Kangaroo Mother Care 20 Years Later: Connecting Infants and Families

Lydia Furman, MD

Kangaroo mother care (KMC), developed in Bogota, Columbia in the 1970s, was considered an innovative and daring practice at the time. Dr Nathalie Charpak and several colleagues introduced the world to a new way of caring for low birth weight infants: In comparison with the usual cautious practice of incubator nursing with severely restricted parental access and discharge only when a weight of 1700 g was attained, KMC involved "strapping the baby upright to the mother's chest in skin-to-skin contact, frequent [exclusive or nearly exclusive] breast feeding, formula supplements if weight gain did not exceed 20 g/day, and early discharge."[1] What now seems a usual intervention was at the time a revolution in newborn care. These scientist–clinicians courageously tested their new method in an observational cohort study[2] and a randomized controlled trial,[3] documenting equivalent survival among infants in the KMC and traditional care groups, thus demonstrating the safety of KMC to skeptics around the world.

Since then, KMC in its original and newer flavors has been integrated into the mainstream of newborn care. A 2016 Cochrane review examined 21 studies including 3042 infants and concluded that KMC for (stabilized) low birth weight infants in low-resource settings was preferable to conventional neonatal care, with lower risk of death and severe infection and higher rates of breastfeeding at term postmenstrual age or discharge from the hospital.[4] Variations of KMC involving briefer periods of infant holding by the mother or father, appropriately called skin-to-skin care (SSC), are practiced in birthing hospitals in high-, low-, and middle-income countries in support of the Baby Friendly Hospital Initiative Step 4 ("help mothers initiate breastfeeding within one hour of birth"). By placing babies in SSC with their mother immediately after birth, "baby crawl" is facilitated (http://www.breastcrawl.org/video.shtml), mothers can learn early feeding cues, and breastfeeding outcomes are improved.[5] Paternal KMC and SSC offer a wealth of benefits too.[6,7] Despite technical obstacles, provider concern, and infant fragility, SSC is being practiced cautiously in NICUs in high-income countries, even with ventilator-dependent infants, because it can promote parental attachment, decrease stress, and increase breast milk volumes.[8–11] KMC clearly makes the world a better place for babies and families.

Some 20 years after the original KMC randomized controlled trial, Dr Charpak et al[7] systematically recontacted, reenrolled, and examined the (now) young adults who were infants in the original study, and present to readers of *Pediatrics* the results of extensive psychological testing comparing their outcomes. Certainly there is good precedent for examining the long-term impact of neonatal care on young adult outcomes of preterm infants.[12] But the challenges of this specific KMC-based research are several. First, KMC is a "bundled intervention" in which parental nurturing, nearly exclusive breastfeeding, and SSC may have individual, synergistic, and overlapping contributions to the studied outcomes.

Department of Pediatrics, University Hospitals Rainbow Babies and Children's Hospital and Case Western Reserve University School of Medicine, Cleveland, Ohio

DOI: 10.1542/peds.2016-3332

Accepted for publication Oct 13, 2016

Address correspondence to Lydia Furman, MD, Division of General Pediatrics and Adolescent Medicine, Rm 784, MS 6019, Department of Pediatrics, Rainbow Babies and Children's Hospital, 11100 Euclid Ave, Cleveland, OH 44016. E-mail: lydia.furman@uhhospitals.org

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

FINANCIAL DISCLOSURE: The author has indicated she has no financial relationships relevant to this article to disclose.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: The author has indicated she has no potential conflicts of interest to disclose.

COMPANION PAPER: A companion to this article can be found online at www.pediatrics.org/cgi/doi/10.1542/peds.2016-2063.

To cite: Furman L. Kangaroo Mother Care 20 Years Later: Connecting Infants and Families. *Pediatrics.* 2017;139(1):e20163332

Second, it is difficult to quantify and qualify parent-associated and parent-delivered interventions because all parents are different. Third, we are a full 20 years out, and "life has happened," so numerous potentially unmeasured contributions to each individual child's life (and outcomes) have occurred. Demonstrating these very challenges, in a seminal 10-year cohort follow-up study that compared preterm infants who received 1 hour of SSC daily for 14 days versus traditional care, the results were not straightforward. Although there was a positive impact on executive function and mother–child reciprocity predicted by SSC, other factors may also have contributed, including maternal–child attachment and neonatal respiratory sinus arrhythmia.[13] Similarly, in their current study Charpak et al identify significantly reduced school absenteeism, a more optimal home environment (as best can be measured), and clinically meaningful reduced hyperactivity, aggressiveness, and externalization in the KMC group at 20 years. Yet the authors are pressed to explain the significantly higher math and language academic scores in the traditional care group. In other words, it is complicated.

Important efforts are ongoing to examine the impact of neonatal events and interventions not traditionally considered medical, which may help explain major outcome differences between infants. For example, untreated pain or stressful events such as procedures may actually lead to localized changes in brain structure and function in premature infants.[14,15] Human milk, just 1 piece of the KMC puzzle, may be an even more powerful and beneficial intervention for both full-term and preterm infants than we have ever realized, with both short- and long-term brain effects.[15–17] KMC straddles the great divide between the medical and nonmedical, and between the parent and the professional. Bridging that divide and continuing to assess the impact of intervention, as Dr Nathalie Charpak and colleagues have worked so long to do, brings us closer to optimal care for every infant and family.

ABBREVIATIONS

KMC: kangaroo mother care
SSC: skin-to-skin care

REFERENCES

1. Doyle LW. Kangaroo mother care. *Lancet*. 1997;350(9093):1721–1722
2. Charpak N, Ruiz-Peláez JG, Charpak Y. Rey-Martinez Kangaroo Mother Program: an alternative way of caring for low birth weight infants? One year mortality in a two cohort study. *Pediatrics*. 1994;94(6 pt 1):804–810
3. Charpak N, Ruiz-Peláez JG, Figueroa de C Z, Charpak Y. Kangaroo mother versus traditional care for newborn infants </=2000 grams: a randomized, controlled trial. *Pediatrics*. 1997;100(4):682–688
4. Conde-Agudelo A, Díaz-Rossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. *Cochrane Database Syst Rev*. 2016;8(8):CD002771
5. Moore ER, Anderson GC, Bergman N, Dowswell T. Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane Database Syst Rev*. 2012; (5):CD003519
6. Shorey S, He HG, Morelius E. Skin-to-skin contact by fathers and the impact on infant and paternal outcomes: an integrative review. *Midwifery*. 2016;40:207–217
7. Charpak N, Tessier R, Ruiz JG, et al. Twenty-year follow-up of kangaroo mother care versus traditional care. *Pediatrics*. 2017;139(1):e20172063
8. Baley J, Committee on Fetus and Newborn. Skin-to-skin care for term and preterm infants in the neonatal ICU. *Pediatrics*. 2015;136(3):596–599
9. Renfrew MJ, Craig D, Dyson L, et al. Breastfeeding promotion for infants in neonatal units: a systematic review and economic analysis.*Health Technol Assess*. 2009;13(40):1–146, iii–iv
10. Chan GJ, Labar AS, Wall S, Atun R. Kangaroo mother care: a systematic review of barriers and enablers. *Bull World Health Organ*. 2016;94(2):130–141J
11. Nyqvist KH, Häggkvist AP, Hansen MN, et al; Baby-Friendly Hospital Initiative Expert Group. Expansion of the baby-friendly hospital initiative ten steps to successful breastfeeding into neonatal intensive care: expert group recommendations. *J Hum Lact*. 2013;29(3):300–309
12. Hack M, Flannery DJ, Schluchter M, Cartar L, Borawski E, Klein N. Outcomes in young adulthood for very-low-birth-weight infants. *N Engl J Med*. 2002;346(3):149–157
13. 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. *Biol Psychiatry*. 2014;75(1):56–64
14. Smith GC, Gutovich J, Smyser C, et al. Neonatal intensive care unit stress is associated with brain development in preterm infants. *Ann Neurol*. 2011;70(4):541–549
15. Valeri BO, Holsti L, Linhares MB. Neonatal pain and developmental outcomes in children born preterm: a systematic review. *Clin J Pain*. 2015;31(4):355–362
16. Belfort MB, Anderson PJ, Nowak VA, et al. Breast milk feeding, brain development, and neurocognitive outcomes: a 7-year longitudinal study in infants born at less than 30 weeks' gestation. *J Pediatr*. 2016;177:133–139.e1
17. Horta BL, Loret de Mola C, Victora CG. Breastfeeding and intelligence: a systematic review and meta-analysis. *Acta Paediatr*. 2015;104(467):14–19

Kangaroo Mother Care 20 Years Later: Connecting Infants and Families

Lydia Furman

Pediatrics 2017;139;
DOI: 10.1542/peds.2016-3332 originally published online December 12, 2016;

PEDIATRICS®
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Kangaroo Mother Care 20 Years Later: Connecting Infants and Families

Lydia Furman

Pediatrics 2017;139;
DOI: 10.1542/peds.2016-3332 originally published online December 12, 2016;