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LOW BIRTH WEIGHT IN TWIN BABIES: CASE STUDY AND CLINICAL MANAGEMENT

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ABSTRACT

Twin pregnancies are inherently high-risk gestations frequently associated with Low Birth Weight (LBW) due to uterine capacity limits and nutrient competition. LBW remains a primary contributor to neonatal morbidity and mortality globally, including in Indonesia. Objective: This study aims to evaluate the implementation of integrated midwifery care using the 7-step Helen Varney framework in managing twin neonates with LBW to optimize clinical outcomes. A qualitative descriptive case study was conducted on a 30-year-old multigravida mother and her twin neonates born at 36^{+4} weeks of gestation. Data were collected through longitudinal observation, physical examinations, and semi-structured interviews. Clinical management followed the systematic Helen Varney framework, benchmarking outcomes against national neonatal care standards. Baby A (2100g) and Baby B (1900g) were born with high vitality (Apgar scores 8-10) despite their LBW status. The primary etiologies identified were maternal nutritional deficits and placental insufficiency. Immediate interventions, including thermal regulation, Vitamin K prophylaxis, and early initiation of exclusive breastfeeding, resulted in steady weight gain and the absence of postnatal complications. Conclusion: Integrated midwifery care and the Continuity of Care (CoC) model are essential in mitigating the risks associated with twin LBW. Standardizing systematic frameworks in primary healthcare settings can significantly improve neonatal survival and long-term growth trajectories.

Keywords: Low Birth Weight, Twin Pregnancy, Neonatal Care

Introduction

Twin pregnancies represent a unique obstetric phenomenon that carries significantly higher risks of perinatal morbidity and mortality compared to singleton gestations. Globally, the high incidence of preterm delivery and intrauterine growth restriction (IUGR) in multiple pregnancies contributes substantially to the prevalence of Low Birth Weight (LBW), defined by the World Health Organization (WHO) as a birth weight of less than 2,500 grams (WHO, 2021). LBW in twin neonates is frequently driven by the limited uterine capacity to accommodate fetal volume and the competition for nutrient supply through the placenta (Arini and Firdaus, 2019)

In Indonesia, the trend of twin pregnancies poses a serious clinical challenge toward achieving neonatal mortality reduction targets. Recent data from the Indonesia Health Profile indicates that LBW remains the leading cause of infant mortality, with a significant proportion originating from multiple births (Kemenkes RI, 2023). This condition is often exacerbated by maternal risk factors, such as inadequate nutritional status and poor adherence to Antenatal Care (ANC)

schedules. The inability of the mother to meet the increased metabolic demands during a twin pregnancy directly impacts the linear growth of the fetuses (Sari and Sabarrudin, 2025)

Pathophysiologically, twin neonates with LBW face complex short-term and long-term complications. Immediate postnatal risks include hypothermia, hypoglycemia, respiratory distress syndrome, and susceptibility to infection due to an immature immune system (WHO, 2021; Juliana et al., 2019). Furthermore, deficiencies in essential micronutrients, such as protein and DHA during the gestational period, can hinder the long-term neurological and physical development of the infants (Arini and Firdaus, 2019). Consequently, preventive and curative clinical management is crucial to ensure neonatal survival. (Arini and Firdaus, 2019) Comprehensive midwifery management, such as the Continuity of Care (CoC) model and the 7-step Helen Varney framework, has proven effective in mitigating risks in high-risk pregnancies (Juliana et al., 2019). Key pillars of care for LBW twins include thermal regulation, early initiation of breastfeeding, and rigorous growth monitoring. This case study aims to evaluate the implementation of integrated midwifery care for LBW twin neonates to provide a practical clinical reference for improving the quality of neonatal outcomes in primary healthcare settings.

Research Method

This study employed a qualitative descriptive design with a case study approach to provide a comprehensive analysis of midwifery management in twin neonates. The subject of this study was a 30-year-old multigravida mother at 36 weeks of gestation with a confirmed twin pregnancy. Data collection was performed through longitudinal observation, physical examinations of both the mother and neonates, and semi-structured interviews. This method allows for a detailed exploration of the clinical trajectory and the efficacy of interventions in a real-world clinical setting (Juliana et al., 2019).

The clinical management and documentation followed the 7-step Helen Varney framework, which encompasses a systematic process from data collection and diagnosis to immediate management and evaluation. The analysis focused on benchmarking the clinical outcomes, such as birth weight and Apgar scores, against established neonatal care standards and the latest national guidelines (Kesehatan, 2024). Ethical considerations were maintained throughout the study, ensuring informed consent and the confidentiality of the subjects' medical records.

Result

The clinical subjects consisted of twin neonates delivered vaginally at 36 weeks of gestation to a 30-year-old multigravida mother. Baby A was born with a birth weight of 2100 grams, achieving Apgar scores of 8/9 at one and five minutes, respectively[2]. Baby B was born with a lower birth weight of 1900 grams, yet demonstrated high vitality with Apgar scores of 9/10. Both neonates were classified as Low Birth Weight (LBW) based on the World Health Organization threshold of less than 2,500 grams, although both remained active and responsive immediately after birth.

An analysis of the clinical data identified maternal nutritional status and placental insufficiency as the primary etiological factors contributing to the LBW status of the twins. These factors are consistent with established correlations between maternal weight gain and fetal development trajectories found in recent midwifery literature . The intrauterine growth restriction (IUGR) observed in this case resulted from the physiological

demands of a multifetal pregnancy combined with suboptimal nutrient transfer.

Immediate neonatal management was executed using the 7-step Helen Varney framework to ensure systematic care. Interventions prioritized thermal regulation, the administration of Vitamin K injections, and the early initiation of exclusive breastfeeding to support metabolic stability (Bhardwaj *et al.*, 2024).

Longitudinal postnatal monitoring confirmed successful clinical outcomes, characterized by steady weight gain and the complete absence of neonatal complications (Kim *et al.*, 2021). These results emphasize that integrated midwifery care is highly effective in mitigating the inherent risks associated with twin LBW deliveries (Hermans *et al.*, 2024).

Discussion

The occurrence of Low Birth Weight (LBW) in this twin pregnancy, with birth weights of 2100g and 1900g, underscores the inherent biological challenges of multifetal gestations. The World Health Organization (WHO) emphasizes that twins are significantly more likely to fall below the 2,500g threshold due to limited uterine capacity and intrauterine growth restriction (IUGR). In this case, the disparity in weight between Baby A and Baby B, despite identical gestational ages, reflects the complex dynamics of nutrient competition and placental efficiency often observed in twin births. While the Apgar scores remained high, indicating good immediate vitality, the underlying LBW status necessitates vigilant long-term monitoring to prevent metabolic and developmental complications.

Maternal nutritional status emerged as a critical determinant of fetal growth in this study, aligning with global findings that optimal nutrition is paramount in high-risk pregnancies (Bienertova-Vasku, 2020). Research indicates that maternal weight gain and the intake of essential nutrients, such as protein and DHA, are directly correlated with fetal tissue accretion and membrane signaling (Hull *et al.*, 2023). The placental insufficiency noted in this case further exacerbated the growth lag, as the placenta serves as the sole conduit for oxygen and micronutrients Consequently, antenatal care must prioritize aggressive nutritional counseling and early detection of growth faltering to improve the weight outcomes of twin neonates (Gruber *et al.*, 2023).

The successful management of these neonates was deeply rooted in the application of the 7-step Helen Varney midwifery framework and the 'Continuity of Care' (CoC) model. By prioritizing immediate thermal regulation, early initiation of exclusive breastfeeding, and vitamin K administration, the clinical team effectively mitigated the risks of hypothermia and hemorrhagic disease. Integrated midwifery care, which bridges the gap between pregnancy and the postpartum period, ensures that LBW twins receive the specialized attention required for steady growth. This case demonstrates that a systematic, evidence-based approach to neonatal care can significantly reduce morbidity and improve the overall prognosis for high-risk twin infants (Sembiring and Sinaga, 2024).

Conclusion and Suggestion

The clinical management of twin neonates with Low Birth Weight (LBW) requires a multifaceted and systematic approach to ensure optimal outcomes. This case study demonstrates that although twin pregnancies are inherently high-risk due to limited uterine capacity and placental

insufficiency , integrated midwifery care following the 7-step Helen Varney framework provides a robust foundation for mitigating complications. The successful stabilization of Baby A (2100g) and Baby B (1900g) was achieved through immediate thermal regulation, Vitamin K administration, and the early initiation of exclusive breastfeeding. These interventions, coupled with regular postnatal monitoring, resulted in steady weight gain and the absence of neonatal morbidity (Tyldesley-Marshall *et al.*, 2021).

Ultimately, maternal nutritional status and frequent antenatal monitoring are the most critical factors in improving the birth weight and vitality of twin neonates. Based on the clinical findings, healthcare practitioners should prioritize the adoption of the Continuity of Care (CoC) model to ensure seamless monitoring from the prenatal to the postpartum period. Special emphasis must be placed on providing aggressive nutritional counseling and the early detection of placental insufficiency during antenatal visits to improve fetal growth outcomes. Furthermore, health institutions are encouraged to standardize the use of systematic frameworks, such as the 7-step Helen Varney approach, for all high-risk twin pregnancies to minimize clinical errors in neonatal management (Wahyuni, Sembiring and Herna, Rinayanti Manurung, 2020). Future research should focus on longitudinal studies to evaluate long-term developmental milestones in LBW twins, while policy makers should enhance public health programs specifically tailored to address the rising trend of LBW cases in multiple gestations.

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