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A Study on the Incidence and Risk Factors of Hypoglycaemia Among Neonates: A Hospital-Based Analysis

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Abstract

Background: Neonatal hypoglycemia is one of the most common metabolic disorders in the early neonatal period. If unrecognized or untreated, it can lead to serious neurological sequelae. Objective: To determine the incidence and evaluate the risk factors associated with hypoglycemia in neonates. Methods: This observational study was conducted on 28 neonates admitted to the neonatal intensive care unit (NICU) or observed in the postnatal ward. Blood glucose levels were measured within 24 hours of birth. Demographic data and maternal/neonatal risk factors were assessed. Results: The incidence of neonatal hypoglycemia was 32.1%. Common risk factors included low birth weight, maternal diabetes, preterm birth, and perinatal asphyxia. Timely identification and intervention led to favorable outcomes in most cases. Conclusion: Neonatal hypoglycemia is a prevalent condition, especially in high-risk newborns. Awareness of the risk factors and early glucose screening is vital for prevention of complications.

KEYWORDS: Neonatal hypoglycemia, perinatal asphyxia, risk factors.

INTRODUCTION

Neonatal hypoglycemia, defined as a plasma glucose level less than 40 mg/dL in the first 24 hours of life, is a frequent neonatal emergency. It is particularly common in high-risk infants such as those born preterm, small for gestational age (SGA), or to diabetic mothers[1].

Neonatal hypoglycemia, or low blood sugar in newborns, is a common metabolic issue with a prevalence ranging from 5% to 15%. The exact incidence can vary based on the definition of hypoglycemia used, diagnostic methods, and the characteristics of the newborn population studied. Some studies report a prevalence as high as 39% for all neonates and 50% for at-risk newborns[2].

Factors influencing prevalence: Definition of hypoglycemia: Different studies use varying blood glucose thresholds to define hypoglycemia, leading to variations in reported incidence. Risk factors: Newborns with certain risk factors, such as being small for gestational age, preterm, or having a mother with diabetes, are at

higher risk of developing hypoglycemia. Timing of feeding: Early feeding is widely recommended to prevent neonatal hypoglycemia, as poor feeding is a risk factor. Diagnostic methods: The method and timing of glucose measurement can also affect the reported prevalence. Consequences of Neonatal Hypoglycemia: Neurological damage: Untreated or prolonged neonatal hypoglycemia can lead to long-term neurological consequences, including brain injury. Mortality: Untreated hypoglycemia can have a high mortality rate[3].

Importance of Early Detection and Management: Screening: Due to the potential for long-term complications, early detection through screening is crucial, especially in at-risk infants. Treatment: Early intervention and treatment are vital to prevent the adverse effects of hypoglycemia[4-9]

Undiagnosed or delayed treatment may result in irreversible brain injury. Identifying high-risk groups and promptly initiating glucose monitoring and treatment can significantly reduce morbidity[10-16].

This study aims to evaluate the incidence of hypoglycemia and identify contributing risk factors in neonates.

METHODOLOGY

This study was conducted in a tertiary hospital. After obtaining institutional ethical committee approval. It was Cross-sectional observational study conducted on 28 patients in the department of Paediatrics, at a tertiary care centre, from April / 2020 to October/2020

Total 28 participant were approached to project among them No one were excluded in this study and Total 28 Confirmed cases were included on the basis of fulfilling of the eligibility criteria.

The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration. Detailed history of systemic diseases and its duration, medication were noted. Patients were subjected to General physical examination.

Study Design:

Prospective observational study.

Study Setting:

Neonatal Intensive Care Unit (NICU) and postnatal ward of a tertiary care hospital.

Sample Size:

28 neonates over a 6-month period.

Inclusion Criteria:

- Neonates ≤7 days old
- Admitted to NICU or postnatal ward for observation
- Consent from parents

Exclusion Criteria:

- Neonates with congenital metabolic disorders
- Severe congenital anomalies

Data Collection Procedure:

- Blood glucose level measured using glucometer within first 24 hours
- Repeat glucose measured if initial was <45 mg/dL
- Risk factor profile assessed

Flowchart: Study Design and Process

Neonates Admitted to NICU/Postnatal Ward (n=28)

↓

Blood Glucose Measured at <24 Hours

↓

Identified as Hypoglycemic or Normal

↓

Assessment of Maternal and Neonatal Risk Factors

↓

Management Initiated and Outcome Tracked

↓

Data Compilation and Analysis

RESULTS

In this study we found that Neonatal hypoglycemia is associated with demographic profile of patient. 41.2% 64.3 % of Term (>37 weeks are suffered of Neonatal hypoglycemia followed by Preterm (<37 weeks) Its prevalence 35.7%. Birth weight ≥2.5 kg is also associated factors for Neonatal hypoglycaemia its prevalence is 60.7 %.

Male are more prone to suffered of Neonatal hypoglycemia as compared to female its prevalence 57.1% .71.4% Neonatal hypoglycemia were predominance amon vaginal deliveriy participants (Table 1)

Demographic Profile of Neonates Table 1 (n=28)

Variable	Frequency (n)	Percentage (%)
Male	16	57.1%
Female	12	42.9%
Term (>37 weeks)	18	64.3%
Preterm (<37 weeks)	10	35.7%
Birth weight <2.5 kg	11	39.3%
Birth weight ≥2.5 kg	17	60.7%
Vaginal delivery	20	71.4%
Cesarean section	8	28.6%

Risk Factors of Neonatal Hypoglycaemia are Maternal diabetes (GDM/DM), Preterm birth, Small for gestational age (SGA), Birth asphyxia, Sepsis and Delayed breastfeeding (>2 hrs)

Risk Factors of Neonatal Hypoglycaemia Table 2 (n=28)

Risk Factor	Frequency (n)	Percentage (%)
Maternal diabetes (GDM/DM)	6	21.4%
Preterm birth	10	35.7%
Small for gestational age (SGA)	7	25.0%
Birth asphyxia	5	17.9%
Sepsis	3	10.7%
Delayed breastfeeding (>2 hrs)	9	32.1%

Incidence of Hypoglycemia:

- Total neonates: 28
- Neonates with hypoglycemia (blood glucose <40 mg/dL): 9
- **Incidence: 32.1%**

Associated Findings in Hypoglycemic Neonates (n=9):

Condition	Number (n)	Percentage (%)
Preterm	6	66.7%
Maternal diabetes	4	44.4%
LBW (<2.5 kg)	5	55.6%
SGA	4	44.4%
Delayed feeding	6	66.7%

Most neonates with hypoglycemia responded to early feeding or IV glucose. No mortality occurred during the study period.

DISCUSSION

The incidence of neonatal hypoglycemia in this study (32.1%) is in line with findings from other developing countries. The most common risk factors were prematurity, maternal diabetes, and low birth weight. Hypoglycemia was effectively managed with early detection and intervention, emphasizing the importance of routine screening in high-risk neonates[18].

Neonatal hypoglycemia, or low blood sugar in newborns, is influenced by various demographic factors. These include maternal characteristics like diabetes, obesity, and age, as well as infant factors such as prematurity, low birth weight, and being small or large for gestational age. Additionally, factors like mode of delivery (e.g., Cesarean section) and maternal use of certain medications can also play a role[19-22].

In this study we found that Neonatal hypoglycemia is associated with demographic profile of patient. 41.2% 64.3 % of Term (>37 weeks are suffered of Neonatal hypoglycemia followed by Preterm (<37 weeks) Its prevalence 35.7% . Birth weight ≥2.5 kg is also associated factors for Neonatal hypoglycaemia its prevalence is 60.7 % .

Male are more prone to suffered of Neonatal hypoglycemia as compared to female its prevalence 57.1% .71.4% Neonatal hypoglycemia were predominance amon vaginal deliveriy participants (Table 1

Maternal Factors: Diabetes: Infants of diabetic mothers (IDMs) are at a significantly higher risk of neonatal hypoglycemia due to the mother's high blood sugar levels during pregnancy, which can lead to the baby's pancreas producing excess insulin, causing low blood sugar after birth[23]. Maternal Obesity: Maternal obesity, even without overt diabetes, has been linked to an increased risk of neonatal hypoglycemia. Maternal Age: Older maternal age has been associated with a slightly increased risk of neonatal hypoglycemia. Gestational Diabetes: Women with gestational diabetes, which develops during pregnancy, are also at increased risk, especially if they require medication to manage their blood sugar. Maternal Hypertension: In late preterm infants, maternal hypertension can be a risk factor for neonatal hypoglycemia.

Infant Factors: Prematurity: Babies born prematurely (before 37 weeks of gestation) are more vulnerable to hypoglycemia due to their underdeveloped ability to regulate blood sugar levels[24]. Low Birth Weight: Infants with low birth weight (below 2.5 kg or below the 10th percentile for gestational age) are at increased risk. Small for Gestational Age (SGA):

Babies who are small for their gestational age, meaning their weight is below the 10th percentile, are more susceptible to hypoglycemia. Large for Gestational Age (LGA):

Infants who are large for their gestational age (above the 90th percentile) are also at risk, particularly if their mothers have diabetes[25]. Neonatal Sepsis and Birth Asphyxia:

Illness and complications like sepsis and asphyxia can also contribute to neonatal hypoglycemia. Other Factors: Mode of Delivery: Cesarean section deliveries have been associated with a higher incidence of hypoglycemia in some studies. Medication Use: Certain medications used during pregnancy, such as ritodrine (to stop preterm

labor), can increase the risk. Fasting Period: Prolonged fasting periods after birth can also contribute to hypoglycemia

Delayed feeding remains a modifiable factor and should be addressed through health education and timely postnatal support.

CONCLUSION

Neonatal hypoglycemia is a significant clinical issue, especially in vulnerable neonates. Regular glucose monitoring and identification of risk factors such as prematurity, maternal diabetes, and delayed breastfeeding can help prevent complications. Strengthening neonatal care protocols can reduce the burden of hypoglycemia-related morbidity.

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CONFLICT OF INTEREST

The authors report no conflicts of interest

SUBMISSION DECLARATION

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

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