

REVIEW ARTICLE

## Kangaroo Mother Care: 25 years after

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### Abstract

The components of the Kangaroo Mother Care (KMC) intervention, their rational bases, and their current uses in low-, middle-, and high-income countries are described. KMC was started in 1978 in Bogotá (Colombia) in response to overcrowding and insufficient resources in neonatal intensive care units associated with high morbidity and mortality among low-birthweight infants. The intervention consists of continuous skin-to-skin contact between the mother and the infant, exclusive breastfeeding, and early home discharge in the kangaroo position. In studies of the physiological effects of KMC, the results for most variables were within clinically acceptable ranges or the same as those for premature infants under other forms of care. Body temperature and weight gain are significantly increased, and a meta-analysis showed that the kangaroo position increases the uptake and duration of breastfeeding. Investigations of the behavioral effects of KMC show rapid quiescence. The psychosocial effects of KMC include reduced stress, enhancement of mother–infant bonding, and positive effects on the family environment and the infant’s cognitive development.

**Conclusion:** Past and current research has clarified some of the rational bases of KMC and has provided evidence for its effectiveness and safety, although more research is needed to clearly define the effectiveness of the various components of the intervention in different settings and for different therapeutic goals.

**Key Words:** Neonatology, preterm infants, Kangaroo Mother Care, breastfeeding, infant development

### Introduction

Kangaroo Mother Care (KMC) was initially conceived as an alternative to the usual minimal in-hospital care for stable low-birthweight infants. It is now, however, considered by many as the most feasible, readily available, and preferred intervention for decreasing neonatal morbidity and mortality in developing countries. KMC complements good quality care of stable low-birthweight infants and allows rational use of expensive, scarce resources such as incubators. KMC

has been used to empower mothers in particular and the family in general and involve them directly in the care of their fragile infant. It gives an opportunity to the father to increase his involvement as care provider, which in turn enriches family relationships and enhances a wholesome development of this basic unit of society. In addition, KMC represents a way of humanizing neonatal healthcare, through the promotion of maternal–infant bonding and breastfeeding, two essential elements for the survival and optimal development of low-birthweight infants.

To celebrate the 25th anniversary of the KMC method, we would like to pay homage to Dr Edgar Rey Sanabria, a Colombian pediatrician who created this intervention in 1978 to address the lack of incubators, cross-infections, and infant abandonment in his hospital. Little did he imagine the impact this technique would have on parents and their small newborns around the world, 25 years later. Little did he foresee the research developments derived from this type of care; not only on the physiology of the premature infant but also on the social and psychological impact on the family. Could he have anticipated that scientists and healthcare providers in developed and developing countries would come to Colombia to learn about KMC? Could he have dreamt that KMC would help give the world a positive image of Colombia, his homeland, contrasting with the news of violence and conflict in the international media?

KMC is an example of both South–South and South–North knowledge transfer; an infrequent event in scientifically based medical care. It is a conceptually simple, elegant technique in which the role of kangaroo healthcare providers is basically to teach, coach, offer expert counseling, and closely monitor the mother–infant dyad. It is not “alternative” medicine but a scientifically sound, multilevel intervention. Although more research on KMC is needed, there is already enough evidence for it to be used extensively for low-birthweight infants. The challenges that remain to be met include resolving the ethical dilemma of asking a mother to hold in the kangaroo position her dying infant; avoiding the emergence of programs of suboptimal quality due to cost-containment requirements; and ensuring that KMC is not taken to the community level before it has been introduced properly for the care of stable infants in hospitals.

In this paper we discuss the three basic components (position, nutrition, and discharge and follow-up policies) of the KMC intervention, the uses of each component in different settings, and the scientific evidence for their efficacy.

## Components

### *Kangaroo position*

The kangaroo position consists of skin-to-skin contact between the mother and the infant in a strictly vertical position, between the mother’s breasts and under her clothes. Skin-to-skin contact should be started as early as possible, even in the delivery room or in the neonatal intensive care unit, and separation of the mother and infant should be avoided whenever possible.

*Alternative modalities: continuous.* The continuous modality is usually employed as an alternative to

minimal care in an incubator for infants who have already overcome major problems while adapting to extrauterine life, are able to suck and swallow properly, and are thriving in a neutral thermal environment. The infant’s temperature stays within the normal range due to heat from the mother’s body. To replace incubators, the kangaroo position should be maintained as long as possible, ideally 24 h/d. The provider must sleep in a semi-sitting position to avoid the reflux more frequent in premature infants. If the primary provider agrees, another person can share the role. Mothers function somewhat like human incubators [1], providing physiological homeostasis, appropriate stimulation, and the main source of nutrition. Basic physiological variables such as temperature, oxygenation, and heart rate are maintained within clinically acceptable limits in the kangaroo position. The kangaroo position is maintained until the infant no longer tolerates it—he sweats and refuses the kangaroo position—indicating that appropriate temperature regulation has been achieved [2,3].

The capacity of mothers to assist in the stabilization of their infants by providing 24-h KMC (in conjunction with technological support if necessary), beginning soon after birth, has not been adequately tested, despite numerous reports during the past decade with respect to more mature preterm infants [4–8], full-term infants on the first day after birth [9], healthy mother–infant dyads with breastfeeding difficulties identified about 12 h after birth [10,11], and, recently, preterm babies immediately after birth [12].

*Alternative modalities: intermittent.* When continuous care is not possible, the kangaroo position can be used intermittently, providing the proven emotional and breastfeeding promotion benefits. The kangaroo position should be offered for as long as possible each time (ideally 2 h or more), provided the infant tolerates it well, beginning well before feeding and continuing for as long afterwards as possible. This 2-h span is important, because it provides the stimulation that the mother needs to increase milk volume and facilitate milk letdown, and offers the infant the optimal opportunity to awaken spontaneously, self-regulate feeding, and experience a complete sleep cycle [10,13]. This duration of KMC also reduces the number of transfers of the infant into and out of the kangaroo position; no matter how carefully these transfers are done, they are disruptive to the dyad and taxing to the infant [14]. The parents (and especially the mother) may not fully develop the feeling that they are properly caring for their premature infant, as compared to families who provide a continuous kangaroo position [15].

*General evidence in support of the kangaroo position*

*Physiological effects.* Many studies have been conducted to determine the impact of the kangaroo position on the infant's physiological condition. The extensive physiological endpoints that have been measured include: heart rate, heart rate variation, vagal tone, respiratory rate, apnea, periodic breathing, disorganized breathing, oxygen saturation, desaturation events, cerebral oxygenation, oxygen consumption, metabolic rate, energy expenditure, pituitary–thyroid axis maturation, hypothalamic–pituitary–adrenal axis indicators, gastrin, somatostatin, cholecystokinin, glucose, bilirubin, hematocrit, weight gain, lactation, breastfeeding, and temperature measurements (back, axillary, abdominal, thigh, tympanic, breast, toe) [16–20]. The results of these studies are either limited or equivocal. The values for most of the variables were within clinically acceptable ranges or were the same as those observed for infants in incubators, open-air cribs, swaddled, or wrapped. The possible reasons for the equivocal findings include confounding from heterogeneity in gestational age, postnatal age, severity of illness at birth and study entry, periodic breathing, apnea or bradycardia at baseline, the comparisons made (e.g. incubator or swaddling versus KMC), or the duration and frequency of KMC.

Meta-analyses have shown that the two physiological outcomes that clearly change are temperature and weight. Body temperature increases by up to 1.0°C during a 1–2-h kangaroo position session [9,21,22], and the weight gain of infants who have repeated sessions of kangaroo position during hospitalization is significantly increased [21,22]. Evidence that the kangaroo position increases the uptake and duration of breastfeeding and increases breast milk production was confirmed in a meta-analysis of studies on full-term and more mature preterm infants who were healthy enough to remain on the postpartum unit [9].

*Behavioral state.* Investigations of the effect of the kangaroo position on behavioral state have produced uniform results for preterm infants, ranging from those who are very small and very immature within the first week of life to those who are nearly at term and medically stable. When placed in the kangaroo position, infants quickly settle down and fall into a lower state of consciousness, usually falling asleep [5,16,23–26]. The sleep is predominantly quiet with regular respirations, and active sleep diminishes [16,27]. Quiet sleep ensues even when infants are held by their fathers in the kangaroo position and continues longer than with mothers [25]. Mothers have commented that even when infants are fussy just before a feed, they fall asleep for an hour or so when put into the kangaroo position [29]. The most common response of the infant to the

kangaroo position is thus rapid quiescence, except perhaps for the infants of substance-abusing mothers [29]. Regardless of how long it takes for preterm infants to fall asleep in the kangaroo position, crying and irritability are rare, even when they are awake; instead, the infants remain in the quiet awake state [5,17,24,27–30]. Most mothers practice longer sessions of KMC as they become more experienced [23].

*Psychosocial effects.* Only a few studies have reported data on parents' well-being or on infants' development after KMC. The synthesis of published results presented below focuses on the impact of the continuous kangaroo position on the infant's environment and cognitive development.

*Impact on the infant's environment: modification of the first proximal environment (neonatal intensive care unit).* The KMC program is usually initiated during routine post-intensive care, when infants are being kept in hospital until they achieve a satisfactory medical status, and then continued after discharge. This period is generally viewed as hampering normal parent–child interaction, because the separation forms an obstacle to caring for and touching the infant. KMC shortens this suboptimal period and allows the parents to play an active role. As the infants are carried on the parent's chest, proximal noise is reduced, most being absorbed by the parent's skin and clothes. The continuous kangaroo position thus modifies the typical stressful exposure in neonatal intensive care units. Like other programs aimed at reducing stress in this environment, it might favor weight gain and mental development [31].

*Enhancement of mother–infant bonding.* During continuous carriage, parents are totally in charge of their infant and feel responsible for their health and survival. This close parent involvement strengthens the connection, particularly if the parent perceives the infant as fragile. Clinical observations of carrier–infant interactions suggest a bonding phenomenon whereby the infant's behavior elicits and reinforces the parenting skills necessary for fostering development [15]. This close relationship adds a fulfilling dimension to primary caregivers and enhances their feelings of responsibility and competence. The positive effect of the continuous kangaroo position on the mother's feelings toward the infant, her feelings of competence, and her adaptation to the mothering role has been widely reported [15,21,32,33]. Moreover, the kangaroo position facilitates psychological healing and reconciliation, and overcomes the initial stress and shock associated with premature birth more quickly [34,35].

*Modification of the family environment.* KMC has a positive effect on the family environment of the premature infant at home, which is more stimulating, more organized, and more open, with greater involvement of the father. As the mothers of fragile infants are more receptive and more oriented towards their infants, the family is also more aware of the infant. Both mothers and independent observers noted that fathers promoted their infants' development by helping to make the home environment more stimulating for them [33,36].

*Impact on the infant's cognitive development.* Data from Bogotá [33,36] suggest that infants allocated to continuous kangaroo position at 1 y had higher IQs than those given traditional care (KMC 101.1, control 97.4;  $p < 0.02$ ). At 12 mo of corrected age, a significantly higher Griffiths score was documented in preterm infants exposed to KMC (12.9 points higher) who had required intensive care and had been diagnosed as doubtful or overtly abnormal neurological development at 6 mo. This may be explained in part by the fact that KMC families (particularly mothers) are more sensitive to infant needs, and provide a more stimulating home environment. They are more active in seeking healthcare, which might have a positive effect in infants with transient or definitive neurodevelopmental conditions.

The main effect of the kangaroo position was on the development of personal relations and on planning functions related to brain developmental stage at birth. A similar trend was observed by Feldman et al. [32]. The explanations are based on three characteristics of the intervention [33,36]. The first is the timing of the intervention, which is started early in hospital, as soon as the infant's physiological state is stabilized. This early start gives the infant qualitative compensation for lost intrauterine experience and avoids input overload. Developmental care during the last weeks of (extra-uterine) gestation positively influences neurodevelopmental functioning [37] and appears to prevent frontal lobe and attentional difficulties in the neonatal period [38]. The second explanatory characteristic is the kangaroo position itself, which induces combinations of sensory modalities: auditory stimulation through the mother's voice, olfactive stimulation from the proximity of the mother's body, vestibular-kinesthetic stimulation from the infant's location on the adult's chest, tactile stimulation from the permanent skin-to-skin contact, and visual stimulation, as the infant is placed in an upright position ( $60^\circ$ ), which allows him or her to see the mother's face and body and contextual elements as she moves around. Because multimodal sensory stimulation programs have been reported as having short-term impact on physical and mental maturation [38], we suggest that this KMC component

may be positively related to mental development. The third explanation is related to breastfeeding, which will be discussed later.

*Other results.* Holding the infant in the kangaroo position has been associated with a positive effect on temperament; KMC infants being better organized and calmer and crying less [36,40,41]. KMC also has a positive effect on the infant's capacity to emit cues and to respond to the mother's requests [15,33,41]. KMC intervention is most effective when started within the first 3 d of life and when used for high-risk infants [15,32,33,36].

We suggest KMC as a means of enhancing environmental caring, creating a climate where parents become progressively more aware of the child and more prone to sensitive caring. The optimal caring context stimulates the infant, who in turn takes advantage of the more optimal environment. KMC could therefore support new goals of neonatal care in hospital, from ensuring the survival of the infant to optimizing the infant's long-term development and enhancing the competence of the parents. KMC promotes an alliance between healthcare professionals and parents. It allows optimal care in which parents are helped to master their parenting abilities.

#### *Kangaroo nutrition*

Kangaroo nutrition is the delivery of nutrition to "kangarooed" infants as soon as oral feeding is possible (even in the delivery room). It is based on exclusive breastfeeding by direct sucking, whenever possible. Initially, a strict schedule (every 2 h) for feeding is followed; when the infant's growth is shown to be adequate, the schedule is relaxed to accommodate the infant's demands. The goal is to obtain a weight gain rate that approaches the intrauterine rate during the third trimester of pregnancy (15–20 g/kg/d until 40 wk of postconceptional age).

*Modality: exclusive or nearly exclusive breastfeeding with formula supplementation if needed and if available.*

The intensive breastfeeding promotion intervention consists of close monitoring and coaching of the mother during the establishment of breastfeeding. It includes a variety of techniques to enhance effective milk production and infant intake, including non-nutritive sucking, use of expressed hind milk, and trophic enteral nutrition with colostrum to promote intestinal maturation while sufficient enteral intake is achieved.

Usually, healthy preterm infants can sustain appropriate growth with exclusive breastfeeding. If the infant's growth is not satisfactory with exclusive

breastfeeding and after an intense intervention known as “ambulatory kangaroo adaptation” (which includes breastfeeding promotion), breastfeeding can be fortified or complemented with formula, according to local protocols. A dropper, a spoon, or a cup is used to administer complement in order to minimize interference with breastfeeding. If the ambulatory weight gain is not adequate, the Bogotá group supplies 30% of the daily recommended intake of preterm formula. After at least 1 wk of adequate weight gain, a progressive decrease in supplementation is attempted. The goal is exclusive breastfeeding when the infant reaches 40 wk of postconceptional age [41].

Other modalities of appropriate preterm infant nutrition have been used, according to the specific needs of the infant, the resources available, and local culture.

*Evidence in support of the kangaroo nutrition.* Observations from ambulatory KMC programs show that up to 50% of infants thrive properly with exclusive breastfeeding (plus vitamins). Ruiz et al. [41] developed a prediction model for early identification of preterm infants appropriate for gestational age who are held in the ambulatory continuous kangaroo position but who will not thrive on exclusive breastfeeding, indicating the need for supplementation with formula or milk fortification. They also showed that the kangaroo breastfeeding policy, with supplementation with formula in cases of unsatisfactory weight gain rates, is a reasonable alternative for feeding in an ambulatory KMC setting, as it is accessible, affordable, supports the achievement of appropriate short-term growth indices, and promotes and sustains breastfeeding.

Breastfeeding as an integral component of KMC might contribute to significant gains in neurological development and IQ. KMC induces mothers to breastfeed their infants [42], and mother’s milk has been associated with gains in IQ [43]. A recent meta-analysis [44] clearly identified the short- and long-term (between 6 mo and 16 y of age) benefits of breastfeeding on cognitive development. On the basis of this and many previous papers, we believe that breastfeeding as a component of KMC could contribute to the enhancement of infants’ mental development.

#### *Kangaroo discharge and follow-up policies*

Early home discharge in the kangaroo position from the neonatal unit is one of the original components of the KMC intervention. If not safely possible, the mother–infant dyad can room in together in a minimal care facility (so-called “kangaroo wards”) until safe discharge is feasible. Appropriate access to emergency care should be assured.

In developed countries, there is usually extensive follow-up of high-risk infants, but this is not always the case in developing countries. One beneficial side effect of KMC has been the introduction of appropriate high-risk infant follow-up programs, usually up to 1 y of corrected age but sometimes longer, which have improved the survival and quality of life of these infants.

#### *Modalities*

*Early discharge to home.* Once a mother–infant dyad has successfully adapted to the KMC intervention and a basic feeding policy has been adopted, infants can safely be discharged from hospital, irrespective of their weight or postconceptional age. The adaptation process can take one to several days. Once at home, the infants are maintained in the kangaroo position, until they reject it (usually towards 37 wk of postconceptional age). The infants’ weights are monitored during daily visits until they recover their birthweight and are gaining 15 g/kg/d. Subsequent visits are conducted weekly until the infants reach term (40 wk of postconceptional age). These discharge and follow-up protocols constitute minimal neonatal ambulatory care, paralleling the minimal in-hospital care provided in neonatal units. Minimal neonatal ambulatory care includes prophylactic drugs, vitamins, iron and other supplements, according to the needs of the infant.

*Early discharge to a “kangaroo ward”.* This alternative has been adopted in several KMC programs serving rural populations where close ambulatory follow-up is impractical or impossible. It can also be used when the home conditions or social support are questionable, or when direct discharge to home under KMC is not feasible socially or culturally, usually because the local health authorities or local healthcare providers are unwilling to take what they perceive as the risks associated with early discharge to home.

*Evidence in support of the kangaroo discharge and follow-up policies.* Early discharge of premature or sick newborns has been discussed in the scientific literature for at least 40 years. Nevertheless, few of the published studies on this policy were properly randomized controlled trials with good statistical power. To our knowledge, only one randomized controlled trial has been conducted of KMC with early discharge and close ambulatory follow-up until the attainment of appropriate weight gain rate at 40 wk of postconceptional age [2,45]. The study found no increased risk of mortality or morbidity in infants under KMC. Furthermore, the growth and development

indices of the KMC infants were similar to those of infants in a classical neonatal unit, while the KMC infants showed less infectious morbidity, and the mid-term breastfeeding rates and the quality of mother-to-infant bonding were higher under KMC.

A meta-analysis of three studies by Conde et al. [22], which included the results of this randomized controlled trial, confirmed these basic findings; however, the authors pointed out several methodological flaws in the three studies. They stated that follow-up was incomplete. In the study that evaluated early discharge, however, complete follow-up information was available on more than 80% of participants at 1 y of corrected age, and data on vital status were available for 93% of the infants. The second flaw described was that the observers who collected the outcome measures were not blinded to the intervention status of the infants. Blinding observers in non-pharmacological interventions is difficult, impossible, or even unethical. In KMC, it is impossible to blind clinical observers to treatment status during an ambulatory visit, as the infant is being held in the kangaroo position. Emphasis should instead be placed on rigorous standardization of outcome measures, using concealment whenever possible and ethically appropriate. It is therefore unrealistic to ask for randomized trials of the entire intervention in which all clinically meaningful outcomes are assessed by observers not blinded to the allocated treatment modality.

Methodological limitations, study design problems, and heterogeneity in general limit the usefulness of studies on early discharge [46]. The basic premises for a successful early discharge policy for low-birthweight infants (irrespective of whether they are under KMC) are: explicit and rational discharge criteria, adequate home conditions, and timely and appropriate follow-up [47].

### Use and adaptation of KMC to different settings

KMC may be used in three main scenarios [3]:

- (1) settings with a very low level of development and severely restricted access to any level of neonatal care;
- (2) settings with access to appropriate resources but which are insufficient for the number of premature births; and
- (3) settings with little or no restriction on access to high-technology neonatal care.

*First setting: very low level of development where neonatal care is minimal or nonexistent.* In countries or regions where, in practical terms, there are no neonatal care units and most births occur in the community, two scenarios are possible.

*First scenario:* Premature infants who are born at home with no assistance or with the assistance of a traditional birth attendant.

Currently, no studies have been conducted to determine whether KMC would affect the survival and health outcomes of these infants. In the absence of such evidence, we consider that the only reasonable recommendation is to place the infant in a continuous kangaroo position as soon as possible after birth, for thermal control during stabilization, and to transport to the closest healthcare unit. In any event, using KMC at home will not cause harm and might be associated with some benefits. Nevertheless, from an ethical point of view, KMC cannot be used as a substitute for an acceptable level of care for premature infants born at home. Use of KMC under these conditions would imply keeping a dying premature infant in the kangaroo position until death occurs. There are no good data about the effects and consequences of this use of skin-to-skin contact, and the rationale, convenience, and ethics need to be established.

*Second scenario:* Preterm infants who are born at a first-level unit, with no specialized care and no possibility of being transferred to a healthcare unit with specialized care.

In such cases, KMC, including skin-to-skin contact, breastfeeding, and the best available healthcare follow-up, represents the best means for ensuring the survival of premature infants who have no significant condition other than being premature. Sick infants who might not survive represent the same ethical and clinical management dilemmas as in the previous scenario. KMC makes it possible to avoid hypothermia, due to the skin-to-skin contact, and hypoglycemia, due to administration of breast milk, either by direct sucking or by dropper or syringe. It is difficult to estimate whether KMC would have a positive impact on survival or quality of life in the absence of other needed interventions, such as ventilatory support, intravenous fluids, antibiotics, and surgery [48,51,56].

*Second setting: access to appropriate resources but which are insufficient for the number of premature births.* In middle- and middle-low-income countries where there are resources of reasonable quality but which are insufficient for the number of premature births, use of KMC represents an effective and efficient alternative which allows better utilization of available resources [2,21,45,50–54], in particular freeing up intermediate and minimal care neonatal hospital beds for cases requiring treatment of higher intensity and complexity. This use should translate into better baseline conditions for controlling nosocomial infections and other iatrogenic events related to overcrowding [45,49].

In middle-income countries, KMC is started as soon as possible and as long as possible in the intermediate or minimal neonatal care unit, or at the mother's bedside if the infant is healthy enough to room-in with the mother. Nutrition is provided according to the protocols of the health facility. Ideally, preparation for full breastfeeding is undertaken. Early discharge, to avoid unnecessarily prolonged hospitalization, can be to a KMC ward or to home. In the latter scenario, the mother-infant dyad is enrolled in an ambulatory KMC clinic and the infant is kept in the continuous kangaroo position. Although scientifically sound and clinically appropriate, this use of KMC is not currently considered in high-income countries.

*Third setting: little or no restriction on access to high-technology neonatal care.* In high-income countries where access to complex neonatal care is widely available and the number of premature births is relatively low, KMC is used mainly during hospitalization to establish healthy bonding between the mother and the infant [15] and to increase breastfeeding rates [9,42,55]. The intermittent kangaroo position in hospital is the most widely used component in this setting, usually starting after the infant has been stabilized, and does not require intensive care, then extended progressively. Non-nutritive sucking of the mother's nipple can be started simultaneously. Nevertheless, KMC is being used more and more often for infants who are still in a neonatal intensive care unit, starting after initial resuscitation and stabilization. The objectives include control of stress in both mothers and infants, further physiological stabilization [32,56], early bonding, and facilitation of future breastfeeding. Few studies of KMC with ventilated infants have been done. Because mothers enjoy KMC with ventilated infants, step-by-step protocols are now available [57–60]. Very early initiation of the intermittent kangaroo position has been used to help stabilize preterm infants in settings with and without ready access to sophisticated intensive care. Theoretically, it could be initiated immediately after birth as part of the initial resuscitation process, either in the delivery room or at the time of admission to the intensive care unit, although the evidence to support this use is mainly anecdotal (case reports, case series, trials with inadequate controls, and pilot studies).

### Closing remarks

In developing countries with limited health resources, overcrowding in neonatal units is associated with high morbidity and mortality among low-birthweight infants. Although KMC originated mainly in response to these circumstances, the benefits attributable to it far exceed its effects on overcrowding in busy,

understaffed, and underequipped neonatal units. One of the most immediate effects of KMC is to prevent prolonged separation of the mother and her low-birthweight infant, which contributes to morbidity, insufficient milk volume, poor growth, and poor mother-to-infant bonding.

Current evidence clearly shows significant benefits of the method, and KMC properly and carefully carried out does not increase the risks for LBW infant health and survival.

Additional better-designed and conducted research is needed to clarify many aspects and possible limitations of KMC in different settings. Extensive investigation on the health economics of KMC is also needed. Nevertheless, currently available experience, expertise, and scientific evidence indicates that wider, more confident use of KMC by professionals caring for low-birthweight infants is warranted.

Furthermore, living the KMC experience is a powerful and transforming event which helps mothers and families to cope with the emotional challenges associated with caring for a high-risk neonate. The healthcare professionals involved are also touched and motivated by the emotional dimensions of KMC, thereby promoting a more sensitive, humane approach to neonatal care at all levels.

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