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Comprehensive midwifery care for a premature newborn with very low birth weight (VLBL) and grade III-IV hyaline membrane disease (HMD) at Gambiran General Hospital, Kediri City

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***Abstract*:**
Neonates with prematurity, very low birth weight (VLBW), and respiratory distress syndrome (Hyaline Membrane Disease/HMD) represent neonatal emergencies that require immediate, comprehensive, and collaborative management. In Indonesia, according to the Indonesia Health Profile (Ministry of Health, 2023), prematurity and its complications are the leading causes of neonatal mortality, contributing to approximately 35% of total neonatal deaths. VLBW occurs in about 11% of newborns, with a significantly increased risk of death, especially in infants weighing less than 1500 grams. Additionally, HMD or Respiratory Distress Syndrome (RDS) affects 60–80% of VLBW neonates, particularwhich demonstratese born before 32 weeks of gestayn. This report presents a case study of a 0-day-old newborn at Gambiran General Hospital, Kediri City, with prematur VLBW, and grade III–IV HMD. The midwifery managemen,t approach was carried out using the Varney method. The infant required resuscitation, surfactant administration, CPAP oxygen therapy, and intensive monitoring. Evaluation showed improvement in respiratory function and nutritional status. These results highlight the vital role of midwives in early detection and collaborative interventions to reduce neonatal morbidity and mortality from such critical conditions.

***Keywords*:**
prematurity; VLBW; HMD; midwifery care; neonatal

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INTRODUCTION

Neonatal health is a key indicator in assessing the quality of maternal and child healthcare services. The neonatal period, particularly the first week of life, is a highly critical phase because newborns are extremely vulnerable to various complications, especially when born prematurely and with very low birth weight (VLBW). Prematurity and VLBW are major risk factors that significantly contribute to high rates of neonatal morbidity and mortality worldwide, including in Indonesia (World Health Organization [WHO], 2022; UNICEF Indonesia, 2024).

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According to the Indonesia Health Profile (Kementerian Kesehatan Republik Indonesia [Kemenkes RI], 2023), approximately 11.1% of babies in Indonesia are born prematurely, and around 6.1% are born with low birth weight, of which a smaller subset meets the criteria for VLBW (<1,500 grams). Furthermore, more than 35% of neonatal deaths in Indonesia are caused by complications related to prematurity, VLBW, and respiratory disorders such as Hyaline Membrane Disease (HMD) (Setiawan et al., 2022).

Premature infants generally have underdeveloped organs—particularly the respiratory system—increasing the risk of developing HMD. Grade III–IV HMD represents a severe neonatal emergency that requires intensive interventions such as surfactant administration, oxygen therapy through Continuous Positive Airway Pressure (CPAP), and sometimes mechanical ventilation (Hawas et al., 2023; Yeh et al., 2019). In such situations, healthcare professionals—especially midwives—play a crucial role in providing appropriate and comprehensive care, starting from early risk identification, initial management, stabilization of the infant's condition, and educating the family (Jones & Smyth, 2021; WHO, 2022).

The urgency of managing emergencies in newborns with prematurity and VLBW underlies the preparation of this report as documentation of midwifery care. This report is intended to serve as a reference for enhancing the quality of midwifery services, particularly in critical neonatal cases within healthcare facilities (Frontiers, 2025; UNICEF Indonesia, 2024).

METHODS

This study employed a descriptive case study method with a comprehensive midwifery care approach. The purpose of this method was to provide an in-depth description of the implementation of midwifery care for a neonate with prematurity, very low birth weight (VLBW), and respiratory distress syndrome or Grade III–IV Hyaline Membrane Disease (HMD). The study was conducted in the Neonatal Care Unit (Panji Room) of Gambiran General Hospital, Kediri City, from June 16 to June 28, 2025. The subject of this study was a 0-day-old newborn of Mrs. N.F., diagnosed with prematurity, VLBW, and HMD, while the object of the research was the process of midwifery care provided to the infant.

Data collection was conducted through direct observation of the patient's condition, interviews with family members and healthcare professionals, review of medical records, and literature studies to enhance theoretical understanding and inform management approaches. Instruments used in data collection included maternal and neonatal assessment forms, the midwifery management process format based on Varney's seven-step method, and patient progress notes using the SOAP

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(Subjective, Objective, Assessment, Plan) framework. Data analysis was conducted using a descriptive qualitative approach, outlining the results of assessment, diagnosis, interventions, implementation of care, and evaluation in accordance with midwifery care standards and current relevant literature.

RESULTS

Assessment results showed that the baby of Mrs. N.F. was a 0-day-old newborn delivered prematurely at a gestational age of less than 32 weeks, with a very low birth weight (<1500 grams), and experiencing severe respiratory distress diagnosed as Grade III–IV Hyaline Membrane Disease (HMD). At birth, the baby did not cry spontaneously, presented with tachypnea, chest wall retractions, grunting, and cyanosis—all typical clinical signs of HMD. The APGAR scores at the first and fifth minutes were low, prompting immediate resuscitation by the medical team. The infant was then referred to the NICU for intensive care, including oxygen therapy, intratracheal surfactant administration, and respiratory support using Continuous Positive Airway Pressure (CPAP).

The midwifery care provided included comprehensive assessment, formulation of midwifery diagnoses, planning, and implementation of both collaborative and independent interventions. Collaborative actions were undertaken with pediatricians and NICU nurses to facilitate advanced medical management, while independent midwifery interventions included monitoring vital signs, providing nutrition through parenteral feeding, preventing hypothermia, and educating the infant's parents about the baby's condition and ongoing care. Evaluation revealed gradual improvements in the baby's condition, including increased oxygen saturation, a reduced frequency of chest retractions, and the gradual emergence of a sucking reflex.

DISCUSSION

This case emphasizes that prematurity and very low birth weight (VLBW) are the primary determinants of neonatal respiratory distress and subsequent mortality. The infant described in this report was delivered at less than 32 weeks of gestation and weighed under 1500 grams—both well-recognized risk factors for Respiratory Distress Syndrome (RDS), also known as Hyaline Membrane Disease (HMD). Immaturity of the lungs and surfactant deficiency result in alveolar collapse, reduced compliance, and impaired gas exchange, leading to hypoxemia and respiratory failure (Shin et al., 2024). According to Yeh et al. (2019), preterm infants with gestational ages below 32 weeks are at

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a substantially increased risk of developing HMD due to inadequate surfactant synthesis and structural immaturity of the pulmonary system.

The low APGAR scores observed in the first and fifth minutes further signified perinatal asphyxia and respiratory compromise, requiring immediate neonatal resuscitation. Low APGAR scores have been consistently associated with increased morbidity and mortality in neonates with RDS (Yang et al., 2022). Prompt resuscitation, airway stabilization, and transfer to the Neonatal Intensive Care Unit (NICU) are essential to optimize survival chances.

In cases of Grade III–IV HMD, early and aggressive intervention is critical. The administration of intratracheal surfactant and the use of Continuous Positive Airway Pressure (CPAP) or mechanical ventilation have been shown to significantly reduce mortality and pulmonary complications (Chiesi Neonatology, 2023). CPAP maintains alveolar expansion and improves oxygenation by stabilizing the functional residual capacity, thereby preventing alveolar collapse. Furthermore, the “golden six hours” after birth have been identified as a crucial period during which timely respiratory support can drastically improve outcomes (Yeh et al., 2019). In this case, early surfactant therapy and CPAP administration contributed to improved oxygenation and a reduction in chest wall retractions, signaling recovery.

Although medical management forms the cornerstone of HMD treatment, midwives play a vital role in providing complementary and supportive care. Midwifery interventions such as continuous monitoring of vital signs, thermoregulation to prevent hypothermia, parenteral or enteral feeding, and parental education are integral to holistic neonatal management (World Health Organization, 2022). Educating parents about the infant’s condition and care needs not only improves adherence to medical recommendations but also reduces parental anxiety and fosters emotional bonding (Jones & Smyth, 2021). The midwife’s ability to identify neonatal emergencies, initiate stabilization measures, and collaborate effectively with pediatricians and NICU nurses is essential in ensuring timely, coordinated, and high-quality care.

The multidisciplinary collaboration observed in this case—between midwives, neonatologists, and NICU nurses—was pivotal to the infant’s gradual recovery. According to Shin et al. (2024), multidisciplinary neonatal care models significantly improve clinical outcomes and reduce complications among preterm and VLBW infants. Such collaboration enhances continuity of care and ensures that complex medical interventions are complemented by ongoing supportive measures.

In conclusion, this case underscores the interdependence of medical and midwifery interventions in managing neonatal respiratory distress due to HMD. The combination of timely surfactant therapy, respiratory support, and continuous midwifery care yielded favorable outcomes.

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Therefore, improving midwives' competencies in neonatal emergency recognition, stabilization, and collaborative practice is essential for optimizing the survival and quality of life of high-risk neonates. Future practice should emphasize early detection, evidence-based respiratory management, and strengthening interprofessional teamwork within perinatal and neonatal care systems.

CONCLUSION

In conclusion, comprehensive midwifery care for newborns with prematurity, very low birth weight (VLBW), and Grade III–IV respiratory distress syndrome (Hyaline Membrane Disease/HMD) requires prompt, accurate, and collaborative management. In the case of Mrs. N.F.'s baby, multidisciplinary interventions, including surfactant administration, oxygen therapy with CPAP, vital signs monitoring, nutritional support, and complication prevention, resulted in a gradual improvement of the infant's condition. These outcomes underscore the pivotal role of midwives in early assessment, informed clinical decision-making, and effective collaboration with the medical team in managing neonatal emergencies. Additionally, family education is an essential component in supporting the success of long-term care. A holistic and evidence-based midwifery approach can contribute significantly to reducing neonatal morbidity and mortality, especially in high-risk infants such as this case.

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