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

MIDWIFERY CARE MANAGEMENT FOR VERY LOW BIRTH WEIGHT INFANT IN THE NICU

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ABSTRACT

Background: Low Birth Weight (LBW) and Very Low Birth Weight (VLBW) infants are defined as newborns weighing less than 2500 grams. This condition serves as a primary indicator of public health status due to its massive contribution to the neonatal mortality rate, which reaches 35.5% in Indonesia. Standardized and comprehensive midwifery care management during the critical phase is highly essential to prevent long-term morbidity. **Objectives:** This case report aims to analyze the implementation of comprehensive midwifery care management for a 21-day-old VLBW infant, Mrs. R's baby, in the Neonatal Intensive Care Unit (NICU) at RSUP Haji Adam Malik. **Methods:** The method employed is a descriptive case study applying Helen Varney's seven-step midwifery management framework. Data were gathered through direct clinical observations of the infant's development, in-depth interviews with the mother, and medical record documentation during the hospital care period. **Results:** The assessment findings indicated that the infant was born prematurely at 28 weeks of gestation with a body weight of 1090 grams, presenting with unstable thermoregulation and an immature sucking reflex. Care implementation was carried out through midwifery interventions including stable thermoregulation care inside an incubator to maintain core body temperature stability (36.5-37.5°C), bolus nutritional administration of breast milk/formula via an Orogastric Tube (OGT) at 15-16 cc/2 hours, structured execution of Kangaroo Mother Care (KMC), and a strict infection prevention protocol. Following 21 days of care, the body weight significantly increased to 1,240 grams with stable vital signs and zero indications of sepsis. **Conclusions:** Structured and comprehensive midwifery care management is proven effective in supporting clinical stabilization, promoting growth, and preventing severe complications in neonates with VLBW.

Keywords: Neonatus, LWB, Midwifery Care, Nutritional Fullment, Kanggoro Mother Care (KMC).

INTRODUCTION

The birth of a baby is a highly anticipated moment for any family, bringing great hope and happiness. However, this situation often turns into deep anxiety when the infant is born in a vulnerable condition requiring intensive medical treatment in the Neonatal Intensive Care Unit (NICU). One of the most significant conditions of vulnerability is the phenomenon of Low Birth Weight (LBW). According to the World Health Organization (WHO), a newborn weighing less than 2,500 grams is categorized as LBW, a condition estimated to occur in 15–20% of all births globally and contributing to 60–80% of neonatal deaths in developing countries.Based on The Sustainable Development Goals (SDGs), the world still faces serious challenges in achieving Target 3.2, which aims to end preventable deaths of newborns and children under 5 years of age by 2030 (SDGs, 2024; WHO, 2024)

In Indonesia, data from the Ministry of Health RI ranks LBW as the second leading cause of neonatal mortality (26.37%), significantly contributing to the country's total under-five child deaths. The province of North Sumatra faces an even greater challenge at the regional level, where the incidence of LBW in 2023 reached 7.1% of all live births, a rate visibly higher than the national average of 6.1% during the same period. This high prevalence indicates that the North Sumatra region still requires strengthening of the neonatal health service system, intensive monitoring for at-risk pregnant women, and standardized care for LBW infants(Dinkes Sumut, 2024; Kemenkes RI, 2024).

A birth weight below 2,500 grams is not only experienced by preterm infants (born premature), but can also affect full-term infants who suffer from intrauterine growth restriction (dismaturity). The lack of standardized management during this critical phase can cause long-term complications such as stunting, cognitive delays, and multi-organ failure. Therefore, this case report aims to analyze and prove the effectiveness of comprehensive midwifery care management for Mrs. R's 21-day-old infant with VLBW to prevent long-term morbidity (Munthe, 2022).

Infants with Very Low Birth Weight (VLBW) are at high risk of experiencing physiological adaptation disorders due to the immaturity of their organ systems, particularly the respiratory, thermoregulatory, nutritional, and immune systems. This condition makes them more susceptible to hypothermia, respiratory complications, infections, and growth failure. Therefore, comprehensive neonatal care is required, focusing on maintaining thermal stability, ensuring adequate nutritional support, preventing infections, and continuously monitoring growth and development. In addition, the implementation of Kangaroo Mother Care (KMC) has been proven effective in improving physiological stability, promoting weight gain, strengthening mother–infant bonding, and reducing mortality among preterm and low birth weight infants (Gong, He and Zhang, 2025).

From a midwifery perspective, the management of Very Low Birth Weight (VLBW) infants requires a systematic and comprehensive approach because these neonates are highly vulnerable to hypothermia, infection, feeding difficulties, and growth impairment. Previous studies have demonstrated that the application of Helen Varney's seven-step midwifery management framework facilitates the delivery of individualized and evidence-based neonatal care, particularly through thermoregulation maintenance, nutritional support, infection prevention, and continuous monitoring of neonatal growth and development. Such interventions contribute to improved clinical stability and weight gain among low birth weight and very low birth weight infants (Eriza, Syahda and Riani, 2023).

METHODS

This study employed a descriptive case study type and design utilizing Helen Varney's Seven-Step Midwifery Management approach. The management framework systematically encompasses comprehensive data collection, clinical data interpretation, identification of potential diagnoses or problems, anticipation of immediate actions or collaboration, comprehensive care planning, implementation, and continuous developmental evaluation. The research was conducted in the Neonatal Intensive Care Unit (NICU) of RSUP Haji Adam Malik Medan, which serves as the primary tertiary referral center in the North Sumatra region. The case study monitoring and clinical observations were carried out intensively over a 21-day hospitalization period in 2024. The application of a structured midwifery management framework is vital to maintain systematic, accurate clinical decision-making when handling vulnerable neonates in critical care environments (Baweleng *et al.*, 2024)

Data processing and analysis were performed through qualitative narrative analysis by executing a clinical gap assessment between high-risk neonatal midwifery care theories and actual bedside practices. A descriptive qualitative approach provides a profound and holistic understanding of specialized neonatal interventions that macro-statistical tables often fail to represent (Herlina, Rustina and Wanda, 2023). Bedside gap analysis between theories and real-world clinical practices allows practitioners to refine operational protocols and significantly reduce neonatal mortality rates (Wahyuni *et al.*, 2020). All processes prioritized the fundamental ethical principle of obtaining written informed consent from the infant's parents before initiating data tracking.

RESULTS AND DISCUSSIONS

Result

The initial assessment revealed that Mrs. R's infant was born spontaneously at 28 weeks of gestation with a Very Low Birth Weight (VLBW) of 1,090 grams. On the 21st day of hospitalization in the Neonatal Intensive Care Unit (NICU), the infant demonstrated significant limitations in physiological adaptation. Body temperature fluctuated and tended to decrease rapidly without adequate external thermal support. This condition is consistent with the characteristics of premature infants, who have limited brown adipose tissue reserves, a relatively larger body surface area compared to body weight, and immature thermoregulatory mechanisms (WHO, 2022; Hansen et al., 2022).

Clinical data interpretation confirmed that the infant was at high risk of rapid heat loss (cold stress). This condition was attributed to the thin subcutaneous fat layer and the relatively large body surface area-to-weight ratio. Furthermore, physical examination revealed that the sucking and swallowing reflexes were not yet well coordinated, which is a common characteristic of neurological immaturity in infants born before 34 weeks of gestation. Consequently, enteral feeding support through an Orogastric Tube (OGT) was required to meet the infant's nutritional and metabolic demands(Karmina and Puteri, 2024).

The diagnosis established was a preterm neonate with Very Low Birth Weight (VLBW). Potential problems identified included severe hypothermia, hypoglycemia due to limited glycogen stores, growth restriction, and neonatal sepsis. Premature infants with VLBW are known to have immature immune systems, making them highly susceptible to nosocomial infections during intensive care hospitalization (Firmansyah *et al.*, 2023; Sivanandan and Sankar, 2023).

Immediate interventions and collaborative management focused on thermal stabilization through placement in an incubator equipped with an automatic servo-control system. The incubator temperature was adjusted according to the infant's skin temperature to maintain a normal core body temperature range of 36.5°C–37.5°C. Incubator care has been shown to effectively maintain thermal stability, reduce energy expenditure, and prevent complications associated with hypothermia in premature infants. Close collaboration with the NICU medical team was also essential for monitoring metabolic status, growth progress, and potential neonatal complications (WHO, 2022; Hansen et al., 2022).

Midwifery care interventions were designed comprehensively by integrating thermoregulation management, nutritional support, infection prevention, and Kangaroo Mother Care (KMC). Nutritional intake was provided through bolus feeding of breast milk and/or formula milk via OGT at 15–16 mL every two hours according to the infant's tolerance. In addition, KMC has been demonstrated to improve thermal regulation, strengthen mother–infant bonding, enhance breastfeeding outcomes, and promote weight gain among

preterm and VLBW infants. Infection prevention measures were implemented through strict adherence to WHO hand hygiene protocols, sterilization of medical equipment, and aseptic umbilical cord care(Surbakti, Lubis and Yuliana, 2023; Wulaningsih, 2023) .

Following 21 days of comprehensive midwifery care management, evaluation findings demonstrated favorable outcomes. The infant's body weight increased from 1,090 grams to 1,240 grams, representing a net weight gain of 150 grams. This improvement indicated a positive response to nutritional support and successful maintenance of physiological stability throughout hospitalization. Moreover, vital signs remained within normal limits, the sucking reflex began to develop, and no signs of local or systemic infection were observed. These findings are consistent with previous studies indicating that comprehensive neonatal care involving optimal thermoregulation, adequate nutritional support, and Kangaroo Mother Care contributes significantly to improved clinical outcomes and growth among VLBW infants (Sivanandan and Sankar, 2023; Gong, He and Zhang, 2025)

Discussion

Stable thermoregulation management through the combination of incubator care and Kangaroo Mother Care (KMC) was proven effective in preventing hypothermia in Mrs. R's infant. Skin-to-skin contact during KMC functions as a natural incubator by transferring maternal body heat to the infant through conduction. Clinically, this method has been shown to accelerate the stabilization of cardiovascular and respiratory functions, while also stimulating the secretion of growth hormones that support weight gain in premature infants. Maintaining thermal stability is crucial because unresolved cold stress may lead to a significant increase in oxygen consumption, metabolic acidosis, and severe hypoglycemia, all of which can threaten neonatal survival (Wahyuni *et al.*, 2020; Wulaningsih, 2023).

Regarding nutritional management, the administration of breast milk and/or formula milk through an Orogastric Tube (OGT) in small-volume, high-frequency feedings (15–16 mL every two hours) was considered safe for the infant's immature gastrointestinal system. This approach provides adequate caloric intake to support catch-up growth while minimizing the risk of serious complications such as Necrotizing Enterocolitis (NEC) and aspiration pneumonia, which may occur due to the incomplete coordination of sucking and swallowing reflexes in premature infants (Rufaindah *et al.*, 2022; Marliani *et al.*, 2024).

The increase in body weight observed in this case, from 1,090 grams to 1,240 grams after 21 days of hospitalization, indicates a positive response to the comprehensive care provided. Weight gain is one of the primary indicators used to evaluate the effectiveness of nutritional management and overall neonatal care in VLBW infants. Adequate nutritional intake, combined with optimal thermal regulation and infection prevention, contributes significantly to energy conservation and tissue growth. Previous studies have reported that consistent weight gain among preterm and VLBW infants is associated with improved clinical outcomes, reduced length of hospital stay, and better neurodevelopmental prognosis (Sivanandan and Sankar, 2023; Gong, He and Zhang, 2025).

Adherence to aseptic protocols in the NICU was another key factor contributing to the success of the care provided. Restricted visitation policies, sterilization of medical equipment, and aseptic dry umbilical cord care effectively minimized the risk of neonatal sepsis. VLBW infants are particularly vulnerable to nosocomial bacterial infections because of their immature immune systems and lower levels of maternally acquired antibodies. Therefore, maintaining a strictly aseptic environment is essential to ensure survival and prevent life-

threatening infections during the critical period of hospitalization (Firmansyah *et al.*, 2023; Manurung *et al.*, 2025).

The successful outcome of this case also demonstrates the importance of applying Helen Varney's Midwifery Management Framework in neonatal care. Through systematic assessment, accurate identification of actual and potential problems, individualized care planning, implementation of evidence-based interventions, and continuous evaluation, midwives are able to provide comprehensive and holistic care for high-risk neonates. This structured approach facilitates early detection of complications and supports timely clinical decision-making, thereby improving neonatal safety and quality of care(Sinaga, 2022; Baweleng *et al.*, 2024).

Furthermore, effective management of VLBW infants in the NICU requires close collaboration among midwives, neonatologists, pediatric nurses, nutritionists, and family members. Family involvement, particularly maternal participation through Kangaroo Mother Care (KMC) and breast milk provision, plays a crucial role in promoting neonatal recovery and growth. Family-centered care has been shown to enhance parental confidence, strengthen mother–infant bonding, improve breastfeeding success, and contribute to better health outcomes among premature and low birth weight infants. Therefore, multidisciplinary collaboration and active parental involvement should be considered essential components of comprehensive neonatal care in the NICU setting (Sivanandan and Sankar, 2023).

CONCLUSIONS

Conclusion

The implementation of comprehensive midwifery care management for a Very Low Birth Weight (VLBW) infant in the Neonatal Intensive Care Unit (NICU) was proven effective in supporting physiological stabilization, promoting growth, and preventing severe complications. The application of Helen Varney's seven-step midwifery management framework enabled the systematic identification of actual and potential problems, allowing appropriate, well-planned, and continuous interventions to be provided.

. The care provided included thermoregulation management through the use of an incubator and Kangaroo Mother Care (KMC), nutritional support through breast milk and/or formula feeding via an Orogastric Tube (OGT), and the implementation of strict infection prevention measures. These interventions successfully maintained the infant's physiological stability throughout the hospitalization period. After 21 days of care, the infant's weight increased from 1,090 grams to 1,240 grams, vital signs remained within normal limits, the sucking reflex began to develop, and no signs of local or systemic infection were observed.

The findings of this case demonstrate that structured, comprehensive, and evidence-based midwifery care management plays a crucial role in improving clinical outcomes and supporting the survival of VLBW infants receiving intensive care in the NICU.

Suggestion

Health care providers should continue implementing comprehensive and evidence-based neonatal care for VLBW infants, emphasizing thermoregulation, adequate nutrition, infection prevention, and family involvement through Kangaroo Mother Care. Further research is needed to evaluate the long-term effectiveness of comprehensive midwifery care management in improving neonatal outcomes among VLBW infants.

ACKNOWLEDGEMENT

The author would like to express sincere gratitude to STIKes Mitra Husada Medan for the academic support and educational facilities provided throughout the study. Special appreciation is extended to the clinical preceptors and mentors in the Neonatal Intensive Care Unit (NICU) of RSUP Haji Adam Malik Medan for their guidance, valuable insights, and clinical supervision during the implementation of this case management. The author also gratefully acknowledges Mrs. R's family for their cooperation and support throughout the infant's hospitalization and care period.

CONFLICT OF INTEREST AND FUNDING DISCLOSURE

The author declares that there is no conflict of interest regarding the publication of this article. This research did not receive any specific grant from funding agencies in the public, commercial, or non-profit sectors.

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