , transient tachypnea of newborn and respiratory distress syndrome.

### INTRODUCTION:

As per World health organization (WHO) low birth weight is defined as any infant born with a birth weight of less than 2500gm (up to and including 2499gm) which further is categorized into very low birth weight (VLBW) which is between 1000 to 1499gm and extremely low birth weight (ELBW) which is less than 1000gm. The incidence of LBW in south Asia is 28%. It is estimated that 15% to 20% of all births worldwide are low birth weight, representing more than 20 million births a year.[1]. The overall risk factors for LBW are similar to the risk factors for preterm birth[2].

Birth weight is a reliable and sensitive indicator for predicting the immediate or late outcome of a newborn[3,4] . Low birth weight infants are at increased risk of different types of early neonatal complications like birth asphyxia, septicemia, respiratory distress syndrome, hypothermia, hypoglycemia, neonatal jaundice etc[1]. Preterm baby is defined as babies born alive before 37 completed weeks of pregnancy [5].

### Neonatal Seizures

**Definition:-** A paroxysmal alteration in CNS function, i.e. motor, behavior and/or autonomic function in a clinical manner is defined as seizure.

Types of seizure are : 1. Epileptic seizures, 2. Non-epileptic seizures, 3. EEG seizures

### Classification of seizures :-

1. Subtle seizures
2. Clonic seizures
3. Tonic seizures
4. Myoclonic seizures

The most common causes of seizures include HIE, metabolic disorders (hypoglycemia and hypocalcemia) and meningitis. The other miscellaneous causes include drug toxicity, maternal history of narcotics, polycythemia, phacomatosis (tuberous sclerosis, incontinentia pigmenti) and low zinc levels in CSF[6].

### AIMS AND OBJECTIVES:

To study the incidence and etiology of respiratory distress in low birth

weight neonates taking place at Maharshi Markandeshwar Hospital, Mullana, Ambala.

### METHODS:

This is a prospective observational study. It was carried out in neonatal division of department Of pediatrics MMIMSR, Mullana. The study included 200 low birth weight neonates born during the study period. This was a hospital based study conducted between May, 2020 till June, 2021.

### INCLUSION CRITERIA

- Eligible neonates delivered and admitted at tertiary care centre, mullana born with a birth weight less than 2500gm is included.
- Study group is comprised of babies with both term and preterm babies.
- Study group is comprised of only inborn babies of our institution.
- Those who agreed for the consent form.

### EXCLUSION CRITERIA

- Neonates with gross congenital malformations / genetic anomalies.
- Those in whom full data of first 72 hours is not available.
- Babies with outborn deliveries.
- Those who rejected the consent form.

### DETAILED METHODOLOGY

The weight of the baby is carried daily on electric weighing machine. All the neonates admitted in NICU are managed as per their pathological issues and conditions. All infants enrolled in the study are followed daily till their final stay in hospital for any morbidity by clinical evaluation and review of hospital records.

### STATISTICAL ANALYSIS

Data is presented as proportions and percentages.

Other statistical tests are applied as necessary.

All data collected has been analyzed using SPSS software version(25.0)

### ETHICAL CONSIDERATION

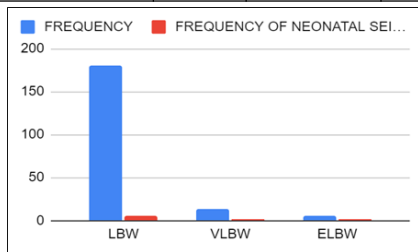
A prior permission from The Institutional Ethics committee was obtained. The study did not impose any financial burden on the parents

or guardians of the study group and an informed written consent is taken by the parents/guardians of the participants before conducting the study. All participants are ensured confidentiality.

**RESULTS AND OBSERVATION:**

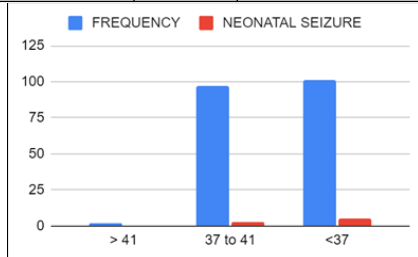
Out of 200 neonates 8 had neonatal seizures. The incidence of neonatal seizures in index study was 4%. According to weight distribution 181(90.5%) were LBW(2499gm - 1500gm) , 14(7%) were VLBW(1499gm-1000gm) , 5(2.5%) were ELBW(<1000gm) and the incidence of neonatal seizure among LBW was 3.31% , VLBW 7.1% and ELBW 20%. According to gestation 2(1%) were post term , 97(48.5%) were term and 101(50.5%) were preterm. The incidence of neonatal seizure among term was 3.09% and preterm was 4.95%. The most common cause of neonatal seizure was birth asphyxia (37.5%) followed by meningitis (25%), hypocalcemia(12.5%), intracranial hemorrhage(12.5%) and RDS(12.5%).

BIRTH WEIGHT	FREQUENCY	FREQUENCY OF NEONATAL SEIZURE	INCIDENCE
LBW(2499gm - 1500gm)	181	6	3.31%
VLBW(1499gm-1000gm)	14	1	7.1%
ELBW(<1000gm)	5	1	20%



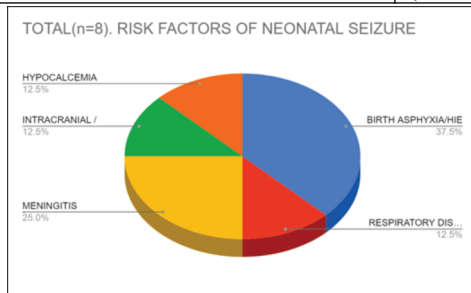
(FIGURE 1)

GESTATION IN WEEKS	FREQUENCY	FREQUENCY OF NEONATAL SEIZURE
> 41	2	0(0%)
37 to 41	97	3(3.09%)
<37	101	5(4.95%)



(FIGURE 3)

RISK FACTORS OF NEONATAL SEIZURE	TOTAL(n=8)
BIRTH ASPHYXIA/HIE	3(37.5%)
RESPIRATORY DISTRESS SYNDROME	1(12.5%)
MENINGITIS	2(25%)
INTRACRANIAL / INTRAVENTRICULAR HEMORRHAGE	1(12.5%)
HYPOCALCEMIA	1(12.5%)



(FIGURE 3)

**DISCUSSION:**

In this study 4% had seizure episodes. The other study with Bandyopadhyay S [7] had 1.3% , Mary Jo Lanska,et.al [8] had 6.19%.

In the study among neonates with weight < 1500gm 10.5% had seizures. Other results seen in study David Kohelet,et.al [9] had 5.6% and Mary Jo Lanska,et.al [8] had incidence of 4.4/1,000.

A study by L Hellstrom-Westas,et.al [10] showed that the incidence of neonatal seizures was more in preterm and low birth weight neonates. A study by David Kohelet,et.al [9] showed that predictors of neonatal seizures were decreasing gestational age and other morbidities like respiratory distress syndrome, intraventricular hemorrhage, periventricular leukomalacia, patent ductus arteriosus, necrotizing enterocolitis. Study by Uday C.Rajput,et.al [11] showed a significantly higher incidence of seizures are associated with preterm gestational age and with co morbidities like respiratory distress , sepsis, NEC.

**CONCLUSION:**

Low birth weight and preterm deliveries are at higher risk for morbidity during and after the birth. Early referral of high-risk pregnancies to the tertiary care centers will greatly reduce the incidence of neonatal seizures in neonates. It is observed that all tertiary care centre have their own data of neonatal stay and outcome. The incidence increases as birth weight and gestation decreases in neonates. The co morbidities causing hypoxic damage and other CNS insults should be controlled at the earliest to avoid occurrence of seizures in neonates.

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Conflicts of interest: There are no conflicts of interest

**Limitations:** The limitation of this study is that the participants are relatively less in frequency. Thus the result of this thesis cannot be applicable on a larger population. The study does not include the outborn babies. The study is limited to low birth weight category.

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