The 6th Mitra Husada Health International Conference (MiHHICo) 2026
Volume 6 (2026) ISSN: 2988-3768

# OBSTETRIC CARE MANAGEMENT OF NEWBORNS WITH HYPOGLYCEMIA IN THE PICU NICU

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## ABSTRACT

**Background:** Hypoglycemia in newborns is a metabolic emergency characterized by low blood glucose levels due to an imbalance between glucose production and utilization. This condition often occurs in neonates with risk factors such as babies born to mothers with diabetes mellitus, high birth weight, prematurity, or impaired metabolic adaptation after birth. **Objectives**: This study aims to provide an overview of the implementation of midwifery care for a 4-day-old infant with hypoglycemia in the PICU of Haji General Hospital, Medan, in 2025. **Methods**: The study used a case study with a midwifery care management approach based on Varney's 7 steps, which include data collection, problem identification, planning, implementation, and evaluation. Data were obtained through observation, physical examination, and measurement of the infant's blood glucose level. **Results:** The study showed that the infant experienced hypoglycemia with an initial glucose level of 33 mg/dL, accompanied by symptoms of weakness and a decreased sucking reflex. Management included administering a 10% glucose bolus, D10W infusion, keeping the infant warm, and gradually introducing breast milk. After intervention, the baby's condition improved, with glucose levels returning to normal (82 mg/dL), increased activity, and a good sucking reflex. **Conclusions:** This case demonstrates that prompt, appropriate, and continuous management of neonatal hypoglycemia can improve the baby's condition and prevent further complications. The role of healthcare workers, particularly midwives, is crucial in early detection and close monitoring of neonates at risk of hypoglycemia.

**Keywords:** Neonatal Hypoglycemia, Newborn, Midwifery Care, NICU, Diabetes Mellitus.

## INTRODUCTION

Neonatal hypoglycemia remains a significant metabolic health issue, affecting approximately 5–15% of all live births worldwide, with the risk reaching 30% higher in at-risk infants. Nationally, Indonesia also faces this challenge, with the prevalence of neonatal hypoglycemia recorded at approximately 12.1% and a common emergency in intensive care units (ICU). (Paramita et al., 2023) According to the Indonesian Pediatrician Association (IDAI, 2022) guidelines, the diagnostic threshold for hypoglycemia is set at less than 40 mg/dL in the first 24 hours and less than 45 mg/dL after 24 hours of age. At Medan Haji General Hospital, this condition is still frequently found, especially in infants of mothers with a history of diabetes mellitus. To address this, the government and healthcare professionals have implemented service standards that include early detection, routine monitoring, and prompt management according to the infant's condition. (Ministry of Health of the Republic of Indonesia, 2021). Previous studies have shown that although prematurity and birth weight play a role, a history of maternal diabetes is the most dominant risk factor. However, close monitoring of blood glucose levels in the early days of life is often suboptimal due to limited knowledge and delayed detection. This research is essential to describe appropriate midwifery care management, as general guidelines often need to be tailored to each patient's specific clinical condition. Therefore, this case report aims to describe the implementation of comprehensive midwifery care for a 4-day-old infant experiencing hypoglycemia in the NICU. (Cao *et al.*, 2023)

## METHODS

This study used a descriptive case study design with a midwifery care approach according to Varney's framework. The subject was a 4-day-old infant admitted to the Neonatal Intensive Care Unit (NICU) of Haji General Hospital, Medan, North Sumatra, in November 2025. Data were collected through medical record review, interviews with the mother, physical examinations, and ongoing clinical observations documented using the SOAP (Subjective, Objective, Assessment, Plan) format (Bamehrez, 2023)



Observed variables included risk factors such as maternal history of diabetes mellitus, repeat cesarean delivery, and birth weight <4100 grams. The outcome variables were blood glucose levels and the infant's clinical condition. Hypoglycemia was defined as a blood glucose level of less than 45 mg/dL after 24 hours of age, measured using a calibrated glucometer using a capillary blood sample. Monitoring was conducted every 1–2 hours to evaluate the response to medical interventions and midwifery care provided (Herna Rinayanti Manurung Lisa Putri Utami Damanik *et al.*, 2024)

Data were analyzed descriptively to describe the clinical course, interventions performed, and evaluation results. Diagnostic and management standards were based on national guidelines and applicable scientific evidence. Ethical approval was obtained from the Health Research Ethics Committee of the Mitra Husada Medan College of Health Sciences, as well as written consent from the infant's mother, who served as the study subject (Stanley, Thornton and De Leon, 2023)

## RESULTS

### Respondent Characteristics

Table 1 presents the clinical profile, risk factors, and changes in blood glucose levels of a 4 day old infant with hypoglycemia treated at the Neonatal Intensive Care Unit (NICU)

**Table 1. Clinical profile and blood glucose level changes of the infant**

| Risk Factor | Normal Blood Glucose n (%) | Hypoglycemia n (%) | Chi-Square |
|---|---|---|---|
| Maternal Diabetes Mellitus | | | |
| Yes | 0 (0.0) | 0 (100.0) | - |
| No | _- | - | |
| Birth Weight | | | |
| Yes | 0 (0.0) | 0 (0.0) | - |
| No | 0 (0.0) | 0 (100.0) | |
| Mode of Delivery | | | |
| Yes | 0 (0.0) | 0 (0.0) | - |
| No | 0 (0.0) | 0 (100.0) | |

Based on Table 1, the newborn born to a mother with diabetes mellitus was found to have hypoglycemia (100.0%), while no cases were observed in infants of non-diabetic mothers. This finding aligns with the theory that infants of diabetic mothers are at high risk of developing hyperinsulinemia, which causes a rapid drop in blood glucose levels after birth. The infant also had a birth weight of 4,100 grams, classified as large for gestational age, another recognized risk factor for neonatal hypoglycemia, with all infants in this category presenting with low blood glucose. Additionally, the infant was delivered by cesarean section, and this group showed 100% incidence of hypoglycemia, consistent with literature indicating that cesarean delivery may affect early metabolic adaptation. The initial blood glucose measurement was 33 mg/dL, confirming the diagnosis of hypoglycemia according to the Indonesian Pediatric Society (IDAI) criteria, which defines hypoglycemia as <45 mg/dL after 24 hours of life. (Hidayah *et al.*, 2025)

## DISCUSSIONS

The findings indicate that maternal diabetes mellitus was significantly associated with the occurrence of hypoglycemia in this case. Infants born to mothers with diabetes experience increased glucose transfer across the placenta, which stimulates fetal pancreatic beta cells to produce excess insulin. After birth, the supply of maternal glucose is abruptly cut off, while high insulin levels persist, leading to a rapid drop in blood glucose and resulting in hypoglycemia. This mechanism is consistent with the physiological process described in previous studies, which confirms that maternal diabetes is a major risk factor for metabolic imbalance in newborns.In addition, macrosomia, defined as a birth weight of more than 4000 grams, also showed a strong association with hypoglycemia. Large infants have higher energy and glucose requirements, but their ability to maintain glucose homeostasis is still immature. This condition is further aggravated by the hyperinsulinemic state caused by maternal diabetes. These findings are in line with research stating that infants with excessive birth weight are at higher risk of developing low blood glucose levels compared to those with normal weight. The results also show that early and appropriate management effectively improved the infant's

condition. Administration of 10% dextrose bolus followed by continuous infusion, combined with frequent breastfeeding, successfully raised blood glucose levels from 33 mg/dL on admission to a stable normal value of 82 mg/dL on the fourth day of treatment. This confirms that timely intervention prevents prolonged hypoglycemia and reduces the risk of neurological complications. These findings support the recommendation that close monitoring and standardized management are essential for newborns at risk, to ensure optimal adaptation and development. (Br, Astaria GintingSiagian *et al.*, 2025)

## CONCLUSIONS

Hypoglycemia in newborns is a metabolic disorder characterized by a decrease in blood glucose levels below the normal range required to maintain bodily functions, especially brain activity. This condition typically occurs during the first days of life as the infant transitions from receiving a continuous glucose supply from the mother through the placenta to regulating its own metabolism after birth. Hypoglycemia can present without symptoms or with signs such as weakness, tremors, poor sucking reflex, cold extremities, and even seizures, and it carries risks of permanent neurological damage if not treated promptly. Factors contributing to neonatal hypoglycemia include maternal history of diabetes mellitus, excessive birth weight or macrosomia, prematurity, low birth weight, delayed initiation of breastfeeding, and perinatal complications such as asphyxia. These factors disrupt the balance between glucose production and utilization in the infant's body, leading to unstable blood glucose levels. Therefore, management of hypoglycemia requires immediate intervention through early breastfeeding, administration of oral or intravenous glucose, maintenance of body temperature, and continuous monitoring of blood glucose levels and clinical condition. With appropriate and timely care, blood glucose levels can be restored to normal and complications can be prevented, allowing the infant to achieve optimal growth and development. As a result, the risk of long-term effects such as developmental delays and neurological disorders can be minimized, supporting the formation of a healthy and high-quality future generation. (Lord and De León, 2024)



## ACKNOWLEDGEMENT

The author would like to express sincere gratitude to the Almighty God for His blessings and grace, enabling the completion of this case report entitled Management of Midwifery Care for a 4-Day-Old Infant with Hypoglycemia. The author also conveys deep appreciation to STIKes Mitra Husada Medan for providing academic facilities, guidance, and support throughout the study process. Special thanks are addressed to the mentor, preceptor, and all lecturers who have provided valuable direction and knowledge during clinical practice and report preparation. Gratitude is also extended to the management and healthcare team of Rumah Sakit Umum Haji Medan, especially in the NICU/PICU unit, for their assistance and permission in collecting data and conducting observations. (Tambun, Mastaida Sinaga *et al.*, 2022)

## CONFLICT OF INTEREST AND FUNDING DISCLOSURE

The author declares that there is no conflict of interest regarding the preparation and publication of this case report. This study did not receive any specific grant or financial support from funding agencies in the public, commercial, or non-profit sectors. All activities were carried out as part of academic requirements and clinical practice.

## AUTHOR CONTRIBUTIONS

Conceptor, data curation, investigation, methodology, formal analysis, validation, visualization, writing original draft, writing review and editing.

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