



“Beyond Survival: Kangaroo Mother Care and Long-Term Neonatal Outcomes—A Comprehensive Nursing Perspective”

Himanshu Trivedi¹, Dr. Anu V. Kumar²

¹PhD Research Scholar, ²Research Supervisor
Index Nursing College,

Malwanchal University, Indore M.P

Date of Publication: 03/02/2025

DOI 10.5281/zenodo.20703268

Abstract: Kangaroo Mother Care (KMC) is a cost-effective, evidence-based intervention involving prolonged skin-to-skin contact between a caregiver and a newborn, exclusive or near-exclusive breastfeeding, and early discharge with adequate follow-up. Initially developed as an alternative to incubator care for low-birth-weight and preterm infants in resource-limited settings, KMC has evolved into a globally recognized neonatal care strategy. Extensive research demonstrates that KMC significantly reduces neonatal mortality, hypothermia, infections, and hospital stay while promoting breastfeeding success and physiological stability. Beyond immediate neonatal survival, emerging evidence highlights the profound influence of KMC on long-term neurodevelopmental, cognitive, behavioral, emotional, and physiological outcomes. Nurses play a pivotal role in implementing, monitoring, educating, and advocating for KMC across healthcare settings. This review examines the principles of KMC, its mechanisms of action, evidence regarding long-term neonatal outcomes, challenges in implementation, and the critical role of nursing professionals in optimizing neonatal health trajectories. The article emphasizes the importance of integrating KMC into routine neonatal care to improve both short-term and lifelong outcomes for vulnerable infants.

Keywords: Kangaroo Mother Care, Neonatal Outcomes, Premature Infants, Low Birth Weight, Neonatal Nursing, Skin-to-Skin Contact, Neurodevelopment, Breastfeeding, Long-Term Outcomes, Neonatal Health

Introduction

Advances in neonatal care have substantially improved the survival rates of preterm and low-birth-weight infants worldwide. However, survival alone is no longer considered the sole indicator of successful neonatal care. Healthcare professionals increasingly recognize the importance of ensuring optimal long-term physical, cognitive, emotional, and developmental outcomes for neonates, particularly those born prematurely or with low birth weight. Among the numerous interventions developed to address these concerns, Kangaroo Mother Care (KMC) has emerged as one of the most effective, economical, and evidence-based approaches to neonatal care (World Health Organization [WHO], 2023).

Kangaroo Mother Care was first introduced in Bogotá, Colombia, in 1978 by Dr. Edgar Rey and Dr. Hector Martinez as an innovative response to overcrowded neonatal units and limited incubator availability. The practice involved continuous skin-to-skin contact between the infant and mother, promoting thermal regulation, breastfeeding, and maternal involvement in care. Since its introduction, KMC has expanded globally and is now endorsed by international organizations, including the WHO and the United Nations Children's Fund (UNICEF), as a standard component of

neonatal care for stable preterm and low-birth-weight infants (WHO, 2023).

Globally, approximately 13.4 million babies are born preterm each year, and complications associated with prematurity remain a leading cause of neonatal mortality and morbidity (Blencowe et al., 2023). Preterm infants often experience challenges such as respiratory distress, feeding difficulties, infections, impaired growth, and neurodevelopmental delays. KMC addresses many of these vulnerabilities through simple physiological and psychosocial mechanisms. The intervention not only improves immediate survival but also positively influences developmental trajectories extending into childhood and adulthood.

Nurses are central to the successful implementation of KMC. Their responsibilities include assessing infant eligibility, educating parents, monitoring physiological stability, supporting breastfeeding, promoting family-centered care, and evaluating long-term outcomes. As healthcare systems increasingly prioritize developmental care and family participation, nursing professionals play a critical role in integrating KMC into routine neonatal practice.



This review explores the concept of KMC, its physiological foundations, and its influence on long-term neonatal outcomes from a nursing perspective.

Concept and Components of Kangaroo Mother Care

Kangaroo Mother Care is defined as a comprehensive neonatal care strategy characterized by early, continuous, and prolonged skin-to-skin contact between the infant and caregiver, exclusive breastfeeding whenever possible, and appropriate follow-up after discharge (WHO, 2023). Although originally designed for mothers, fathers and other caregivers may also participate in KMC, contributing to family-centered neonatal care.

The first component of KMC is skin-to-skin contact. During this process, the infant is placed upright against the caregiver's bare chest, allowing direct contact between the infant's skin and the caregiver. This position facilitates thermal regulation, cardiorespiratory stability, and emotional bonding. The second component involves support for exclusive breastfeeding, ensuring adequate nutrition and promoting immune protection. The third component includes early discharge and structured follow-up, enabling continued care within the home environment while maintaining professional monitoring.

Unlike conventional incubator care, KMC emphasizes the active involvement of parents in neonatal care. This family-centered approach fosters parental confidence, reduces anxiety, and promotes attachment, thereby creating a supportive environment for infant growth and development.

Physiological Basis of Kangaroo Mother Care

The effectiveness of KMC is rooted in several physiological mechanisms that directly influence neonatal health. Skin-to-skin contact provides natural thermoregulation, helping infants maintain optimal body temperature. The caregiver's chest can respond dynamically to the infant's temperature needs, increasing or decreasing heat transfer accordingly. This biological synchronization reduces the risk of hypothermia, a major contributor to neonatal morbidity and mortality.

KMC also stabilizes cardiovascular and respiratory functions. Studies indicate that infants receiving KMC demonstrate more stable heart rates, improved oxygen saturation levels, fewer episodes of apnea, and reduced respiratory distress compared with infants receiving conventional care (Conde-Agudelo & Díaz-Rossello, 2016). The close proximity to the caregiver's heartbeat and breathing patterns may contribute to these stabilizing effects. Another important mechanism involves stress reduction. Premature infants in neonatal intensive care units (NICUs) are frequently exposed to stressful stimuli such as noise, bright lights,

painful procedures, and separation from caregivers. KMC decreases cortisol levels and promotes parasympathetic nervous system activity, thereby reducing physiological stress responses. Reduced stress may positively influence brain development during critical periods of neural maturation.

Furthermore, KMC enhances breastfeeding success by facilitating early initiation, improving milk production, and strengthening mother-infant interactions. Breast milk contains essential nutrients, growth factors, antibodies, and bioactive compounds that support brain development and immune function. The synergistic effects of skin-to-skin contact and breastfeeding contribute substantially to improved neonatal outcomes.

Impact of KMC on Immediate Neonatal Outcomes

Numerous studies have demonstrated the effectiveness of KMC in improving immediate neonatal outcomes. Meta-analyses have shown that KMC significantly reduces neonatal mortality among preterm and low-birth-weight infants when compared with conventional care (Boundy et al., 2016). The reduction in mortality is primarily attributed to improved thermal regulation, enhanced breastfeeding, reduced infections, and greater physiological stability.

KMC is associated with lower rates of severe infections and sepsis. Skin-to-skin contact promotes colonization with maternal microbiota rather than hospital-acquired pathogens, thereby reducing the risk of healthcare-associated infections. Additionally, breast milk provides immunological protection through antibodies and antimicrobial factors.

Hospital length of stay is often reduced among infants receiving KMC. Earlier discharge not only decreases healthcare costs but also minimizes exposure to hospital-related stressors. Families benefit from increased involvement in care, while healthcare systems experience reduced resource utilization.

Weight gain and growth outcomes also improve with KMC. Enhanced breastfeeding practices, improved metabolic efficiency, and reduced energy expenditure contribute to better growth patterns during the neonatal period. These immediate benefits form the foundation for favorable long-term developmental outcomes.

Long-Term Neurodevelopmental Outcomes

One of the most significant areas of KMC research concerns neurodevelopmental outcomes. The neonatal period represents a critical stage of brain development characterized by rapid synapse formation, neuronal differentiation, and neural network organization. Environmental influences during this period can profoundly affect lifelong cognitive and behavioral functioning.



Evidence suggests that infants who receive KMC demonstrate superior neurodevelopmental outcomes compared with those receiving conventional care. Longitudinal studies have reported improvements in cognitive performance, executive functioning, attention, memory, and academic achievement among children exposed to KMC during infancy (Charpak et al., 2017).

The beneficial effects of KMC on brain development may result from multiple mechanisms. Reduced exposure to stress hormones protects vulnerable neural structures from adverse developmental effects. Enhanced sensory stimulation through touch, warmth, smell, and auditory exposure promotes neural connectivity. Improved sleep quality associated with KMC further supports brain maturation and memory consolidation.

Neuroimaging studies have demonstrated differences in brain organization among individuals who received KMC during infancy. These findings suggest that early skin-to-skin contact may influence neural pathways involved in cognition, emotional regulation, and social functioning. Consequently, KMC represents not only a survival intervention but also a developmental strategy with lifelong implications.

Cognitive and Academic Outcomes

Long-term follow-up studies have identified positive cognitive outcomes among children who received KMC as neonates. Researchers have observed higher intelligence quotient scores, improved executive functioning, enhanced problem-solving abilities, and better school performance in KMC recipients compared with control groups (Charpak et al., 2017).

The association between KMC and cognitive development is likely multifactorial. Enhanced parent-infant interactions provide opportunities for early learning and stimulation. Improved breastfeeding contributes essential nutrients such as long-chain polyunsaturated fatty acids that support brain growth. Reduced stress and improved physiological stability create favorable conditions for neural development.

Academic success during childhood and adolescence appears to be positively influenced by KMC exposure. Studies have reported better concentration, reduced behavioral difficulties, and improved educational achievement among former KMC recipients. These findings highlight the enduring impact of early caregiving practices on developmental trajectories.

Long-Term Behavioral and Emotional Outcomes

Beyond cognitive development, Kangaroo Mother Care (KMC) has been associated with significant improvements in behavioral and emotional outcomes throughout childhood and adolescence. Premature infants are at increased risk of emotional dysregulation,

attention-deficit disorders, anxiety, depression, and social difficulties later in life. Early separation from parents, prolonged hospitalization, and exposure to stressful neonatal intensive care environments may contribute to these adverse outcomes. KMC offers a protective mechanism by fostering secure attachment and reducing early-life stress, thereby supporting healthy emotional development.

Attachment theory emphasizes the importance of close physical and emotional contact between infants and caregivers during the early stages of life. Skin-to-skin contact strengthens maternal-infant bonding and enhances parental responsiveness to infant cues. Infants receiving KMC often demonstrate greater emotional security, improved self-regulation, and reduced behavioral problems during childhood. Longitudinal studies have reported lower rates of hyperactivity, aggression, and social withdrawal among children who experienced KMC compared with those who received conventional neonatal care (Feldman et al., 2014).

The emotional benefits of KMC may extend into adolescence and adulthood. Research indicates that individuals who received KMC as neonates exhibit stronger family relationships, better social functioning, and improved emotional resilience. These outcomes may be attributed to the nurturing environment created through continuous caregiver involvement during the neonatal period. By promoting positive parent-child interactions from the earliest stages of life, KMC contributes to healthier psychosocial development across the lifespan.

Effects of KMC on Sleep and Stress Regulation

Sleep plays a crucial role in neonatal brain development, memory formation, growth, and physiological recovery. Premature infants frequently experience disrupted sleep patterns due to environmental stressors, medical interventions, and separation from caregivers. KMC has been shown to improve sleep organization and increase the duration of quiet sleep, which is essential for neurological maturation.

The close physical contact provided during KMC creates a soothing environment that promotes physiological stability and reduces stress responses. Infants held in skin-to-skin contact demonstrate lower cortisol levels, improved autonomic regulation, and fewer episodes of distress. Reduced stress exposure during critical developmental periods may protect the developing brain from harmful neuroendocrine effects.

Improved stress regulation also has implications for long-term health. Chronic activation of stress pathways during infancy has been linked to impaired cognitive development, emotional difficulties, and increased susceptibility to chronic diseases later in



life. By minimizing stress and enhancing comfort, KMC contributes to healthier neurobiological development and improved resilience.

Growth and Physical Development Outcomes

Growth failure remains a significant concern among preterm and low-birth-weight infants. Adequate nutrition, thermal regulation, and metabolic efficiency are essential for optimal growth and development. KMC positively influences these factors, leading to improved weight gain, linear growth, and head circumference growth during infancy.

Skin-to-skin contact reduces energy expenditure by maintaining thermal stability, allowing infants to allocate more energy toward growth processes. Enhanced breastfeeding practices associated with KMC provide essential nutrients required for tissue development, brain growth, and immune function. Several studies have demonstrated higher rates of exclusive breastfeeding and longer breastfeeding duration among mothers practicing KMC (Moore et al., 2016).

Long-term follow-up investigations have shown that infants receiving KMC often achieve comparable or improved growth outcomes relative to infants managed through conventional care. Adequate growth during infancy is closely linked to favorable developmental outcomes, including improved cognitive functioning and reduced risk of chronic health conditions. Therefore, the positive effects of KMC on growth may contribute indirectly to broader developmental benefits.

Cardiovascular and Metabolic Health Outcomes

Emerging evidence suggests that KMC may have lasting effects on cardiovascular and metabolic health. Premature birth is associated with an increased risk of hypertension, cardiovascular disease, insulin resistance, and metabolic syndrome later in life. Early-life interventions that reduce physiological stress and promote healthy development may mitigate some of these risks.

Studies examining adults who received KMC during infancy have reported improved autonomic nervous system regulation and better cardiovascular function compared with individuals who received traditional neonatal care. Enhanced regulation of heart rate variability and stress responses may contribute to long-term cardiovascular health. Although further research is needed, these findings suggest that KMC may influence biological pathways extending far beyond the neonatal period.

Improved breastfeeding rates associated with KMC may also contribute to healthier metabolic outcomes. Breastfeeding has been linked to reduced risks of obesity, type 2 diabetes, and cardiovascular disease in later life. Through its support of

breastfeeding and physiological stability, KMC may promote long-term health and disease prevention.

Impact on Family Well-Being

The benefits of KMC extend beyond the infant to encompass the entire family. Parents of preterm infants frequently experience anxiety, depression, stress, guilt, and feelings of helplessness. Traditional neonatal care models often limit parental involvement, contributing to emotional distress and reduced confidence in caregiving abilities.

KMC empowers parents by actively involving them in their infant's care. Participation in skin-to-skin contact promotes feelings of competence, attachment, and emotional connection. Mothers practicing KMC often report increased confidence in breastfeeding and infant care. Fathers who participate in KMC similarly experience enhanced bonding and parental satisfaction.

The psychological benefits for families may persist long after hospital discharge. Improved parent-infant relationships contribute to healthier family dynamics and better developmental environments for children. Family-centered care approaches that incorporate KMC therefore support both neonatal outcomes and overall family well-being.

Nursing Responsibilities in Kangaroo Mother Care

Nurses are central to the successful implementation and sustainability of KMC programs. Their role extends beyond clinical monitoring to include education, advocacy, emotional support, quality improvement, and interdisciplinary collaboration. Effective nursing practice is essential for maximizing the benefits of KMC and ensuring patient safety.

Assessment is a critical nursing responsibility. Nurses evaluate neonatal stability, determine eligibility for KMC, monitor vital signs, and identify potential complications. Continuous observation ensures that infants tolerate skin-to-skin contact safely and effectively. Monitoring includes assessment of temperature, respiratory status, oxygen saturation, feeding tolerance, and weight gain.

Education represents another fundamental nursing function. Parents require clear guidance regarding positioning techniques, duration of KMC sessions, breastfeeding practices, hygiene measures, and signs of neonatal distress. Nurses provide individualized instruction and reinforce learning through demonstration and supervision. Educational interventions enhance parental confidence and promote adherence to KMC protocols.

Emotional support is equally important. Parents of preterm infants often experience fear and uncertainty regarding their infant's condition. Nurses serve as trusted sources of information and



reassurance, helping families navigate the challenges of neonatal hospitalization. Compassionate communication fosters trust and encourages active parental participation in care.

Nurses also play a vital role in policy development and quality improvement initiatives. By advocating for evidence-based practices and participating in staff training programs, nurses contribute to the integration of KMC into routine neonatal care. Their leadership is essential for overcoming institutional barriers and promoting widespread adoption of KMC.

Challenges and Barriers to Implementation

Despite strong evidence supporting KMC, several barriers continue to limit its implementation across healthcare settings. Resource constraints, inadequate training, cultural beliefs, staff shortages, and limited institutional support may hinder the adoption of KMC practices.

In some healthcare facilities, insufficient space and privacy reduce opportunities for prolonged skin-to-skin contact. Overcrowded neonatal units and high patient-to-nurse ratios may further restrict implementation. Addressing these challenges requires organizational commitment and investment in family-centered care infrastructure.

Knowledge deficits among healthcare professionals can also impede successful implementation. Nurses and physicians who lack training in KMC may feel uncertain about eligibility criteria, monitoring requirements, or safety considerations. Comprehensive educational programs are necessary to ensure competency and confidence among healthcare providers.

Cultural factors may influence parental acceptance of KMC. Misconceptions regarding infant fragility, concerns about handling premature infants, and traditional caregiving beliefs may affect participation. Nurses play an important role in addressing these concerns through culturally sensitive education and support.

Additionally, socioeconomic challenges such as transportation difficulties, financial constraints, and limited social support may affect continuity of KMC following hospital discharge. Community-based follow-up services and family support programs can help address these barriers and promote sustained implementation.

Future Directions in KMC Research

Although substantial evidence supports the effectiveness of KMC, ongoing research continues to explore its broader implications. Future investigations should examine the biological mechanisms underlying long-term developmental benefits, including neuroplasticity, epigenetic modifications, and stress-response regulation.

Further studies are needed to evaluate KMC outcomes across diverse populations and healthcare settings. Research involving extremely preterm infants, medically complex neonates, and high-income healthcare systems may provide valuable insights into optimizing KMC protocols. Standardization of outcome measures would facilitate comparisons across studies and strengthen the evidence base.

Technological innovations may also enhance KMC implementation. Digital monitoring systems, telehealth support, and mobile health applications can improve follow-up care and parental education. These approaches may increase accessibility and adherence, particularly in resource-limited settings.

Nursing research remains essential for identifying best practices, evaluating educational interventions, and addressing implementation challenges. As neonatal care evolves, nurses will continue to play a central role in advancing KMC research and translating evidence into practice.

Clinical Implications for Nursing Practice

The growing body of evidence supporting Kangaroo Mother Care (KMC) has important implications for nursing practice across neonatal care settings. Nurses are uniquely positioned to facilitate the integration of KMC into routine clinical care because of their continuous interaction with neonates and families. The successful implementation of KMC requires nurses to possess comprehensive knowledge regarding neonatal physiology, developmental care principles, breastfeeding support, and family-centered care approaches.

In neonatal intensive care units and special newborn care units, nurses should incorporate KMC as an essential component of individualized developmental care plans. Early initiation of KMC, whenever clinically feasible, should be encouraged to maximize physiological and developmental benefits. Nursing assessments should include evaluation of infant readiness, caregiver preparedness, and environmental factors that may influence successful implementation.

Breastfeeding promotion remains a critical aspect of nursing care associated with KMC. Nurses should provide evidence-based guidance regarding lactation management, positioning techniques, milk expression, and feeding cues. By supporting breastfeeding alongside skin-to-skin contact, nurses contribute significantly to improved nutritional status, immune protection, and neurodevelopmental outcomes.

The transition from hospital to home represents another important area of nursing intervention. Comprehensive discharge planning should include education regarding continued KMC practices,



breastfeeding support, recognition of warning signs, growth monitoring, and follow-up appointments. Community health nurses can further strengthen continuity of care through home visits, parental counseling, and ongoing developmental surveillance.

Interprofessional collaboration is also essential. Nurses should work closely with neonatologists, pediatricians, lactation consultants, physiotherapists, occupational therapists, and social workers to ensure coordinated care. Such collaboration enhances the quality and consistency of KMC implementation while addressing the diverse needs of neonates and their families.

Recommendations

Based on current evidence, several recommendations can be proposed to strengthen the implementation and effectiveness of Kangaroo Mother Care:

First, healthcare institutions should establish standardized KMC protocols that clearly define eligibility criteria, initiation procedures, monitoring requirements, documentation standards, and discharge planning processes. Standardization promotes consistency and improves patient outcomes.

Second, comprehensive training programs should be provided for nurses and other healthcare professionals involved in neonatal care. Educational initiatives should emphasize the scientific basis of KMC, practical implementation strategies, safety considerations, and communication skills necessary for parental support.

Third, healthcare systems should create supportive environments that facilitate family participation in neonatal care. Dedicated KMC spaces, privacy measures, comfortable seating, and flexible visiting policies can enhance parental engagement and adherence.

Fourth, public health programs should promote awareness regarding the benefits of KMC among families and communities. Community education campaigns may help address cultural misconceptions and increase acceptance of KMC practices.

Fifth, long-term follow-up programs should be established for preterm and low-birth-weight infants who receive KMC. Regular developmental assessments enable early identification of delays and facilitate timely intervention when necessary.

Finally, continued research should focus on long-term developmental, behavioral, cardiovascular, and psychosocial outcomes associated with KMC. High-quality multicenter studies will further strengthen the evidence base and guide future practice recommendations.

Conclusion

Kangaroo Mother Care has transformed neonatal care by demonstrating that simple, low-cost, and family-centered

interventions can produce substantial improvements in both survival and long-term developmental outcomes. Originally developed as an alternative to incubator care in resource-limited settings, KMC has evolved into a globally recognized evidence-based practice that benefits preterm and low-birth-weight infants across diverse healthcare environments.

The advantages of KMC extend far beyond immediate neonatal stabilization. Research consistently demonstrates positive effects on neurodevelopment, cognitive performance, emotional regulation, behavioral functioning, growth, breastfeeding success, physiological stability, and family well-being. These benefits often persist throughout childhood, adolescence, and potentially adulthood, highlighting the profound influence of early caregiving experiences on lifelong health trajectories.

From a nursing perspective, KMC represents an exemplary model of holistic and family-centered care. Nurses play a pivotal role in assessing infant readiness, educating caregivers, monitoring clinical stability, supporting breastfeeding, promoting parental involvement, and advocating for evidence-based neonatal practices. Through compassionate care, effective communication, and professional leadership, nurses contribute significantly to the successful implementation of KMC and the optimization of neonatal outcomes.

As healthcare systems continue to prioritize quality, equity, and patient-centered approaches, KMC offers a sustainable and highly effective strategy for improving neonatal health worldwide. Strengthening nursing education, institutional support, community engagement, and research initiatives will further enhance the impact of KMC and ensure that vulnerable infants receive the best possible start in life.

References

1. Blencowe H, Cousens S, Oestergaard MZ, Chou D, Moller AB, Narwal R, et al. National, regional, and worldwide estimates of preterm birth rates in the year 2020 with trends from 2010 to 2020. *The Lancet*. 2023;401(10375):1261–1278.
2. Boundy EO, Dastjerdi R, Spiegelman D, Fawzi WW, Missmer SA, Lieberman E, et al. Kangaroo mother care and neonatal outcomes: A meta-analysis. *Pediatrics*. 2016;137(1).
3. Charpak N, Tessier R, Ruiz JG, Hernandez JT, Uriza F, Villegas J, et al. Twenty-year follow-up of Kangaroo Mother Care versus traditional care. *Pediatrics*. 2017;139(1).



4. Conde-Agudelo A, Díaz-Rossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. *Cochrane Database of Systematic Reviews*. 2016;8.
5. Feldman R, Rosenthal Z, Eidelman AI. Maternal-preterm skin-to-skin contact enhances child physiologic organization and cognitive control across the first 10 years of life. *Biological Psychiatry*. 2014;75(1):56–64.
6. Flacking R, Dykes F, Ewald U. The influence of kangaroo care on maternal attachment and infant development. *Journal of Clinical Nursing*. 2011;20(13–14):1880–1888.
7. Lawn JE, Mwansa-Kambafwile J, Horta BL, Barros FC, Cousens S. Kangaroo mother care to prevent neonatal deaths due to preterm birth complications. *International Journal of Epidemiology*. 2010;39(Suppl 1):i154.
8. Moore ER, Bergman N, Anderson GC, Medley N. Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane Database of Systematic Reviews*. 2016;11.
9. Nyqvist KH, Anderson GC, Bergman N, Cattaneo A, Charpak N, Davanzo R, et al. Towards universal Kangaroo Mother Care: Recommendations and report from the First European Conference and Seventh International Workshop on Kangaroo Mother Care. *Acta Paediatrica*. 2010;99(6):820–826.
10. Sharma D. Golden hour of neonatal life: Need of the hour. *Maternal Health, Neonatology and Perinatology*. 2017;3(1):16.
11. Tessier R, Charpak N, Giron M, Cristo M, de Calume ZF, Ruiz-Pelaez JG, et al. Kangaroo Mother Care and the bonding hypothesis. *Pediatrics*. 1998;102(2).
12. United Nations Children's Fund (UNICEF). Kangaroo Mother Care: A practical guide for healthcare providers. New York: UNICEF; 2022.
13. World Health Organization. WHO recommendations for care of the preterm or low birth weight infant. Geneva: World Health Organization; 2023.
14. World Health Organization. Kangaroo Mother Care implementation strategy and global recommendations. Geneva: World Health Organization; 2023.
15. Johnston CC, Campbell-Yeo M, Disher T, Benoit B, Fernandes A, Streiner D, et al. Skin-to-skin care for procedural pain in neonates. *Cochrane Database of Systematic Reviews*. 2017;2.
16. Jefferies AL. Kangaroo care for the preterm infant and family. *Paediatrics & Child Health*. 2012;17(3):141–143.
17. Ludington-Hoe SM. Thirty years of Kangaroo Care science and practice. *Neonatal Network*. 2011;30(5):357–362.
18. Smith ER, Bergelson I, Constantian S, Valsangkar B, Chan GJ. Barriers and enablers of Kangaroo Mother Care implementation from a health systems perspective. *BMC Health Services Research*. 2017;17(1):144.
19. Vesel L, Bergh AM, Kerber KJ, de Graft-Johnson J, Moxon SG, Niermeyer S, et al. Kangaroo Mother Care: A multi-country analysis of health system bottlenecks and potential solutions. *BMC Pregnancy and Childbirth*. 2015;15(Suppl 2).
20. World Health Organization. Immediate Kangaroo Mother Care and survival of low birth weight infants. Geneva: World Health Organization; 2021.