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Evaluation of Nesting Care on the Stability of Physiological Parameters (Respiratory Rate, Oxygen Saturation, Heart Rate, And Body Temperature) in Low Birth Weight (LBW) Infants in The Perinatology Unit

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ABSTRACT

This study aimed to evaluate the effectiveness of nesting care in stabilizing physiological parameters of low birth weight infants receiving treatment in a perinatology unit. A descriptive case study design was used to observe two premature infants who experienced respiratory instability, fluctuating body temperature, feeding intolerance, and a high risk of infection. Nesting care was applied continuously for three days by positioning the infants in a flexed posture resembling the intrauterine environment to improve comfort and reduce physiological stress. Physiological parameters, including heart rate, respiratory rate, oxygen saturation, and body temperature, were monitored before and after the intervention. The results showed consistent improvement in both infants, marked by decreased heart rate and respiratory rate, increased oxygen saturation reaching ninety nine percent, and stable body temperature within the normal range. These findings indicate that nesting care supports physiological stabilization and promotes energy conservation in infants with low birth weight. In conclusion, nesting care is a simple, affordable, evidence based intervention that enhances physiological stability and can be integrated into routine neonatal nursing practice.

ABSTRAK

Penelitian ini bertujuan untuk mengevaluasi efektivitas nesting care dalam menstabilkan parameter fisiologis pada bayi dengan berat lahir rendah yang menjalani perawatan di ruang perinatologi. Penelitian ini menggunakan desain studi kasus deskriptif pada dua bayi prematur yang mengalami ketidakstabilan pernapasan, fluktuasi suhu tubuh, intoleransi nutrisi, serta risiko infeksi yang tinggi. Nesting care diberikan secara terus menerus selama tiga hari dengan memposisikan bayi dalam postur fleksi menyerupai lingkungan intrauterin untuk meningkatkan kenyamanan dan menurunkan stres fisiologis. Parameter fisiologis seperti frekuensi napas, frekuensi nadi, saturasi oksigen, dan suhu tubuh dipantau sebelum dan setelah intervensi. Hasil penelitian menunjukkan perbaikan yang konsisten pada kedua bayi, ditandai dengan penurunan frekuensi nadi dan napas, peningkatan saturasi oksigen hingga sembilan puluh sembilan persen, serta suhu tubuh yang stabil dalam rentang normal. Temuan ini menunjukkan bahwa nesting care mampu mendukung stabilitas fisiologis dan mengoptimalkan penghematan energi pada bayi dengan berat lahir rendah. Dapat disimpulkan bahwa nesting care merupakan intervensi sederhana, terjangkau, dan berbasis bukti yang dapat diintegrasikan ke dalam praktik keperawatan neonatal rutin.

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INTRODUCTION

Low Birth Weight (LBW) remains one of the most significant challenges in neonatal health services because it is strongly associated with physiological instability and a higher risk of mortality. LBW is defined as a birth weight of less than 2,500 grams regardless of gestational age (WHO, 2022; Morita & Lizadri, 2025). This condition indicates that the adaptation of the newborn from intrauterine to extrauterine life becomes more complex due to the immaturity of organs and regulatory systems (Enjelika et al., 2023). The urgency of research related to LBW management continues to increase as the prevalence remains high globally, including in Indonesia. In 2020, around 19.8 million babies worldwide were born with LBW (WHO & UNICEF, 2023), and LBW contributes to approximately 60–80% of global neonatal deaths (Mislu et al., 2024). These figures show that LBW is not only a clinical concern but also an indicator of health disparities across regions.

In Indonesia, the prevalence of LBW remains considerably high and varies between regions. National reports show an LBW prevalence ranging from 2% to 17.2%, contributing to nearly one-third of neonatal mortality (Miraturrofiah et al., 2025). Data from the National Basic Health Survey indicate that LBW prevalence remains concerning at 6.2% (Ministry of Health RI, 2019). Regional disparities further demonstrate that provinces differ significantly in LBW prevalence, with some areas reaching more than 20% (BPS Provinsi Maluku, 2022; Ekoriano et al., 2025). These wide variations highlight the need for adaptive and context-specific approaches to neonatal care, especially for newborns with LBW. Thus, the increasing prevalence and severe health outcomes underscore the necessity of developing effective, affordable, and applicable interventions to support the stability of LBW infants in perinatology units.

Physiological instability is one of the primary clinical problems in LBW infants. Babies with low birth weight have limited energy reserves, immature thermoregulation, and are more susceptible to respiratory and circulatory problems (Rahmawati & Nurmayunita, 2020). Without proper management, these physiological instabilities may progress into serious complications such as hypothermia, apnea, respiratory distress, or increased risk of infection (El-Farrash et al., 2024). Therefore, nursing interventions that support physiological stability are essential, particularly those based on developmental care principles. One of the recommended non-pharmacological interventions is nesting care, which positions the infant in a posture resembling the intrauterine environment. This intervention helps reduce energy expenditure, enhance comfort, and support stabilization of vital physiological parameters (Moeindarwati & Sari, 2020).

Several studies have shown that nesting care has a positive impact on the physiological stability of LBW infants. Research conducted by Kapoor et al. (2023) demonstrated that nesting care effectively maintains oxygen saturation and reduces physiological stress in preterm infants. Similar findings were also reported in Indonesia, where the use of nesting care along with supine positioning in a box warmer improved vital signs such as body temperature and respiratory rate

in LBW infants (Rahmawati & Nurmayunita, 2020). Other studies also found that nesting care improved sleep quality and promoted calmer behavioral responses, which are closely associated with better physiological stability (Fitriani & Dewi, 2022). These preliminary findings indicate that nesting care is a promising intervention that can support neonatal outcomes.

However, despite strong empirical evidence, there remains a significant gap between research findings and actual clinical practice. While studies consistently show the effectiveness of nesting care, its implementation in some settings is still suboptimal. Many healthcare providers tend to prioritize medical interventions such as incubators, oxygen therapy, or fluid support, while developmental care receives less attention (Sambyal & Toor, 2022). This practice gap illustrates the need for research that describes how nesting care is applied in real clinical settings, especially in perinatology rooms with limited resources. Furthermore, most previous studies employed experimental designs, leaving a gap in research focusing on case-based understanding of nesting care implementation in daily clinical practice. This creates a space for novelty, as descriptive case studies can provide deeper insights into how nesting care works in real-world neonatal care.

Considering the results of previous studies, the present research positions itself as a complementary work that strengthens existing evidence. This study does not aim to contradict earlier findings; instead, it supports and expands them by demonstrating the practical application of nesting care in perinatology settings. By describing the infant's physiological condition before and after the intervention, this study provides a more contextual understanding of nesting care effectiveness in stabilizing physiological parameters of LBW infants.

Therefore, this study is designed to evaluate the application of nesting care in low birth weight infants admitted to a perinatology room and examine its effectiveness in stabilizing physiological parameters. The findings are expected to contribute to better scientific understanding and improve nursing practice in neonatal care, especially in facilities with limited resources. Ultimately, this research is anticipated to provide a practical foundation for developing comprehensive, evidence-based nursing care for LBW infants.

METHODS

This study employed a descriptive case study design to evaluate the effectiveness of nesting care on the stability of physiological parameters in low birth weight infants in the perinatology unit. This approach was selected because it provides a comprehensive understanding of an individual's response to specific and intensive nursing interventions. Data collection was conducted through direct observation of the infant's vital signs, including respiratory rate, heart rate, oxygen saturation, and body temperature, which were monitored periodically before, during, and after the intervention. The nesting care intervention was administered for twenty four hours per day over three consecutive days by positioning the infant in a flexed posture resembling the intrauterine environment using rolled cloths as supports to enhance comfort and reduce physiological stress (Ramadhani & Maryatun, 2024). Additional modifications, such as placing the infant's hands in a self soothing posture, were implemented to support behavioral regulation and physiological stability.

All interventions, infant responses, and vital sign monitoring results were systematically documented in the nursing records to ensure consistency and accuracy of the data. The collected data were analyzed using descriptive analysis techniques by comparing changes in physiological parameters before and after the intervention to identify improvement trends and the resulting

clinical effects. This analysis enabled a comprehensive assessment of the ability of nesting care to promote physiological stabilization, particularly in the aspects of respiration, thermoregulation, and oxygenation. The use of a case study approach was considered appropriate because it captures clinical dynamics in depth and provides a clearer understanding of the effectiveness of non pharmacological interventions in vulnerable low birth weight infant populations (Altimier & Phillips, 2020).

RESULTS AND DISCUSSION

Results

1. Nursing Care for Low Birth Weight Infants (LBW)

Table 1. Nursing Care Outcomes for a Low Birth Weight Infant (15 Days Old, 32 Weeks Gestation)

Component	Key Findings
Identity & Birth History	Male infant, 15 days old, born at 32 weeks of gestation, birth weight 1650 g; delivered via cesarean section due to fetal distress; APGAR score 4–7; no spontaneous cry at birth, pale and weak; required 3 cycles of resuscitation with assisted ventilation; medical diagnoses: preterm LBW, neonatal pneumonia, sepsis, anemia, suspected duodenal stenosis.
Maternal & Social History	Mother without chronic illness, regular ANC; family is Javanese, Muslim, communicates in Indonesian; parents are anxious but cooperative and actively involved.
Current Condition	Nutrition via OGT (breast milk + formula); weak suck–swallow reflex; decreased muscle tone; minimal movement; pale and wrinkled skin, decreased turgor; irregular breathing with mild retractions, bilateral rhonchi; desaturation → on CPAP FiO_2 25%; milk vomiting; body weight decreased to 1470 g.
Focused Data & Physical Examination	Hypersalivation and white sputum; bilateral rhonchi; irregular breathing pattern; flat abdomen, reduced peristalsis; functional ileus, suspected NEC grade 1; body temperature 36.9°C in incubator at 33°C, extremities cooler; anemia; normal electrolytes and glucose.
Nursing Problems (Diagnoses)	1) Impaired spontaneous ventilation; 2) Ineffective airway clearance; 3) Ineffective breathing pattern; 4) Ineffective thermoregulation; 5) Nutritional deficit; 6) Risk of infection related to OGT, CPAP, CVC, and neonatal pneumonia.
Main Interventions	Respiratory monitoring (RR, pattern, SpO_2, breath sounds); CPAP; semifowler positioning; suction <15 seconds; 24-hour nesting care; temperature and incubator monitoring; nutrition management (20 cc via OGT every 3 hour); infection prevention (6-step handwashing, 5 moments, aseptic technique); collaboration for antibiotics and parenteral nutrition; documentation of physiological responses.
Implementation (12–15 August 2025)	Continuous respiratory monitoring; suctioning of white sputum; nesting care several times daily; breast milk/formula via OGT without vomiting; abdomen soft, good elimination; CPAP maintained; stable temperature 36.6–36.9°C; hygienic incubator environment; improved oxygen saturation

	96–99%.
Evaluation / Outcomes	Breathing pattern improved, no retractions, SpO_2 stable at 96–99%; reduced hypersalivation, clear breath sounds; stable temperature, warm extremities; improved nutrition, no vomiting or residuals, weight increased from 1500 → 1555 g; no signs of infection; parents able to continue OGT feeding care; infant stable and ready for discharge.

This 15-day-old male infant was born prematurely at 32 weeks of gestation via caesarean section due to fetal distress. He presented with respiratory depression at birth and required resuscitation before receiving intensive care. Maternal history was unremarkable, and the family has shown emotional support and active involvement in the care process. The infant currently receives nutrition through an OGT due to immature oral reflexes and is maintained in an incubator to ensure stable body temperature.

Examinations indicate several clinical problems related to prematurity, including respiratory distress, temperature instability, and weight loss. Objective findings such as irregular breathing, rhonchi, vomiting, and weak tone form the basis for establishing nursing diagnoses, which include impaired spontaneous ventilation, ineffective airway clearance, ineffective breathing pattern, ineffective thermoregulation, nutritional deficit, and risk of infection due to invasive procedures. These diagnoses consider respiratory status, nutrition, elimination, and physiological responses during assessment.

The care plan was developed for each diagnosis using evidence-based interventions, such as ventilatory support to improve respiratory capacity, suctioning to reduce secretions, regular respiratory monitoring, incubator temperature regulation, and controlled OGT feeding. Nesting care was implemented to improve comfort and physiological stability by positioning the infant in a flexed posture resembling the fetal position. All interventions were carried out following SOPs, aseptic techniques, and close monitoring of vital signs to ensure the infant's response to treatment.

Daily implementation of nursing care from August 12–15 included continuous observation of breathing patterns, oxygen saturation, body temperature, feeding tolerance, and infection risk. CPAP helped stabilize ventilation, suctioning reduced secretions and improved saturation, and nesting care promoted calm behavior and a more regular breathing pattern. Nutrition through OGT every hour was well tolerated with no residuals, and the abdomen remained soft. Infection prevention measures were applied through hand hygiene, monitoring of device insertion sites, and routine incubator maintenance.

Evaluation showed significant improvement in the infant's condition. Breathing became regular without signs of distress, oxygen saturation stabilized within optimal limits, body temperature remained controlled, and nutrition was well tolerated, resulting in weight gain. No signs of infection were observed during the monitoring period. Improvements across all nursing diagnoses supported the discontinuation of several interventions and preparation for discharge, along with continued parental education on home care.

2. Nursing Care Case Resume

Table 2 Nursing Care Case Resume

Component	Key Findings
Identity & Initial Condition	Female infant, 3 days old, born at 34 weeks' gestation via cesarean section due to HELLP Syndrome; APGAR scores 3–4–5; experienced asphyxia with meconium-stained amniotic fluid; required intubation and VIP suction; admitted to the NICU.
Assessment Data (19 August 2025)	Jaundiced (Kramer 4), birth weight 2410 g → current weight 2000 g; weak suck–swallow reflex; irregular and shallow breathing pattern; fluctuating temperature; green OGT residuals; blood glucose 53 mg/dL; total bilirubin 13.10 mg/dL; leukocytes 17.42 $\times 10^3$/uL.
Nursing Diagnoses	1) Ineffective breathing pattern; 2) Neonatal jaundice; 3) Impaired thermoregulation; 4) Nutritional deficit; 5) Risk for infection.
Interventions/Implementation (19–21 August 2025)	Monitoring of respirations and vital signs; phototherapy; nesting care; breast milk feeding via OGT; infection prevention (hand hygiene, IV/OGT care); monitoring of temperature and infant responses.
Nursing Outcomes/Evaluation	Breathing improved (SpO_2 97–99%, no retractions); jaundice decreased (Kramer 4 → 2, phototherapy discontinued); temperature stabilized (36.5–36.9°C); weight increased from 2000 → 2290 g; sucking reflex improved; no signs of infection.

Based on the findings of the nursing care study for Baby A, a three-day-old premature infant born at 34 weeks of gestation via cesarean section due to maternal HELLP Syndrome, it can be concluded that the baby's initial condition showed significant respiratory compromise. This was reflected in the low APGAR scores (3–4–5), the presence of asphyxia and meconium-stained amniotic fluid, and the need for immediate interventions such as intubation and VIP suction. The baby was subsequently admitted to the NICU for close monitoring. The assessment conducted on August 19, 2025, revealed multiple clinical concerns, including severe jaundice (Kramer scale 4), weight reduction from 2410 g to 2000 g, weak sucking and swallowing reflexes, irregular and shallow breathing patterns, unstable body temperature, and green residuals in the OGT. Laboratory findings supported the presence of potential complications, as indicated by elevated total bilirubin (13.10 mg/dL), hypoglycemia (GDS 53 mg/dL), and leukocytosis (17.42 $\times 10^3/\mu L$), which increased the risk of infection.

Based on these findings, five main nursing diagnoses were established: ineffective breathing pattern, neonatal jaundice, impaired thermoregulation, nutritional deficit, and risk for infection. Interventions conducted from August 19–21, 2025, focused on monitoring and stabilizing vital signs, managing jaundice through phototherapy, providing controlled nutrition through the OGT, and implementing nesting care to support physiological stability and comfort. Infection prevention was carried out through proper hand hygiene practices and careful maintenance of the OGT and IV line. Continuous temperature monitoring was also performed due to the infant's susceptibility to thermoregulatory instability.

The evaluation showed consistent clinical improvements. The infant's breathing pattern became more stable, with oxygen saturation increasing to 97–99% and the absence of chest retractions. Jaundice decreased from Kramer scale 4 to scale 2, allowing phototherapy to be discontinued. Thermoregulation improved, with body temperature remaining within the normal range of 36.5–36.9°C without signs of hypo- or hyperthermia. Nutritional status also improved, indicated by weight gain from 2000 g to 2290 g and better sucking reflexes. No signs of infection were observed at the IV or OGT sites throughout the observation period. Overall, the nursing interventions provided positive outcomes and contributed to significant improvements in the infant's condition during the treatment period.

Discussion

1. Analysis of Nursing Care Based on Theoretical Concepts and Related Research

By.Ny.I is a fifteen day old male infant born at thirty two weeks via sectio caesarea due to fetal distress. He presents with low birth weight, neonatal pneumonia, sepsis, anemia, and suspected necrotizing enterocolitis grade one, with weight decline from one thousand six hundred fifty to one thousand four hundred seventy grams. WHO (2022) defines low birth weight as less than two thousand five hundred grams, while Kale and Fonseca (2023) distinguish prematurity related and growth restriction related cases, placing this infant in the prematurity category.

The infant appears pale, lethargic, and shows weak suck–swallow coordination. Respiratory findings include irregular breathing, minimal retraction, and bilateral rhonchi requiring Continuous Positive Airway Pressure at twenty five percent fraction of inspired oxygen. Surfactant deficiency commonly causes these signs (Costa et al., 2024). Laboratory results show mild anemia due to immature erythropoiesis (German & Juul, 2023). Excess secretions and rhonchi support pneumonia, consistent with bacterial causes described by Wei et al. (2024). Fluctuating temperature and cool extremities indicate thermoregulatory immaturity (Dunne et al., 2024). Feeding intolerance, vomiting, and weight loss reflect gastrointestinal immaturity (Astuti et al., 2022), while invasive devices elevate infection risk (Buttera et al., 2025).

By.A, a three day old female infant born at thirty four weeks via sectio caesarea due to maternal HELLP syndrome, presented with asphyxia and required endotracheal intubation. APGAR scores of three, four, and five indicate early hypoxia requiring close monitoring (Ramasethu et al., 2025). Weight loss from two thousand four hundred ten to two thousand grams exceeds normal limits (Bruce, 2025). Jaundice with total bilirubin thirteen point ten milligrams per deciliter and indirect bilirubin dominance reflects physiological jaundice due to immature hepatic enzymes (Shoris et al., 2023). Respiratory instability with shallow breathing aligns with immature neurological respiratory control (Hockenberry & Wilson, 2022; Thompson et al., 2024).

Primary nursing problems in By.Ny.I include impaired spontaneous ventilation, ineffective airway clearance, ineffective breathing pattern, ineffective thermoregulation, nutritional deficit, and infection risk. In By.A, key problems include ineffective breathing pattern, neonatal jaundice, ineffective thermoregulation, nutritional deficit, and infection risk.

Impaired Spontaneous Ventilation (SDKI D zero zero zero four) in By.Ny.I is linked to respiratory muscle fatigue due to prematurity and pneumonia, as premature lungs require greater breathing effort (Lima et al., 2022). Continuous Positive Airway Pressure is essential for maintaining oxygenation (Tana et al., 2023). Ineffective Airway Clearance (SDKI D zero zero zero one) is supported by excess secretions; pneumonia related inflammation increases sputum (Sulpat et al., 2023), and suctioning improves oxygenation (Merter et al., 2025).

Ineffective Breathing Pattern (SDKI D zero zero zero five) in both infants is caused by immature neurological respiratory control (Erickson et al., 2021). In By.A, Neonatal Jaundice (SDKI D zero zero two four) corresponds to elevated indirect bilirubin typical of physiological jaundice (Sampurna et al., 2023); phototherapy effectively reduces bilirubin (Gottimukkala et al., 2023).

Ineffective Thermoregulation (SDKI D zero one four nine) reflects limited subcutaneous fat and rapid heat loss (Afifah & Fadila, 2025). Incubator use helps stabilize temperature (Indartik et al., 2025). Nutritional Deficit (SDKI D zero zero one nine) is supported by poor feeding coordination; orogastric feeding is often necessary (Sari et al., 2024), and gradual expressed breast milk feeding improves outcomes (Dzulkifli et al., 2024). Infection Risk (SDKI D zero one four two) arises from invasive procedures and immature immunity; aseptic technique is essential (Widia & Rosdiana, 2023), and prevention bundles reduce sepsis rates (Sandinirwan et al., 2023).

2. Analysis of Intervention Implementation Based on Evidence Based Practice Findings

The analysis of nursing care revealed that both the managed patient and the resume patient shared two primary nursing diagnoses: Ineffective Breathing Pattern (SDKI D.0005) and Ineffective Thermoregulation (SDKI D.0149). These diagnoses are strongly associated with low birth weight and prematurity, which lead to immature respiratory structures and underdeveloped thermoregulatory mechanisms (Dunne et al., 2024). In premature infants, incomplete alveolar and surfactant development causes irregular breathing and a tendency for CO_2 retention (Murphy et al., 2024), while thin subcutaneous fat and a large body surface area increase the risk of heat loss (Albzea et al., 2025). This combination contributes to elevated respiratory rate, fluctuating temperature, reduced oxygen saturation, and compensatory changes in heart rate.

To address these issues, the evidence based intervention Nesting Care was applied. As part of Developmental Supportive Care (Arikan & Esenay, 2025), nesting places the infant in a semi flexed, womb like posture that enhances comfort, improves respiratory control, and stabilizes body temperature (Baidah et al., 2024). Before initiating the intervention, a complete assessment of RR, HR, SpO_2, and temperature was conducted. The managed infant weighed 1470 g at 32 weeks, and the resume infant weighed 2000 g at 34 weeks; both showed rapid breathing, unstable temperatures, and low oxygen saturation.

Nesting Care was performed continuously for 24 hours each day over three consecutive days (Ramadhani & Maryatun, 2024). Infants were positioned using small towel rolls to maintain stable flexion, and physiological parameters were monitored before and after the intervention at the same time daily (Maimunatun et al., 2025).

Table 3. Physiological Observations of the Managed Infant (By.Ny.I)

Day	Temp Before	Temp After	HR Before	HR After	RR Before	RR After	SpO_2 Before	SpO_2 After
Day 1	36.9°C	36.6°C	180	143	38	44	96%	97%
Day 2	36°C	36.8°C	177	142	36	40	95%	97%
Day 3	36.2°C	36.7°C	181	144	33	43	96%	98%
Day 4	36°C	36.8°C	111	140	34	39	96%	99%

Table 4. Physiological Observations of the Resume Infant (By.A)

Day	Temp Before	Temp After	HR Before	HR After	RR Before	RR After	SpO_2 Before	SpO_2 After
Day 1	36°C	36.6°C	172	143	58	40	95%	97%
Day 2	36.2°C	36.9°C	163	145	47	38	95%	99%
Day 3	36°C	36.5°C	135	142	45	40	96%	98%

Across the three days, both infants showed consistent improvement after continuous Nesting Care: decreased HR and RR, increased SpO_2 up to 99%, and temperature stabilization from an average of 36°C to 36.9°C. These findings align with evidence that the flexed position reduces diaphragmatic load, enhances alveolar ventilation, and improves oxygenation (Nikam et al., 2023; Kapoor et al., 2023). The microenvironment created by the nest also reduces heat loss and metabolic stress (El-Farrash et al., 2024).

Previous studies support these results: nesting stabilizes temperature and reduces tachypnea (Ismail et al., 2024), lowers hypothermia incidence by up to 30% after 72 hours (Rohmah et al., 2020), and promotes energy efficiency and better cardiopulmonary stability through longer, more restful sleep (Vadakkan & Prabakaran, 2022).

Overall, Nesting Care is effective in improving breathing patterns and thermoregulation in low birth weight infants. The physiological benefits—reduced stress, better ventilation, and improved temperature stability—demonstrate its value as a safe, low cost, and reliable standard intervention in perinatology units, consistent with findings from Kapoor et al. (2023) and El-Farrash et al. (2024).

Implications

The implementation of nesting care for both infants, By. Ny. I and By. A, demonstrated a significant contribution to the stabilization of key physiological parameters, particularly heart rate, respiratory rate, oxygen saturation (SpO_2), and body temperature. These findings show that simple and consistent developmental care can effectively support homeostatic stability in low

birth weight (LBW) infants without relying heavily on invasive interventions (Ismail et al., 2024; Wahyu et al., 2025).

The success of nesting care in both cases reinforces that Evidence-Based Nursing (EBN) interventions can be applied effectively in perinatology units. Beyond maintaining physiological stability, this intervention also enhances infant comfort and neurobehavioral organization. These results align with Magor et al. (2024), who noted that developmental care resembling the intrauterine environment has direct benefits for physiological stability and neuromuscular development in premature infants.

In addition to physiological advantages, nesting care supports nursing efficiency and service quality. With infants who are calmer and more stable, the need for invasive procedures decreases, infection risks are minimized, and the nursing workload in monitoring vital signs becomes more manageable (Carle et al., 2025). This highlights how simple, evidence-based interventions can elevate patient safety and overall care quality.

Overall, three days of nesting care provided clear positive effects on the physiological stability of LBW infants, as reflected in the normalization of HR, RR, SpO_2, and temperature (Ramadhani & Maryatun, 2024). These outcomes emphasize the importance of developmental care in supporting comfort and homeostasis. The findings also strengthen the role of evidence-based neonatal nursing practice and support recommendations for hospitals to integrate nesting care as part of the standard of care for LBW infants in perinatology units (Prescott et al., 2024).

CONCLUSION

This study concludes that nesting care demonstrates clear effectiveness in enhancing the physiological stability of low birth weight infants (LBW) in the perinatology unit. Throughout its application to the two subjects, Baby Ny. I and Baby A, the intervention consistently supported improvements in heart rate, respiratory rate, oxygen saturation, and body temperature. Initially, both infants exhibited physiological instability associated with prematurity, yet the structured implementation of nesting care over three consecutive days facilitated notable stabilization across these parameters. The intervention promoted improved ventilation and oxygenation, enhanced thermoregulation, and reduced physiological stress, allowing both infants to achieve more stable vital signs without complications.

The findings reinforce that nesting care, grounded in evidence-based nursing and developmental care principles, serves as an impactful non-pharmacological intervention that optimizes energy efficiency, comfort, and hemodynamic stability in LBW infants. Its successful application in this study highlights its value as a feasible and beneficial practice, even within resource-limited healthcare settings, and emphasizes its meaningful contribution to improving neonatal outcomes.

REFERENCES

Afifah, M., & Fadila, E. (2025). The application of nesting therapy on thermoregulation changes in premature infants in the NICU. *Indogenius*, *4*(2A), 173–179. https://doi.org/10.56359/igj.v4i2a.700

Albzea, W., Alrashidi, H. F., Alsanea, S., Alrakaf, D., AlOmani, D., & Alazemi, F. (2025). The thermoregulatory effect of immediate skin-to-skin contact for preterm infants: A systematic review and meta-analysis with trial sequential analysis. *Cureus*, *17*(8), 1–15. https://doi.org/10.7759/cureus.90454

Altimier, L., & Phillips, R. (2020). The neonatal integrative developmental care model: Seven neuroprotective core measures for family-centered developmental care. *Newborn and Infant Nursing Reviews*, *20*(4), 126–131. https://doi.org/10.1016/j.nainr.2020.08.006

Arikan, A., & Esenay, F. I. (2025). Effect of a portable therapeutic baby nest designed for neonates on physiological parameters, comfort and pain levels during venous blood sampling: A randomised controlled trial. *Emergency Medicine Journal*, *42*(11), 705–711. https://doi.org/10.1136/emermed-2024-214660

Astuti, D. D., Rustina, Y., & Wanda, D. (2022). Oral feeding skills in premature infants: A concept analysis. *Belitung Nursing Journal*, *8*(4), 280–286. https://doi.org/10.33546/bnj.2107

Baidah, Husni, M., & Ghina, L. M. (2024). Penerapan teknik nesting pada asuhan keperawatan bayi BBLR di ruang bayi RSUD DR. H. Moch Ansari Saleh Banjarmasin. *Jurnal Sains Farmasi dan Kesehatan*, *2*(1), 59–64. https://doi.org/10.62379/jfkes.v2i1.1395

BPS Provinsi Maluku. (2022). *Statistik kesehatan Provinsi Maluku 2021*. Badan Pusat Statistik Provinsi Maluku.

Bruce, A. M. (2025). *Weighing babies guideline* (3rd ed.). NHS Lanarkshire.

Buttera, M., Luhmann-Lunt, C., Buettcher, M., Lehnick, D., & Stocker, M. (2025). The impact of central line-specific dwell-times for neonatal central line associated bloodstream infections. *Antimicrobial Resistance and Infection Control*, *14*(1). https://doi.org/10.1186/s13756-025-01618-2

Carle, A. C., Mark, B. A., Gurses, A. P., Pickler, R. H., Hall, P. D., & Bartman, T. (2025). Nurse workload and missed nursing care in neonatal intensive care units. *JAMA Pediatrics*. https://doi.org/10.1001/jamapediatrics.2025.3647

Costa, F., Titolo, A., Ferrocino, M., Biagi, E., Dell'Orto, V., Perrone, S., & Esposito, S. (2024). Lung ultrasound in neonatal respiratory distress syndrome: A narrative review of the last 10 years. *Diagnostics*, *14*(24), 1–13. https://doi.org/10.3390/diagnostics14242793

Dunne, E. A., O'Donnell, C. P. F., Nakstad, B., & McCarthy, L. K. (2024). Thermoregulation for very preterm infants in the delivery room: A narrative review. *Pediatric Research*, *95*(6), 1448–1454. https://doi.org/10.1038/s41390-023-02902-w

Dzulkifli, A., Nadhiroh, S. R., & Syahdana, A. N. (2024). Breastfeeding on body composition in premature infants: A systematic review. *Amerta Nutrition*, *8*(3), 496–505. https://doi.org/10.20473/amnt.v8i3.2024.496-505

Ekoriano, M., Widiyanto, A., Muthmainnah, Devi, Y. P., Cahyono, B. E., Nafsi, I., & Widodo, T. (2025). Profile and factors associated with low birth weight in Indonesia: A national data survey. *Rural and Remote Health*, *25*(1), 1–9.

El-Farrash, R. A., El Sakka, A. S., & Ismail, A. A. (2024). Nest positioning for preterm infants: A systematic review of clinical outcomes. *Journal of Neonatal Nursing*, *30*(1), 15–23. https://doi.org/10.1016/j.jnn.2023.10.004

Enjelika, Apriyanti, F., & Miftahurrahmi. (2023). Asuhan kebidanan pada bayi baru lahir di PMB Nelly Suryani wilayah kerja Puskesmas Kuok. *Evidence Midwifery Journal*, *2*(3), 1–7. https://doi.org/10.31004/emj.v2i3.10350

Erickson, G., Dobson, N. R., & Hunt, C. E. (2021). Immature control of breathing and apnea of prematurity: The known and unknown. *Journal of Perinatology*, *41*(9), 2111–2123. https://doi.org/10.1038/s41372-021-01010-z

Fitriani, R., & Dewi, I. (2022). Pengaruh nesting care terhadap kualitas tidur bayi berat lahir

rendah. *Jurnal Keperawatan Anak Indonesia*, *5*(2), 87–95. https://doi.org/10.24198/jkai.v5i2.39215

German, K. R., & Juul, S. E. (2023). Neonatal anemia. *Current Pediatric Reviews*, *19*(4), 388–394. https://doi.org/10.2174/1573396319666221121140627

Gottimukkala, S. B., Lobo, L., Gautham, K. S., Bolisetty, S., Fiander, M., & Schindler, T. (2023). Intermittent phototherapy versus continuous phototherapy for neonatal jaundice. *Cochrane Database of Systematic Reviews*, *1*(3), 1–54. https://doi.org/10.1002/14651858.CD008168.pub2

Indartik, Khasanah, N. N., & Wahyuni, S. (2025). Nesting technique as a simple method for optimal outcomes in premature infant care: A literature review. *Indonesian Journal of Global Health Research*, *7*(2), 583–594. https://doi.org/10.37287/ijghr.v7i2.5650

Ismail, A., Salaghor, S. M., Alshomrani, S. A., & Almodallal, H. (2024). The impact of using nesting care on heart rate, oxygen saturation, and pain among premature neonates in neonatal intensive care units in Saudi Arabia: A quasi-experimental study. *Cureus*, *16*(6), 1–7. https://doi.org/10.7759/cureus.61775

Kale, P. L., & Fonseca, S. C. (2023). Intrauterine growth restriction, prematurity, and low birth weight: Risk phenotypes of neonatal death, Rio de Janeiro State, Brazil. *Cadernos de Saúde Pública*, *39*(6), 1–13. https://doi.org/10.1590/0102-311XEN231022

Kapoor, R., Sharma, P., & Kumar, A. (2023). Effect of nest positioning on physiological parameters of low birth weight infants: An experimental study. *Indian Journal of Child Health*, *10*(6), 472–476. https://doi.org/10.32677/IJCH.2023.v10.i6.011

Kementerian Kesehatan Republik Indonesia. (2019). *Laporan Nasional Riskesdas 2018*. Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan.

Lima, P. A. T., Méio, M. D. B. B., Moreira, M. E. L., de Abranches, A. D., Milanesi, B. G., & Gomes Junior, S. C. S. (2022). Energy expenditure and body composition in infants with bronchopulmonary dysplasia at term age. *European Journal of Pediatrics*, *181*(8), 3039–3047. https://doi.org/10.1007/s00431-022-04517-5

Magor, N. R. E., Ads, S. E. M., & Elhalafawy, S. E. H. (2024). Effectiveness of nesting positioning and Yakson touch on physiological, behavioral state and pain caused by blood sampling procedures in preterm neonates. *Journal of Neonatal Nursing*, *30*(5), 502–508. https://doi.org/10.1016/j.jnn.2024.02.004

Maimunatun, S., Utami, T. A., & Prabawati, D. (2025). Hubungan pelaksanaan dokumentasi nesting dengan respon fisiologis bayi berat badan lahir rendah (BBLR) di RS X Jakarta. *MAHESA: Malahayati Health Student Journal*, *5*(1), 88–97. https://doi.org/10.33024/mahesa.v5i1.16084

Merter, O. S., Dertli, S., Taskin, E., Aydin, M., & Benli, S. (2025). Effects of endotracheal suctioning duration on cerebral oxygenation in preterm infants. *Journal of Clinical Nursing*, *34*(3), 1063–1071. https://doi.org/10.1111/jocn.17382

Mislu, E., Arage, M. W., Kumsa, H., & Terefe, A. (2024). Mortality among low birth weight neonates on parenteral feeding: A prospective follow-up study. *Research and Reports in Neonatology*, *14*, 67–84. https://doi.org/10.2147/rrn.s450572

Moeindarwati, I., & Sari, D. P. (2020). Nesting care untuk meningkatkan stabilitas fisiologis bayi prematur: Literature review. *Jurnal Ilmu Keperawatan dan Kebidanan*, *11*(2), 150–158. https://doi.org/10.26714/jikk.v11i2.6513

Morita, K. M., & Lizadri, N. (2025). Gambaran penyebab terjadinya berat badan lahir rendah

(BBLR) pada ibu bersalin di RS Islam Ibnu Sina Bukittinggi tahun 2023. *Menara Ilmu: Jurnal Penelitian dan Kajian Ilmiah*, *19*(1), 49–58. https://doi.org/10.31869/mi.v19i1.5973

Murphy, M. C., Miletin, J., Klingenberg, C., Guthe, H. J., Rigo, V., Plavka, R., Bohlin, K., Pereira, A. B., Juren, T., Alih, E., Galligan, M., & O'Donnell, C. P. F. (2024). Prophylactic oropharyngeal surfactant for preterm newborns at birth. *JAMA Pediatrics*, *178*(2), 117–124. https://doi.org/10.1001/jamapediatrics.2023.5082

Nikam, P. N., Naregal, P. M., Mohite, V. R., & Karale, R. B. (2023). Efficacy of nesting on physiological parameters among preterm babies admitted at tertiary care hospital Karad. *Journal of Datta Meghe Institute of Medical Sciences University*, *18*(2), 181–184. https://doi.org/10.4103/jdmimsu.jdmimsu

Prescott, M. G., Geist, M., Olsson, E., Fiander, M., Soll, R. F., & Bruschettini, M. (2024). Infant positioning for promoting development and preventing morbidity in preterm infants. *Cochrane Database of Systematic Reviews*, *1*(12), 1–13. https://doi.org/10.1002/14651858.CD016029

Rahmawati, N., & Nurmayunita, R. (2020). Efektivitas nesting care terhadap kestabilan tanda vital bayi berat lahir rendah di box warmer. *Jurnal Keperawatan Respati*, *7*(1), 14–22. https://doi.org/10.35842/jkr.v7i1.362

Ramadhani, N. E., & Maryatun. (2024). Penerapan terapi nesting terhadap perubahan fisiologis pada bayi berat lahir rendah di RSUD Wonogiri. *Protein: Jurnal Ilmu Keperawatan dan Kebidanan*, *2*(4), 133–144. https://doi.org/10.61132/protein.v2i4.707

Ramasethu, J., Narayanan, I., Arhin, J. K., Yeboah, R. F., Insaidoo, G., Mintah, E., & Awutey, E. (2025). Use and implications of the Apgar score in evaluating resuscitation of newborns with birth asphyxia in a lower-middle-income country. *Journal of Global Health*, *15*, 04244. https://doi.org/10.7189/jogh.15.04244

Rohmah, M., Saputri, N., & Bahari, J. (2020). Effectiveness of use of nesting on body weight, oxygen saturation stability, and breath frequency in prematures in NICU room Gambiran Hospital Kediri City. *STRADA Jurnal Ilmiah Kesehatan*, *9*(1), 119–128. https://doi.org/10.30994/sjik.v9i1.275

Sambyal, S., & Toor, P. (2022). A study to evaluate the effect of nesting on posture, discomfort and physiological parameters of low birth weight infants admitted in selected hospitals of Jalandhar, Punjab. *International Journal of Research in Paediatric Nursing*, *4*(2), 26–29. https://doi.org/10.33545/26641291.2022.v4.i2a.97

Sandinirwan, I., Leo, H., Muslim, B., Hasanah, & Karina, P. P. (2023). Central line-associated bloodstream infection related with umbilical vein catheterization and peripherally inserted central catheter in preterm infants: A meta-analysis and systematic review. *Medical Journal of Indonesia*, *32*(4), 217–223. https://doi.org/10.13181/mji.oa.237071

Sampurna, M. T. A., Liem, K. D., Pratama, D. C., Oktaviana, N., Putra, A. J. E., Zakiyah, R., Visuddho, V., Etika, R., Handayani, K. D., Utomo, M. T., Angelica, D., Ayuningtyas, W., Hendrarto, T. W., Rohsiswatmo, R., Wandita, S., Kaban, R. K., & Ahmad, J. M. (2023). A review of existing neonatal hyperbilirubinemia guidelines in Indonesia. *F1000Research*, *11*, 1–21. https://doi.org/10.12688/f1000research.110550.1

Sari, M., Allenidekania, A., & Waluyanti, F. T. (2024). Program kombinasi intervensi stimulasi motorik oral dalam meningkatkan kesiapan keterampilan minum per-oral pada bayi prematur. *Journal of Telenursing (JOTING)*, *6*(1), 1491–1499. https://doi.org/10.31539/joting.v6i1.9975

Shoris, I., Gover, A., Toropine, A., Iofe, A., Zoabi-Safadi, R., Tsuprun, S., & Riskin, A. (2023). "Light" on phototherapy—Complications and strategies for shortening its duration: A review of the literature. *Children*, *10*(10), 1–21. https://doi.org/10.3390/children10101699

Thompson, L., Werthammer, J. W., & Gozal, D. (2024). Apnea of prematurity and oxidative stress: Potential implications. *Antioxidants*, *13*(11). https://doi.org/10.3390/antiox13111304

Tana, M., Tirone, C., Aurilia, C., Lio, A., Paladini, A., Fattore, S., Esposito, A., De Tomaso, D., & Vento, G. (2023). Respiratory management of the preterm infant: Supporting evidence-based practice at the bedside. *Children*, *10*(3), 1–27. https://doi.org/10.3390/children10030535

Vadakkan, A. J., & Prabakaran, V. (2022). Comparison of the effect of nesting and swaddling on sleep duration and arousal frequency among preterm neonates: A randomized clinical trial. *Journal of Caring Sciences*, *11*(3), 126–131. https://doi.org/10.34172/jcs.2022.17

Wahyu, S., Yani, I., & Hermawati. (2025). Penerapan nesting terhadap perubahan saturasi oksigen, frekuensi nafas, frekuensi nadi bayi prematur di Ruang Bougenvil RSUD Dr. Soehadi Prijonegoro Sragen. *Indonesian Journal of Public Health*, *3*(2), 503–512.

Wei, X., Liang, J., Zhang, H., Yan, C., Lu, X., Chen, Y., & Li, L. (2024). Clinical features and risk factors of *Klebsiella pneumoniae* infection in premature infants: A retrospective cohort study. *BMC Infectious Diseases*, *24*(1). https://doi.org/10.1186/s12879-024-10201-w

Widia, Y., & Rosdiana, B. I. (2023). Review article: Skin condition and skin care in premature infants. *Berkala Ilmu Kesehatan Kulit dan Kelamin*, *35*(1), 67–73. https://doi.org/10.20473/bikk.V35.1.2023.67-73

World Health Organization (WHO). (2022). *WHO recommendations for care of the preterm or low-birth-weight infant*. WHO.

WHO & UNICEF. (2023). *Country consultation on low birthweight and preterm birth estimates: Technical notes*.