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Perinatal asphyxia and the risk of hypoxic ischemic encephalopathy: A cross-sectional study

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***Abstract*---**Background: Neonate-onset encephalopathy has a wide range of clinical presentations. Premature or late birth (defined as occurring before or after 35 weeks of gestation) and early-onset neurological impairments are linked to this condition. The patient may have a loss of consciousness, convulsions, difficulty breathing, delayed or halted respiration, slowed or stopped reflexes, and depressed tone. The purpose of this research was to determine the incidence of hypoxic ischemic encephalopathy (HIE) in patients diagnosed with perinatal asphyxia in a tertiary care hospital. Materials and methods: The GKMC/BKMC Hospital in Sawabi, Pakistan, conducted this cross-sectional research there. During the time period of July 1, 2021, to December 31, 2021, researchers acquired information. Eighty newborns with perinatal hypoxia were included in the research. Hypoxic ischemic encephalopathy screening criteria were applied to each infant. Results: In this study, ages were between 1 and 10 days old, with average being 2.5371.28 days. The

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average gestational age was 37.6811.24 weeks, and the average birth weight was 3.2750.35 kg. Vaginal deliveries accounted for 75% of all births, whereas caesarean sections were performed for just 25%. Hypoxic ischemic encephalopathy affected 8 people. Patients accounting for 11% of the total. Conclusion: According to our study, the Occurrence rate at a major teaching hospital is 11%. Overall, 51% of our neonates had mild to severe hypoxic ischemic encephalopathy. During the course of the research, all newborns were returned to their mothers.

***Keywords*---**Asphyxia, Hypoxic, Ischemic, Encephalopathy, Perinatal.

Introduction

There are many clinically distinct forms of newborn encephalopathy[1]. Infants with this syndrome, regardless of their gestational age at birth (34 weeks or later), show signs of developmental and functional disorders in the brain from birth Signs include loss of awareness and convulsions, difficulty breathing and maintaining a steady rate, sluggish reflexes, and a flattened affect[2].

There is no one cause of neonatal encephalopathy. Certain cases of neonatal encephalopathy (HIE) may be attributable to birth asphyxia or a lack of oxygen during labour and delivery, however this is not always the case. It is difficult to determine whether an acute hypoxic-ischemia event led to infant encephalopathy since there is presently no definite diagnosis for the condition[3]. Poor Apgar ratings, infant convulsions, and a low pH in the umbilical cord are all clinical indications of hypoxic-ischemic encephalopathy, although encephalopathy itself is nebulous and may occur even in the absence of long-term neurologic sequelae and worldwide hypoxic-ischemic brain damage[4]. It is generally reasonable to diagnose "presumed HIE" when clinical signs point to hypoxic-ischemic encephalopathy as the most probable cause and to initiate neuroprotection therapy intended particularly to treat hypoxic-ischemic encephalopathy while waiting for results of further testing (HIE) The incidence of newborn encephalopathy is estimated to be between 2 and 9 cases per 1,000 live births, however this range is very subjective due to variations in diagnostic criteria For clauses 2–7, we shall make use of the term "neonatal encephalopathy," since it has gained widespread acceptance. A survey of the American population indicated that the incidence of "birth asphyxia" dropped between 1992 and 20025. A review study6 found that whereas 3% of babies were predicted to have neonatal encephalopathy in 2010, only 1.5% of infants had hypoxic-ischemic encephalopathy[5].

The Prenatal Asphyxia Patient Hypoxia ischemic encephalopathy has been reported to have an incidence of 0.0013%, according to a previous study. With regards to prenatal asphyxia Hypoxia ischemic encephalopathy7 was discovered in a staggering 14% of patients in a prior study by Aliyu I. et al. Despite significant advancements in prenatal treatment over the last several decades8, asphyxia remains a deadly disorder that accounts for a disproportionate share of infant mortality and impairment. Among Pakistanis, we are the first to do this

sort of research[6]. Studies on other groups cannot be extrapolated to our own because of the wide discrepancy in outcomes. Because of this, I plan on researching the incidence of hypoxic ischemic encephalopathy due to prenatal asphyxia. My research will not only help those in the area, but it will also provide us a better idea of how common this illness is among our population[7].

Operations-relevant categorizations Ischemia-reperfusion brain injury Term infants have a unique clinical status in response to a severe or prolonged hypoxic-ischemic crisis before or after delivery. Delivery asphyxia occurs when a newborn baby is unable to initiate or sustain breathing after birth[8].

Material and Methods

GKMC/BKMC Hospital's Pediatrics Department in Sawabi, Pakistan, from July 1, 2021, to December 31, 2021. A formula is presented in Section 9. 95 percent probability of hypoxic ischemic encephalopathy. Our study used a non-probability sequential sampling technique with the following parameters: Q= 98-P, D= 4%, Confidence level = 90%, and n= 80. Our research included only male and female infants who met the criteria for perinatal asphyxia and were born at full term (Gestational age > 35 weeks on LMP at delivery). Our research did not include participants with single major organ anomalies, congenital abnormalities, or encephalopathies linked to premature delivery.

Data Collection Procedure

After getting clearance from the institution's ethical committee and research department, the Department of Pediatrics included 80 patients in the study. After getting parental consent, patients were included. Participants in our research signed this consent form to ensure their privacy and declare there was no danger. We acquired demographic data (Age, gender and weight on weighing machine). Using the same criterion, all newborns were tested for HIE. All data was collected via a form.

Data Analysis

IBM-SPSS-24 examined the data. HIE modality gender discrepancies. Calculated proportion and frequency. We calculated Mean SD for age, GA at birth, and birth weight. Stratification accounted for maternal, paternal, gestational, and birth weight. Post-stratification chi-square test p-value 0.04 was significant.

Results

From July 1, 2021 to December 31, 2021, researchers from GKMC/BKMC Hospital's Pediatrics Department in Sawabi, Pakistan conducted a Cross Sectional Study to count the number of cases of hypoxic ischemic encephalopathy among patients who had suffered from perinatal asphyxia. Eighty infants were included in the trial, all of whom had experienced perinatal hypoxia. According to the operational definition, all babies were tested for hypoxia ischemic encephalopathy. Mean age was 2.42811.25 days, with a range of 1.10 days. In Table 1, we see that the average gestational age was 36 weeks, 7 days, and the

average birth weight was 3.270 kilogrammes (Kg). Figure 1 displays the frequency and proportion of patients in each gender. Figure 2 shows that 75% of births resulted from a vaginal delivery and 25% via a caesarean section. Table 2 shows that 11% of individuals had hypoxic ischemic encephalopathy. Hypoxic ischemic encephalopathy is broken down by age, gender, gestational age at birth, delivery method, and birth weight in the tables below.

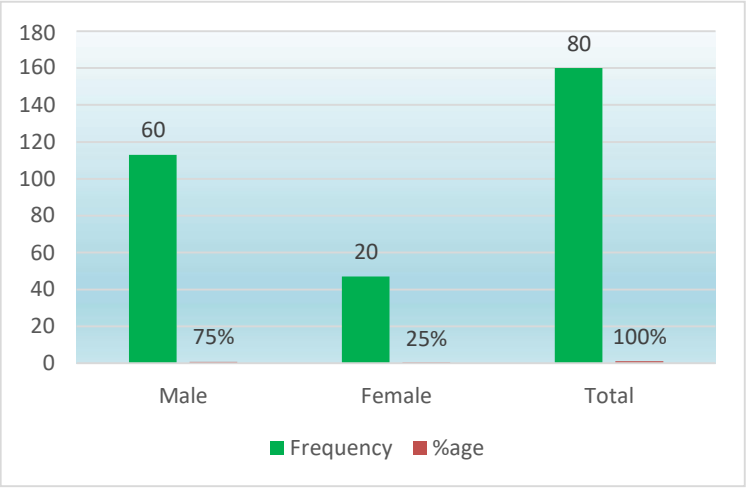

Figure 1: Patients' occurrence and median age by sex

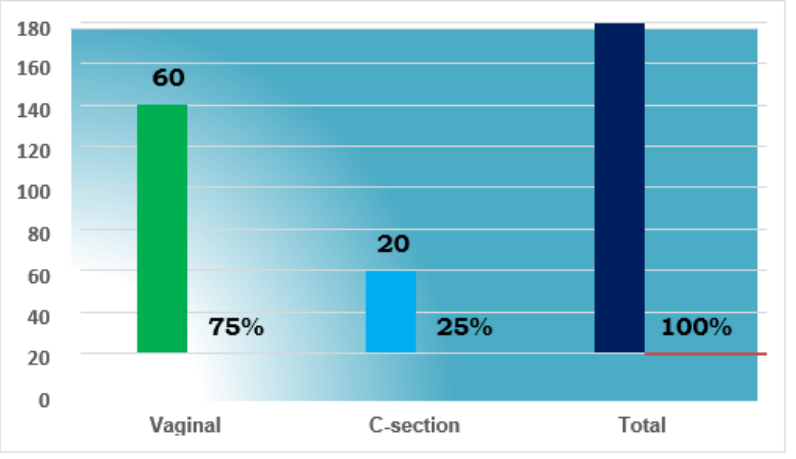

Figure 2: Distribution of patients and their ages by method of delivery N=80

Table 1: Normalized difference (SD) for age, GA, and weight N=80 patients

S. No	Populations	Mean ± SD
01	Days and Age	2.428±1.25
02	Birth gestational age (weeks)	3.270±0.37
03	Weight (Kg)	36.780±1.22

Table 2: Hypoxic ischemic encephalopathy: Occurrence and Patient Proportions N=80

S. No	Hypoxia-induced ischemic encephalopathy	Occurrence	%age
01	Yes	08	11%
02	No	72	89%
03	Total	80	100%

Table 3: The Age-Related Changes in the Occurrence of Hypoxic-Ischemic Encephalopathy

Age wise	Hypoxia-induced ischemic encephalopathy		P-Value
	Yes	No	
One to five	08(9%)	72(91%)	0.432
>five	(0%)	4(100%)	
Total	08(10%)	72(91%)	

Table 4: Hypoxia-induced ischemic brain injury prevalence by gestational age

Birth gestational age (weeks)	Hypoxic ischemic encephalopathy		P-Value
	Yes	No	
35-37	7(11%)	61(91%)	0.815
>38	1(9%)	11(90%)	
Total	08(11%)	72(91%)	

Table 5: Examination of Body Mass Index Variation in Hypoxic Ischemic Encephalopathy

Weight & kg	Hypoxic ischemic encephalopathy		p-value
	Yes	No	
≤three	07(68%)	5(18%)	0.001
>three	1(2%)	67(82%)	
Total	08(70%)	72(91%)	

Discussion

Common in infants born before or after 35 weeks, neonatal encephalopathy affects brain function. Some signs include impaired consciousness, convulsions, trouble breathing, and a depressed tone. In order to determine how often hypoxic ischemic encephalopathy occurs at patients with perinatal asphyxia, a cross-sectional research was conducted between July 1, 2018, and December 31, 2021, in the Department of Pediatrics at GKMC/BKMC SWABI[9]. Eighty infants with perinatal asphyxia11 participated in the research. Infants were checked for hypoxic ischemic encephalopathy. The mean age in this sample was 2.4281.25 days, with a range of 1–10 days. With a birth weight of 36,7801.22 kg and a

gestational age of 3,2700.37 weeks12, this baby was a whopper[10]. About 75% of births occurred naturally while 25% required a caesarean section. In the study, 11% of the patients were diagnosed with hypoxia ischemic encephalopathy. The prevalence of HIE in Tanzania was 32%, which was greater than the prevalence of HIE in our research (13%). Our research revealed a much higher frequency than in developed countries[11]. Asphyxia in newborns is a major killer. 24 percent of babies in Tanzania are lost to HIE. Premature infants who survive HIE are at increased risk for developing cerebral palsy and epilepsy. HIE is a superior tool for improving maternal and infant surveillance in hospitals. One-half of the infants in our research group had mild HIE. Similar to a research in Ireland, where mild HIE was identified in 68% of 221 newborns, we found that almost all babies with moderate HIE had full recoveries and were sent home to their families. Ninety-one percent of babies were returned to their mothers in Tanzania and India. Babies with mild HIE may recover and be discharged early with the right care[12].

Common neurologic symptoms in our sample include weak or absent reflexes, hypotonia, and lethargy. Similar signals were identified in a research conducted in Pakistan. In our study, 9% of newborns had seizures. In a previous trial conducted at Iran's Besat hospital, similar results were found, with 10% of subjects experiencing seizures out of 16[13]. Among infants diagnosed with HIE, we observed that 11% did not survive their first month of life. Research conducted in Cameroon (10%) and Uganda (13% mortality) show similar findings as this one. Our study's mortality rate was lower than what was reported for LBW and LB in South Africa (15%), Liaquat Teaching Hospital (16%), and Ayub Teaching Hospital (20%) in Pakistan[14].

High infant mortality rates are associated with severe cases of HIE. This calls for a stepping up of efforts to reduce LBW. Mild HIE neonates (ages 4-10) with low birth weight (40%) and prematurity (45%)16 showed no improvement[15].

Conclusion

Our study in a tertiary care setting found an overall frequency of 11% for hypoxia ischemic encephalopathy. Most infants with HIE in our research had a moderate form of the disorder (51%). Infants were sent home to their moms at the end of the research period.

The overall death rate was 9% in the first week of life. Baby's with low birth weight and severe HIE had the highest fatality rate. Moderate HIE neonates, those with a low birth weight and who were premature at day 7, showed no signs of improvement after therapy.

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