International Journal of Research In Paediatric Nursing

E-ISSN: 2664-1305
P-ISSN: 2664-1291
Impact Factor (RJIF): 6.32
www.paediatricnursing.net
IJRPN 2026; 8(1): 01-04
Received: 02-10-2025
Accepted: 06-11-2025

Mahesha M
HOD & Assistant Professor, Department of Child Health Nursing, Cauvery College of Nursing, Mysuru, Karnataka, India

Corresponding Author:
Mahesha M
HOD & Assistant Professor, Department of Child Health Nursing, Cauvery College of Nursing, Mysuru, Karnataka, India

Comprehensive nursing management of newborns in the neonatal intensive care unit: A narrative review

Mahesha M

DOI: https://www.doi.org/10.33545/26641291.2026.v8.i1a.260

Abstract
The Neonatal Intensive Care Unit (NICU) provides advanced, lifesaving care for newborns with complex medical needs arising from prematurity, perinatal complications, and congenital conditions. While technological advancements have significantly improved neonatal survival, nursing management remains the cornerstone of effective intensive care delivery. Neonatal nurses provide continuous clinical surveillance, implement specialized interventions, prevent complications, and support families during critical periods. This review presents an in-depth, nursing-centered analysis of newborn care in the NICU, focusing on admission stabilization, thermoregulation, respiratory and cardiovascular management, nutrition, fluid and electrolyte balance, infection prevention, neurological and developmental support, pain and skin care, family-centered practice, and discharge planning. Emphasis is placed on evidence-based nursing interventions that promote physiological stability, neurodevelopment protection, and long-term health outcomes. The review highlights the expanding scope of neonatal nursing and underscores the importance of skilled, holistic, and compassionate care in improving neonatal outcomes.

Keywords: Neonatal intensive care, NICU nursing, newborn management, neonatal nursing practice, preterm infant

Introduction
The neonatal period constitutes a critical stage of life during which newborns must rapidly adapt from intrauterine to extra uterine existence. Despite global progress in maternal and child health services, neonatal mortality continues to account for a substantial proportion of under-five deaths, particularly in low- and middle-income countries [1]. Prematurity, low birth weight, birth asphyxia, neonatal infections, and congenital anomalies are the predominant contributors to neonatal morbidity and mortality.

The establishment of Neonatal Intensive Care Units has revolutionized the management of high-risk newborns by enabling continuous monitoring and advanced therapeutic interventions. However, improved survival rates have also brought increased attention to long-term neurodevelopment outcomes and quality of life. Within this highly specialized environment, neonatal nurses play a pivotal role. Their responsibilities extend beyond technical skill execution to include vigilant assessment, early recognition of complications, clinical decision-making, and comprehensive family support. Nursing management is therefore central to both immediate survival and long-term well-being of critically ill newborns [2].

Indications for NICU Admission
NICU admission is required when newborns need advanced monitoring or intensive medical support beyond routine neonatal care. Infants born preterm, particularly those with gestational ages below 34 weeks, commonly require NICU admission due to physiological immaturity. Other indications include very low birth weight, respiratory distress syndromes, perinatal asphyxia, suspected or confirmed neonatal sepsis, metabolic disturbances such as hypoglycemia, severe hyperbilirubinemia, congenital anomalies, and postoperative care following neonatal surgery [3].

Neonatal nurses are instrumental in identifying infants who require intensive care, ensuring safe transfer, and initiating immediate supportive measures. Early nursing intervention during this phase significantly influences clinical outcomes.

Admission assessment and early stabilization

The initial phase of NICU admission demands rapid, systematic, and coordinated nursing action. Stabilization begins with assessment of airway patency, adequacy of breathing, and circulatory status. Continuous monitoring of heart rate, respiratory rate, oxygen saturation, blood pressure, and body temperature is established promptly. Baseline anthropometric measurements and blood glucose levels provide essential reference data for ongoing care.

Nurses assist in establishing vascular access, obtaining laboratory samples, and initiating prescribed therapies. Detailed documentation and frequent reassessment allow early identification of deterioration. Subtle changes in tone, activity level, color, or feeding behavior are often the earliest indicators of clinical instability, underscoring the importance of continuous nursing vigilance [4].

Thermoregulation and nursing care

Maintenance of thermal stability is a fundamental priority in neonatal intensive care. Newborns, especially preterm infants, are predisposed to hypothermia due to immature thermoregulatory mechanisms, limited brown fat stores, and a large surface area relative to body weight. Even mild hypothermia can result in increased oxygen consumption, hypoglycemia, metabolic acidosis, and increased mortality [5].

Nursing management focuses on maintaining a neutral thermal environment through incubators or radiant warmers. Continuous temperature monitoring enables early detection of thermal instability. Nurses minimize heat loss by reducing unnecessary exposure, using warm linens, and employing protective measures such as caps and polyethylene wraps for extremely preterm infants. Effective thermoregulation reduces physiological stress and supports metabolic homeostasis.

Respiratory nursing management

Respiratory compromise remains one of the most common reasons for NICU admission. Immature lung development, surfactant deficiency, and weak respiratory drive predispose neonates to respiratory distress. Nursing responsibilities include continuous assessment of respiratory effort, oxygen saturation, chest movement, and breath sounds.

Nurses administer oxygen therapy, manage continuous positive airway pressure or mechanical ventilation, and ensure proper positioning to optimize lung expansion. Airway patency is maintained through careful suctioning when indicated. Close monitoring is required to prevent complications such as apnea, ventilator-associated infections, oxygen toxicity, and chronic lung disease. Nursing judgment is critical in balancing adequate oxygenation with prevention of iatrogenic harm [6].

Cardiovascular nursing management

Transition from fetal to neonatal circulation involves complex cardiovascular adaptations that may be compromised in preterm or critically ill infants. Nursing management aims to maintain adequate cardiac output and tissue perfusion. Continuous monitoring of heart rate, blood pressure, capillary refill time, and skin perfusion allows early detection of circulatory compromise.

Nurses regulate intravenous fluids with precision to avoid fluid overload or hypovolemia. Administration of inotropes and cardiovascular medications requires meticulous dose calculation and close observation for therapeutic response. Early recognition of conditions such as patent ductus arteriosus, hypotension, or shock is essential to prevent multi-organ dysfunction [7].

Nutritional Management

Nutrition is a critical determinant of growth, immune competence, and neurodevelopment in neonates. Nursing care emphasizes early initiation of nutrition while ensuring feeding safety. Human breast milk is the preferred source of nutrition due to its immunological and protective properties, including reduced risk of necrotizing enterocolitis [8].

Nurses administer enteral feeds via orogastric or nasogastric tubes, assess feeding tolerance, and monitor for signs of intolerance such as abdominal distension or vomiting. When enteral feeding is contraindicated, parenteral nutrition is managed with strict aseptic precautions. Accurate intake-output documentation and daily weight assessment guide nutritional adequacy and growth monitoring.

Fluid and electrolyte balance

Neonates have limited renal concentrating ability, making them susceptible to fluid and electrolyte disturbances. Nursing management involves continuous monitoring of urine output, daily body weight, serum electrolytes, and blood glucose levels. Early identification and correction of imbalances such as hypoglycemia, hyponatremia, or dehydration are crucial to preventing neurological injury and systemic complications [9].

Infection prevention and control

Neonatal infections remain a major cause of morbidity and mortality in NICU settings. Immature immune defenses and frequent invasive procedures increase infection risk. Nurses play a central role in infection prevention through strict hand hygiene, adherence to aseptic techniques, and implementation of standardized care bundles.

Ongoing surveillance for early signs of infection, including temperature instability, apnea, lethargy, and feeding intolerance, enables timely intervention. Prompt administration of prescribed antimicrobial therapy and careful monitoring of response are essential components of nursing care [10].

Neurological and developmental support

The NICU environment can be stressful and potentially detrimental to neurological development if not carefully managed. Developmentally supportive care aims to reduce environmental stressors and promote brain maturation. Nursing interventions include minimizing noise and bright light, clustering care activities, and providing supportive positioning and nesting.

Pain assessment using validated neonatal pain scales and implementation of both pharmacological and non-pharmacological comfort measures are essential. Developmental care strategies have been associated with improved behavioral organization and long-term neurodevelopment outcomes [11].

Skin integrity and pain management

Neonatal skin is structurally immature and highly vulnerable to injury. Nursing management includes gentle handling, frequent skin assessment, appropriate selection of adhesives, and prevention of pressure-related injuries. Pain

management is a professional and ethical responsibility, as repeated painful stimuli without adequate relief may have lasting neurodevelopmental consequences. Nurses play a key role in recognizing pain and implementing appropriate interventions [12].

Family-centered nursing care

Family-centered care is an essential component of modern NICU practice. Parents of critically ill newborns often experience significant emotional distress. Nurses provide emotional support, clear communication, and education regarding the infant's condition and care requirements.

Encouraging parental participation through kangaroo mother care and involvement in routine caregiving activities strengthens parent-infant bonding and improves outcomes. Family-integrated care models have demonstrated positive effects on both parental well-being and neonatal recovery [13].

Discharge planning and continuity of care

Discharge planning is an ongoing process initiated early during NICU admission. Nurses assess readiness for discharge based on feeding competence, thermal stability, consistent weight gain, and physiological stability. Comprehensive parent education regarding home care, medication administration, danger signs, and follow-up appointments is critical to ensuring safe transition from hospital to home [14].

Discharge advice for newborns transitioning from the Neonatal Intensive Care Unit to home is a critical component of nursing management, as this period marks a shift from highly monitored hospital care to parental caregiving. Neonatal nurses play a central role in preparing parents to safely assume responsibility for their infant's ongoing care. Discharge advice must be individualized, comprehensive, culturally appropriate, and reinforced through repeated education to ensure parental understanding and confidence.

Parents are educated regarding feeding practices, including exclusive breastfeeding or expressed breast milk feeding, appropriate feeding frequency, recognition of hunger cues, and correct positioning during feeds. For infants discharged on special feeding regimens, such as fortified feeds or tube feeds, nurses provide hands-on demonstration and supervised practice. Parents are instructed to monitor feeding tolerance and to recognize warning signs such as poor feeding, vomiting, abdominal distension, or lethargy, which require prompt medical attention.

Thermal care at home is emphasized, particularly for preterm and low birth weight infants who remain vulnerable to hypothermia. Nurses advise parents on maintaining appropriate room temperature, adequate clothing, and avoidance of excessive exposure to cold environments. Education on safe bathing practices and skin-to-skin contact further supports thermal stability.

Guidance on infection prevention is a key discharge responsibility. Parents are counseled on the importance of hand hygiene, limiting exposure to crowded places, avoiding contact with individuals with infections, and maintaining a clean home environment. Nurses also educate families about umbilical cord care, skin care, and early signs of infection such as fever, poor feeding, respiratory difficulty, or unusual behavior changes.

Medication administration, if prescribed, is explained in detail by nurses, including correct dosage, timing, method of administration, and potential side effects. Parents are encouraged to clarify doubts and demonstrate understanding to reduce the risk of medication errors. Written instructions are often provided to reinforce verbal teaching.

Monitoring of growth and development forms an essential part of discharge advice. Parents are instructed to observe weight gain, feeding patterns, elimination habits, and developmental milestones. Nurses educate caregivers on recognizing danger signs such as apnea, cyanosis, seizures, jaundice, breathing difficulty, or reduced activity, emphasizing the need for immediate medical consultation if these occur.

Immunization counseling is included as part of discharge education. Nurses inform parents about vaccines received during hospitalization and the schedule for future immunizations, stressing the importance of adherence to national immunization guidelines. For high-risk infants, follow-up appointments with pediatric specialists, nutritionists, or developmental clinics are coordinated prior to discharge.

Parental education also addresses safe sleep practices, including supine positioning, avoidance of soft bedding, and maintaining a smoke-free environment to reduce the risk of sudden infant death syndrome. Emotional support and reassurance are provided to parents, acknowledging the anxiety associated with caring for a previously critically ill newborn at home.

In addition, nurses ensure that parents are informed about follow-up visits, growth monitoring clinics, and emergency contact information. Discharge advice is reinforced through written discharge summaries, checklists, and contact numbers to promote continuity of care and prevent readmissions. Effective discharge counseling empowers parents, enhances newborn safety, and supports successful long-term outcomes following NICU hospitalization.

Conclusion

Nursing management in the Neonatal Intensive Care Unit constitutes a highly specialized and integrative area of practice that critically influences neonatal survival, recovery, and long-term developmental outcomes. The physiological complexity of newborns, particularly preterm and critically ill infants, necessitates that nurses apply advanced clinical knowledge, technical competence, and continuous critical judgment within a dynamic and high-risk care environment. Beyond immediate stabilization and life-support measures, NICU nursing encompasses prevention of secondary complications, protection of neurodevelopment, and promotion of holistic well-being through coordinated interventions in thermoregulation, respiratory and cardiovascular support, nutrition, fluid and electrolyte balance, infection prevention, pain management, and developmental care. The inclusion of family-centered approaches further enhances care outcomes by empowering parents through education, emotional support, and active participation in caregiving, thereby strengthening continuity of care beyond discharge. As neonatal technologies advance and survival rates improve, the scope of neonatal nursing continues to expand, underscoring the need for ongoing professional development, adherence to evidence-based practice, ethical sensitivity, and quality improvement initiatives. Collectively, effective nursing management remains the cornerstone of neonatal intensive care, with a

profound and lasting impact on both immediate survival and long-term health trajectories of vulnerable newborns.

Conflict of Interest
Not available.

Financial Support
Not available.

References

1. World Health Organization. Newborns: improving survival and well-being. Geneva: World Health Organization; 2023.
2. Kenner C, Lott JW. Comprehensive neonatal nursing care. 6th ed. New York: Springer; 2018.
3. Martin RJ, Fanaroff AA, Walsh MC. Fanaroff and Martin's neonatal-perinatal medicine. 11th ed. Philadelphia: Elsevier; 2020.
4. Tappero EP, Overfield T. Neonatal nursing care handbook. 2nd ed. New Jersey: Pearson; 2019.
5. Kumar V, Darmstadt GL. Neonatal hypothermia. Semin Perinatol. 2009;33(6):357-364.
6. Sweet DG, Carnielli V, Greisen G, Hallman M, Ozek E, Plavka R, *et al*. European consensus guidelines on respiratory distress syndrome. Neonatology. 2019;115(4):432-450.
7. Evans N. Cardiovascular adaptation in neonates. Neonatology. 2018;113(4):347-352.
8. Victora CG, Bahl R, Barros AJD, França GVA, Horton S, Krasevec J, *et al*. Breastfeeding in the 21st century. Lancet. 2016;387(10017):475-490.
9. Oh W, Guignard JP. Renal function in the neonate. Neonatology. 2018;114(2):183-190.
10. Polin RA, Denson S, Brady MT, Committee on Fetus and Newborn, Committee on Infectious Diseases. Strategies for prevention of health care-associated infections in the NICU. Pediatrics. 2012;129(4):e1085-e1093.
11. Als H. Developmental care in the neonatal intensive care unit. Curr Opin Pediatr. 2015;27(2):146-152.
12. Anand KJS. Pain management in neonates. Clin Perinatol. 2019;46(4):695-714.
13. O'Brien K, Robson K, Bracht M, Cruz M, Lui K, Alvaro R, *et al*. Family integrated care in the neonatal intensive care unit. Lancet Child Adolesc Health. 2018;2(4):245-254.
14. American Academy of Pediatrics. Hospital discharge of the high-risk neonate. Pediatrics. 2008;122(5):1119-1126.

How to Cite This Article
Mahesha M. Comprehensive nursing management of newborns in the neonatal intensive care unit: A narrative review. International Journal of Research in Paediatric Nursing 2026;8(1):01-04.