



Kangaroo care for the preterm infant and family

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Kangaroo care (KC) is the practice of skin-to-skin contact between infant and parent. In developing countries, KC for low-birthweight infants has been shown to reduce mortality, severe illness, infection and length of hospital stay. KC is also beneficial for preterm infants in high-income countries. Cardiorespiratory and temperature stability, sleep organization and duration of quiet sleep, neurodevelopmental outcomes, breastfeeding and modulation of pain responses appear to be improved for preterm infants who have received KC during their hospital stay. No detrimental effects on physiological stability have been demonstrated for infants as young as 26 weeks' gestational age, including those on assisted ventilation. Mothers show enhanced attachment behaviours and describe an increased sense of their role as a mother. The practice of KC should be encouraged in nurseries that care for preterm infants. Information is available to assist in developing guidelines and protocols.

Key Words: *Family-centred care; Kangaroo care; Preterm infant; Skin-to-skin care*

Kangaroo care (KC) is the practice of skin-to-skin contact between an infant and parent. It was introduced more than 25 years ago in Bogota, Colombia, as one component of an alternative approach to traditional neonatal intensive care unit (NICU) care for low-birthweight infants, in response to overcrowded nurseries, scarce and costly resources such as incubators, and high rates of neonatal infection and mortality. The overall approach was termed 'kangaroo mother care' (KMC). Mothers held their low-birthweight infants upright next to their skin for 24 h a day. Frequent and exclusive breastfeeding was promoted. Infants were discharged home regardless of weight as soon as their mother understood how to care for and feed her infant. In this setting, KMC reduced infant mortality and improved mother-infant attachment (1). KMC has since been adopted in countries around the world.

A systematic review focusing on infants with birthweights <2000 g in low- or middle-income countries found a significant reduction in neonatal mortality when KMC was started in the first week of life (RR 0.49, 95% CI 0.29 to 0.82) (2). A recently updated Cochrane review explored the effectiveness of KMC as an alternative to conventional NICU care of low-birthweight infants (birthweight <2500 g) (3). Based on 16 studies (2518 infants), 11 of which were conducted in low- or middle-income countries, the review concluded that KMC reduced not only mortality at discharge (RR 0.60, 95% CI 0.39 to 0.93), but also severe illness, infections and length of hospital stay, as well as improving

La méthode kangourou pour le nourrisson prématuré et sa famille

La méthode kangourou (MK) désigne la pratique qui consiste à mettre le nourrisson peau contre peau avec son parent. Dans les pays en développement, il est démontré que, pour les nourrissons de petit poids de naissance, la MK réduit la mortalité, les maladies graves, les infections et la durée des hospitalisations. La MK est également bénéfique aux nourrissons prématurés des pays à revenu élevé. La stabilité cardiorespiratoire et la thermostabilité, l'organisation du sommeil et la durée du sommeil paisible, les issues neurodéveloppementales, l'allaitement et la modulation des réponses à la douleur semblent être plus positives chez les prématurés qui profitent de la MK pendant leur hospitalisation. On n'a relevé aucun effet néfaste sur la stabilité physiologique des nourrissons dès 26 semaines d'âge gestationnel, même lorsqu'ils étaient sous ventilation assistée. Les mères présentent des comportements d'attachement plus marqués et une meilleure perception de leur rôle de mère. Il faudrait favoriser la pratique de la MK dans les pouponnières qui soignent des nourrissons prématurés. Les auteurs fournissent de l'information pour contribuer à l'élaboration de lignes directrices et de protocoles.

mother-infant bonding, breastfeeding and maternal satisfaction. KMC is now considered by many to be an important intervention to decrease morbidity and mortality for low-birthweight infants in developing countries (1,4).

In high-income countries, access to modern technology and resources may alleviate the need to use KC to improve survival of low-birthweight infants. Nevertheless, the practice of skin-to-skin contact between the preterm infant and parent has been adopted in many NICUs in these countries, initially as a means of promoting maternal-infant bonding and breastfeeding. KC is one way of involving both mothers and fathers in the care of their at-risk infant and helps to humanize the NICU experience. Continued research has explored the safety and benefits of KC for the preterm infant in the NICU setting, and is briefly reviewed in this practice point.

During KC, the infant, clad in a diaper and cap, is held in an upright prone position against the bare chest of the parent (most often the mother) and covered with clothing and/or a blanket. The duration of skin-to-skin contact varies but usually lasts 1 h to 3 h per session, with cardiorespiratory and temperature monitoring of the infant during this time. Although most often provided for stable preterm infants who do not require assisted ventilation, KC is being offered increasingly to infants who require ventilatory support and to infants who weigh as little as 600 g and who are 26 weeks' gestational age or younger at birth, including those who

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are newly born. It is important that NICUs have guidelines for provision of KC that include gestational age and weight criteria, assessing readiness and tolerance, appropriate physiological monitoring for signs of stability and stress, and protocols describing safe transfer of the neonate between isolette and parent. Such guidelines are available (5-9). Barriers to implementation of KC vary from nursery to nursery, and may include poor staff knowledge, inadequate training, discomfort with the process, lack of time and/or resources, lack of privacy and parental reluctance. Identification of such barriers is an important step in the successful implementation of KC.

Is KC safe for the preterm infant?

A variety of physiological parameters have been assessed to ascertain the safety of KC for preterm infants. A meta-analysis of 23 studies of 190 term and 326 preterm infants (gestational age range 26 to 36 weeks) concluded that there was an increase in body temperature of 0.22°C, no change in heart rate, and a statistically but not clinically significant decrease in oxygen saturation of 0.60% during periods of skin-to-skin contact (10). Prematurity did not affect the stability of these parameters. KC does not increase the frequency or duration of apneic episodes (11,12) nor increase oxygen consumption (13). One study described a small increase in the frequency of episodes of bradycardia and oxygen desaturation, believed to be related to positioning of the infant (12). Most studies have been conducted with stable, nonventilated preterm infants, but stability during KC is also reported for those receiving assisted ventilation (14). Some centres routinely and successfully provide skin-to-skin care for infants with chest tubes and on ventilators, including high-frequency oscillatory ventilation (8). Criteria and procedures for providing safe KC to preterm infants who are intubated and ventilated have been published (5,8,9). An individualized and interprofessional team approach to determine infant and parental readiness for KC is suggested. One reference recommends considering delaying KC for infants <27 weeks' gestation who require high humidification, infants with abdominal wall and neural tube defects that are to be kept sterile prior to surgery, newly postoperative infants in whom stability is not yet determined, and for infants with significant hemodynamic instability characterized by wide blood pressure swings and/or significant bradycardia, apnea or oxygen desaturation with handling that is associated with prolonged recovery (8).

What are the benefits of KC for preterm infants?

Preterm birth is believed to disrupt the neonate's smooth and integrated neurobehavioural development, resulting in disorganization of the nervous system. This may manifest as disturbances in physiological functioning, stress and behaviour. During KC, cardiorespiratory and temperature stability is achieved, as described above. Furthermore, preterm infants exhibit decreased arousal and decreased REM sleep during skin-to-skin care, suggesting more mature sleep organization (15). KC increases sleep time, including time spent in quiet sleep (15,16). At term, preterm infants who have received KC during their stay in the NICU demonstrate longer periods of quiet sleep and alert wakefulness, shorter periods of active sleep, and more organized sleep-wake cyclicality when compared with infants who did not, suggesting more rapid improvement in state organization (17,18). These infants are also more alert and responsive, and less irritable and fussy (19).

Similar advantages in neurobehaviour are also noted after NICU discharge and may have an effect on long-term development. Two cohort studies have shown that preterm infants ranging in gestational age from 25 to 35 weeks who received KC during their hospital stay had improved neurodevelopmental outcome,

scoring higher on the Mental Development Index and Psychomotor Development Index of the Bayley Scales of Infant Development both at six months (17) and at 12 months (19) when compared with infants who received conventional care.

The benefits of breast milk for the preterm infant are well-known and include decreased incidence of infections and necrotizing enterocolitis, and improved growth and neurodevelopmental outcome. KC is associated with a longer duration of breastfeeding, higher volumes of milk expressed, higher exclusive breastfeeding rates and higher percentage of breastfeeding at the time that preterm infants are discharged from hospital (20,21).

The practice of KC decreases the incidence of nosocomial infection; this benefit is more significant in developing rather than developed countries (3). Early KC likely increases the chance of the infant being colonized with maternal flora rather than the flora in the nursery, which may include antibiotic-resistant organisms and coagulase-negative staphylococcus. Because KC is only undertaken between individual infant-mother dyads, it should not increase the spread of infection from one infant to another during infectious outbreaks. However, decisions about KC during infectious outbreaks would need to be made on an individual basis in consultation with infectious disease personnel.

Preterm birth and admission to the NICU result in separation of mother and baby, interrupting the process of attachment. Mothers who have had the opportunity to provide KC for their infants describe feelings of being needed, increased confidence in knowing their infants and a sense of their role as a mother (22). Near the time of discharge home, mothers were observed to look at and touch their infant more frequently, show more positive affect and be more adaptive to their infant's signals than did mothers who had not provided KC (17). When followed after discharge, these same mothers, as well as fathers, provided a better home environment and were more sensitive to their infant.

During KC, the infant experiences maternal heart sounds, rhythmic maternal breathing, warmth and prone positioning, all of which offer gentle stimulation across the auditory, tactile, vestibular and thermal sensory systems, which may modulate the perception of pain. KC has been shown to be efficacious in reducing the physiological and behavioural responses to pain in preterm infants 28 to 36 weeks' gestation (23,24). KC is one of the nonpharmacological measures recommended by the Canadian Paediatric Society and the American Academy of Pediatrics for reducing pain associated with bedside procedures in the NICU (25).

SUMMARY

Skin-to-skin care has positive benefits, for both infants and mothers, that persist after discharge from the NICU, with no reported detrimental effect on physiological stability for preterm infants as young as 26 weeks' gestation, including those on assisted ventilation. KC enables both mothers and fathers to care for and nurture their fragile infant and promotes family health during a time of great stress. KC enhances breastfeeding and may contribute to improved neurodevelopmental outcome. Nurseries that care for preterm infants should be encouraged and supported in implementing this practice. Information is available to assist nurseries in developing best-practice guidelines and protocols for implementation (6-9). Further research is required to examine the impact of KC on ventilated infants who are <26 weeks' gestation, examining outcomes such as intraventricular hemorrhage, weight gain and neurodevelopment.

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