# International Network of Kangaroo Care Bibliography

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The annotations are done by Dr. Susan Ludington and do not represent the opinions or reviews of other members of the International Network of Kangaroo Care.
The following is a list of professional articles. For some, the resource that will be easiest and most comprehensive to have about Kangaroo Care is Dr. Susan Ludington’s book called “Kangaroo Care: The Best You Can Do for Your Preterm Infant.” Published in 1993 by Bantam Books. You can buy a copy from Dr. Ludington at Frances Payne Bolton School of Nursing, 10900 Euclid Ave. room 322D, Cleveland, OH 44106-4904 or from La Leche League at 1400 N. Meacham Rd., Schaumburg, Ill. 60173 for the same cost. Several of the articles on this bib are available for $1.00 (U.S.) each plus $2.00 for mailing and we will be able to fulfill orders for up to five articles per request for items you are unable to retrieve from your library resources. Please circle those you want and submit payment and we will copy and send the articles to you. Thank you.

Mrs. Kangaroo, is it true
You are hiding someone new
In the pocket part of you?
There must be someone new and growing
It’s little ears have started showing.

Kitty McCausland RN, BSN, UCLA

UPCOMING CONFERENCES:
October 11-15, 2006: 6th Workshop of the International Network of KC meeting in Cleveland, OH. Go to http://fpb.case.edu/KangarooCare and click on the upper left corner on Conferences for brochure and registration form

Last week of February, 2007 Certification workshop at Sarasota, Florida. Cost is $225.00 for both days and includes continental breakfast, box lunches and afternoon soda break. Contact Kim Boggs at KBoggs@OhioHealth.com.

This bibliography contains original articles from all around the world, published abstracts, published articles in foreign languages, a list of sample pamphlets and protocols that are available and a list of researchers in the area and what they are studying. Some of the articles listed are annotated. The bibliography is available from:

Susan M. Ludington, CNM, Ph.D., FAAN
Walters Professor of Pediatric Nursing,
FP Bolton School of Nursing, Case Western Reserve Univ.
10900 Euclid Ave. Room 322D Cleveland, OH 44106-4904
(216) 368-5130 Email: Susan.ludington@case.edu

Terminology: KC = Kangaroo Care; KMC = Kangaroo Mother Care (KC given by mother); KFC = Kangaroo Father Care (KC given by father); KPC or PKC = Kangaroo Parental Care (KC given by mother and father and data reported as results of parental KC); KSC = Kangaroo SURROGATE Care (KC given by someone other than biological parents). PT = preterm; FT = fullterm, KCBF = breastfeeding while in Kangaroo Care position, BF = breastfeeding, RCT = randomized controlled clinical trial.

ORIGINAL ARTICLES

________(2006). Management of asymptomatic hypoglycaemia in healthy term neonates for nurses and midwives. Australian Nursing Journal, 13 (2) (June), pg. 13. Evidence Based Practice report. An increasingly litiginous society has caused the lower level of euglycemia to rise from that which existed in the original work by Hartmann and Jaudon in 1937 (i.e. the limits are within 2 standard deviations of population mean for both healthy term and preterm infants). “Healthy term newborns that are breast-fed on demand need not have their blood glucose routinely checked and need no supplementary foods or fluids” is a WHO 1997 recommendation that is still considered a grade A recommendation. Other WHO 1997 recommendations that still have grade A best practice status are: “Thermal protection (the maintenance of normal body temperature) in addition to breastfeeding is necessary to prevent hypoglycaemia” and “Given the importance of thermoregulation, skin to skin contact should be
promoted and “kangaroo care” encouraged in the first 24 hours after birth.” The standards for evidence based practice used in this article are those of the Joanna Briggs Institute (www.joannabriggs.edu.au) and are: Grade A=effectiveness established to a degree that merits application; Grade B=effectiveness established to a degree that suggests application, Grade C=effectiveness established to a degree that warrants consideration of applying the findings, Grade D= Effectiveness established to a limited degree, Grade E= Effectiveness not established.

**Recommendations, hypoglycemia, breastfeeding, birth KC, evidence-based guidelines.**

________ (2004). Holding the very low birthweight infant: skin-to-skin techniques. Neonatal Network. Article describe the nursing considerations and techniques involved to successfully implement skin-to-skin holding for VLBW, technology dependent infants. **Implementation.**


, 1995. Appropriate technologies can help make motherhood safer. Safe Mother, 18, 4-8. Review of available technologies and KC is one that is identified as keeping the infant warm against the mother’s skin and is recommended. **Review. Temperature.**


Academy of Breastfeeding Medicine. 2005. Protocol #5 on Breastfeeding recommends birth kc to promote temperature regulation, maintenance of euglycemia and successful BF. Protocols of Academy of BF Medicine are available at the website:

Acolet D, Sleath K, & Whitelaw A. (1989). Oxygenation, heart rate, and temperature in very low birthweight infants during skin-to-skin contact with their mothers. Acta Paediatrica Scandinavica, 78, 189-193. KC for 10 minutes in 14 very low birth weight infants 6-134 days old and between 1000-1200 grams (five infants had BPD; two on nasal cannula, and 9 had no lung disease). When asleep, infants placed prone in incubator or prone 60º incline on mom’s chest. 5 minutes of stabilization and then VS every 30 seconds for 10 minutes. Then positions were changed (KC went to incubator; incubator went to KC) for another 10 minutes. During KC HR rose significantly within normal limits, BPDers had significant rise in transcutaneous p02, no infant had apnea, bradycardia during KC, all maintained their temperature. Concluded KC was safe for BPD babies. States they do not do KC with infants having serious apnea/bradycardia. **Descriptive Cross Over Study, PreTerm, VLBW (Micropreemie), BPD, Nasal cannula, HR, RR, SaO2, Axillary Temp, Bradycardia, apnea, Safety**


Affonso, D., Bosque, E., Wahlberg, V., & Brady, J. 1993. Reconciliation and healing for mothers through skin-to-skin contact provided in an American tertiary level intensive care nursery. Neonatal Network 12 (3), 25-32. Mothers interviewed two years after preterm birth who had KC during hospitalization had better resolution of the
birth experience and were able to move on better than control mothers who were still asking basic questions about the hospitalization experience. KC helps closure over preterm birth. **PT, Qualitative, maternal feelings.**

Affonso, D., Wahlberg V, & Persson, B. 1989. Exploration of mothers’ reactions to the Kangaroo method of prematurity care. *Neonatal Network*, 7, 43-51. Mother’s have lots to say about preterm birth as it is very stressful to them, and KC helps with the maternal “psychological hemorrhage” associated with preterm birth. **PT, Descript. Maternal confidence, psychological stability.**


American Academy of Pediatrics, Section on Breastfeeding, (2005). *Breastfeeding and the Use of Human Milk. Policy Statement.* Pediatrics 115(2), 496-506. This is an evidence-based policy statement on ways to improve breastfeeding in fullterm healthy newborns. On page 498, as #3 of 15 recommendations, it is stated that “3. Healthy infants should be placed and remain in direct skin-to-skin contact with their mothers immediately after delivery until the first feeding is accomplished. The alert, healthy newborn infant is capable of latching on to a breast without specific assistances within the first hour after birth. Dry the infant, assign APGAR scores, and perform the initial physical assessment while the infant is with the mother (pg. 498). The mother is an optimal heat source for the infant. Delay weighing, measuring, bathing, needle-sticks, and eye prophylaxis until after the first feeding is completed. Except under unusual circumstances, the newborn infant should remain with the mother throughout the recovery period (pg. 499).” On page 500 there are “Additional Recommendations for High-Risk Infants. Hospitals and physicians should recommend human milk for premature and other high-risk infants either by direct breastfeeding and/or using the mother’s own expressed milk. Maternal support and education on BF and milk expression should be provided from the earliest possible time. Mother-infant skin-to-skin contact and direct breastfeeding should be encouraged as early as feasible.” **Guidelines, FT and PT, BF, birth KC, spontaneous search for nipple and latch.**

American Academy of Pediatrics & American Heart Association, 2006 Neonatal Resuscitation Textbook- 5th Edition, p1-18. Lesson #1, page 18 states: “Nearly 90% of newborns are vigorous term babies with no risk factors and with clear amniotic fluid. They do not need to be separated from their mothers after birth to receive the equivalent of the initial steps of resuscitation. Thermoregulation can be provided by putting the baby directly on the mother’s chest, drying, and covering with dry linen. Warmth is maintained by direct skin-to-skin contact with the mother. Clearing of the upper airway can be provided as necessary by wiping the baby’s mouth and nose.”: **Fullterm, Guideline, Birth KC.**

Anderson GC. (1989). Skin-to-skin: Kangaroo care in western Europe. *American Journal of Nursing*, 89, 662-666. This article relates the practice of KC in Europe and how helpful it has been found to be in relation to breastfeeding and reducing infant crying. **Review, BF, Crying**

Anderson, GC (1989). Skin-to-skin: The kangaroo technique in Western Europe. *Servir*, 37(6), 316-320. This is a copy of the article listed above.

Anderson GC. (1991). Current knowledge about skin-to-skin (Kangaroo) care for preterm infants. *Journal of Perinatology, 11*(3), 216-226. All of the KC studies are classified to the type of design so one can clearly differentiate randomized controlled trials from others. Good summary statements and terminology related to KC nomenclature. **Literature Review, HR,RR, crying, oxygen, temperature, nomenclature**


Anderson GC, Burkhammer M, Morrison B, Ludington-Hoe SM, Chiu S-H. 2003. Skin-to-skin contact improves breastfeeding outcomes. Abstract #346, pg 188 at Research ShowCASE, CWRU, April. 4, 2003, Cleveland. This is same as Anderson, Chiu, Morrison et al. 2004 publication below. 50 fullterms who were having “difficulty” (a yes/no answer to the question “Are you having any difficulty breastfeeding?”) BF between 11-24 hours postbirth, were given 3 consecutive KC sessions (n=50) with BF (KCBF) in the presence of lactation consultant on Postpartum Day 2 and one on the morning of discharge (postpartum day 3 n=48 as 2 withdrew). At the end of the KCBF on postpartum day 3, 98% were BF, 75% (n=36) were EXCLUSIVELY BF, 11% (n=23) partially exclusive. At one week post discharge, 73%(35/46) exclusively BF, 5/46 partially, 6/46 none and 2 lost (So n=46). One month post discharge 52%(25/45) exclusive, 9/45 partial, 13/45 none, 1 lost (so n=45). Rampant interruptions to infant sleep and BF (nine in one hour). The data at discharge are better than the 71.9% in Ross Mothers’ Surveys (Cadwell, 2002), and the 75% as the Healthy People 2000 objective and 2010 National Health Objectdives (USDHHS, 2000).Abstract, Fullterm, KCBF, exclusive BF, Discharge BF, one week post discharge, one month post discharge, BF interruptions,

Anderson GC, Chiu SH, Dombrowski MA, Swinth JY, Albert JM, Wada N. (2003). Mother-newborn contact in a randomized trial of Kangaroo (skin-to-skin) care. J Obstet Gynecol Neonatal Nursing,32 #5, 604-611. This reports the actual number of hours mothers got KC in an RCT of early KC. 47 Kcers and 44 control LBW preterm infants given KC.wrapped holding during first 48 hours after birth. KC moms did very little KC when its practice was not structured (28.5% of observations (not of time) if on Postpartum, 10.0% of observations if infant in NICU). KC moms did wrapped holding 14.8% of observations on postpartum and 2.6% of observations in NICU.(wrapped holding of Kcers = to wrapped holding of controls on postpartum unit). Observations taken q 15 min for 1st 6 hours and then as seldom as q3 hours for 24-48 hours postbirth. Kcers had 2x as much contact as controls. When KC began was not specified and this was much less than 82% of time as in Syfrett 1996 abstract. VERY LITTLE KC occurs naturally. RCT, Perterm PT, Very Early KC, Birth KC.

BF within 11 hours of birth were given three consecutive supervised BF in the KC position on postpartum day 1 and another on Day 2. Amount of KC varied but occurred between 11-24 hours postbirth. Several measures were recorded with each BF and at discharge, 7 days postbirth, and one month postbirth. 2 dyads withdrew before discharge, so 48 finished KC sessions: 39 (81.3%) were exclusively BF & 9/48 (18.7%) were partially BF. At 1 week postdischarge, 35/48 (72.9%) were exclusively BF; 5 (10.4%) were partially, 6 (12.5%) were not BF, and 2 (4.2%) were lost to FU. At one month postdischarge, 25 dyads (52.1%) were exclusively BF, 9 (18.8%) were BF partially, 13 (27.1%) were not BF, and 1 (2.1%) lost to FU. These data compare favorably with the 71.9% of Ross Mother’s Survey and the 75% designated as Objectives 16-19 of Healthy People 2010. Descriptive, Fullterm, BF at discharge, 1 week, 1 month, exclusive BF, KCBF


Anderson GC, Moore E, Hepworth J, Bergman N. 2002. Early skin-to-skin contact for mothers and their healthy newborn infants(Cochrane Review). In The Cochrane Library, Issue 1, 2002. Oxford: Update Software. 16 RCTs were reviewed and showed significant and positive effects of KC on BF, neutral thermal range, blood glucose, crying and maternal affectionate love, touch, and contact behavior during an observed BF. Meta-analysis procedure, BF, temperature, blood glucose, maternal behaviors,

Anderson GC, Moore E, Hepworth J, Bergman N. 2003. Early skin-to-skin contact for mothers and their healthy newborn infants. (Cochrane Review). In The Cochrane Library, Issue 2, 2003 Oxford: Update Software. or Cochrane Database Systematic Review 20003: CD003519,. 806 mother-infant pairs studied across eight randomized controlled trials. Pairs with early KC had significantly better performance on all measures of BF status up to three months postbirth and on BF duration up to 12 months postbirth. KC infants were more likely to maintain temperature within neutral thermal zone, were less likely to cry, and had higher blood glucose and a lower respiratory rate. Mothers with early skin-to-skin contact displayed more affectionate behaviors Meta-analysis results.Cry, Blood Glucose, RR, Temp., maternal behaviors, early KC


Anderson GC, Swinth JY. 2004. Concerns about parents sleeping while holding their infants in Kangaroo Care [Letter to the editor]. Neonatal Network, 23(2), 53.

Anisfeld, E., Lipper E. 1983. Early contact, social support and mother-infant bonding. Pediatrics 72(1), 79-83. On one day all moms (29) given KC (immed. After birth put naked on moms abdomen for a total of 45-60 min. Then transferred to nursery), on other day all moms(30) got routine care (taken to warmer, wrapped, shown to mom, then to nursery) Then routine – saw moms q 4 hrs for feed, most bottle fed. – day determined randomly. At 2 days observed q l
min x 15 min during feeding. KC moms had more affectionate behavior than controls and if in low social support group as compared to high social support group. Quasi-experimental, Fullterm, Delivery KC. Maternal behavior


Awi, D.D. & Alikor, E.A. (2004). The influence of pre-and post-partum factors on the time of contact between mother and her newborn after vaginal delivery. Niger Journal of Medicine 13(3), 272-275 and erratum in Niger Journal of Medicine 2005 (Oct-Dec) 14(4), 460. Analysis of interviews and observations and medical records of pre and postpartum factors influencing time interval from vaginal delivery to first KC between 250 moms and newborns in a University Nigerian hospital showed that only 38.4% of moms started KC within 30 minutes of birth. Factors associated with early KC were maternal age < 25 years, primiparity, labor <12 hours, and later episiotomy repair. Factors associated with late KC (after first 30 minutes post-birth) were early performance of routine cleaning and measurement of newborn. A higher proportion of mothers who had BF assistance had had early KC (48.8%) than those who did not have any assistance (17.1%). 96/242 (39.7%) moms who received information on BF had early contact compared with none of the other 8 moms who did not get BF education. Marital status and moms education had no association with KC. Immediate contact between newborn and mother should take precedence over hospital routines. Fullterm, Descriptive, Regression Analysis, Birth KC , episiotomy repair, BF education., 3rd world.

Baker, A. M. (1993). Maternal perceptions of the kangaroo care experience. Unpublished master’s thesis, The College of St. Catherine, St. Paul, Minnesota. Focused interviews with 3 mothers. KC decreased or eliminated maternal anxiety. Physical and emotional intimacy were HIGHLIGHTS of experience—they had much pleasure. KC heightened the dilemma of caring for other children, and KC supported mat-infant interaction, and moms were more aware of infant’s behaviors and cues. KC also helped moms develop awareness of their own feelings and responses to infant. Qualitative, Maternal Anxiety

Bakewell-Sachs, S. 2002. Physiologic stability of intubated VLBW infants during skin-to-skin care and incubator care. Comment by Susan Bakewell-Sachs. MCN. American J. Maternal Child Nursing, 27(2), 123. This is a short one paragraph reiteration of Smith’s report in Advances in Neonatal Care, vol. 1, pg. 28-40 and concludes that incubator care may be less stressful for intubated infants than KC. Ventilated KC, Preterm, Summation, Stability

Bakewell-Sachs S & Gennaro S. 2004. Parenting the post-NICU premature infant. MCN, the American J of Maternal/Child Nursing 29 (6), 398-403. This article is designed to assist nurses in giving comprehensive, evidence-based care in preparation for discharge and when working with the mother after discharge. Mothers need information, guidance from nurses, support from other mothers, and interventions that improve parent-infant interactions. “Most studies have focused on interventions such as kangaroo care, developmentally based care,….Kangaroo care has been shown to have beneficial effects for infants and parents; a recent study found that mothers who participated in kangaroo care had more positive mood, touch, and adaptation to infant cues, and their infants showed greater alertness and less gaze aversion compared to control group (Feldman, Eidelman, Sirota, Weller, 2002).” (pg. 400). On page 402 in Figure 1, entitled “nursing interventions for the care of the NICU graduate”, #5 is “Encourage use of kangaroo care and infant massage.” Clinical review, post-discharge, maternal mood

Bauer, K., Pasel, K., Versmold, H. 1996. Chest skin temperature of mothers of term and preterm infants is higher than that of men and women. Pediatric Research, 39(#4)Part2: 195A. Reports the chest temperature of women who are not mothers, mothers of term and preterm infants, and chest temp of men. **Descriptive, not KC, chest temperature**

Bauer K, Pyper A, Sperling P. Uhrig C, & Versmold H. 1998. Effects of gestational age and postnatal age on body temperature, oxygen consumption, and activity during early skin-to-skin contact between preterm infants of 25-30 week gestation, AGA, and their mothers. *Pediatr Res.*, 44(2): 247-251. 27 infants spontaneously breathing infants (GA=25-30 wks) given 60 min in incubator and then 60 min in KC and 60 min. back in incubator in wk 1 and then got KC DAILY for 1 hr each day until 7 days later (2nd week of life). Interfeeding observations made with 1 hour periods of observation. No change in oxygen consumption, more sleep in KC, 25-27 weekers lose rectal heat during KC, 28-30 weekers gain heat in KC (0.3°Cin 1 hour). No sig change in oxygen consumption. In week 2 all infants slept more in KC (Sig diff). Maternal chest temp at 2 cm below clavicle. Maternal chest temp stayed at 34.3-34.4 for both groups during KC. Sleep was Brueck score of 3 or 4, based on behavioral observation. Humidity was 80% in incubator, 40% in room air. Temp dropped during transfer into and out of KC in 25-27 weekers. Oxygen consumption did not increase during SSC orduring temp drop with transfer. Maternal temp under towel was same as surface temp in incubator. In wk 1 infants slept >90% time in incubator and KC. In wk 2 infants spent more time asleep in KC (pretest 78%, KC 90%, posttest82% for 25-27 wkers; 92 to 97 to 85 for 28-30 weekers.. KC had no effect on HR and O2 consumption. **Pretest-test-posttest, one group, NOT an RCT, oxygen consumption, sleep, temperature. HR, Small vs. not so small, Maternal temp., sleep**


Bauer, K., Uhrig C, Sperling P., Pasel K., Wieland C., & Versmold H.T. (1997). Body temperatures and oxygen consumption during skin-to-skin (Kangaroo) care in stable preterm infants weighing less than 1500 grams. *Journal of Pediatrics*, 130(2), 240-244. 22 stable preterms <1500 grms and AGA given first KC in first wk of life. Continuously measures HR, rectal temp, foot skin temp and oxygen consumption for 1 hr in incubator, during 60 min of KC, and 1 hr in incubator. HR never changed from 151. During KC, rectal temp is 0.2C and foot temp 0.6C higher than pretest. During posttest, body temps returned to pretest. O2 consumption during KC (6.1±0.9 ml/kg/min.) was not higher than in incubator (5.8±0.8 ml/kg/min. Time in Quiet sleep (Brueck score of 3 or less –behavioral state) as % total time was 93 ± 7 pretest, 96±7 KC, 91±9 posttest and state was NOT SIG DIFF. Everything returned to pretest value in posttest period. For stable preterm infants <1500 gms and < 1 week of age, one hour of KC is not a cold stress compared with incubator care. TRANSFER to mom took 9± 4 min. **Germany. Pretest-test-posttest, one group, NOT an RCT. Transfer time, rectal temp, foot temp, oxygenation, oxygen consumption, stability, First week of life. QUIET TIME, <1500 gm. Stability**

Bauer, K., Uhrig C, Versmold H. (1999). How do mothers experience skin contact with their very immature (gestational age 27-30) weeks), only days old premature infants? *Z Geburtshilfe Neonatol.*, 203(6): 250-254. **English Abstract** 17 mothers recorded their experiences with ad lib KC over 14 days beginning 3 days postbirth with 27-30 (median was 27.5wk;median wgt of 1130g). They increased KC from 60-120 minutes, 21% wanted longer KC periods, 82% had positive feelings and 78% said KC increased attachment to baby. **Descriptive Qualitative Study, duration of KC, mat feelings,attachment**

Bauer K, Uhrig C, & Versmold H. (1999). [How do mothers experience skin contact with their immature
gestational age 27-30 weeks), only days old premature infants? Z Geburtshilfe Neonatol, 203(6), 250-254. GERMAN

Bar Yam, N.B., 2002. Kangaroo mother care: Restoring the original paradigm for infant care and breastfeeding. J Human Lactation, 18 (3), 289 for a review of the film in the title that was made by Nils Bergman. FILM, BF

Beal, J. 2005. Toward evidence-based practice. MCN: American Journal Maternal Child Nursing 30(5), 338. This is a commentary of Dodd’s 2005 article and Roller’s 2005 article. She recommends using these manuscripts for evidence-based practice. Review


Bergh A-M, Arsalo I, Malan AF, Patrick M, Pattinson RC, Phillips N. (2005). Measuring implementation progress in kangaroo mother care. Acta Paediatrica 94, 1102-1108. This is a report of testing an implementation model (pg. 1104) and recording benchmarks that show progress in adapting and using KMC in hospitals in South Africa. She offers indicator (bench marks) for each of the implementation constructs: creating awareness, adopting the concept, taking ownership, evidence of practice, evidence of routine and integration, sustainable practice. Model and quantification of progress has worked well. PT, Implementation Plan, Benchmarks

Bergh A-M, Pattinson RC. 2003. Development of a conceptual tool for the implementation of Kangaroo Mother Care. Acta Paediatrica 92, 709-714. This provides a conceptual model to assist the implementation of KC. Qualitative research approach used in South Africa to elicit main issues in establishing a program of KC and they developed a set of core questions to assist in decision making about using KC at the institution level. Implementation, staff issues


Bergman, N. Kangaroo mother care: Rediscover the natural way to care for newborn baby. International J of Childbirth Education 18 (1), 30 & 27. This is a simple to read reason why KC should be practiced with fullterm infants. Article conveys two concepts: No separation and Breastfeeding. Review, Full Term, BF

Bergman, N. (2005). More than a cuddle: skin-to-skin contact is key. Practicing Midwife 8(9), 44. Short commentary on the importance of kangaroo care for breastfeeding and providing then natural niche for the infant. PT, FT, Commentary, Review.

Bergman NJ, Linley LL, & Fawcus SR 2004. Randomized controlled trial of skin-to-skin contact from birth versus conventional incubator for physiological stabilization in 1200- to 2199-gram newborns. Acta Paediatrica 93(6), 779-785. Over first 6 hours post birth, gave either KC or incubator care and measured number of times infant’s physiologic values exceeded clinical norm range and scored the values using SCRIP, a stability scoring system. “Newborn care provided by KC on the mother’s chest results in better physiological outcomes and stability than the same care provided in closed servo-controlled incubators. Cardiorespiratory instability seen in separated infants in the first 6 hrs is consistent with mammalian “protest-despair” biology, and with “hyperarousal & dissociation” response patterns described in human infants. Newborns should not be separated from their mothers.” (pg.779). PT, RCT, HR, RR, stabilization, birth KC, stability


Bier J-A.B., Ferguson A.E., Morales, Y., Liebling, J.A., Archer, D., Oh, W., & Vohr, B. (1996). Comparison of skin-to-skin contact with standard contact in low birth weight infants who are breast-fed. Archives Pediatric and Adolescent Medicine, 150, 1265-1269. Gave KC once medically stable and no oxygen support to 50 PT <3.3lbs BW for 10 minutes only each day x 10 days and measured every minute HR, RR, SaO2, Axillary Temp, # Desats. First 10 minutes of 176 KC sessions and 137 standard contact sessions were scored. RR, HR, temperature were same between groups. SSC temps rose in first 5 minutes and then matched control group thereafter. A warming effect of KC was seen. SaO2 was higher during KC and fewer desats (<90%) during KC (11% of 1716 SaO2 recordings during KC) and 24% of 1334 recordings during standard care (swaddled by moms). No diff in mean daily maternal milk expression, more stable milk production in KC. 90% of KC moms vs 61% non-KC moms were breastfeeding throughout hospitalization and 50% vs 11% were still BF at 1 month after discharge. At 6 months, 20% of KC & 10% control still BF. All mothers of multiples who Kced breastfed at discharge, and only 50% of multiples in standard care were BF at discharge, but no mother of multiples was still BF at 3 and 6 months. Mums and babies calm in KC. RCT, KCBF, BF, milk production, milk expression, duration of BF, SaO2, oxygenation, HR, RR, Axillary Temp, # Desats, stability.


Bigelow A. Littlejohn 2002? Charpak refers to this too. Looked at maternal satisfaction with KC in South Africa. No publication as yet, just a poster. Maternal Satisfaction.


Blaymore-Bier, J-A. See Bier, JB above.

Boge, B. 1986. Anecdote from Gambia on Kangaroo Care. Comments at International Nursing Research conference, Univ. of Alberta, Edmonton, Alberta, CANADA.

Bohnhorst B, Gill D, Dordelmann M, Peters CS, & Poets CF. 2004. Bradycardia and desaturation during skin-to-skin care: No relationship to hyperthermia. J Pediatr 145 (October), 499-502. 22 preterm infants (median age 32 weeks) with postconceptional age <36 wks at study time underwent three 2-hour recordings of breathing movements, nasal airflow, HR SpO2, and oximeter waveforms. Pretest was done in incubator at neutral thermal temperature, followed immediately by KC at 15-30 degree incline prone, and posttest was back in incubator where ambient temp had been elevated by 1 degree C (or up to 2 degrees C if infant’s body temp did not rise at least 0.4 degrees C during posttest). Head was uncovered and body covered by towel. Took rectal temp every 5 mins and uncovered baby if necessary to keep temp stable during KC. Desats <80%, brady (>1/3 of baseline HR for at least 5 seconds), apnea ≥10 sec were rare, Periodic breathing (3 or more central apneic pauses of 4 sec or more, separated by less than 20 breaths) were recorded as %. Temp did not rise during KC, but rose 0.6C in posttest.
Proportion of regular breathing was lower during KC than pre & posttest. Baseline HR (154) & RR (66) did not change with KC (HR = 156, RR =67), rose in posttest (HR= 162, RR = 78). SpO2 did not change at all (Pretest = 97.5, kc=98.0, posttest=98.0). # of bradys + desats (combined together) was significantly higher during KC (3.0/hr) than posttest (1.7/hr) & higher (but not significantly) than pretest (2.2/hr). # of bradys alone/hr was 0.0 during KC, versus 0.3 during pretest and 0.6 in posttest. # of desats/hr was 1.0 pretest, 2.3 KC, 0.9 posttest (Sig. Differ between KC and posttest only). Mean nadir of bradys and desats did not change, & PB showed trend to increase during posttest (pretest = 0.01%, KC = 0.0%, posttest = 0.75%). “Frequency of apneas remained largely unchanged”(pg. 500) (pretest = 1.0/hr, KC=0.8/hr, posttest = 1.2/hr). ALL VALUES ARE MEDIANS, not means. Authors conclude that POSITIONAL FACTORS interfering with respiration play a role during KC. KC was associated with less regular breathing. Authors suggest continuous monitoring of HR, oxygenation, and temp during KC.

Bohnhorst B, Heyne T, Peter CS, Poets CF. (2001). Skin-to-skin (Kangaroo) care, respiratory control, and thermoregulation. J. Pediatr 138 (2), 193-197. 22 spontaneously breathing preemies (28wks, 26 days, 1310g) had a 2hr recording B4, during, after KC (of 2 hrs duration). HR, RR, # of bradys, # hypoxemia (<80%) & rectal temp (from 36.9 to 37.3)increased; proportion of regular breathing decreased during KC. Changes may be due to heat stress. Pretest-Test-Posttest Quasi Exp.. Negative Effect. Preterm. HR RR, Brady, apnea, desats, temp, breathing pattern.

Bozke, E.M., Brady, J.P., Affonso, D.D., & Wahlberg, V. (1995). Physiologic measures of kangaroo versus incubator care in a tertiary level nursery. Journal of Obstetric, Gynecologic, and Neonatal Nursing, 24(3), 219-228. Pretest in incubator-test in KC-posttest in incubator. All infants got this 6 days/wk x 3 weeks for 18 data collection periods per infant. Infants served as own control. Reports that skin temperature was lower in KC than before or after (p=0.03). Control over insulation across the infant’s back was questioned even though manuscript reports control. State measured every 10 minutes using Anders and Parmelee scale and showed No difference in Apnea, Bradycardia or lowest SaO2 between KC and incubator periods and there was lower % of total sleep, and lower Active Sleep and more transitional sleep during KC, no differences in % or amount of Quiet Sleep. Bradycardia increased with gavage and bottle feedings and decreased frequency associated with breastfeeding independent of KC or incubator care. Quasi-Experimental pretest-test,-posttest design. Preterm, Negative Effect., skin temp. HR, RR, SaO2 during KC and posttest, Quiet Sleep, Active Sleep, Transitional Sleep, Apnea, Bradycardia


Bowden VR, Greenberg CS, Donaldson NE. (2000). Developmental care of the newborn. Online Journal of Clinical Innovations or CINAHL Information Systems (Glendale, CA). 3, issue 7, 27 pages with 286 ref. Available online at http://www.cinahl.com or from Cinahl Information Systems, 1509 Wilson Terrace, Glendale, CA 91206. The 14 pages that appear online do not include all references. In essence, KC is part of development care for all NEWBORNS.FULLTERM, Developmental Care

Breitbach, KM. (2001). Kangaroo Care. In Craft & Rosenberg (Eds.) Nursing Interventions for Infants. Thousand Oaks, CA: Sage Publ,pp. 151-162. This is a chapter that talks about listing Kangaroo Care as a nursing intervention within the taxonomy of the NANDA system for nursing diagnoses in the United States. Defined it and listed 18 activities associated with Kangaroo Care. Terminology


outcomes have been noted. Concludes that “the early, intimate, and physiologically stabilizing benefits of skin-to-skin care provide for a new conceptualization of the optimal environment for preterm infants in intensive care.”


Brown, L.D., Heermann, J.A. (1997). The effect of developmental care on preterm infant outcome. Applied Nursing Res, 10(4), 190-197. On pg. 193 they identify that they encouraged KC as soon as possible on the tiniest of infants as part of their intervention (and they have a picture of VENT KC on page 196). 25 infants <1500 grm given NIDCAP and compared to RETROSPECTIVE sample. Treatment grp had fewer and less severe IVH, fewer days of ventilation, shorter hospitalization, greater wgt gain. Retrospective comparison, IVH, Days of Vent, LOS, WGT, VENT KC

Burkhammer MD, Anderson GC, Chiu S-H. 2004. Grief, anxiety, stillbirth, and perinatal problems: Healing with Kangaroo Care. J Obstetric, Gynecologic, & Neonatal Nursing, 33(6), 774-782. Case study of one mother with history of stillbirth who had anxiety and BF difficulties with term newborn. When she Kced first time, she cried, had memories of stillbirth baby, then relaxed. Infant moved unaided to breast, self-attached, and had successful BF. She learned to BF on cue, protecting her baby’s sleep-wake cycle and contributing to 100% BF success, 4% nipple pain, no breast pain. Got 8 KCBF sessions in hospital, and was exclusively BF at 1 week post discharge & had 100% BF success score, 2% nipple pain, and no breast pain. “There is a sense of calm and peacefulness between Makaia (baby) and me while kangarooing. KC and BF helped ease my unsteady emotions….After coming home from hospital, we spent most of our time kangarooing…. Within seconds of KC, Makaia’s whole body relaxes, his breathing slows to a soothing rhythm, and he has the most tranquil look in his eyes.” Pictures of KC are on page 778. Case study, fullterm, relaxation, mat stress, BF, BF success, nipple pain, breast pain, KC post-discharge, sleep

Bystrova K, Widstrom AM, Mattheisen AS, Ransjo-Aarvidson AB, Welles-Nystrom B, Wassberg C, Vorontsov I, Uvnas-Moberg K. 2003. Skin-to-skin contact may reduce negative consequences of the “stress of being born”: A study on temperature in newborn infants, subjected to different ward routines in St. Petersburg. Acta Paediatrica 92 (3), 320-326. RCT of 176 fullterm newborn mother dyads, grp A got KC (120 mins), grp B got held in arms swaddled or clothed, grp C kept in cot in nursery swaddled or clothed. Axillary, thigh, back and foot temperatures from 30-120 min postbirth. All temps rose significantly in all TX grps (grp A and B). Foot temp dropped sig in nursery grp C and drop was greatest in swaddled group C babies. Foot temp rose most in KC group and remained high in KC group. KC after birth may be a natural way of reversing stress-related effects on circulation induced during labour. FULL TERM, Axillary, Thigh, Back, Foot Temps, RCT, Birth KC/VEKC


Carbajal, R. (2005). Traitment non pharmacologique de la douleur du nouve-ne. Non pharmacologic management of pain in neonates. Archives de pediatrie, 12, 110-116. Review of pain management strategies and reviews Gray and Johnson’s articles and states that skin to skin contact is a part of BF and provides the direct (by blocking nociceptive transduction or transmission or activation of descending inhibitory pathways or by activating attention and arousal systems that modulate pain (pg. 114) and indirect mechanisms (reduce total amount of noxious stisnuli to which infants are exposed) of how SSC reduces pain. Review, pain

and reviews these after talking about main source of pain being procedural in neonate. Says skin to skin contact can reduce pain indirectly by reducing total amount of noxious stimuli to which infant is exposed and directly by blocking nociceptive transduction or transmission or by activation of descending inhibitory pathways or by activating attention and arousal systems that modulate pain. National guidelines are needed to improve pain management. He is from France. This is exactly same as previous citation.

Carfoot S, Williamson PR, Dickson R. 2003. A systematic review of randomized controlled trials evaluating the effect of mother/baby skin-to-skin care on successful breastfeeding. Midwifery, 19(2), June, 2003, pg. 148-155. Used same method as Cochrane reviews, reviewed 7 randomized trials and found quality questionable in 4 of 5 studies about duration of BF. No studies on success of BF. Findings “fail to support the current initiative to implement changes in clinical practice to include skin-to-skin contact. Methodological flaws within the included studies prohibit firm conclusions being reached with regard to the effect of skin-to-skin contact on the duration of BF, timing of first BF or baby physiological factors (temperature and behavior). This review highlights the need for further primary research to assess the effect of skin-to-skin contact on the BF experience” (pg. 148). Across the studies, KC was given for 15-90 minutes. Two studies in Spain, 1 Canada, 1 Austria, and 3 in Guatemala. FULLTERM, Review, BF, Meta-Analysis

Carfoot S., Williamson, P.R., Dickson, R. (2004). The value of a pilot study in breastfeeding research. Midwifery 20, 188-193. RCT pilot with fullterm infants who got 45 minutes of KC starting after weighing after birth, or 45 minutes of regular swaddled holding after weighing, drying, dressing. More than 75% of KC infants had success of 1st breastfeed using IBFAT (BAT) score of 8 and that was more than controls (62%) Fullterm, RCT, BF success, Birth KC

Car footh, S., Williamson, P., Dickson, R. (2005). A randomized controlled trial in the north of England examining the effects of skin-to-skin care on breastfeeding. Midwifery 21(1), 80-83. RCT of 102 KC dyads (quickly dried, and weighed and then given to mother and removed from mother for dressing, measuring and perineal suturing - got minimum of 45 minutes of KC and then breastfeeding of about 45 minutes), 102 routine care (dried and wrapped in towel and then given to mother and interrupted for weighing, dressing, measuring – swaddled holding for 45 minutes) dyads.89/98 (91%) babies had successful 1st feed vs. 82/89 (83%) controls (Non significant difference) Success of BF measured by IBFAT with latch added so that score of 8 or more was success.) 42/97 Kcers and 40/100 controls EXCLUSIVELY BF @ 4 months.(Non Significant difference), Infant temp 1 hour postbirth higher in KCers (p – 0.02), more moms 87/97 (90%) Kcers were very satisfied with their care (KC) vs. 60/102 (59%), 83/97 (86%) of kcers and 31/102 (30%) controls said they prefer to receive same care in future. Limitation of study was that mothers changed groups and were retained in original group for statistics (p..76). RCT, Fullterm, BF Success, BF Success Tool, maternal satisfaction , maternal preference, Temp, BF Exclusivity at 4 months, Episiotomy KC, Birth KC

Carlsson SG, Fagerberg H, Horneman G, Hwang C-P., Larsson K, Rodholm M, Schaller J., Danielsson B., Gundewall C. (1978). Effects of various amounts of contact between mother and child on the mother’s nursing behavior. Developmental Psychobiology, 11, 143-151. 50 fullterm dyads in 3 groups: extended contact (KC in BF position for 1-2 hours immediately after birth and for 2-4 hrs between meals – n=17), extended contact in KCBF position for 1-2 hrs immediately after delivery but not between meals after that (n=17), routine care (hold baby for max of 5 minutes after birth- no KC after that as placed in crib at side of mother after washing, iding,etc. N=16). Watched when baby took nipple in mouth & recorded q 15 sec. Til 2 mins. after baby let go of nipple. Moms showed more smiling, talking, and other contact behaviors than routine care moms during feeding interactions. KC for 1-2 hrs immed.after birth influenced feeding behavior during the following four days. Fullterm, KCBF position, Maternal behaviors Delivery KC.

Carlson SG, Fagerberg G, Horneman G, Hwang C-P., Larsson K, Rodholm M, Schaller J. Danielsson B., Gundewall C. (1979). Effects of various amounts of contact between mother and child on the mother’s nursing behavior: A follow-up study. Infant Behavior and Development, 2, 209-214.17 Naked babies put in mothers bed for 1-2 hrs immediately after delivery, baby placed on the mother’s body in nursing position or at her side with its face touching the mother’s breast. After 2 hrs, baby taken away, washed and put in crib at mom’s side. (mom held infant for up to 5 min after birth, then taken away, washed and put in crib). Observations began when infant took nipple and continued for two minutes after letting go of nipple. This was six week Postpartum assessment of feeding in the home.No group differences
at 6 weeks as seen in 1978 study because feeding at 6 wks is so routinized that it has lost its significance as a means of communication. **Fullterm, KCBF position**


Cattaneo A, Davanzo R., Worku B, Surjono A., Echeveria N, Bedri A, Huksari, E., Osorno L, Gudetta B, Setyowireni D, Quintero S, & Tamburlini G. (1998) Kangaroo mother care for low birthweight infants: A randomized controlled trial in different settings. *Acta Paediatr* 87: 976-985. Multicenter study, median entry age was 10 days (R=1-74) KMC produced breastfeeding/breastmilk feeding rates at discharge of 83%, 98%, and 80%. Mexican KMC infants with early discharge had more common overall BF (88 vs 70%) and BF exclusivity (80 vs. 16%) than controls. Length of stay shorter for KMC. Transfer back to conventional care was 13.4%. 91% of moms were happy with KMC and 83% comfortable with KMC. **Randomized Controlled Trial (RCT), Mortality, BF, Length of Stay, transfer back rate, 3rd world, maternal feelings**


CDC (2005). The CDC Guidelines for Breastfeeding. Atlanta, GA: CDC Publications. On page 1 of chapter?? It states “skin-to-skin contact should be given to improve breastfeeding outcomes.” Get the citation and copy from Barb Morrison.

Cerezo MR, de Leon R., Gonzales BJV. 1992. Mother child early contact with “the mother kangaroo” program and natural breast feeding. *Rev Latino Amer Perinatol* 12, 54-60. Randomized controlled trial of 61 infants in incubator and 51 infants in KC. Infants were observed during 3 month follow-up visits in NICU follow-up clinic. 78% of KC infants were exclusively BF (34% for controls) at 3 months and no differences in morbidity, serum bilirubin/glucose, hematocrit,blood culture, other cultures, feeding methods during hospitalization, and increase in weight over the 30 days post discharge between groups. **Preterm, RCT, BF, Morbidity, Weight gain, infections, blood values.**


Chantry C.J. (2005). What should the lactation consultant know about the Academy of Breastfeeding Medicine breastfeeding management protocols? *Journal Human Lactation* 21(1), 39-41. Review of clinical scenario about taking fullterm infant from breastfeeding mom because dextrostick showed 37 mg/dl. “Separation of mother and infant at birth to treat hypoglycemia with breast milk substitutes was less than optimal management. Chemstrip of 37 mg/dL in an asymptomatic infant within the first 3 hours of birth is normal and does not require treatment per se” pg. 39. Serum glucose is 10-15% higher than whole blood glucose on which the heel stick screening is performed. If serum glucose is <35(serum, not whole blood) or infant is symptomatic is to offer breastfeeding and providing formula only if the infant
will not breastfeed” (pg. 39). The separation of mother and baby is inappropriate because skin-to-skin contact immediately after birth in a stable infant is the recommended routine in part because it actually is more likely to result in euaglycemia! Skin to skin contact assists with maintenance of normal body temperature and reducing energy expenditure, concomitantly stimulating suckling and milk production. Breastfed term infants have lower concentrations of blood glucose but higher concentrations of ketone bodies than formula-fed infants. Increased ketone bodies appear to be a normal adaptation to the low nutrient intake that occurs during the establishment of breastfeeding. Suggested thresholds for glucose levels at which to intervene may not apply to breastfed infants who may tolerate lower plasma glucose levels without any significant clinical manifestations or sequelae. These recommendations are grade A recommendations based on standards of US Preventive Services Task Force and those of the Academy of Breastfeeding Medicine. Fullterm, birth KC, breastfeeding, guidelines, evidence-based practice, hypoglycemia

Charpak, N. 2006. Kangaroo Babies. A Different Way of Mothering. London: Souvenir Press. (English version of French document). Available through www.amazon.com, Or available from Souvenir Press Ltd. 43 Great Russell Street, London WC1B 3PA, phone: 020 5780 9307; Fax: 020 7580 5064 or sppublicity@ukonline.co.uk. Price is 14.99 pounds. Review of KMC for consumers and an introduction for health professionals. Presents the story of baby Sebastian and does a good job sharing maternal feelings. On page 91 the difference between KMC and skin-to-skin contact is alluded to but never conveyed but seems to be suggested on page 93 in which skin-to-skin contact is intermittent and KMC is an integral method of care for mother and baby: PT, Review


Charpak, N., Figueroa, Z. 1996. La Methode Kangourou. Edit: ESF, Paris, France. (French) Available through herchar5@colomsat.net.co


Charpak N, Figueroa de Calume, Z., Hamel A., Medina C, Y., Cifuentes C, Y. 1997. El Metodo Canguro, Descriptive, implementation, motor development, mental development, head circumference, exclusive BF, BF duration, cerebral palsy, readmission, weight, length, quality of care, mortality, morbidity, guidelines, definition of KMC, 1-yr follow-up, home KC, third world, 24 hr/day KCNOT ON CHARTS YET,


Charpak N, Ruiz JG, Zupan J, Cattaneo A, Figueroa Z, Tessier R, Christo M, Anderson G, Ludington S, Mendoza S., Mokhachane M, Worku B. (2005). Kangaroo Mother Care: 25 years later. Acta Paediatrica 94(5), 514-522. This contains summary reviews of outcomes and emphasizes practice guidelines and outcomes for implementing KMC in a variety of levels of neonatal care and in low-middle- and high income countries. Defines KMC as continuous skin to skin contact between mother and infant, exclusive breastfeeding, and early home discharge in the Kangaroo position (514). Pg. 515 says KMC is not “alternative medicine”, but a scientifically sound intervention. Clinical dilemma of asking mom to hold in KMC her dying infant has to be resolved, and we should avoid emergence of suboptimal quality (what does this mean? Duration, frequency? Without monitoring? With a stressed vs relaxed mom?), and KC should not be taken to community level before introduced properly for care of stable infants in hospital (what is proper introduction? And why not?) Paper reviews the KMC position, KMC nutrition, and discharge/follow-up policies and outcomes of KMC research. KC position is strictly upright, start at birth and ASAP in NICU, avoid separation (515). Continuous KC is for minimal care incubator infants; intermittent KC (ideally 2 hr or more) should begin before feeding, Review, community, continuous KC, end-of life KC, position, birth KC, alternative medicine, guidelines, temperature, implementation.

Charpak N, Ruiz-Pelaez JG. (2006). Resistance to kangaroo mother care implementation in developing countries: proposed solutions. Acta Paediatrica 95(5), 529-534. Between 1994 and 2004, 44 teams were sent to 25 developing countries to initiate KMC and some were not successful. 17 open-ended questions were answered by 15 coordinators at successful sites and by 15 coordinators at unsuccessful sites. The early discharge component with ambulatory follow-up was the most difficult component to implement and other barriers were difficulties arising from health professionals, mothers and families that reflected local cultural practices. Solutions are active surveillance for sources of resistance and identification of obstacles and practice solutions. Descriptive, qualitative comparison, barriers, resistance to KMC, BF, early discharge, implementation, third world, 24hr/day KC. NOT ON CHARTS YET

Charpak N, Ruiz-Pelaez J.G., & Charpak, Y. (1994). Rey-Martinez Kangaroo mother program: An alternative way of caring for low birth weight infants? One year mortality in a two cohort study. Pediatrics, 94(6 Pt1), 804-810. Infants < 2000 grm birthweight observed in two hospitals, one that gave KMC and the other did not. Enrolled when ready for minimal care. KMC infants (n=162) were 24/7 KMC until not tolerated any more (about 37 weeks postmenstrual age), and discharged early. Controls (n=170) were in incubators and had later discharge. Both followed up to one year. KMC infants had higher relative risk of death, grew less in first 3 months, and had higher proportion of developmental delay at 1 year, survival was similar between groups, but weight gain and neurodevelopment questions remain. PT, descriptive of two groups, Mortality, 12 month follow-up, development, weight gain, length of stay, 3rd world. Not on charts yet. Comment in Pediatrics, Dec. 1994, 94(6 PT1), 931-932.


Charpak N, Ruiz-Pelaez JG, Figueroa de Calume Z & Charpak Y. 2001. A randomized, controlled trial of kangaroo mother care: results of follow-up at 1 year of corrected age. Pediatrics 108(5), 1072-1079. A randomized trial of 382 KMC and 364 traditional care preemies <2000 gm who were randomized when off of O2 support and getting only minimal care. 24/7 KMC, nearly exclusive BF, and early discharge were KMC conditions. Evaluation at term age, e,6,9, and 12 months corrected age. Risk of death lower but not significantly lower in KMC, head circumference greater in KMC developmental indices (Griffith psychomotor at 6 and 12 months; and more cerebral palsy in incubator group) not different between groups. Shorter hospital stay for <1500 gramers. Number of infections the same between groups but severity less in KMCers. Many KMCers were breastfed til 3 months age. KC humanizes neonatology, promotes BF, shortens hospital stay without compromising survival, growth, or development. PT, RCT, mortality, infection, length of stay, head circumference, BF, humane care. Psychomotor development, cerebral palsy, 3rd world Not on charts yet.

Charpak, N., Ruiz-Pelaez, J.G., Figueroa de Calume, Z. & Charpak, Y. (1997). Kangaroo mother versus traditional care for newborn infants ≤2000 grams: A randomized, controlled trial. Pediatrics, 100 #4, Oct. 1997, pg. 682-688. 382 KMC and 364 traditional care newborns were followed in this RCT. 24 hour/day 7 days a week KMC given in upright position at different hospital than traditional infants and moms taught KMC and ambulatory KMC +early discharge. Early discharge criteria are: have overcome major adaptation to extrauterine life, have received treatment for infection or other problems, suck and swallow properly, achieve 20 g/day weight gain (p. 683). Traditional care stayed in hospital until usual discharge criteria met (wt of 1700 grams or more, regulates temp, gains weight). Term age results reported here. No differences in: # and proportion of deaths; # & proportion of infections (14% in each) (infection was one that required antibiotic), weight, height, head circumference, # of infants total or partially (some formula) breastfeeding, no diff in readmission rate. Differences were: KMC had earlier discharge (1.1 days sooner), lower # of severe infections (nosocomial infections requiring rehospitalization – KMC 3.8%, controls 7.8%), proportion of subjects getting only formula was lower in KMC. KMC is not associated with increased risk of dying, there’s no reduction in early physical growth in KMC, early discharge did not increase admissions, and shorter stay can mean less crowding. KMC is safe. She differentiates intermittent skin-to-skin contact from KMC and says skin-to-skin contact is only one component of KMC. RCT. Mortality, Wgt, height, head circumference, infections, Fortified breastmilk, length of stay, skin-to-skin contact is not KMC, readmissions, 3rd world

Charpak, N., Ruiz-Pelaez J.G., Figueroa Z, & Kangaroo Research Team. (2005). Influence of feeding patterns and other factors on early somatic growth of healthy, preterm infants in home-based kangaroo mother care: a cohort study. Journal Pediatric Gastroenterology and Nutrition, 41(4) Oct., 430-437. Prospective descriptive study of 129 healthy preterm infants sesnt home on ambulatory KC and exclusive BF. In hospital, formula given to infants who did not gain 15 g/day for 3 consecutive days. At term age (at home by then?) 60/126 infants gained wgt adequately with exclusive BF. In 14 who need supplements, adequate wgt gain achieved before term age and supplements were stopped. More immature infants need supplementation more frequently, infants with lower weight for GA at birth were less likely to achieve adequate weight by term age. Growth indices at term age in KMC group were between 10-25th percentile, similar to non KMC preterms. PT, weight, home KC, exclusive BF.

Charpak N, Ruiz-Pelaez JG, & Motta, S. 2006. One year follow-up of a cohort of preterm infants (<34 weeks GA) discharged with ambulatory oxygen in Bogota, Colombia. 206 newborns were followed-up from 7 KMC programs. 4 infants died, 21 (35%) lost to follow-up at term age and 99 (48%) at 12 months. At term age exclusive BF = 54 (26.2%), growth at 12 months was normal, 16% still had supplemental home oxygen at 3 months and oxygen continued until infants were 106 days old maximum, 73% were readmitted at least once and 67% of readmissions were due to respiratory problems. 50% had ophthalmology screening and ROP =35% of those. 19% had neuromotor tests at 1 year. Descriptive, follow-up, mortality, home KC, home oxygen, exclusive BF, mental development, motor development, readmissions, weight and length, ROP, third world, 24 hr/day KC.


Chiu, S-H, Anderson, G.C., Burkhammer M.D. (2005). Newborn infant temperature during skin-to-skin breastfeeding in dyads having breastfeeding difficulties. *Birth*, 32, 115-121. 48 fullterms having Breastfeeding difficulty at 12-18 hours postbirth had temporal artery temperature taken before, once during, and after each of 3 consecutive breastfeedings in KC on postpartum Day 1. Temp reached and remained in neutral thermal range (36.5 and 37.6) during KCBF. BF sessions differed in length from30 minutes to 50 minutes before a feeding. Found that temps increased to neutral thermal zone when infants were cool and decreased to neutral thermal zone when infant was too warm (pg. 119). In two infants temp went from 36.2 before KC to 36.4 and 36.6 at 30 mins of KC and stayed at that level. An infant’s temp of 37.5 dropped to 36.8 and another’s from 37.4 to 37.2 during KC. “Data suggest mother has ability to modulate infant’s temperature during KC, if given the opportunity” (pg. 119). A need for a wrap is inferred from the statement “training sessions on KC may need to be provided for hospital staff. It is possible that with incorrect KC position, infant temperature may decrease.” (pg. 120). KCBF guidelines are : infant should wear diaper small enough to maximize ventral surface, mom should wear clothing that can open down the front, wear hospital BF gown backwards as opening is too small for BF, put head cap on infant if birth kc is given, if ambient temp is cool place blanket (maybe warmed blanket) over infant’s back. **Descriptive, temporal artery temp, KCBF, Fullterm, thermal synchrony, KC wrap/education needed, guidelines for KCBF.**

Christensson, K., (1996). Fathers can effectively achieve heat conservation in healthy newborn infants. *Acta Paediatrica*, 85, 1354-1360. Paternal KC with FULL TERM newborns from C/S deliveries. 44 infants studied and glucose levels were higher in KC than cot babies at 90 minutes postbirth and at 24 hrs. postbirth, mean axillary temp was higher in KC group. **RCT, FULLTERM, FATHERS, temp, Blood glucose, C/S, Birth KC/VEKC**


Christensson, K., Cabrera, T., Christensson, E., Uvnas-Moberg, K., & Winberg, J. (1995). Separation distress call in the human infant in the absence of maternal body contact. *Acta Paediatrica*, 84, 468-473. Conducted in Spain. Primiparous and multiparous women of NSVD given 90 minutes of KC postdelivery (Grp A, n= 15) or left in cot for 90 minutes (Grp B, n= 14) or placed first in cot and then given KC later (Grp C, n=15). Temperature increased (Grp A KC axillary temp at 90 minutes post birth = 36.9 and control = 36.4) and crying was significantly less in the KC group A. Thermoregulation by KC persists for 2-3 days and is mediated by increased cutaneous circulation due to sympatholytic activity. Examined if the comfort provided by KC was associated with changes in peripheral blood levels of CCK and


Christidis I, Zotter H, Rosegger H, Engele H, Kurz R, Kerbl R. (2003). Infrared thermography in newborns: the first hour after birth. *Gynakol Geburtshilfliche Rundsch, 43*(1), 31-35. Surface temp within 1 hr of birth was examined in 42 fullterms (AGA) with infrared thermography. Immed. after birth, surface temp is uniform picture, skin temp is significantly cooler than core. Soon, peripheral sites become cooler but trunk has constant temp; bathing in warm water leads to more even temp profile, radiant heaters and KC with mother prevents heat loss and produce uniformly warm thermogram of infant.

Chwo, M-J., Anderson, G.C., Good, M., Dowling, D.A., Shiau, S-H H., & Chu, D.-M. (2002). Randomized controlled trial of early Kangaroo care for preterm infants: Effects on temperature, weight, behavior, and acuity. *J Nursing Research (Taiwan), 10*(2), 129-142. 34 healthy preterm infants in TAIWAN were randomly assigned before first feedon day following birth. KC was done during BF, controls were clothed and wrapped and held that way for one hour, three times a day during feedings. KC vs. controls showed KC had higher TYMPANIC temps (37.3 vs 37.0), more quiet sleep (62 vs 22%), more inactive awake, less drowsiness, less crying (2 vs 6%). No diff in weight loss or acuity (LOS).

Clifford, PA, Barnsteiner J. (2001). Kangaroo care and the very low birthweight infant: Is it an appropriate practice for all premature babies? *J Neon Nurs, 7*(1): 14-18. 7 infants at CHOP (Children’s Hospital of Philadelphia)(6 vented) who started KC from 4-32 days of life showed physical safety could be maintained during KC. Physiol. variables remained WNL during KC, KC enables interactive relationship, promotes bonding. No exclusion criteria for KC’s use. All wore hats, covered by blanket and parent’s shirt. Smallest was 25 wks who did kC at 10 days of age at 680 grams. Minimum KC was 30 minutes, range was 58-84 mins of KC. 2 infants had UA lines, 6 with PICC lines. Stability of baseline HR, No Brady, no HR drift, no apnea, no cold stress and temp stability was maintained.
Clifford PA, Stringer M, Christensen H, Mountain D. 2004. Pain assessment and intervention for term newborns. J Midwifery Womens Health 49 (6), 514-519. She begins with review that infants perceive pain even previable fetuses. Review of NIPS, CRIES, PAIN, and OPS scales. On pag 516 she says “skin-to-skin contact is an effective intervention during heel lance procedures for blood assays. The physiologic mechanisms supporting tactile-induced pain reduction are not known, but it is theorized not to be opioid-mediated” (cites Gray et al. 2002 as source). “Prior to a painful procedure, implementation of one of the nonpharmacologic interventions should be used.” (517).

Interventions available to reduce or eliminate pain, such as KC, are discussed in this review article on term infant pain. KC effectively manages newborn infant pain. **Review, Fullterm, pain**


Conde-Agudelo A., Diaz-Rosello JL., Belizan JM. 2000b. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. Review. In: The Cochrane Library, Issue 4,2000. Oxford: Update Software. Available from [www.nichd.nih.gov/cochrane/](http://www.nichd.nih.gov/cochrane/) and [www.nichd.nih.gov/cochrane/](http://www.nichd.nih.gov/cochrane/). Analyzed 3 studies (Sloan 94; Charpak 97, Cattaneo 98) and concluded “all studies were of moderate to poor methodology. No evidence of difference on infant mortality, Decreased severity of illness, decreased respiratory distress, decreased maternal dissatisfaction with care, decreased perception of social support in NICU, increased exclusivity BF, increased weight gain, increased maternal competence (p,3), but says that methodological quality of trials weaken credibility of findings and that “there is still insufficient evidence to recommend its routine use in LBW infants. Well designed RCT's are needed.”(pg. 3).Only one outcome of the meta-analysis was KMC reduced likelihood of NOT EXCLUSIVELY BF at discharge. **META-ANALYSIS. INFECTION, Wgt, BF., LOS, mortality, severity of illness, respiratory distress, maternal satisfaction, social support, mat.competence.**

Conde-Agudelo A., Diaz-Rosello JL, Belizan JM. 2003. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. Cochrane Database Systematic Reviews, #2, CD002771. This is the Feb. 11, 2003 update. They reviewed 5 new studies out through Dec. 2002 (Tesier et al., 1998; No RCT met criteria for review weaknesses were blinding procedures for those who collected outcomes, handling of drop outs, completeness of follow-up) so recommendations are not changed. Results of new studies (but not meta-analysis) for Mortality (no difference), Infection (decreased in KC), BF (More exclusive BF in KC), Readmissions (no differences), Weight gain (significantly more in KC), psychomotor development (no differences at 12 months), maternal competence (sig. better in KC), hypo & hyperthermia (sig. less in KC), cost (50% less for KC), and length of stay (KC= 4.5 days, control – 5.6 days) are reported.
on pages 8-10 and based on three studies of 1362 infants, all tested in developing countries. Available through www.nichd.nih.gov/cochrane/conde-agudelo/conde-agudelo.htm. Meta-analysis – no new results, but reviews several individual studies WGT, Infection, Temp, LOS, Cost, 12 month PsychomotorDev, Maternal competence.


Craig S, Tyson JE, Samson J, Lasky RE. 1982. The effect of early contact on maternal perception of infant behavior. Early Human Dev. 6, 197-204. Healthy term infants randomly assigned to KC or routine care. 23 KC placed in KC on chest covered by blanket and then wrapped for move to recovery room and then returned to KC on mother for approx 1 hr. 26 routine care infants(infant wrapped, given to mom for 10 minutes then taken to nursery). Home visits made one month after delivery and mothers interviewed regarding experience of pregnancy, delivery, and first pp months and Broussard Maternal Perception of Infant and Infant Behav Record. Moms in both groups perceived infants as less difficult than average infant and no differences between groups seen with one hour of contact, in either male or female infants. FULLTERM

Cristo M. 2002. Get this from Rejean Tessier. I don’t have it. Has to do with maternal feelings of competence and adaptation to mothering role.

Curry, MAH. (1979). Contact during the first hour with the wrapped or naked newborn: Effect on maternal attachment behaviors at 36 hours and three months. Birth and Family J. 6(4), 227-235. 20 women randomly assigned to wrapped (11) or naked baby (9) during 1st hour after birth- started after 5 min APGAR and continued for 17-49 minutes. Blanket across the infant’s back. Behav observed for 15 sec each minute x 15 minutes at 36 hrs postbirth and at 3 months of moms at play. NO diff in attachment behaviors at either time. Temps taken q 15 minutes to be sure it was ok. FULLTERM, Temp, Maternal Behavior, RCT, swaddled, Birth KC/VEKC

Curry, M.A.,(1982). Maternal attachment behavior and mother's self-concept: The effect of early skin-to-skin contact. Nursing Research, 31(2), 73-78. 11 Controls (wrapped infant) vs. 9 KC infants. Maternal attachment at 36 hours and 3 months postbirth, FULL TERM. Attachment behaviors, Self concepts. VEKC??When did KC begin?


Women’s Health 49 (4 Suppl 1), 29-35. Review of evidence of interventions to help newborn infants in developing countries. Exclusive breastfeeding, KMC, newborn resuscitation, and infant massage are encouraged and “have important complementary roles in providing care to newborn infants in adverse conditions.” Review, developing countries, infant massage, birth KC.


Davanzo, R., & Cattaneo, A. (1995). The kangaroo mother method. The Kangaroo, 4(1) July: p. 6-9. This is a review of Sloan (Lancet, 1994) and Charpak (Pediatrics 1994) articles with a commentary related to the recommending Kangaroo Care for implementation on a global basis. The Kangaroo is a journal published by the Bureau for International Cooperation in Maternal and Child Health and is available by writing to the address listed in Davanzo 1993. Implementation, Review

De Chateau P. (1979). Effect of hospital practices on synchrony and the development of the infant-parent relationship. Seminars in Perinatology, III(1), 45-60. I think this is a report of practices, not a study or report of KC. We will check this out. Fullterm, synchrony


De Chateau P, Wiberg B. (1977b) Long-term effect on mother-infant behaviour of extra contact during the first hour post partum. II. A follow-up at three months. Acta Pediastriica Scand 66, 145-151. Fullterm primip moms given 15-20 min suckling and KC during 1st hr. after delivery vs control (infant taken to nursery) had sig. diff behav at 36 hrs and 3 months postbirth during free play. KC moms kissed, looked on face more and babies smiled more and cried less frequently. A greater proportion of KC moms were still BF at 3 months. Influence of KC was more pronounced in boy-mom than girl-mom pairs. Interviews revealed no diff in maternal perception of 1st week at home, infant sleeping at 3 months was same, same # had had colic and meds for colic. KC infants given night feeds twice as long, fewer reported problems with night feeding in KCs. Control moms reported more difficult adaptation to infant and needed home help longer (14.5 vs 7.6 days). FULLTERM, KCBF, BF at 3 months, maternal behavior, maternal perception, infant smile/crying, RCT, EARLY KC

De Chateau P, Wiberg, B. (1984). Long-term effect on mother-infant behavior of extra contact during the first hour postpartum. Part III: Follow-up at one year. Scand J Soc Med, 12: 91-103. 15-20 minutes of KC during BF was given to moms and FULL TERM babies and compared to crib held infants. At 1 year, KC moms held and touched infants more frequently, talked more often positively to infant, returned to employment to a lesser extent, and had a greater proportion of infants who were sleeping in room of their own. In 4/5 parts of Gessell Development Schedule, KC babies were ahead of controls. No differences between groups on Vineland Social Maturity Scale and the Cesarec Marke Personality Scheme. KC moms breast fed 2.5mos. more. Fullterm, RCT, Early KC, KCBF, Development


de Leeuw R (1987). The kangaroo method. Ned Tijdschr Geneeskd, 131(34), 1484-1487. (DUTCH). KC was started at Academic Hospital of the Univ. of Amsterdam for a small preterm infant having intractable apneic attacks.
Apneic attacks diminished due to improved breathing pattern while on KC. **Descriptive, apnea, breathing patterns.**


De Leeuw, R., Collin, E.M., Dunnebier, E.A., & Mirmiran, M. (1991). Physiologic effects of kangaroo care in very small preterm infants. *Biology of the Neonate*, 59(3), 149-155. Clinical observation study using pretest-test-posttest (each period = 1 hour) design of 8 preterms (27-29wks GA, M=28 wks; bw 770-1465 M=1104g) given one hour of maternal or paternal KC when clinical condition allowed (after days of ventilation and O2 support by CPAP or hood for irregular breathing with apneic attacks. Infants wore hat and blanket, parents sat in upright chair. Some had CPAP or O2 by mask during KC. KMC done randomly in am or pm. Mean entry age=18.1 dyas, HR, RR, TcpO2 (between scapula on back), Behavioral state by 2 observers (80% reliability) using Prechtl & Parmelee scoring. Min by min scoring of regular/irregular breathing, % of time of reg/irreg breathing, # of apnea >10 seconds and % total time of apnea >10 secs., power spectrum of breathing, rectal temp (B4 & after KC), bradycardia (<100 bpm). No diff between periods in HR, # of brady increased slightly during KC but not significantly (two infants had increase from 0 to 13 or 8 during KC), RR (during KC some had increased RR, some had decreased RR), % time in reg vs irreg breathing, # of apnea and total apnea time, tcpO2 (but 8 of the data points infants were still on O2 support), % time in state 1,2, and transitional state (crying was not seen at all in any period), and in rectal temp (rectal temp increased somewhat in all but 2 very small infants who had a decrease of 0.3C from 36.8 to 36.5 and other from 37.1 to36.2 (0.9C change). Need to prevent hypothermia in very LBW infants. Power spectrum of breathing showed 3 infants had clear increased regularity of respiration and others had no change in regularity of breathing). Parental questionnaires show KC increases parental-self confidence and confidence in the baby. Some infants improved, others had no change. No clinical deterioration during KC. KMC has no lasting effect on sleep in infants. **Quasi-Experiment: PreKC-KC-PostKC infants as own control, Sleep, Micropreemies who were unstable and VLBW, Paternal KC, CPAP KC, State, Breathing pattern, rectal temp, apnea >10 sec # and % time, bradycardia, crying, parent confidence, TcpO2**


Diaz-Rosello, J.L. (1996). Caring for the mother and preterm infant: Kangaroo care. *Birth*, 23(2): 108-111. This is a review article with 17 references. **LITERATURE REVIEW**


Dodd, VL. (2005). Implications of kangaroo care for growth and development in preterm infants. J Obstet Gynecol Neonat Nurs 34(2), 218-232. A review article. Temperature studies revealed for infants greater than 28 weeks that temperature is stable or increases (pg. 225); heart rate data was concerning in only one of 17 studies reviewed (and that was Bohnhorst, 2001 – she did not review Bohnhorst et al., 2004); respiratory rate is not negatively affected by KC except for some tachypnea in Bohnhorst 2001 study (pg. 225), oxygenation is stable or improved except for Bohnhorst 2001 study with 8 infants; nurturing and sensitivity to infant needs occurs in KC group and is not disputed by any study; and that KC contributes to increased weight gain. Concludes that KC has nurturing advantages to both infant and parent. Review, PT, HR, RR, Wgt, maternal feelings, oxygenation.


Dombrowski MAS, Anderson GC, Santori C, Burkhammer (2001). A case study of KC (Skin-to-skin) care with a depressed woman. MCN, Am, J Maternal Child Nurs, 26 (4), 214-216. KC started at 2 hrs postbirth, Mom was crying and expressing sad thoughts at that time – depressive symptoms disappeared within hours. During 1st 3 hrs of KC mom slept almost continuously. Continued KC every other day x 3 mos. and there after when she was stressed. Early KC, Depressed KC, Stress-relieving KC.


Durand, R., Hodges, S., LaRock, S., Lund, L., Schmid, S., Swick, D., Yates, T., & Perez, A. (1997). The effect of skin-to-skin breastfeeding in the immediate recovery period on newborn thermoregulation and blood glucose values. Neonatal Intensive Care, March/April, 1997, p. 23-27. Infants started either KC or radiant warmer care 30minutes after birth and continued for 120 minutes. Temperature at 120 minutes postbirth was higher than swaddled and cot infant’s temperature. No differences in blood glucose levels was present. KC assists with manintenance of normal body temperature and reduces energy expenditure and concomitantly stimulated suckling and milk production. Maintenance of body temperature is needed to prevent lowered blood glucose levels. Fullterm, BF, Temperature, Blood glucose, Birth KC/VEKC. Is this an RCT?

Dzukou T, De La Pintiere A, Betremieux P, Vittu G, Roussay M, Tietche F. 2004. Kangaroo mother care: Bibliographical review on the current attitudes, their interests, and their limits. Arch Pediatr 11 (9), 1095-1100. In developing countries KMC regulates body temp and metabolic adaptation of the new/born. In developed countries, KMC contributes to decreased parental anxiety and improves relation with child. SAYS IT IS DIFFICULT TO RECOMMEND USE OF KMC in CURRENT PRACTICE (just like Conde-Agudelo et al, 2003 and repeated also in Venancio 200 article) Rigorous randomized controlled trials are needed to establish full safety and know kmc’s impact on neuropsychological development and the real somatic growth and economic cost. Review, maternal attitude, maternal feelings, metabolic rate, temperature, growth, cost. Fullterm FRENCH

Eichel P. 2001. Kangaroo Care: Expanding our practice to critically ill neonates. Newborn and Infant Nursing Reviews, 1(4): 224-228. Relates steps to starting KC, beginning with the 1st KC Conference in America. Did KC with vented babies, some stress with transfer but recovered quickly, then sound sleep with fewer episodes of A/B, desat. Some needed 10-15% more FiO2 during KC. Now they feed and suction in KC. Clinical Report.<1000gm, Vent KC,sleep,
apnea, bradycardia, desaturations feed/suction in KC, Implementation.

Ellett, M.L., Bleah D.A., Parris S. (2004) Feasibility of using kangaroo (skin-to-skin) care with colicky infants. Gastroenterology Nursing, 27 (1), 9-15. 75 parents agreed to participate in an internet-based study of KC’s effects on colic, but only 5 actually did participate and only 2 completed data collection. Data based on 2 shows KC is promising intervention for colic and no other treatments are out there. She recommends a larger clinical trial. One infant spent 605 minutes crying and the other 1470 minutes. Difficult to do experimental study over the internet. Fullterm, Case Study, Cry, Colic, Behav. states


Engler, A.E. 2005. Maternal stress and the white coat syndrome: a case study. Pediatric Nursing 31(6), 470-473. One mother was doing KC when the infant’s surgeon approached her and the “white coat” syndrome caused her fingertip temperature to increase. GET THIS. Case study, PT, maternal stress, fingertip temperature.

Engler, A.E., Ludington-Hoe, S.M., Cusson, R.M., Adams, R., Bahnsen, M.A., Brumbaugh, E.J., Coates, P., Grieb, J.K., McHargue, L.K., Ryan, D., Settle, M., & Williams, D.M. (2002) Kangaroo care: National survey of practice, knowledge, barriers, and perceptions. MCN, Amer. J. Maternal Child Nursing 27(3): 146-153. 537 (59%) of all NICUS in America returned surveys. Over 82% report practicing KC, but mostly only upon request of mother. Nurses are knowledgeable. Barriers are infant safety concerns and reluctance by RN, NNP, MD and families. Units that practice KC have more positive perception than units that do not practice KC. >60% report that low GA or low weight are not contraindications. SURVEY. Barriers

Engler, A.E. in press for 2006. Randomized trial of Kangaroo to reduce maternal stress. In press. RCT, pretest-test-posttest of 25 (13 KC,12 control) who gave 2 hours of KC or sat beside incubator for talk/touch but not holding for two hours on ONE Day only. Postnatal age was 17 days and GA was 32.8 wks. And mean BW of 1986 gms. Fingertip temp pretest KC 93.1, midway thru KC 92.13 , post was 91.07 & was sig higher in KC (higher fingertip temp = less stress) than controls at the mid point. PSS: NICU scales taken before and after the 2 hours.. Sights and sounds bothgroups went up, control grp had significant rise and KCers did not; Appearance & behavior of baby” only sig decrease in controls eventho KCers decreased too, Parental Role Alteration had no sign change in either group tho trend was for bothgroups to decrease stress intheir scale. MAACL was sig. lower in KC group after TX. No diff in skin conductance, galvanic skin response, salivary cortisol. PT, Maternal Stress, Fingertip temp, skin conductance, galvanic skin resistance, salivary cortisol, MAACL for dysphoria


Fardig, J.A. (1980). A comparison of skin-to-skin contact and radiant heaters in promoting neonatal thermoregulation. Journal of Nurse-Midwifery, 25(1 Feldman), 19-27. 17 KCers got KC after initial nursing care under radiant warmer (Grp A), 17 got immediately KC (never under radiant warmer – Grp B) & 17 controls had no skin contact at all (Grp C). Skin temps taken every 3 minutes for 45 minutes; Rectal temps at 21 and 45 min postbirth. More controls had skin and rectal temps below NTZ at 21 and 45 min postbirth than either of KC grps. KCers (Grp B) had temps that were same as those under radiant warmer (Grp A). FULLTERM, skin temp, rectal temp, Birth KC/VEKC
Feldman R, Eidelman A, Sirota L, Weller A. (2002). Comparison of skin-to-skin (Kangaroo) and traditional Care: Parenting Outcomes and Preterm Infant Development. Pediatrics, 110(1 Part 1), 16-26. 73 LBW infants who got KC in the NICU and 73 matched controls at other hospital. At 37 weeks GA, mother-infant interaction, maternal depression, maternal perceptions measured. At 3 months infant temperament, mat-paternal sensitivity, etc. KCers had more positive interactions, and moms showed more positive affect, touch, adaptation to infant cues and infants were more alert, less gaze aversion. KC moms had less depression. At 3 months, KC moms and pops were more sensitive and provided a better HOME environment. At 6 months, KCers had higher Bayley Mental (96.39 vs 91.81 for controls) and psychomotor (KC= 85.47; control 80.53). Matched TX and Control, used TWO Hospitals, not RCT. Development, Bayley Mental/Motor, Temperament, Mat Behavior, alert, Mat. depression. SLEEP??

Feldman R, Eidelman AI. (2003). Skin-to-skin contact accelerates autonomic and neurobehavioral maturation in preterm infants. Developmental Medicine and Child Neurology, 45(4), 274-281. 70 infants got 24.31 days of KC for a total of 29.76 hours. 19 males, 6 females I each group. GA was 30.28 wks, bw = 1229.95 gm and medical risk. KC is standard option in care, so no randomization of subjects, but they were matched. Vagal tone for 10 min B4 KC at 32 weeks and 10 min at 37 wks - KCers had more rapid maturation of vagal tone. Behavioral state measured in 10 sec epochs x 4 hrs on 4 consecutive evenings at 32 (B4 KC) and same procedure at 37 wks using an unnamed 6 state scale – more rapid improvement in state organization (longer periods of quiet sleep, longer period of alert wakefulness and shorter periods of active sleep & better sleep cycling at 37 weeks than at 32 weeks in KC group and more mature state regulation at 37 weeks than controls.) NBAS at 37 weeks showed more mature neurodevelopmental profile (especially habituation and orientation) in KCers. State regulation is sign of maturation and is delayed in preterms. State scoring system was modeled after Brazelton and Holditch-Davis, a 6 state system without established psychometric properties. Matched TX and Controls, but not RCT. Vagal tone, Quiet & Active sleep, Alert Inactivity, NBAS for development, Sleep Cycling

Feldman R, Weller A, Leckman JF, Kuint J, Eidelman AI (1999), The nature of the mother’s tie to her infant: Maternal bonding under conditions of proximity, separation, and potential loss. J Child Psychiat 40 (6),929-939. Measured attachment in fullterm mothers, healthy preterm infant moms, and VLBW infant moms. Pg. 937 says “Intervention efforts that aim to enhance proximity and touch in VLBW infants, such as skin-to-skin contact (kangaroo care), may be crucial for these mothers in order to initiate the bonding process.” FT, PT, maternal attachment, maternal depression

Feldman R, Weller A, Sirota L, Eidelman Al. (2003). Testing a family intervention hypothesis: The contribution of mother-infant skin-to-skin contact (Kangaroo Care) to family interaction, proximity, and touch. J. Family Psychology 17(1), 94-107. 146 three-month old preterms were tested. 73 had received KC in the NICU. Micropatterns of proximity and touch were coded. Following KC, moms and dads were less intrusive, infants showed less negative affect, and family style was more cohesive. Maternal and paternal affectionate touch of infant and spouse was more frequent, spouses remained in closer proximity, and infant proximity position was conducive to mutual gaze and touch during triadic play in the KC group. KC is beneficial for development of family processes. Not an RCT, interactions, development, proximity

Feldman, R, Weller A, Sirota L, Eidelman A. (2002). Skin-to-skin contact (Kangaroo care) promotes self-regulation in premature infants: Sleep wake cyclicity, arousal modulation, and sustained exploration. Developmental Psych, 38(2), 194-205. 73 preterm infants got KC, 73 controls. KCers got at least 1 hr of KC per day x 14 consecutive days in NICU (Mean 26.62 hrs of KC+ 12.14 hrs). Tested 1-2 days B4 KC at 32 weeks and at 37 weeks GA, and at 3 and 6 mos. Corrected age. Control gp tested at 32 weeks and all other times were same. State measured in 10 sec epochs over 4 hrs before KC and at 37 weeks. KC infants spent SIG more of the 4 hr time in QS and Alert Wakefulness and less time in Active Sleep than controls. @term, KC more had mature state distribution, more organized sleep-wake cyclicity (but not B4 KC at 32 weeks), @ 3mos KC had higher threshold to negative emotionality and more efficient arousal modulation with complex stimuli. At 6 mos KC infants had longer duration and shorter latencies to shared attention and sustained exploration in toy session. Behavioral state scoring system was modeled after Brazelton and Holditch-Davis but is not
an established psychometric tool. **Not an RCT, State, Development, sleep cycles, Quiet Sleep, arousals, Infant emotion.** Used same stats as Engler

Ferber S.G., Makhoul I.R. (2004). The effect of skin-to-skin contact (kangaroo care) shortly after birth on the neurobehavioral responses of the term newborn: a randomized, controlled trial. *Pediatrics, 113*(4), 858-865. 47 healthy mom-infant dyads (22 KC) began KC 15-20 mins after delivery for 60 min, 25 controls got no KC, standard wrapped care after being taken out of delivery room to be weighed and dressed and then returned to mom (kc only, control group babies went to nursery for 2 hours). At 4 hours postbirth they observed infant for every two minutes over one hour. KC group slept longer, were mostly in quiet sleep state, had less time in transitional, fussy, crying, and alert states (using 6 state Brazelton scoring), showed more flexor movements and postures, less extensor movements. KC influences state organization and motor system modulation shortly after delivery, this kind of care should be offered shortly after birth. KC reduces infant stress (pg. 861). **Fullterm, RCT, development, sleep, quiet sleep, crying, alert state, flexed posture and flexed movements, motor develop, stress.**

Field, T., Hernandez-Reif, M., Feijo, L., Freedman, J. 2005. Prenatal, perinatal, and neonatal supplemental stimulation: A survey of neonatal nurseries. *J Perinatology, 82* US neonatal staff member responded to questionnaire. 1)skin-to-skin following birth in the delivery room (83%), containment (swaddling and surrounded by blanket rolls occurred in 86% of NICUs, music is in 72% of NICUs, rocking in 85%, kc (98%), nonnutritive sucking during tubefeedings in 96% NICUs, and breastfeeding in 100% NICUs. Pregnancy massage (19%), labor massage (30%), Doula (30%), NICU waterbeds (23%), preterm infant massage (38%). These are physicians’ perceptions, not staff nursing and I, SML, think that they are inaccurate as 100% of NICU infants do not get breastfed!! **PT, FT, Survey, KC, BF, rocking, NNS, swaddling, skin-to-skin.**


Fischer, C.B., Sontheimer, D., & Linderkamp, O. 1998. Cardiorespiratory stability of premature boys and girls during Kangaroo Care. *Early Human Development 52*(2), 145-153. Pretest(2 hrs)-KC (2 hrs with cap and covered across back with cotton blanket)-posttest (2 hrs) design in which stability of HR, RR, and SaO2 values was measured by a method developed by the team-amethod of counting the boxes on the graph paper of how high the values were. KC had no effect on any stability indicator; boys had significantly less stability in all three measures than girls. **PT, Quasi-exp, HR, RR, SaO2, KMC only, stability.**


Fohe K, Kropf, S, Avenarius S. 2000. Skin-to-skin contact improves gas exchange in premature infants. *J. Perinatology, 5,* 311-315. 53 preemies <1800gm pretest incubator(60 min)-test(KMC: 90 min)-posttest(60 min) acting as own controls. HR increased 5 bpm, RR decreased 5bpm, SaO2 increased by 0.4%, tcpO2 increased by 48 mmHg, RECTAL temp increased by 0.3°C during KMC. Smallest increase in HR and highest decrease in RR is <1000 gramers; SA02 and tcp02 increases doubled in <1000grm compared to >1800 gms. Infants remain clinically stable and have more efficient gas exchange. No risk of hypothermia in <1000 gramers. **HR, RR, SaO2, rectal temp, FiO2, TcPO2,TcPCO2. Very low birthweight and some micropreemies, Quasi-exp., stability**

Franck LS, Bernal H, Gale G. 2002. Infant holding policies and practices in neonatal units. *Neonatal Network, 21*(2), 13-20. National survey of policy and practice of conventional and KC holding. 215/400 responses from Level 3 and Level 2 nurseries. 40% of units have policies for KC and only 26% have policy for conventional holding; 73% offer parents KC with extubated infants, 45% offer KC with intubated ones, paternal KC permitted in 68%, sibling KC in 2%, grandparent KC in 6% of units, Many units permit KC with ventilated, CPAP, artery caths, percutaneous venous caths,
and chest tubes (p. 18). Benefits are enhanced attachment and closeness. Readiness for KC determined by SaO2, HR, & RR, not wgt, GA. 25-33% of respondents identified staff RN and MD has not supportive of KC. Barriers to KC are infant stress, privacy, timing of parental visit, and getting staff help. Descriptive Survey.

Fransson, A-L., Karlsson, H., & Nilsson, K. (2005). Temperature variation in newborn babies: importance of physical contact with the mother. Archives of Diseases of Childhood Fetal Neonatal Edition, 90(6), F500-F504. Descriptive study of abdominal, foot, and rectal temperatures over the first two days of life in 27 healthy fullterm newborns when held in close contact with their mother (babies wore diaper, cotton vest and romper pg. F500) and when in cot were covered by blanket) versus when in a cot beside the mother. 48 hours of recording beginning 4-8 hours post-birth, so this is Early KC. There is no mention of KC as a condition, but the conclusion says “During periods of skin to skin care, peripheral and abdominal skin temperature increased, indicating a heat gain”.(pg. F503) but the article does not describe any skin to skin period, and since when is dressed in vest, diaper, and romper called skin to-skin care? Foot temps rose quickly, all temps were higher when baby was with mom than when in cot. In KC mean difference between rectal and abdominal temp was 0.2C vs 0.7 in cot babies; difference between rectal and foot in KC was 1.5C vs. 7.5C in cot babies – temp difference between rectal and foot of 7-8 degrees C indicates a HEAT LOSS close to the maximum heat loss for which a neonate can compensate. Difference between rectal and foot temp in KC showed positive heat balance, no heat loss. Article emphasizes importance of close physical contact with mothers for temp regulation during the first few postnatal days. Fullterm, descriptive, abdominal Temp, foot temp, rectal temp, swaddled KC, Early KC.

Furlan C.E., Scochi C.G., Futado, M.C. (2003). Perception of parents in experiencing the kangaroo mother method. Review Latin-American Enfermagem, 11(4), 444-452. 10 parents completed interview within 60 days after preterm infant discharge from charity hospital inside Brazil. Four themes were: KC should be flexible, KC improves mother-child and family relationship, KC helps complete infant’s growth & development, and KC helps mother develop caregiving skills. Preterm, descriptive study, Parental report of KC’s meaning to them, attachment, development, caregiving skills.


Furman, L., Minich N., Hack, M. (2002). Correlates of lactation in mothers of very low birth weight infants. Pediatrics, 109(4), 695-696. Significant correlates of lactation beyond 40 wks Conceptional age included beginning milk expression before 6 hs post-delivery, expressing milk  5 times per day, and Kangaroo Care. Increased maternal support specifically directed toward behavioral factors, including early and more frequent milk expression and kangaroo care, may improve the rates of successful lactation among mothers of VLBW infants who choose to breastfeed. Regression analysis. BF

Gale, G, Franck, L., & Lund, C. (1993). Skin-to-skin (kangaroo) holding of the intubated premature infant. Neonatal Network, 12(6), 49-57. 25 intubated (>10 breaths/min) infants ofany weight or gestation with axillary temp 36-372 given adlib KC. Axillary temp measured after 10 mins of KC Did standing transfer. Transfer was most stressful, No infant dropped temp and it more commonly rose and had to have hat removed. Infants <1.2 grams needed 15-20 of adaptation to get good SaO2s, some became wriggly, less comfortable, and desaturated after 20-30 minutes. Bigger infants tolerated KC better and >30 week PCA did better in KC than <30 weeks. Infants slept for 10-15 min and then aroused in response to parent voice. One accidental extubation. Parent statements reflected stronger identify and knowledge of infant, greater confidence in infant need for them and ability to meet needs. Parent liked to watch infant’s SaO2 improve during KC. No neg reactions from parent. PT, descriptive, VENT KC, SaO2, Sleep, transfer, axillary temp, parent staff responses

Gallagher KJ. 2000. Continuous skin-to-skin contact in the NICU: Kangaroo or “Possum” care? J. Perinatology, 5, 318-319. Silly article saying it should be called possum care because KC did not originate in Australia. How to people get this stuff published? Commentary.

Galligan, M. 2006. Proposed guidelines for skin-to-skin treatment of neonatal hypothermia. MCN, American Journal of Maternal/Child Nursing. (sept/oct) 31(5), 298-306. Clinical review of existing to literature to document the evidence behind using KC to rewarms hypothermic fullterm newborns during first 3 days postpartum. Hypothermia is defined as mild: 36.0-36.4; moderate as 32.0-35.9, severe as less than 32.0, normal rectal or axillary temp is between 36.5 and 37.5 according to WHO 1997; AAP and ACOG 1997. In first 20 hours of life 17% of all temps are in hypothermic range (Takayama et al., 2000); and 51.8% of 200 term infants studied over first 72 hours postbirth had one or more hypothermic episodes and episodes peaked between 15 hr and 2nd day of life postbirth (Li et al., 2004).Christensson et al., 1998, Fransson et al., 2005 and Karlsson 1996 are reviewed. The guidelines are: no symptoms of distress, normal HR and RR, and having mild hypothermia, have mom empty bladder and be willing, medicate mom for pain, room temp should be at least 25C, mom wears hospital gown, no bra, and sits at any angle at which shes comfortable, put hat on infant’s head, allow as much of infant skin as possible in contact, use receiving blanket in fourths, monitor infant temp with axillary probe 15 minutes after start of KC, if temp is same or improved, check at 30 mins and then 1 hour post KC beginning. If infant axillary temp at any time is 36. or less or if temp is dropping after 30 minutes of KC or rectal temp less than 30 or infant not normothermic after 1 hour of KC or infant has signs of distress, stop KC. Fathers are an acceptable alternative, and KC may be beneficial for adoptive parents. She has a evidence-based scoring system that is unusual: A1=at least one randomized controlled trial involving this population; A2 = at least one RCT involving related populations, B = well designed RCT, or empirical data from published research reports, or widely accepted scientific principles, C = official recommendations of established advisory panels, D = expert opinions or consensus among clinicians. Guidelines, FT, hypothermia rewarming, evidence-based practice rating system., temp.

Gardner MR & Deatick JA. 2006. Understanding interventions and outcomes in mothers of infants. Issues in Comprehensive Pediatric Nursing 29 (1): 25-44. Review of literature of interventions designed to improve mothering outcomes. The manuscript relates that home visiting, KC, education, counseling, and group intervention all promote effective mothering during the first years of an infant’s life. Nurses should use these interventions to promote effective mothering during the first year of life. Review, maternal behaviors.

Gardner, S. 1979. The mother as incubator – After delivery. Journal Obstetric, Gynecologic and Neonatal Nursing. May/June 1979, 174-176. Infants delivered and dried, and given routine care, eye instillation, ID bands, and weighing and footprinting - then 10 given to mom for KC and covered with warm blanket. 9 were wrapped in one cotton and one plastic blanket, held briefly by parent and put under radiant warmer. Rectal temps taken 2 and 15 minutes after birth. KC infants had less drop in temp (1.1degree C) from 2-15 minutes than control (1.5 degrees C). FULLTERM, Birth KC/VEKC, rectal temp, swaddled care


Gazzolo D, Masetti P, Meli M. 2000. Kangaroo care improves post-extubation cardiorespiratory parameters in infants after open heart surgery. Acta Paediatric, 89(6), 728-729. 5 male infants (X age=5 months) who had repeatedly failed extubation attempts earlier after cardiac surgery were observed every two minutes throughout three two-hour KC periods (each with a preKC measurement 2 hrs before KC). All 3 KC sessions occurred within first 12 hours of extubation (KMC was diaper only, covered with blanket)in Modena, Italy.SaO2 and tcpO2 sig. increased and TcpCO2, HR, and CVP sig. decreased during the 3 different KC periods. “Despite restricted study pop, findings suggest prolonged periods of KC during postop care might have impact on quality, therapy, and length of stay of postop pedi pts, with possible influences on management and costs” p. 729. Descriptive. HR, RR, SaO2, TcPO2, TcPCO2, CVP, pH, Na,
Ca, K, BP, Fullterm


Gloppestad, K. 1995. Initial separation time between fathers and their premature infants: A comparison between two periods of time. Vard I Norden, 15(2): 10-17. When KC was introduced, waiting time was significantly reduced by 66.8%. FATHERS, visiting times

Gloppestad, K., 1996. Parents’ Skin to Skin Holding of Small premature infants: Differences between fathers and mothers. Vard Nord Utveckl Forsk, 16(1): 22-27. The time from birth til fathers held their preemie in KC was significantly later compared to mothers- about 120% difference of the median in time. FATHERS

Gloppestad, K. 1998. Experiences of maternal love and paternal love when preterm infants were held skin-to-skin and wrapped in blankets: Differences between the two types of holding. Vard I Norden, 18(1): 23-30. 103 mothers and 82 fathers held infants in both KC and swaddled and rated their love significantly higher when holding KC than when holding wrapped infants. No differences between fathers and mothers love ratings during KC. KMC and FATHERS


Gloppestad, K. 1998. Lactation in mothers of preterm infants: Prevalence at different points of time. Vard I Norden 4, vol. 18(4), 27-35. Mothers gave KC to preterm infants and answered open-ended questions about amount of breastmilk and BF practices at 1,3,6,8,12 months postbirth. Preterm BF. Engl abstract only


Gomez Papi, A., Baiges Nogues, M.T., Batiste Fernadez, M.T., Marca Gutierrex, M.M., Nieto Jurado, A., Closa Monasterolo, R. (1998). Metodo canguro en sala de partos en recien nacidos a termino (Spanish). An Esp Pediatr 1998 Jun;48(6):631-633. English is: Kangaroo method in delivery room for fullterm babies. 533 normal fullterms were given KC as soon as dried and for next two hours. Temperature of infant was related to duration of KC and 96% had axillary temp >36, 98.5% of infants stayed awake with KC, and KC infants who breastfed during KC stayed longer in KC. If infant had more than 50 min. of KC he had 8 times more probability of breastfeeding spontaneously. Moms tolerated it well though they were tired. FULLTERM, DELIVERY ROOM, Birth KC. Descriptive study, Axillary temp, Awake state, BF, Mother’s tolerance of KC.

e24. 30 newborns held in KC or left in crib for heel stick. Crying and grimace reduced by 82% & 65% from control levels. HR also reduced. Moms given 15 minutes to relax and were then tested. Says effect of KC is not opioid mediated but instead, in combination with taste and suckle of BF appears to form a pain blockade. KC meets the American Academy of Pediatric’s recommendation to use nonpharmacologic and environmental interventions to reduce or eliminate newborn stress or pain during circumcision (AAP, Circumcision Policy Statement. (#RE9850), Elk Grove, Ill: AAP. Fullterm, HR, pain, cry, grimace, maternal relaxation.

Gray L., Miller LW, Philipp BL, Blass EM. 2002. Breastfeeding is analgesic in healthy newborns. Pediatr 109 (4), 590-593. RCT of 15 infants who were breastfeeding in KC position during heelstick, 15 swaddled in bassinet during heel stick, 198 minutes after previous feed. Taste, suckling and KC were the elements that reduced crying by 91% and grimacing by 84% from control infant levels and HR was substantially reduced. In KC, infants cried 4% or 8.77 seconds and grimaced for 8%, 17.25 seconds during lance compared with 43% (72.07 seconds) crying and 50% (80.31 seconds) grimacing in controls. 11/15 Kcers did not cry or grimace at all during heel lance, and these effects extended well in recovery phase (1/15 Kcers cried during recovery, for a total of 10 seconds and controls cried for 28 seconds). KC HR rose 6 pbm and control HR rose 29 bpm. Breastfeeding in the KC position.CRYING, HR, Grimacing, RESIDUAL EFFECTS, RCT.


Gross-Loh C. 2006. Caring for your premature baby. Mothering March-April, 38-47. REED AND PUT ON ARTICLE.

Grossman K, Thane K, Grossman KE. 1981. Maternal tactual contact of the newborn after various postpartum conditions of mother-infant contact. Developmental Psychology, 17, 158-169. 54 mixed parity middle income West German infants. Grp 1: 12 controls – mom saw infant and may have touched briefly, then baby dressed and moved to mothers bedside in bassinet; saw infants 5 times each day for about 30 minutes at feeding times. Grp 2: early contact infants - may have received 30 min of KC in delivery room (nude infant placed in maternal arms on delivery bed with heater overhead; n = 12), then routine feeding every 4-5 hours same as control. Grp 3 (n=17) extended contract, had infants beside their beds for 4 hours in am and 1 hour in pm and could change their diapers. Grp 4 (n=13)- possible KC same as group 2 and rooming-in same as grp 3. AT 2,5,8 days: Summed score for tender touches, duration and frequency increased for extra contact group. Fullterm, Quasi exp as assigned sequentially (successively) in grp 1 then grp 2 etc. maternal behavior May not be KC –does not specify if mom wore gown. Check with Gene if this is KC or not – did she clarify for the Cochrane?

Hales D, Kennell J, Klaus M, Mata L, Sosa R. Urrutia J. (1975), The effect of early skin-to-skin contact on maternal behavior at twelve hours. Ped Res, 9(4), p. 259.9 primip moms given infant for 45 min of KC after leaving delivery room and then to nursery til 12 hrs old vs 10 primip moms who were separated from babies after delivery for first 12 hrs. AT 12 hrs, babies brought to moms and observed for behaviors for 15 second every minute x 15 mins.KC moms had sig increased attachment behaviors(fondling, kissing, en facing, gazing at, holding baby close) but no caretaking differences. FT. Does not specify randomization.Quasi-Experiment. Maternal attachment behaviors.

Hales D, Kennell J, Sosa R. (1976). How early is early contact? Defining the limits of the maternal sensitive period. Pediatric Res. 10,259. Randomized study of 3 grps in Guatemala. Grp 1 (n=20) got 45 min of KC in recovery room under heat lamp and then to nursery until 12 hours old- called early contact group; grp 2 (n= 20) got 45 min of KC starting at 12 hours postbirth(called delayed contact), grp 3 (n =20) first saw swaddled baby at 12 hrs postbirth. At 36 hours: Sig. More affectionate behaviors (en face, looking at baby, talking, fondling,kissing, smiling) than delayed or control moms. No difference between groups in proximity maintaining behavior(keeping baby in bed, holding it close) or in care taking (wiping mouth, burping) of infant. RCT, Fullterm. Maternal behaviors. (Same as 3rd study reported
by Sosa et al., 1976).

Hales D, Lozoff B, Sosa R, Kennel JH. 1977. Defining of the maternal sensitive period. Dev Med Child Neurol 19 (4), 454-461. Randomized study of 3 grps in Guatemala. Grp 1 (n=20) got 45 min of KC in recovery room under heat lamp and then to nursery until 12 hours old—called early contact group; grp 2 (n= 20) got 45 min of KC starting at 12 hours postbirth(called delayed contact), grp 3 (n=20) first saw swaddled baby at 12 hrs postbirth. At 36 hours: Sig. More affectionate behaviors (en face, looking at baby, talking, fondling, kissing, smiling) than delayed or control moms. No difference between groups in proximity maintaining behavior(keeping baby in bed, holding it close) or in care taking (wiping mouth, burping) of infant. RCT, Fullterm. Maternal behaviors. (Same as 3rd study reported by Sosa et al., 1976).


Harris H. 1994. Remedial co-bathing for breastfeeding difficulties. Breastfeeding Review 2(10), 465-467. This is a remarkable picture story of doing KC in a warm bath in the immediate postpartum period (within one hour of birth) to get infant to crawl spontaneously to the breast. Author states that infant needs UNINTERRUPTED time to do this and will go to breast if given time. She says pouring water over infant will keep him warm, crying stops, infants occasionally go to sleep, so stroke him down his back and his journey to the breast conintues. Descriptive, crying, temperature, BF, sleep


Hendricks-Munoz, K. (2002). Karen Hendricks-Munoz, MD, discusses Kangaroo Care at NYU Medical Center. Msnyuhealth.org. Posted July 16, 2002. available at www.msnyuhealth.org/articles/kangaroo_care.html. Describes KC, they permit it as long as mom likes, says moms breast warms up and cools down with infant Cites HR, RR from other studies and states “We are continuing to find that KC helps babies grow stronger and leave hospital sooner–upto 20 days sooner- with no evidence of increased infection. Also quotes a study of less maternal depression. PT, clinical report, infection, growth, LOS, Mat depression, Mat-Neonatal Thermal Synchrony.


Hill PD, Aldag JC, Chatterton RT. (1999a). Breastfeeding experience and milk weight in lactating mothers pumping for preterm infants. Birth, 26(4), 233-238. Average frequency of KC/wk was used as covariant in comparison of single vs double pumping on milk yield from2-5 weeks PP. No infants were breastfed during wks 2-5 PP.. KC was significantly related to 2=5 wk PP milk yield (p=.017). PT, BF


Hurst NM, Meier P. 2001. Managing breastfeeding for preterm infants and their mothers. Central Lines, 17(4), 1, 3-7. Refers to use of KC on pg 3 with pictures and how helpful it is to promote breastfeeding. Differentiates starting with KC and progressing to KC + nonnutritive sucking to BF. BF


Hurst, N.M., Valentine, C.J., Renfro, L., Burns, P. & Ferlic, L. (1997). Skin-to-skin holding in the neonatal intensive care unit influences maternal milk volume. J. Perinatology, 17(3): 213-217. 8 mothers started KMC during the 4 weeks postdelivery and 8 others in the following 4 weeks. All babies had been ventilated. Mean 24-hour milk volumes at 2,3,4 weeks after delivery showed strong linear increase in KMC infants, and no change in control infants’ mothers’ milk volumes. FULL-TERM, milk volume, BF


Ibe OE, Austin T, Sullivan K, Fabanwo O, Disu E, Costello AM. 2004. A comparison of kangaroo mother care and conventional incubator care for thermal regulation of infants <2000 g in Nigeria using continuing ambulatory temperature monitoring. Ann Trop Paediatri 24 (3), 245-251. Cross-over quasi-experimental study of ambulatory KMC alternating with incubator care in Lagor, Nigeria. Each KMC/incubator session was 4 hours, 38 KMC sessions compared to 38 incubator sessions in 13 stable 1200-1999g infants who were 24 hrs-30 days old who wore cotton vests and caps (pg. 246) during KMC (IS this REALLY KMC?) and only diaper in incubator. KMC done by mother or by surrogate female. Infant forehead and axillary temp and maternal chest temp every 5 min x 4 hrs for eachs esion. Each day had 3 KMC and 3 incubator periods. Mean axillary temp in KMC = 37.6 (o.5), incubator = 37.1 (0.8); mean microambient temp in KMC = 34.3(01.2) and incubator = 33.6 (3.5). Core (axilla)-periphery (forehead skin) diff in KMC = 1.5 (0.6) and in incubator – 1.0 (0.7). Risk of hypothermia reduced by >90% in KMC vs. incubator, and more cases of hyperthermia (>37.5) in KMC, core-periphery temp differences widen but risk of hyperthermia >37.9 was not significant. Microambient temp (next to infant, under bra top of mom) higher in KMC than incubator (the room temp was same). 88% of Moms thought KMC safe, 100% preferred KMC to incubator because no separation, 63% had probs adjusting to KMC, 53% thot KMC was convenient for mom, 75% thought KMC was comfortable for mom, 100% thought KMC comfortable for baby. KMC is preferred method for managing stable LBW infants. Quasi-Exp, 3rd world, Axillary temp, forehead temp, core-periphery gradient, Micro-ambient temp(breast temp) Maternal feelings, surrogate
KC. Swaddled KC (dressed).

Isaacson LJ. 2006. Steps to successfully breastfeed the premature infant. Neonatal Network, 25(2), 77-86. On page 81 begin two sections entitled Kangaroo Care and then Kangaroo Care Plus Gavage Feeding. It generally recommends KC because KC familiarizes the infant with mother’s scent and feel of breast, moms experience let down during KC, and report largest let down when holding in KC (Meier et al., 1998). Under gavage feedings it says gavage feedings can be given during KC and allows infant to associate full stomach feelings with being at breast. At 30 wks pma infants want to suck and can go to breast in KC and”for the most part, infants on CPAP, nasal cannula, or, of course, room air, are stable enough to participate in this (suckling at breast and gavage feeds in KC) step.” (pg. 82). Clinical Review, PT, BF, CPAP, Cannula, gavage feed, let down. Not on Charts yet.

Javorski M, Caetano LC, Vasconcelos MG, Leite AM, Scochi CG. 2004. Social representations on breastfeeding according to preterm infants’ mothers in Kangaroo Care. Rev Lat Am Enfermagem 12(6), 890-898. A qualitative study of meanings assigned to breastfeeding in KC mothers. Mothers identified the following meanings: healthy babies are breastfed, mother’s milk provides protection and preserves premature’s life, BF is the complement of motherhood, BF a premature infant is hard and exhausting. Babies have problem of late sucking.

Johanson, R.B., Spencer, S.A., Rolfé, P., Jones, P., & Malla, D.S. (1992). Effect of post-delivery care on neonatal body temperature. Acta Paediatrica, 81(11), 859-863. 300 infants (KC beginning immediately after birth when infant put to breast under mom’s clothing or possibly under swaddling and kept against mother’s breast) was as effective as oil massage or plastic swaddling in keeping babies warm. Fullterm and Preemies were analyzed as one group, and there are many methodological omissions in the report. Kangaroo Care may or may not have been given. RCT, Birth KC/VEKC, swaddling, temperature, Preterm and fullterm

Johnson, AN. 2005. Kangaroo holding beyond the NICU. Pediatric Nursing 31(1), 53-56. A review article that cites many studies as well as International Network for Kangaroo Mother Care. Article relates origins of KC, the effects of KC on infant physiology, maternal feelings, pain outcomes, maternal attachment (and quotes general adult attachment literature in relation to touch effects), infant development (called long-term study of community KC), and has a simple and useful table of effects on page 54 and she outlines the role of all nurses in KC on page 55. Implications for nursing are that KC should be expanded to the pediatric units (because “no studies in Pediatric Intensive Care unit” pg. 55), prenatal classes to parents and into the community. Visual aids and reading materials are important tools, (pg. 55). And “the use of IVs and oxygen does not preclude the practice of kangaroo holding” (pg. 55). “Advance practice nurse need to be included in the plan for KC” (55) Also effects on maternal pain should be considered. Review, Community KC, Maternal Pain, Maternal Stress, Pediatric KC, INK,


Johnston, C.C., Stevens, B., Pinelli, J., Gibbins, S., Filion, F., Jack, A., Steele, S., Boyer, K., & Veilleux, A. (2003). Kangaroo Care is effective in diminishing pain response in preterm neonates. 2003 Arch Pediatric and Adolescent Medicine 157(11), 1084-1988. 74 preterms 32-36 wks postconceptual age and within 10 days of birth were in cross-over (served as own controls) study of 30 minutes of KC and then heelstick in KC versus being prone in incubator and getting heelstick in incubator. Premature Infant Pain Profile scores over first 90 seconds of heel lance procedure were significantly lower by 2 points in KC. KC effectively decreases pain of heelstick. PT, Quasi-Experimental, Pain

Kadam S, Binoy S, Kanbur W, Mondkar JA, Fernandez A. 2005. Feasibility of Kangaroo mother care in Mumbai. Indian J Pediatrics 72(1), 35-38. 89 low birth weight infants (<1800 gms, stable cardiopulmonary in air, APGAR of 7 at 5 mins and on feeds (breast or breastmilk feeds by spoon), Mean age = 3.2 days (1-8 days range) randomized (44 KC, 45 conventional care [CMC]) in tertiary care unit. Moms sat semi reclined holding upright baby beneath cloth dupatta for at least one hour each session and continuing for as long as comfortable (Mean = 9.8 hrs/day SD = 3.7 hrs) and until discharge (wgt gain for 3 days, maintaining temp, feeding well, and mom confident of caring for baby at home). CMC under radiant warmer until discharge. HR and SaO2 continuous, RR each hour when in quiet state, Axillary temp for 3 minutes each hour and when hypothermic (<36°C) & hyperthermic (>38°C). KMC group had significantly: less hypothermia (10/44 vs. 21/45), higher SaO2 (95.7 vs. 94.8%), and decreased respiratory rate (36.2 vs 40.7). No differences in # of hyperthermia episodes, sepsis (KMC=6; CMC=8), apnea (KMC=6, CMC=8), BF onset (KMC 4.7 days ± 3.3; CMC 5.6 days ± 3.9), hospital stay (KMC=8.5 ± 4.4; CMC=9.3 ± 4.5 days), weight gain (KMC = 1494 ± 211g; CMC = 1462 ± 205g). 15 KMC babies transferred back to conventional care (for sepsis = 6; for apnea = 6, for jaundice = 7 – which equals transfer back to CMC rate of 34.1%). Klebsiella pneumoniae was predominant organism. One baby died in each group (due to sepsis for KMC and NEC for CMC). Moms asked 3 questions: Do you feel comfortable when giving KMC? Will you continue giving KC at home? Does your husband agree with this care? 86% moms happy with KMC, 14% felt CMC was better; 79% of moms felt comfortable during KMC and 73% felt they would be able to give KMC at home; 64% fathers agreed with KMC. PT, RCT, temp., SaO2, HR, RR, apnea, sepsis/infection, hospital stay, maternal feelings, community KC, BF, weight gain, transfer back rate, 3rd world


Kambarami RA, Chidede O, & Kowo DT. (1998). Kangaroo care versus incubator care in the management of well preterm infants—a pilot study. Annals of Tropical Paediatrics, 18(2), 81-86. 37 KC group gained twice as much weight per day as the 37 controls, had shorter hospital stay, and better survival rate. RCT. Weight, LOS, survival.


Kambarami R, Chidede O, Pereira N. (2003). Long term outcome of preterm infants discharged home on kangaroo care in a developing country. Annals Trop Paediatr., 23 (1), 55-59. 297 preterm infants born at Harare, Zimbabwe were discharged home on KC. 26.6% died (median age=66 days), 47.5% survived, 25.9% lost. Hospital readmit rate = 22.9% with 8.8% mortality. Maternal mortality=4.7%, chronic infant morbidity was 7.4%. Infant mortality was related to young age of mom, Bw <1500, and maternal mortality, not to dischgwgt or BW. Descriptive, Home follow-up, Morbidity, Mortality, hospital readmit rate.

Kambarami R, Mutambirwa J, Maramba PP. 2002. Caregivers’ perceptions and experiences of ‘kangaroo care’ in a developing country. Trop Doct 32 (3), 131-133. Focus group showed that nurses preferred KC to conventional methods, but still it’s use is not widespread. Knowledge & awareness of method need to be improved. Qualitative, focus group, staff perception.

Karlsson H. 1996. Skin to skin care: heat balance. Archives of Disease in Childhood 75: F130-F132. Nine healthy neonates, FULLTERM, were given 60 minutes of KC on Mom's chest and rectal temps increased by 0.7°C, going up to 37°C, during KC. Heat was gained from areas in contact with mother’s skin; heat loss from un-protected heads was high, but dry heat loss during KC was similar to dry heat loss in an incubator. Overall, there was reduced heat loss in infants during KC, allowing heat to be conserved. Kcers attained and maintained rectal temps. Fullterm, Rectal temp, descriptive, Temperature
Kennedy N, Gondwe L, Morley DC. (2000). Temperature monitoring with ThermoSpots in Malawi. *The Lancet*, 355, 1364. Ten infants <2000g had axillary and rectal temps measured 2x/day x 5 days. KC was done for hypothermia. KC was cost-free and effective method of rewarming. **Axillary temperature, Rectal temperature, Rewarming.**

Kennell, J.H. (2006). Randomized controlled trial of skin-to-skin contact from birth versus conventional incubator for physiological stabilization in 1200g to 2199 g newborns. *Acta Paediatrica* 95(1), 15-16. The is a commentary on Bergman’s RCT and he asks why Bergman would even think of trying this study and did not cite the previous studies done by Ludington-Hoe and another by Anderson et al and their published reports as reasons, but was glad that Bergman did this trial. He also makes laudatory comments about the breast biosynchrony study of Ludington-Hoe et al., that was published in Journal of Obstetric, Gynecologic, and Neonatal Nursing in 2006. **PT, Commentary, breastbiosynchrony temps.**


Kluthe C, Wauer RR, Rudiger M. 2004. Extrasystoles: Side effect of kangaroo care? *Pediat Critical Care Medicine*, 5 (5), 455-456. Case report of one preterm infant who exhibited cardiac arrhythmia on the ECG monitor during KC, leading to interruption of KC. Arrhythmia disappeared after placing baby back in incubator. Most likely reasons for arrhythmia were not valid, and arrhythmia reappeared upon continuation of KC. ECG monitoring revealed the reason was monitoring error due to superimposed electrical activity from the parent. Oxygen saturation represent a more reliable method of monitoring during KC (N.B.: this is similar to the Sonthheimer et al’s 1995 report entitled “Pitfalls in respiratory monitoring…” which says you pick up maternal breaths and pauses if leads are not placed under the infant’s axilla where the mother’s cardiac cycle is not picked up). **Case study, descriptive, HR, arrhythmia, oxygen saturation.**


controlled trial of 68 fullterm infants who received 30 mins of KC before injection, making sure mothers felt relaxed (which supposedly takes 10-15 mins). Then moms rotated infant to supine for injection in anterior thigh. After injection, infant turned prone for more KC comforting. Standard care infants lay undisturbed in crib for 10-15 mins before injection. HR, behavioral state, cry time measured before, during and after injection. **Fullterm, Pain, RCT, HR, Behav State, Cry time.**

**Kovach 2002.** FT. Most hospitals give KMC at delivery, some do APGARS In KC.


Kritzinger A & Louw B. 2003. Clinical training of undergraduate communication pathology students in neonatal assessment and neonate-caregiver interaction in South Africa. S Afr J Commun Disord 50, 5-14. Development of a clinical training module in Early Communication Pathology for communication specialists to use with mothers at risk of infant neglect and abuse. Prenatal communication with mothers increased KMC and many other outcomes. Really a study about the communication module used and how the students learned neonatal assessment and how to influence mothers. **Education report, increased use of KMC after early communication.**  

Lagro MG & Stekelenburg J. 2006. The Millenium Project of the United Nations, focusing on adequate postpartum care to reduce maternal and neonatal mortality world-wide. *Ned Tijdschr Geneeskd 150* (20), 1143-1147. (Dutch). Review article. Reduction in maternal and infant mortality by 2/3 is one goal (goal #4) of Millenium Project. Neonatal mortality needs to be reduced by half. KC can reduce morbidity in premature infants. Mothers and infants should be checked closely postbirth during the following periods: the first 6 hours, the first 6 days, the first 6 weeks, and the first 6 months according to World Health Organization. **Preterm, review, morbidity.** Not on charts yet.  

Lai HL, Chen CJ, Peng TC, Chang FM, Hsieh ML, Huang HY, Chang SC. 2006. Randomized controlled trial of music during kangaroo care on maternal state anxiety and preterm infants’ responses. *International Journal of Nursing Studies,* July issue. Pretest-posttest RCT of 15 KMC + music preterms compared to 15 incubator care preterms (no music, no KMC). RCT. KMC and music (maternal choice of lullaby) was for 60 min/section/day for 3 consecutive days. Infant HR, infant RR, infant Sao2 were within normal limits and no differences between groups. KMC + music group had more occurrence of Quiet sleep state and less crying. KMC + music resulted in lower maternal anxiety. Maternal state anxiety improved daily, indicating cumulative effect. **PT, RCT, Maternal stress, cumulative effect, HR, RR, Sao2, behavioral state, crying, Quiet sleep, music, 3rd world.**  

Landers S. 2003. Maximizing the benefits of human milk feeding for the preterm infant. *Pediatric Annals,* 32 (5), 298-306. This article summarizes current knowledge of short and long term benefits of human milk feedings for preterm infants and challenges in providing adequate nutrition, along with strategies to assist in providing human milk feedings. Infection risk of human milk are related too. On page 303 is a full section on Skin-to-skin holding that even talks about the enteromammary pathway for protection of preterm infants from nosocomial infection. Very positive review of KC. **Preterm, BF, enteromammary pathway.**  

Legault M, Goulet, C. (1994). Removing the premature from the incubator. From the traditional method to the kangaroo method. *Infirmiere Quebec* 2(2), 34-41. **Preterm Swaddled holding.**


Lehtonen L, Martin RJ (2004). Ontogeny of sleep and awake states in relation to breathing in preterm infants. *Semin Neonatol* 9(3), 229-238. Not an article about KC, but it states on page 335 that “KC has been shown to improve the integrity of sleep” and that more studies of KC and sleep cyclicity are needed. States that although behavioral states are immature during preterm period, their cyclicity is clearly seen with large proportion of indeterminate sleep and small amount of wakefulness. Oxygenation is stable during active and quiet sleep in ventilated preterm infants, but indeterminate sleep and arousals are associated with hypoxic episodes. Arousals have also been linked to apnea in spontaneously breathing infants. Well-defined sleep cycles are beneficial to the oxygenation of preterm infants, so ways to promote natural sleep are needed. Kangaroo care and optimal positioning have been shown to improve the integrity of sleep. Optimizing sleep cycling might improve long-term outcome of preterm infants. **Review. PT, sleep, cycles, arousals, apnea**


Levine, A. 1999. Human neonatal care initiative. *Acta Paediatrica* 88, 353-355. This is an 11 step program to humanizing neonatal care. The eleven steps are:

Lima G, Quintero-Romero S, & Cattaneo A (2000). Feasibility, acceptability, and cost of kangaroo mother care in Recife, Brazil. *Annals Tropical Paediatrics*, 20(1), 22-26. 114 LBWs got 24 hr KMC up to discharge. No hospital deaths, no mod/severe hypothermia but 30 episodes/100 infant days of mild hypothermia (36-36.4) occurred mainly due to maternal separation. 88% exclusively BF at discharge; daily wgt gain was 15 g during KMC. 87% BF at 1 month; 63% BF at 3 months; KMC cost $20.00/day vs $66/day conventional care. **24 HOUR KC IMPLEMENTATION, breastfeeding, weight gain, mortality, temperature**


Ludington, S.M. (1990). Energy conservation during skin-to-skin contact between preterm infants and their mothers. *Heart and Lung*, 19(5 Pt1), 445-451. Descriptive of 8 healthy, stable preterm infants given one 3 hr session of KC. Reports HR and behavioral state (ABSS) during pretest, test, and posttest periods. Quiet sleep increase, activity level decreased during KC. Longer QS inKC than incubator. HR incrased with increasing activity. **PT, Descriptive, HR, abdominal temperature. Behav state sleep, activity**


Ludington, SM (2003). Preterm skin contact effects on electrophysiologic sleep. Abstract # 354, pg. 192 of Research ShowCASE, CWRU, April 4, 2003, Cleveland, OH. Randomized controlled trial of 1st 8 subjects, cycling of sleep during KC is evident, but not prior to KC and not for two days before KC. **RCT, PT, sleep, sleep cycles.**


Ludington-Hoe, S.M., Anderson, G.C., Swinth, J.Y., Thompson, C., Hadeed, A.J. (2004). Randomized controlled trial of Kangaroo Care: Cardiorespiratory and thermal effects on healthy preterm infants. Neonatal Network, 23 (3), 39-48. 24 healthy preterms 33-35 weeks gestation given 3 hours KC in randomized pretest-test-posttest design. KC (11) vs. control (13) in open air crib. All measures taken each minute and means remained in normal clinical range showing safety. HR approached tachy and brady in pretest and posttest period, but not in KC. HR rose 8 bpm in KC and was significantly higher in KC than in control. (More stable physiology in KC). RR no sig change. Mean SaO2 dropped 1.0% in KC (significantly dropped). Apnea, brady, and periodic breathing recorded continuously on pneumogram and no apnea/brady occurred during KC. Only one KC infant had one episode of PB during KC and many controls had lots of PB in all periods. Significantly less PB in KC and between groups. More regular breathing in KC during KC period than in control group. Abdominal temp rose significantly (almost 1.0C) in KC and then dropped .05C in postKC. PT, RCT, HR, RR, SaO2, abd.temp, apnea, brady, periodic breathing


Ludington-Hoe, S.M., Hashemi, M.S., Argote, L.A., Medellin, G., & Rey, H. (1992). Selected physiologic measures and behavior during paternal skin contact with Colombian preterm infants. Journal of Developmental Physiology, 18(5), 223-232. Descriptive study of preterms who got 2 hours of PKC immediately after breastfeeding by mom. All three temps continuously rose in PKC and 5/11 subject became hyperthermic during 2 hours of PKC. Infants predominantly slept in quiet sleep during PKC, and fathers demonstrated good fathering behaviors during PKC. Several fathers got tired of KC after 1.5 hours. Tympanic temp is difficult to take during KC. Warming all the way down to the toe occurred. Behavioral thermoregulation was demonstrated by 4/11 infants. Descriptive, Preterm, FATHERS, Abdominal temp, toe temp, tympanic temp, fathering behavior.

Ludington-Hoe, S.M., Hosseini, R.B. & Torowicz D.L. (2005). Skin-to-skin contact (Kangaroo Care) analgesia for preterm infant heel stick. AACN Clinical Issues, 16(3) 373-387. 23 preterms about 32 weeks PCA received 3 hrs of KC and heelstick in KC and 3 hours in incubator with heel stick in incubator – all on one day. Heel stick was for dextrostick. HR rose significantly less in KC heelstick than in incubator heelstick. Crying length was significantly less in KC heelstick (5.0 sec vs. 45 seconds) and three infants did not cry at all! 15 minutes of KC baseline state and post-heel stick state was significantly more time in deep sleep than when in incubator. No differences in RR, oxygen saturation between groups and periods. Experimental cross-over, HR, RR, SaO2, crying time, behavioral state, pain, sleep

Ludington-Hoe SM, Johnson M, Morgan K, Lewis T, Gutman J, Wilson D. Scher MS. 2006. Neurophysiologic assessment of neonatal sleep organization: preliminary results of a randomized controlled trial of skin contact with preterm infants. Pediatrics, 112, e909-e923. 28 preterms (at32 wks +/- 7 days) were tested for sleep in pretest (in hooded incubator, undisturbed, from one feeding to next ~2-3 hrs duration) and then in test (for KC group this was in KC at bedside in lounge chair; controls remained in incubator for feeding interval). Sleep, sound, and light measured by EEG. Arousals from Active sleep and quiet sleep were lower in KC over entire study period and during test-pretest matched segments of quiet and active sleep. Rapid eye movements, and indeterminate sleep were lower in SSC and active sleep segments. When high lighting was removed from regression analysis, quiet sleep increased during SSC. Sleep patterns during SSC are analogous to more mature sleep organization. RCT, PT, Sleep, arousals, transitions

Ludington-Hoe, S.M., Johnson, M.W., Morgan, K., Lewis, T., Gutman, J., Wilson, D., & Scher, M.S. 2006 Randomized controlled trial of Skin-to-skin contact (Kangaroo Care) effects on infant sleep. Nursing Research (Under review). 90 complete data sets of pretest/incubator and test (KC or in incubator if in control group) EEG/polysomnographic data of 2-3 hours interfedding intervals of sleep. Sig. Fewer arousals in SSC than incubator and in quiet sleep and active sleep segments in SSC than in controls, and fewer REMS in active sleep in SSC, increase (4.5 beats) HR and increased RR (5 breaths per minute) in SSC than controls. NO diff in quantity of sleep, but in quality. No diff in # of state transitions, % time in indeterminate sleep, active and quiet sleep. SAO2, but respiratory and cardiac stability (sig. Decreased standard deviation) was present in SSC group. All SSC changes were sameas seen in better sleep organization and suggest brain maturation is occurring during SSC. SSC sleep is better than incubator sleep. RCT, PT, Sleep, arousals, HR, RR, SaO2, stability


based on n=111; Infant B (M=160.82=/-7.61; R =143-178 based on n=102). Maternal-neonatal synchrony exists. Preterm, case study, HR, SaO2, Maternal breast temp, incubator temp, abdominal temp.


Ludington-Hoe, S.M, Nguyen, N, Swinth, J., Satyshur, R. 2000. Kangaroo Care compared to incubators in maintaining body warmth in preterm infants. Biologic Research for Nursing, 2(1),July, 60-73. RCT, 16 KC and 13 control infants in a pretest (in incubator)-test (in KC or incubator)-posttest (in incubator) design of three consecutive 3-hour interfeeding intervals were given 3 hrs of KC. Abdominal temperatures were not different between periods and groups; toe temp was sig higher during KC than incubator periods; Maternal breast temp met neutral thermal zone within 5 minutes of onset of KC. Similar preterm infants can maintain body warmth with 3 hours of KC. Temperature synchrony appears possible. Preterm, RCT. Abd, toe and breast temps, stability, temp synchrony

Ludington-Hoe, S.M., & Swinth, J. (2001). Kangaroo mother care during Phototherapy: Effect on bilirubin profile. Neonatal Network,20 (5). 41-48. Randomized controlled trial of 3 groups of infants with 10 in each group: one with 1 hour of KC per day with biliblanket over back, one with biliblanket and under lights without KC, and one with KC alone. No significant differences in bilirubin reduction over 4 days and no difference in rebound. RCT. Bilirubin


Magill-Evans J., Harrison MJ., Rempel G., & Slater L. 2006. Interventions with fathers of young children: systematic literature review. Journal of Advanced Nursing 55(2), 248-26. A meta-analytic review of literature that includes Feldman et al’s. 2002 study (pg. 254 & 258). Authors conclude that though number of intervention studies is limited, if interventions involve active participation of the father with his own child, enhanced interactions with the child will result and fathers will have positive perception of child. More research is needed to determine effect of fathers interactions on child development. Review. PT, FT, Paternal KC, NOT ON CHARTS YET.

Marchi L. 2004. Kangaroo habitat, a home care experience. Soins Gerontol March-April (46), 27-28. French article and I am not sure it is about infant Kangaroo Care as it is a gerontology article. Unavailable to me in the U.S. KC?


Maternal & Newborn Health/Safe Motherhood Unit. 1997. Thermal Protection of the Newborn: A Practical Guide. WHO: Geneva, pp. 30-37. This shows developing nations how to keep babies warm in KC. This is a nice follow-up to the SAREC report from Sweden. Available from Maternal and Newborn Health/Safe Motherhood Unit. Reproductive Health (Technical support), WHO, 1211 Geneva 27, Switzerland.
Matthiesen, A-S, Ransjo-Arvidson A-B, Nissen E, Uvnas-Moberg K. 2001. Postpartum maternal oxytocin release by newborns: Effects of hand massage and sucking. Birth 28, 13-19. 10 fullterms who had no maternal analgesia in labor were videotaped for hand,finger,mouth, tongue movements and sucking every 30 seconds from birth to 1st BF and placed in KC immediately after being dried. Infants used hands to explore and stimulate breast before 1st BF with a coordinated pattern of hand and sucking movements. Hand movements stop during sucking. Periods of increased massagelike hand movements or sucking at breast were followed by increased oxytocin levels – hand movements produce oxytocin too. All babies moved to breast spontaneously. Descriptive study, Fullterm, BF, Birth KC/VEKC


Mazurek,T, Mikiel-Kostyra, K., Mazur, J., Wieczorek P, Radwanska B, Pachuta-Wegier L. (1999) Influence of immediate newborn care on infant adaptation to the environment. Medycyna Wieku Rozwojowego, 3(2), 215-224. Fullterms randomly assigned to grp 1 (n=22) put in mom’s arms skin-to-skin and both covered with sheet & stayed here til end of experiment; grp 2 (n= 22) infant wrapped in blanket and given to mom, no skin to skin, covered with a sheet, grp 3(n=22) infant wrapped and kept separate from mom at a distance in same room. Observed for 75 min. Study began 6-8 min after birth. Skin thigh temp, HR, RR, and glucose level best in KC group. KC grp cried 3 times less than gp 3 and less than grp 2. KC group had optimal adaptation and special protection against hypothermia. Glucose highest in KC(60 mg/dl), grp 2=52, grp 3= 49.6 mg/dl. In Grp 2 27% did not get warmer over the 75 min and metabolism was impaired. KC is protection against hypothermia and hypoglycemia. RCT, FULLTERM, temp, thigh, HR. RR, pH, Blood glucose, crying episodes/duration, Birth KC/VEKC


McCain G, Ludington-Hoe SM, Hadeed AJ. (2005). Kangaroo Care effects on heart rate variability: A case study. J Obstet Gynecol Neonatal Nurs. 34(6), 689-694. 1.5 hours incubator time was compared to 1.5 hours in KC in a 35 week preterm infant. Heart Rate Variability was measured by ANSAR 1000. Low frequency, high frequency, and Low/high frequency ratio were calculated. Much more data was available during KC than in incubator because of infant quiescence during KC; sympathetic control remained high during KC and parasympathetic control increased during KC. Preterm Case Study, HRV, behavioral state


McClellan MS, Cabianca WA. 1980. Effects of early mother-infant contact following cesarean birth. OB GYN, 56(1), 52-55. 40 C/S dyads in early contact (n= 20) or brief contact control (n=20). observed . Early contact infant taken to exam outside delivery room and care given, then returned to mom for visual contact for 5-15 min. After C/S complete, in recovery room KC (covered with light blanket) began and continued for 60 min in recovery room. Then spent 4-5 hrs in recovery, alternating KC and visual contact when baby was in warmer next to bed. Brief contact group infant put in warmer, cared for, then presented to mom for <5 mins for visual contact only then no contact during 6 hr recovery period. Maternal Perception of infant, maternal behaviors, and postnatal research inventory taken once on either 1st or 2nd PP day and then once between 28-32 days of age at home visit. Maternal perception in hospital was significantly higher for KC than controls, and higher mat behavior scores in hospital and at home. RCT, Fullterm. Mat. Perception/behavior, Early KC (in birth recovery room)

Report of Gene Anderson’s experimental study with preterm infants with KC beginning soon after birth. Tells of the MCN case study of KC beginning 4.5 hrs postbirth, saying the premise is that mothers can stabilize their infants. Says crying occurs twice as often in separated fullterm infants and fullterms have pathologic levels of salivary cortisol. Daddy says he still feels baby on his chest even when not holding him. Mom reports less anxiety when attending to other things while daddy was kangarooing. Parents learn how to do KC quickly. Review, PT, FT, VEKC, paternal KC, mat. Anxiety, cortisol, crying, learning to do KC

McGrath JM, & Brock, N. (2002). Efficacy and Utilization of Skin-to-Skin Care in the NICU. Newborn & Infant Nursing Reviews, 2(1), 17-26. Finally, we have an updated review since 1996. This reviews the research studies in chart form and comes to conclusions that are not surprises but are succinctly presented for those who have not kept up with the literature. Review, BF, Implementation


Meier PP. (2001). Breastfeeding in the special care nursery: Prematures and infants with medical problems. Pediatric Clinics North American, 49(2), 425-443. This is a summary of the BF program at Rush that starts KC as soon as infants are extubated and allows them to have Nonnutritive sucking at breast as early as 24-25 weeks postconceptional age. Shows picture of 900 gm and 25 weeker on CPAP in KC at breast. 90% of infants <1500 gms are BF at discharge in this program. Breastfeeding

Meier PP 2003. Supporting lactation in mothers with very low birth weight infants. Pediatric Annals, 32 (5), 317-325. Reviews the Rush Mother’s Milk Club Program elements, all strategies to improve BF, including Pictures of KC on page 317, pg321, and a section on bottom left column page 320 says “Mothers and fathers are encouraged to hold even the smallest ventilated infants in KC to minimize apnea, bradycardia, and hypoxemia that can accompany bolus gavage feedings” (pg. 320). Shows on page 320 the “My Mom Pumps For Me” recording form for recording KC sessions. Preterm, Breastfeeding, Ventilated KC, apnea, bradycardia, SaO2


Meier PP, Engstrom JL, Mingoletti SS, Miracle DJ, & Kiesling S. 2004. The Rush Mother’s Milk club: Breastfeeding interventions for mothers with very-low-birth-weight infants. J. Obstet Gynecol Neonatal Nurs, 33 (5), 164-174. Daily KC is an integral part of the Rush Mother’s Milk Club program. They reviewed 207 VLBW records from 1997-1998. Lactation initiation is 72.9%, mean dose of own mother’s milk at 15,30, & 60 days was 81.7%, 80.1%, and 66.1% respectively, of total volume fed. 57.2% of hospital days infants were exclusively breastfed and 72.5% of hospital days infants received some of their own mother’s milk. The outcomes of low income African American women are the highest in the literature and these outcomes approach national health objective. PT, BF, lactation initiation rate, % feeds of mothers’ own milk.
Messmer PR, Rodrigues S, Adams J, Wells-Gentry J, Washburn K, Zabaleta I, Abreu S. 1997. Effect of Kangaroo Care on sleep time for neonates. Pediatric Nursing, 23(4): 408-414. One group of 20 stable (no O2) 30 wk PMA preterms in preKC, KC, postkc for one hour, four times. Increase in % of quiet sleep time (Braaelton’s 6 stage scale) during KC (pretest=13.60%, KC = 25.55%, posttest = 14.95%), less awake time (pretest = 59.8%, KC = 46.9%, posttest = 60.95%), had longer and deeper sleep periods (pg. 413), less agitation, few episodes of apnea and bradycardia during each period and stable SaO2 in KC as compared to incubator. HR, RR, SaO2 did not change. Most infants experienced few episodes of apnea and bradycardia during each period, similar to Bauer et al, 1996” (pg. 412). LOS did not differ between KC infants and others in nursery. Nonsignificant but positive trend for improved maternal attitude and emotional affect and decreased stress during KC. Hispanic moms less accepting of kc, hesitant to unbutton blouse (pg.413). Quasi Experimental, pretest-test-posttest own control, repeated measures. PRETERM, RR, HR, T, sleep, apnea, bradycardia, oxygenation, agitation, crying, Mat stress, mat attitude, affect, parent interaction, patkc, hispanic


Meyer K, Anderson GC (1999). Using kangaroo care in a clinical setting with fullterm infants having breastfeeding difficulties. MCN. The American J. of Maternal Child Nursing, 24, 190-192. One fullterm who wasn’t BF @ 20hrs postbirth got 60 min KC before next feeding. Spontaneously sought and latched on. Two others did same thing at 18 and 40 hrs postbirth when given KC “for about 1 hr”. FULL-TERM, BF.

Michelsson, K., Christenson, K., Rothganger, H., & Winberg, J. (1996). Crying in separated and non-separated newborns: Sound spectrographic analysis. Acta Paediatrica, 85: 471-475. 29 fullterm infants were randomly assigned to cot or Kangaroo care for the first 90 min. following birth. Cot babies cried 10 times more than KC babies and the cry duration was 0.8-0.9 seconds with a contour that is a discomfort cry, elicited mainly by separation from the mother. FULL TERM.


Mikel-Kostyra K, Mazur J, Boltruszko I. 2002. Effect of early skin-to-skin contact after delivery on duration of breastfeeding: A prospective cohort study. Acta Paediatrica 91, 1301-1306. 9612 healthy fullterm newborns were in three groups according to hospital care in Poland in 1995. 1 group got no KC after birth (n=208), another <20 minutes (n=845; 532 got 1-4 min KC, 200 got 5-9 min, and 113 got 10-19 min) and a third which got >20 minutes of KC (n=72; 20-29 min = 19; >30 min = 53). Years later the national data set was mined for chart review. 1923 healthy newborns were randomly assigned to complete follow-up questionnaires when infants were 3 years old. 1340 (69.7%) of questionnaires were returned and 1250 subjects were included in analysis. KC was given to 1020 dyads (81.6%) 96.6% of KC contact was initiated within first 10 minutes of birth. After c/s, only 11.2% of cases got KC, and in half of them it was started 1 hour or later after delivery. In 586 moms, KC was initiated within first 5 min of birth and lasted <5 minutes. KC >20 min prolonged duration of exclusive BF by 1.35 mo, overall BF by 2.10 months compared to no KC group. Especially beneficial was KC >30 min and longer. KC>20 minutes after delivery in DR, increased duration of exclusive
BF, but not overall BF. KC was main prognostic factor for duration of exclusive BF, even just under 6 minutes of KC. Extensive contact (>20 min) was more beneficial. Short KC was not very supportive for BF (30% of infants with KC <20 min started suckling, but 81% of infants with KC >20 min did so). Fullterm, BF, short vs long KC (>20 minutes), Exclusive BF, BF duration. See also Nommsen-Rivers annotation below.

Mikel-Kostyra, K., Mazur J, Wojdan-Godek, E. (2005). Factors affecting exclusive breastfeeding in Poland: cross-sectional survey of population-based samples. See Praventivmed 50(1), 52-59. One cross sectional survey in 1995 in hospitals (n=11,422 newborns) and a second in 1997 in primary care centers (n= 10,156 newborns) submitted data to regression. In hospital factors contribution to non-exclusivity BF were C/S, BF initiation after 2 hr post-birth, lack of KC, use of pacifiers, separation > 1hour/24h, and infant health problems. After hospital discharge, factors were use of pacifier, mom’s reluctance to exclusively BF more than 4 months, and low maternal/paternal education. Descriptive surveys, BF, exclusive BF.

Miles, R., Cowan, F., Glover, V., Stevenson, J., Modi, N. 2006. A controlled trial of skin-to-skin contact in extremely preterm infants. Early Human Development 82(7), 447-455. Infants <32 weeks GA given one session of KC daily for 4 weeks beginning within one week of birth were compared to infants in standard care. Infant behavior at discharge, response to immunization at 4 and 12 months age, memory, behavior, and development at 1 year age showed no differences between groups. Maternal depression, stress, anxiety, lactation performance and infant interaction were assessed at infant discharge, 4 & 12 months later. No differences between groups in any variable. KC after extremely preterm birth has neither benefit nor adverse consequences. Authors are unable to recommend resource allocation for the implementation of KC for extremely preterm infants. PT, RCT, micropreemie, pain, behavior, memory, development, maternal stress, maternal anxiety, BF, infant interaction, maternal depression, one year follow-up


Mizuno K, Mizuno N, Shonohara T, & Noda M. 2004. Mother-infant skin-to-skin contact after delivery results in early recognition of own mother’s milk odour. Acta Paediatrica 93(12), 1560-1562. Randomized control trial in 2002 of 60 healthy fullterm infants into KC (n=30) (KC for a mean 63.7 ±7.7 minutes immediately after birth and stopped once infant had suckled at breast and no fathers were present) and control group (n=30) (no contact with mothers until 24 hours old, no skin contact after birth, and no fathers present) who were given mother’s milk odour to follow at day 1 and day 4 after birth. All infants remained in observation ward for 24 hours postbirth (and fed formula in nursery) and then went to moms for BF every 3 hrs.. Moms stay in hospital for 4 days. Infant facial action (and frequency of mouthing movements (sucking, licking, chewing) were assessed on day 1 and 4 before 1st BF of the day, and BF every 3 months was assessed. KC infants demonstrated a larger difference in frequency and duration of mouthing movements between their own and another mother’s milk odour (and more movement with formula than orange juice or water) at 4 days age than control infants (and they mouthed more with own mother’s milk smell than other mother’s milk scent on day 4) and KC infants breastfed 1.9 months longer than controls. Most common reason for stopping was insufficient milk supply. KC results in enhanced infant recognition of own mother’s milk’s and longer BF. During 1st hour of life serum noradrenalin levels are 20-30 times higher than later and noradrenaline neurons in the locus coerulus send signals to the olfactory bulb and promote olfactory learning (Refs 8 & 9 in article). Attraction to mother’s milk odor could be genetically determined as infants who have no contact with mom for 2 wks also demonstrate this preference (pg. 1643). Fullterm, RCT, BF, Birth KC, mouting and facial action to show recognition of milk odor.

Modrcin-McCarthy, M.A., Harris, M., & Marlar, C. 1997. Touch and the fragile infant: Comparison of touch techniques with implications for nursing practice. Mother Baby Journal, 2(4), 12-19. Provides overview of historical perspectives on touch, Sister Callista Roy’s adaptation model as a framework for touch studies, and a comparison of the types of touch (procedural, comforting –that includes stroking, massage, tactile-kinesthetic touch, gentle human touch, and Kangaroo Care (pg 17-18). Author admonishes one to “frequently monitor the infant during kc for temperature instability, patency of tubes, and stimulation tolerance”(pg. 17) and states that “minimal detrimental effects are associated with KC if the infant is medically stable”17. Stability

IMPLEMENTATION


Moon J. (2004). Verse and Vision: Kangaroo Care. J Perinatal Education, 13 (1), iii. A picture of twins in shared KC accompanies the following verse: In talking to the Kangaroo, its opinion would be... To care “for your child as my mother cared for me.” In order to be stable, when you are able, “Care for your child the way my mother cared for me.” Close to her heart—warmth, gentle beating, love unflitting. Research shows it’s so, this Kangaroo Care, no matter what the species, it’s a mother’s care. POEM

Mooncey S, Giannakoulopoulos X, Glover V., Acolet D., Modi N. (1997). The effect of mother-infant skin-to-skin contact on plasma cortisol and Beta-endorphin concentrations in preterm infants. Infant Behavior and Development, 20(4): 553-557. Plasma beta-endorphin and plasma cortisol were measured after 20 minutes of KC to determine if attenuation of stress response occurred in comparison to a control group. Cortisol did drop significantly after KC in the KC group and after control period in control group; Endorphin dropped significantly in KC group as compared to control. KC results in significant reduction in B-endorphin as sign of attenuation of stress response; no adverse effects occurred.

Moore, E. 2005. Dissertation. RCT of 20 mothers intending to BF with fullterm infants (KC= 10; swaddled holding = 10) who were placed between maternal breasts for KC or given to mother/father for swaddled holding (hands left out for observation of hunger cues) at 15 minutes post birth after eye care, Vit K shot, drying, footprinting, banding was done under warmer. When infant demonstrated hunger cues (mouthing, rooting, open mouth, looking around, alertness, head turning, sucking on fingers or fist, etc) then put onto breast in cross cradle position (upright infants slipped down during feeding), but not before hunger cues were seen because infant is not ready to breastfeed before cues appear. KC group demonstrated hunger cues significantly earlier (between 30-45 minutes post-birth; swaddled infants at ?? - ?? mins postbirth) and in greater number (those hunger cues in KC group) than swaddled grp. Both grps got equal BF attention. All BF sessions over 1st 7 days of life scored by mother using IBFAT (Infant Breast Feeding Assessment Tool – Mathews MK, 1988; scores arousal, eating behaviors, nipple grasp, consistent sucking) in which score of 10-12 = effective feeding. Kcers had higher IBFAT scores than swaddled grp at 1st feed. After feeding complete, KC could continue. Length of KC varied between 1.5-3.0 hours in delivery room because mother being cared for by the research nurse and deliveries were on weekends when DR was less busy. Nipple protractility was confounder because babies did not suckle or latch on at 1st feeding as well if mom had flat or minimally erect nipples (future study should score erectility and control for this). Time of effective BF (measured as time when first of 3 consecutive IBFAT scores of 10 or more occurred) showed that KCers were nippleing effectively sooner (took ½ the time that control group to achieve this outcome). One, 3,and 6 months postbirth follow-up showed: at 1 month babies who had earlier effective sucking had fewer BF problems than later effective sucking, but no differences between the grps. 3 and 6 month data not assessed as of August 1, 2005. Trend for KC moms to return to work sooner and more were full time (perhaps because babies feeding well?). ONSET OF MILK production should be measured and asking when mom feels breast is fuller [consider babies weight loss at 72 hrs postbirth and milk production in response to birth weight loss as recent 2004/2005 article shows]. Author concluded that KC has profound effect on early BF, but did not see diff in exclusivity and duration of BF. Qualitative results showed that mothers wanted qualified woman to help with 1st feeding. Fullterm, RCT, BF Effectiveness, IBFAT, BF exclusivity, BF duration, KCBF, Birth KC/VEKC, maternal feelings,

1980) shows that immediate, continuous skin-to-skin contact between mother and newborn keeps newborns warmer than using a radiant warmer. The mother is best the best incubator because she keeps the baby at the right temperature. “


Morelius, E, Theodorsson E, Nelson N. 2005. Salivary cortisol and mood and pain profiles during skin-to-skin care for an unselected group of mothers and infants in Neonatal Intensive Care. Pediatrics 116(5), 1105-1113. Seventeen dyads were studied at 1st and 4th KC sessions to measures stress in each. Maternal stress decreased during KC (salivary cortisol dropped 32%, HR by 7%, and visual analog scale of stress by 89% and mood increased by 6%). Before the 4th session mothers rated less stress on the VAS and salivary cortisol and HR improved faster. Infant salivary cortisols increased in some and decreased in others, Infant HR and PIPP and NIPS pain scores decreased during KC. Moms need more support with KC during 1st session than later sessions. Descriptive, maternal stress, cortisol, HR, Pain (PIPP and NIPS), maternal emotion (MOOD), infant stress

Morton JA, 2003. The role of the pediatrician in extended breastfeeding of the preterm infant. Pediatric Annals 32 (5), 308-316. This article identifies variables that predict the best outcomes for BF at discharge from NICU, reviews factors that led to compromised milk production, and lists strategies to transition the infant from milk feedings to breastfeedings. On page 312 it talks about KC under the Stimulants to Milk Production section, saying it “provides innumerable benefits to mother and baby and has consistently been associated with improved milk production, improved infant growth, and competence in BF and extended lactation” pg. 312. Preterm, BF


Mulet, R.C., Figueroa de Leon, R., Gonzalez, J.V.B. (1992). Mother-child early contact with the mothers kangaroo program and natural breastfeeding. Rev. Latin Perinat. 12, #3-4, 54-60. Randomized trial in Guatemala; 61 in conventional care, 51 KC began KC in hospital and followed for 3 months: 78% KC vs. 34% controls(p<.005) exclusively BF at 3 mos., growth/development at 3 months was same in both groups. Has English summary on page 60. RCT


Naughten F. (2005). The heel prick: how efficient is common practice? RCM Midwives 8(3): 112-114. States that Kangaroo Care can be used to reduce heel stick pain. Pain, READ AND PUT ON Charts

Neu, M. 1999. Parents’ perception of skin-to-skin care with their preterm infants requiring assisted ventilation.
Nine parents (8 moms, 1 father) of ventilated preterms were interviewed and were apprehensive when first doing KC and needed support to do it with these infants. Parents valued the experience but needed intervention to alleviate apprehension, enhance autonomy feelings, and modify environment. Those who continued with KC had more active parenting role.

Neu M. 2004. Kangaroo Care: Is it for everyone? Neonatal Network 23 (5), 47-54. Qualitative study of two interviews with mothers, one B4 & one after discharge asking them to relate their experience of holding in the NICU and at home. Mothers who held in KC and who held swaddled infants were interviewed. KC moms had no anxiety, no frustration, and no fatigue (pg. 50) and perceived many benefits of close contact with the infant. 4 mothers who switched from KC holding to swaddled holding expressed emotional distress (pg. 53). Building a trusting relationship and providing individualized attention about holding the infant are important for all mothers of preterms, even when they appear competent and satisfied because they may not be discussing their feelings of emotional distress or dissatisfaction with nurses in the NICU. Descriptive, Qualitative, maternal stress/distress, anxiety, fatigue, swaddled holding, KC at home.

Neu M., Browne, J.V. & Vojir, C. (2000). The impact of two transfer techniques used during skin-to-skin care on the physiologic and behavioral responses of preterm infants. Nursing Research, 49(4), 215-223. 15 ventilated preterms (MGA=30.2wks; Mwt=1094g, Mage=18.3days) each received one day each of transfer by nurse (sitting) or transfer by parent (standing)(14 Moms, 1 Father) on 2 consecutive days in random order in interrupted time series, cross over design. Min-by-min HR, SPO2 recorded manually for 30 min B4 & after transfer & every minute during 1 hr of KC. Axillary Temp was stable, HR increased, SPO2 decreased and there was more motor disorganization with transfer but returned to baseline during and after KC regardless of transfer technique. More physiologic and motor disorganization, less self-regulation, more need for caregiver support during transfers than during pre, post, and KC periods. During and after KC, infants showed NO SIGNS of ENERGY DEPLETION. VENT KC, FATHER, Infant own control.HR, SPO2, Temp, motor movements, energy conservation, self-regulation.

Newport, M.A. 1984. Conserving thermal energy and social integrity in the newborn. Western J. Nursing Research, 6(2), 175-192. 39 healthy fullterms got KC, 37 got routine care. KC began after dried and covered with warm cotton blanket and continued for 15 mintes; routine got dried and wrapped and put in Montgomery warmer bed for 15 min. No temp differences (temp remained stable), HR, RR had no diffs. No diarrhea, no ketouria, and no diff in weight loss. FULLTERMS, no mention of assignement method. Delivery KC

Nissen E, Gustavsson P, Widstrom A-M, Uvnas-Moberg K. 1998. Oxytocin, prolactin, milk production, and their relationship with personality traits in women after vaginal delivery or cesarean sections. J. Psychosomatic OB & Gynaeceology 19, 49-58. Personality shift of new mothers is in part dependent upon KC after birth and is reinforced by BF. Moms become more open, more interactive, and calmer using the Karolinska Scales of Personality due to oxytocin and prolactin levels which are released by skin-to-skin contact. See also Uvnas-Moberg K, Widstrom A-M, Nissen E, BjorvellH. 1990. Personality traits in women 4 days postpartum and their correlation with plasma levels of oxytocin and prolactin. J. Psychosomatic Ob & Gyn, 11, 261-273. Fullterms, maternal personality, delivery KC. Get this we don’t have

Nissen E, Lilja G, Widstrom AM, Uvnas Moberg K. 1995. Elevation of oxytocin levels early postpartum in women. Acta Obsetetrica & Gynecologica Scandinavica 74, 530-533. It is highly probable that skin-to-skin contact by itself stimulates oxytocin release. Thus, KC may assist in delivery of placenta and involution when used early postpartum.

FT, RCT??, Oxytocin, delivery KC GET this as we don’t have it either.

Nommsen-Rivers, L., 2003. Early skin-to-skin contact: Does duration matter? J.Human Lactation, 19 (3), 331-332. This is a review of Mikiel-Kostyra et al., 2002 study. Cites Baby Friendly’s guideline that step 4 is to “help mothers to initiate BF within 30 minutes of birth.” She states that in Mikel’s study the duration of KC was very brief, lasting only 1-4 minutes for 58% of the mothers. Only 6% had KC for 20 minutes or more, 76% had it for 1-19 mins, and 18% had
no early contact at all. Irrespective of the duration of KC, 97% initiated KC within 10 minutes of birth. Duration does

**EXCLUSIVITY OF BF: no contact** exclusive BF duration was 2.47 months, 1-19 mins KC had 2.77 months, and

>20 minutes of KC = 9.07 months; >30 minutes KC = 10.07 months of BF. KC >20 minutes and education beyond

high school were significant predictors of EXCLUSIVE BF duration. **REVIEW OF OTHER STUDY, Birth KC**


intensive care unit. J. Human Lactation, 10(4), 237-243. 178 mothers felt that deprivation of early contact with infants

was a cause of BF failure.”Ample opportunities for early skin-to-skin contact should be offered both mothers delivered

vaginally and by cesarean section in order to compensate the delayed physical contact with the

infant.”p.240.**Descriptive, BF**

Nyqvist, KH. 2004. How can Kangaroo Mother Care and high technology care be compatible? J. Human

Lactation,20 (1), 72-74. This is an implementation article that answers the questions, How can someone work with

NICU staff to overcome barriers, whether perceived or real, to implementing KC? Answer is 1) educate everyone about

KC’s + effects, and 2) reach an interdisciplinary agreement about practical, evidence-based guidelines that ensure safe and consistent care. This article includes the policy at Children’s Hosp. In Uppsala, Sweden. **Preterm, Implementation, Policy/Guidelines.**

Nyqvist, KH. 2005. Breastfeeding support in neonatal care: An example of the integration of international evidence and experience. Newborn and Infant Nursing Reviews, 5 (1), 34-48. Components of a successful Swedish Breastfeeding program in which 97% of lowbirthweight infants were fed breastmilk upon discharge are conveyed. On page 36 is a section entitled “Kangaroo Mother Care” under the heading “Models of care that support breastfeeding.” In this section she cites previous work showing that KMC has high BF success rate. On page 40 she has a section entitled “skin-to-skin contact” under “Feeding policy: A Swedish Example.” in which she states that infants who are ventilated are provided KMC as soon as they show adequate physiological stability in connection with transfer out of and back into incubator.” They avoid KMC during first week of life for infants <1000 grams to prevent hypothermia. Other than signs of severe bradycardia, apnea, or desats, there are no restrictions for KMC in frequency and duration. **Clinical report Preterm, BF, Ventilated, Guidelines, apnea, bradycardia, desats**


continuously in an intimate environment with unlimited BF access over the first hours and days after home birth. 33% of homebirth babies and continuous immediately KC with BF in KC do not lose birthweight while birthweight loss is regular phenomenon in Netherlands where they have restricted KC in homebirths. He even says that sustained KC outside the familiar home environment is inadequate to prevent birthweight loss. He proposes that KC in a familiar birthing context produces less infant stress (physiologic stress of newborn is immediately alleviated by arms of ecstatic mother, minimizing energetic output and stopping wgt loss. Another mechanism to prevent birth weight loss is that babies take in more colostrums than thought possible and colostrums has lots of IgA antibodies (proteins with huge osmotic charge(canhold lots of water),so when baby takes colostrums, he increases his capacity for water retention, and colostrums has enzymes important to metabolism, large bioavailability of zinc (and these are growth related substances), and normal colostrums ejection reflexes (let down)don’t work if we separate the infant right after birth (pg. 73). Birth weight loss is not a physiologic necessity. **Clinical report, weight, KCBF, antibodies in milk**

Ohgi S, Fukuda M, Moriuchi H, Akiyama T., Nugent JK, Brazelton, TB, Arisawa K, Takahashi T,Saitoh H. (2002). The effects of kangaroo care on neonatal neurobehavioral organization, infant development and temperament in healthy low-birth-weight infants through one year. J. Perinatology, 22 (5), 374-379. 26 KCers(healthy LBW) got 20min-2 hours of KC per day from 33 wk-40 wks PCA. KCers showed higher scores in orientation, state regulation on NBAS, lower scores in Intensity and higher scores on MOOD at 6 months on Infant Temperament Questionnaire than 27 standard care infants. At 12 months, KC scored higher on Bayley Mental and Motor. KC effectively promoted neonatal
behavioral organization and enhanced developmental outcome over 1st year of life. **Non-randomized trial with historical control, NBAS@ 40wks, Bayley and Carey Temperament @ 6,12 mos. Development**

Ogi S, Arisawa K, Takahashi T, Akiyama T, Goto Y, Fukuda M, Saito H. 2001. The developmental effects of an early intervention program for very low birthweight infants. *No To Hattatsu, 33*(1), 31-36. KC group got NBAS as intervention at 40 weeks PCA and then 44 wks (or may be from 38-44 wks for treatment) of KC starting at 38 weeks PCA. NBAS used at 44 wks, Bayley at 12 months. KC group scored higher on orientation, motor performance, state range & regulation tasks, supplementary on NBAS, lower scores in intensity and higher scores in Mood on Carey at 6 months; at 12 month KC infants had higher Bayley Mental and Motor Scales. KC promotes neonatal behavioral organization and developmental outcome over 1st year of life. Development, NBAS, Temperament. Longitudinal non-randomized as KC grp compared to historical control.

Olausson H, Lamarre Y, Backlund H, Morin C, Wallin BG, Starck G, Elholm S, Strigo I, Worsley K, Vallbo AB, Bushnell MC. (2002). Unmyelinated tactile afferents signal touch and project to insular cortex. *Nature Neuroscience 5* (sept), (9), 900-904. Human hairy skin has dual tactile innervation: fast conducting myelinated afferent fibers, and slow conducting unmyelinated (C)afferents that respond to light, caressing touch. Activation of C tactile (CT) afferents produced faint sensation of pleasant touch. Activation of CT fibers in skin activate the insular cortex (limbic system), not somatosensory areas of S1 and S2. CT is a system for limbic touch that underlies the emotional, hormonal, and affiliative responses to caress-like, skin-to-skin contact between individuals. Touch physiology. KC as pleasant experience.

Ortman BL, Schmidt CL (1999). The Effect of Kangaroo Care on the Development of the Preterm Infant. Doctoral Dissertation from North Georgia College and State University. Available from Dr. Sherri Williams, Dissertation chair, Dept. of Physical Therapy. Barnes Hall, R. A-8, Dhalonega, GA 30597. 706-864-1969. A randomized trial of 5 KC and 9 routine parental holding of 27-32 wk PCA prematures. Kcers got 30 min/day x 4days/wk x 4 wks. Control got adlib parental visiting and holding x 4 wks. At end of 4th week, no differences between groups on weight gain, Test of Infant Motor Performance, and Maternal Attachment Inventory and length of stay – but KC infants had significantly lower PCAs at entry. PT, RCT, MOTOR DEV, Maternal attachment, Lenth of stay, wgt gain

Page, J. (1995). Kangaroo Care: Enhancing infant and parent well-being in the NICU. *Perinatal Newsletter, 12*(1), 5-8. Provides limited review of KC (does not identify all studies, such as Ludington-Hoe’s 1992 paternal KC study) and then talks about Page’s proposed study of cardiorespiratory effects with Canadian infants. Does include Protocol for KC. **PROTOCOL.**


Pattinson RC, Arsalo I, Bergh A-M, Malan AF, Patrick M, & Phillips N. 2005. Implementation of kangaroo mother care: A randomized trial of two outreach strategies. *Acta Paediatrica 94*, 924-927. RCT to test if educational package alone or educational package + visits by facilitator increased KMC implementation. 34 hospitals in KwaZulu-Natal Province. Visits were done 3 times – first was 3 hour long and was held 6 weeks after launch and helped professionals go through a workbook on KMC (did not give lectures, only answered questions and facilitated discussion based on workbook), 2nd visit was 8 weeks later and only facilitation, 3rd visit was to the site and took 2 hours to score implementation, answer questions, and give advise on issues raised by site. Evaluation done 8 months after initiation and
were scored on the progress monitoring tool (See Bergh et al., 2005). Evidence of practice (score >10) was success. Group with visits scored higher than group without visitor. Median score of package + visitor group was 15.44 (N=17 hospitals and all demonstrated practice), only 12/17 in control group demonstrated practice and score was 11.33. Successful implementation can be achieved better with supportive visits. RCT, Implementation.

Pattinson RC, Bergh AM, Malan AF, & Prinsloo R. 2006. Does Kangaroo Mother Care Save Lives? Journal Tropical Pediatrics July 5. Descriptive study of 40 hospitals (neonatal mortality rate was 88.14/1000 live births before KMC) and results of 11 hospitals that reported mortality rates before (87.72/1000 live births) and after (60.76/1000) implementation of KMC. This is a large and significant reduction in neonatal mortality rate for infants between 1000-1999 grams birth weight. KMC reduces mortality. Descriptive, PT, mortality. Not on charts yet.

Pearson J, Andersen K. (2001). Evaluation of a program to promote positive parenting in the neonatal intensive care unit. Neonatal Network: J. of Neonatal Nursing, 20(4): 43-48. Not a study of KC per se, but a qualitative study of a parent support groups use to promote parenting. On page 46 under the theme “Awareness of Cues and Optimizing Interaction” three comments from parents are reported: “KC is interesting”, “KC, I love this idea!!!!”, and “They talked about KC and parents then want to do it.” Qualitative Evaluation of Program that included KC but was not focused on KC.


Prochnik M & de Carvalho MR. 2001. Metodo Mae-Canguru de Atencao ao Prematuro. BNDES Social. Banco Nacional de Desenvolvimento Economico e Social (Brazilian Development Bank: Rio de Janeiro, September. This is a book in English outlining the new paradigm for mothering premature infants known as Kangaroo Care. It relates Why it is done, how it will be done in Brazil, the mobilizing event that started KC in Brazil, the 10 steps to the KMC method in Brazil (Written policy, specially trained personnel, well-informed women, initiation of KMC as quickly as possible, demonstration of KMC, skin-to-skin contact, bed for both mother and infant, accompanied breastfeeding, no pacifiers nor bottles, and assistance groups), and data collection forms that all hospitals in the country are using. The
book also defines three phases of KMC: Phase One is KMC during intensive care of the LBW infant; Phase Two KMC is during Intermediate care of the LBW infant, and Phase Three is KMC at home. Early discharge to 24/7 KMC for the first 6 months of life is part of the national program of KMC in Brasil. **PT, Implementation, Guidelines, and Phase Two based data collection tools.**

Quasem I, Sloan NL, Chowdhury A, Ahmed S., Winikoff B, Chowdhury AMR. 2003. Adaptation of Kangaroo Mother Care for community-based application. J Perinatology 223 (8, Dec. 2003), 646-651. 35 expectant or newly delivered moms were taught about KMC, did it and at 1 month postpartum were interviewed to evaluate KMC experience. 77% of moms initiated KMC and 85% with LBW babies did not. Moms delayed newborn bath and some slept upright with babies for 24hr/day KC. KMC was quickly and popularly adopted. **Includes simple guidelines for choosing infants appropriate for KMC. Descriptive, PT/FT, Implementation, maternal experience.**

Ramanathan K, Paul VK, Deorari AK, Taneja U, George G. (2001). Kangaroo mother care in very low birth weight infants. Indian J Pediatrics, 68(11),Nov. 1019-1023. Stable preterms <1500gmBW were randomized into KMC (n=14) for at least 4hr/day in not more than 3 sittings starting once stable and in intermediate (incubator) care and continued at home) or control (n=14)) who got standard care in incubator. KMCer’s had better weight gain 15.9±4.5gm/day vs. 10.6±4.5 gm/day, and earlier discharge (27.2 vs. 34.6 days) than controls. # of moms exclusively BF at 6 wks postdischrg was double for KMC (12/14) than control (6/14). **RCT, BF, HOME, WGT gain, length of stay, Exclusive BF, 3rd World**

Ransjo-Arvidson AB, Matthiesen AS, Lilja G, Nissen E, Widstrom AM, Uvnas-Moberg K. (2001). Maternal analgesia during labor disrupts newborn behaviors: Effects on breastfeeding, temperature, and crying. Birth, 28(1), 5-12. 28 FULLTERM newborns were placed in KC immediately after birth and videotaped. Grp 1(n=10)=no anesthesia; grp2 (n=6)= mepivacaine via pudendal block, grp 3(n=12)= pethidine, bupivacaine or multiple analgesia –hand movements,hand-to-mouth movements, touching nipple with hands prior to sucking, licking movements, and sucking breast all less in grp 3, nearly 40% of grp 2 and 3 infants did NOT breastfeed in first 2.5 hous of life. Grp 2 & 3 infants had higher temp (intrascapular temp went from 35.5-35.6 to 36.3-36.5 in analgesic groups (but from 35.4 to 35.8 over first 120 minutes of KC) and cried more (for longer periods) especially group 3. Reports that analgesia during labor makes mothers hyperexic, and this may make infants too warm, or increased crying can make infants warmer. **FULLTERM, BF, Comparative Survey**

Reid, C. (2004). Kangaroo care. Neonatal Network, 23 (2), 53. This is an author’s reply to some comment.

Renfrew MJ, Lang S, Woolridge MW. (2001). Early versus delayed initiation of breastfeeding (Cochrane Review). In: *The Cochrane Library*, Issue 1, 2001. Oxford: Update Software. Available from http://www.update-software.com/abstracts/ab000043.htm. Three studies reviewed comparing early skin contact with late skin contact and BF. Early contact and BF was associated with greater communication between mothers and infants but not with BF duration or # of women BF after birth. The studies reviewed are from 1978,79 and 90 (before KC really became established) and the first one does not say they did KC at all, but just put baby to breast. The other two are clearly KC studies.


Richardson, H. (1997). Kangaroo Care: Why Does It Work? Midwifery Today, International Midwife 44, Winter 1997, 50-51. This sounds very much like a talk that Dr. Ludington gave and it cites Dr. Ludington throughout. Relates brief history, talks of mother’s breast modulating infant temperature, regulated HR and RRs and coherence (wrongly cited as 4 weeks of growth when it really two wks of growth), increased growth, improved sleep. PT, Review of Ludington talk, Maternal-Neonatal Thermal Synchrony.

Ridley, K. (2000 or 1994? Probably 1994). NICU offers high-touch in a high-tech world: Kangaroo Care. Inside, 10-12. This reports RECOVERY, RESUSCITATION, or CONSOLATION KC, in which dying preterm is given to parents to hold and then physiologic recovery takes place. SaO2 rose dramatically and parents continued 24hr/day KC for 3 days and then every night of hospitalization. Tells of 14 infants given KC at Brigham & Women’s hospital in Boston. No date on article which is hospital newsletter, but Jennifer Wallace reported this at the 1993 National Council of Nurse Researcher’s meeting in Los Angeles in Feb. 1994 and Wallace-Ridpath wrote an article on it too. I wrote and asked for year and got no response. RESUSCITATION KC

Rigard, L., & Alade, M.O. (1990). Effect of delivery room routines on success of first breast-feed. The Lancet, 336, 1105-1107. Comparison of fullterm infants who laid on mother’s belly for 20 min. immediately after delivery (n=34)(separation group) and were then removed were compared to those who stayed nude on belly and chest for at least 1 hour (n=38)(contact group = KC contact). The KC contact infants began crawling to the breast at 20 min, began rooting, and at mean 50 min after birth most were sucking at breast. More KC contact infants had correct sucking technique (24/38 vs. 7/34). FT, KCBF, BF, crawling


Roberts, K.L., Paynter, C., McEwan, B. (2000). A comparison of Kangaroo Mother Care and Conventional Cuddling Care. Neonatal Network, 19(4), 31-35. 30 healthy preterms, ≥30wk GA, no O2 help, with stable temp for 24 hrs, in crib or incubator randomly assigned to 2 hrs 5 days/wk x 4 wks of KMC (n=16) or holding while clothed (n=14). No control group in study because both groups got some holding. No differences in weight gain, temperatures, duration of BF, parental stress (PSS-NICU score), or parental expectations score. Limitations were clinician values for temp & wgt gain, no calibration of scales or interrater reliabilities, small sample size, and inability to do inferential stats because of small sample size. Says Holding while Clothed is not a Control. RCT, PARENTAL KC. Wgt, BF, parental stress, temperature,

Rojas MA, Kaplan M, Quevedo E, Foster LB, Ehrenkranz RA, Mayes L. (2003). Somatic growth of preterm infants during skin-to-skin care versus traditional holding: A randomized, controlled trial. J Developmental & Behavioral Pediatrics 24 (3), 163-168. 60 preterms (swaddled holding = 27; KC = 33) <32 wks GA, <1500 grm, hemodynamically stable with minimal ventilatory support. KC was for up to 8 hours per day (periods up to 4 hr/twice a day) every day til infant reached 2000 gm or was discharged, whichever was first (KC occurred for 1-28 days; swaddled holding occurred for 0-15 days with a median of 1 session per day. Fathers held infants mean 27% of swaddled holding time, 31% of KC time, and 30/33 fathers gave KC. Rate of head growth was higher in KC group; weight gain, linear growth, caloric intake, survival were not sig diff between groups (but 2 KC babies died during study, one swaddled died). SSC group had significantly greater total head growth and head growth rates once head size at birth was accounted for. 9/26 (35%) of swaddled were successfully breastfed; 18/30 (60%) of KC were successfully breastfed. KC was “strongly associated with successful breastfeeding” (p. 165). Fewer KC infants had episodes of oxygen desaturation during handling, and trend for fewer episodes of hypothermia and regurgitation in KC group (pg. 166). RCT Preterm, Paternal KC, Temperature, Regurgitation, BF, Length of Stay, Head Circumference, length, Daily caloric intake, mortality.
Roller, CG. (1999). Kangaroo care for a restless infant with gastric reflux: One nurse midwife’s personal experience. *MCN Am. J. Maternal Child Nursing, 24*(5): 244-246. Full-term infants who were given SURROGATE KC by the CNM because mother was unavailable. Infant had severe and refractory GER but was GER free during two feedings given with KC two days apart. **SURROGATE KC**

Roller CG. 2005. Getting to know you: Mothers’ experiences of kangaroo care. *J Obstet Gynecol Neonat Nurs 34*(2), 210-217. 10 mothers of preterms with APGAR of 6 or more at 1 minute and 7 or more at 5 mins (1500-3000 gms who have completed 32-36 wks age) answered in 15-90 minute semi-structured interviews “What was it like for you to provide KC for your preterm infant while in the hospital?” They were questioned at home, at 1-4 weeks postpartum. 4 themes emerged all related to ‘Knowing the infant.” The two major themes were “Mother kept from knowing the newborn” and “mothers getting to know their newborn.” Mothers found KC calmed them (pg. 215) and calmed the infant. KC facilitated bonding and maternal-infant acquaintance. All ten moms said KC was ‘wonderful way to get to know their babies’ (pg. 214). KC is “a warm, calming, positive, bonding experience, and the women stated that KC calmed their jittery babies.”(pg. 215). One baby was still calm 3 hours after KC ended (pg. 215). One grandmother did KC in hospital (pg.215). One mom said “Every time I breastfed him I was holding him skin-to-skin” (pg. 215). KC was pleasant experience for moms. 9/10 women did KC at home. **Descriptive, Qualitative, PT, maternal feelings, Maternal stress, bonding, residual effect, Surrogate KC, KCBF, home KC, Very Early/Early KC**


Ruiz JG, Charpak N, Cuervo LG. 2004. Kangaroo mother care, an example to follow from developing countries. *British Med J 13,* 329(7475), 1179-1181. Review article of what KMC is 24/7 with exclusive BF does. She concludes that KMC is at least as safe as standard care, and quotes from specific studies that KMC improves BF rate, decreases infection, reduced hospital stay, non-significant reduction in mortality, and slight improvements in developmental indices (but infants at higher developmental risk had markedly better neurodevelopmental outcomes), and improved bonding. She talks about KMC wards and quotes one in Manila and one in Sweden and cautions use of KMC with moms who feel intimidated or overwhelmed in caring for a baby. She lists many centers for KMC in the world and summarizes with WHO’s statement. (States on page 1180 that infants reject permanent KC contact at 37 wks postmenstrual age, but we have not seen that in USA and why would there be ambulatory KMC up to one year of life if infants are rejecting KMC?). **PT, Review, length of stay, development, bonding, mortality, infection, BF, weight, maternal feelings, NOT YET ON CHARTS**

Ruiz JG, Charpak N, Figuero Z. 2002. Predictional need for supplementing breastfeeding in preterm infants under Kangaroo Mother Care. *Acta Paediatrica 91* (10), 1130-1134. Preterms >1200 grams can grow properly on exclusive BF. 45% of infants on ambulatory KMC grow properly, but 55% need supplementation to grow properly. **Descriptive, Preterm, BF, post-discharge**


Safe Motherhood, 2004. Kangaroo Mother Care. Safe Motherhood. A newsletter of worldwide activity. Issue 31, 2004 (1), p. 5. **This a review of the Kangaroo Mother Care book produced by WHO so countries can establish their own programs of KMC. This newsletter is available from World Health Organization, 1211 Geneva 27, Switzerland or through rhrpublications @who.int. The ISSN is 1014-9511.**


Scalembra C, Cattaneo A. 2002. WHAT IS THIS. CHARPAK referred to it.


Schanler RJ. (2001). The use of human milk for premature infants Pediatr Clin North Am 2001, 48(1), 207-219. This review article covers the role of fortification and states “the potential stimulation of an enteromammary pathway through skin-to-skin contact provides species-specific antimicrobial protection for premature infants, and this needs to be explored. Thus, neonatal centers should encourage the feeding of fortified milk, together with skin-to-skin contact, as reasonable methods to enhance milk production while potentially facilitating the development of an enteromammary response.” Review

Schanler RJ, Lau C, Hurst NM, & Smith EO. 2005. Randomized trial of donor milk versus preterm formula as substitutes for mothers’ own milk in the feeding of extremely premature infants. Pediatrics 116(2), 400-406. Preterms <30 wks GA randomly assigned to receive either donor milk (n=81) or preterm formula (n=92) if mothers milk supply was insufficient from birth to 90 days of age or hospital discharge and compared to infants who received only mother’s milk (n= 70 or 29%). 17 infants in donor milk group had insufficient weight gain and were switched to preterm formula. Outcomes measured after attainment of milk intake of 50mL/Kg were late onset sepsis (no diff between donor milk and preterm formula grps), NEC (no diffs), presumed sepsis (no diff), urinary tract infection (no diff), dietary intake (DM intake > PF but slower rate of weight gain), weight gain (see note above), KC, and duration of hospital stay (no diffs) and mortality (no diffs). MM group had less LOS, NEC, and total infection related events, and shorter hospital stay, fewer gram neg organisms in blood cultures. Donor milk offered little observed short term advantage of Preterm formula. Exclusive mothers own milk showed advantages of fewer infection related events and shorter stay in hospital. PT, RCT, BF, donor milk, preterm formula, infection, length of stay, weight, mortality, NEC. Not on charts yet.


Schrod L. & Walter, J. 2002. Effect of head-up tilt position on autonomic function and cerebral oxygenation in preterm infants. Biology of Neonate, 81, 255-259. Handling, temperature control, and head elevated body position are stress factors for infants during KC (pg. 258). 36 preterms (32.5 wks, bw=880-2980 with median BW of 1460g)were tested to determine if head-up position of KC causes autonomic stress. After 3 minutes of adaptation, prolonged head-up position did not produce further changes in HR, MAP, SaO2, and resp. frequency was reduced by 6-12% (42 → 38). HRV showed greater increase in low frequency than high frequency activity after being tilted, but both changed significantly on day 8 only, suggesting a relative increase in sympathetic versus vagal activation. Preterms <1500 g showed significant decrease of regional cerebral oxygen saturation of about 2-5% from day 2-day 8 (this level is clinically insignificant). There were no prolonged side effects of prolonged head-up position (tested by using a wedge under the baby) in stable preterms over first days of life (2-12 days of life), though initial decline in total cerebral hemoglobin in first 3 minutes of head-up position might be critical in very immature infants. “Prolonged head-up positioning has no undesirable effects in preterm infants with stable circulation including very immature infants of 25 weeks gestation”(pg. 259). Descriptive, HRV, HR, SaO2, MAP, cerebral hemoglobin, cerebral oxygen pressure,
Schwartz B, Fatzinger C, & Meier PP. 2004. Rush special care keepsakes: Families celebrating the NICU journey. MCN, the American J of Maternal/Child Nursing 29 (6), 354-365. Parents are encouraged to participate in weekly scrapbooking sessions held each Saturday (funded by Paula Meier) to record pictures and anecdotes of their feelings and experiences in the NICU (which acts as a parent-to-parent support group) and Family Holiday Photo Shoots (always including family members rather than picture of infant alone in holiday attire). Mothers get a picture taken on their first KMC session and are prompted to write by the following words: “What a beautiful photograph! What would you like to remember always about the way you felt when that picture was taken? What would you like to share about it with your baby when she is old enough to learn about her NICU stay? Did she wake up and look at you, or did she relax so much that she settled into a deep sleep?" “Mrs. G---, you journaled about your first Kangaroo Care last week. Do you have any suggestions for Mrs. T?” In this way, scrapbooking techniques transform the weekly session from a craft project to a parent support network (358). Also on page 358 there is a picture of one mother’s scrapbook page of KMC and it shows “Joshua, In this life you have mommy time, daddy time, family time but the time I had with you was called Kangaroo time. It was one of the best times with you. I enjoyed talking to you, singing, telling stories, praying, laughing, crying and most important time spent with you.” (358).

Clinical report, scrapbooking, parent support, bonding


Sheridan, B. (2000). Katie’s story: A little inspiration. Central Lines 16(4): 27. Story of a 28 weeker’s recovery. KC was started and author states “Probably one of the greatest parts of my job is when a parent first kangaroos her baby.” PT, Case study.

Sheridan V. 1999. Skin-to-skin contact immediately after birth. Practicing Midwife 2 (9), 23-28. Concern over temp regulation during KC is concern still. Very Early KC, FT. Shiau Chiu has this article as she reviewed it for her Birth article.


Simkiss DE (1999). Kangaroo mother care [Editorial] J Tropical Pediatrics, 45(4), 192-194. This two page editorial talks about origins of KMC, components of KMC (Kangaroo position for 24 hours per day, Kangaroo feeding at breast, Kangaroo discharge), summarizes the 1996 INK meeting recommendations and consensus paper, says hi tech European and US units adopted KC, cites temperature, apnea, periodic breathing, oxygenation, oxygen consumption, development, infection, and breastmilk production outcomes (pg 192), mentions paternal KC and Feldman & Eidelman’s improved self-regulation findings, and relates outcomes in resource poor countries (Bergman, Sloan, Addis Ababa and Mexico studies). She says ‘good evidence to show that KMC is physiologically safe (pg.193), but long term effects on neuropsychological and emotional development in infants need to be explored further. She states KMC does not increase mortality, instead it reduces hypothermia, improves weight gain, improves BF at discharge rates, is cost effective, leads to early discharge and is acceptable to parents. She next cites the INK research goals 1)work on effectiveness and safety of KMC as a means of stabilizing preematuries and LBW’s just after birth 2) further health systems research on its application in different settings, KMC at birth for VLBW in 1st and 2nd level maternity units with very limited resources and 4) KMC
for home deliveries not assisted by trained personnel (from Cattaneo et al., 1998). **Review INK, recommendations, 24 hr KC, KCBF, KC discharge, guidelines, weight, infection, length of stay, low cost, temperature, BF, mortality, emotional dev., development, parental acceptance, apnea, periodic breathing, SaO2, oxygen consumption, milk production. Not on charts yet.**

Singh M & Deorari A.K. (2003). Humanized care of preterm babies. Indian Pediatrics 40, 13-20. A clinical paper that reviews the virtues of the womb, principles of humanized care, elements of a baby-friendly ecology in the NICU (i.e. sound, light, positioning, handling, feeding with human milk, rhythmic gentle stimulation, tactile/vestibular development [through intermittently KC “during KC mostabiesfeelcomfortable, stop crying and achieve physiologic stability. At times, intractable apneic attacks may be relieved by skin to skin contact. During skin to skin contact there is a possibility of transfer of tremendous electromagnetic energy from compassionate mother to her tiny baby, producing calmness, comfort, autonomic stability, promotion of physical growth and augmentation of forces of healing. There virtues of skin to skin contact need to be further studied and exploited”], auditory stim, visual stim, and olfactory stim. **PT Clinical review, apnea, crying, comfort, stability, growth. Not yet on charts.**

Sizun J, Westrup B, ESF Network Coordination Committee. 2004. Early developmental care for preterm neonates: a call for more research. Archives Diseases in Childhood: Fetal and Neonatal Edition 89, F384-F389. On page F385 it says that KC has been proposed as an alternative or complement to conventional neonatal care for preterms and that positive effects have been reported (improved growth, breastfeeding rate, and reduced nosocomial infections – citing Charpak et al., 2001), that most trials have been in developing countries and results may not have same relevance in countries where high technology neonatal care is more widely available” (and it sites Conde-Agudelo et al., 2000 to support this last statement!). **Review, developmental care, infection, BF, wgt.**


Smith SL (2001). Physiologic stability of intubated VLBW infants during skin-to-skin care and incubator care. Advances in Neonatal Care, 1(1)(Oct), 28-40. 14 bronchopulmonary dysplasia mechanically ventilated infants (X wgt=2 lbs. 3oz; X GA = 30.5 wks) were randomly assigned to cross over of 2 hrs of KC before 2 hrs of incubator or vice versa. During KC higher skin (37.02) and leg temps occurred than during incubator (36.58 for skin temp). Babie needed 14% more O2 during KC and their SaO2 was lower during KC than in incubator. Smith postulates that increased energy and O2 consumption occur during two hours of KC with ventilated infants. **VENT KC, thigh temp, skin temp, FiO2, oxygenation, SaO2**

Smith SL (2002). Infant holding in intensive care. AACN News, 19(2), pg. 4, 5. Short clinical scenario of KC with intubated infant that gives Smith chance to review the lit again and say that KC with intubated infants may not be the best practice. She reviews her 2001 study here as well.

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Smith SL. 2003. Research corner: Myth vs. Reality: Holding intubated infants in the NICU. AACN News. Available on http://www.aacnnews.nsf. A case study of Jay, a 26 weeker who is 38 days old and intubated and given KC. This report relates myths that she dispels. Myth #1 is Intubated infants are physiologically more stable when held than when in incubator; She says the rectal temp of a 772 grammer decreased to 37.2 during KC, showing the fragility of very small infants during KC (But 37.2 is a great temp! and near the upper limit of normal of 37.5 for this infant according to Scopes and Ahmed’s work). She reviews Neu’s work and concludes that the “data regarding safety and efficacy of KC on intubated VLBW infants is conflicting.” Clinical review, Vent KC. 2nd report of temp drop during KC.

Smith, SL. 2003. Heart period variability of intubated very-low-birth-weight infants during incubator care and maternal holding. Am J Critical Care 12 (1), 54-64. 14 preterm infants tested at mean of 34 postnatal days who were on mechanical ventilation (BPD babies) served as own controls and were randomly assigned to 2 hrs of intermittent KC for 2 consecutive days followed by 2 days of incubator care or vice versa. Multiple 300 second epochs of 5Hz data was analyzed. Mean interbeat interval (time domain assessment) was 332 ms during KC, 368 ms during incubator. No differences in low frequency, high frequency, low/high frequency ratio power (Frequency domain assessment) between KC and incubator existed (pg. 60). Mean LF for kc was 124.6 ms² (R=51.9-71.4 ms²), LF for incubator was 70.3 before KC, 71.4 after KC and 51.9-61.7 ms² during incubator period. Mean HF power was similar for KC (8.8) and incubator (6.1 ms²). LF/HF ratio was 6.7ms² during KC and was between 6.8 – 8.1 ms² during incubator. Gestationally older infants (32-34 weeks corrected age) had increased power (but not significantly different) in the low and high frequency regions than 28-29, 30-31 wk infants. Significantly higher temp and significantly higher FiO2 during KC than incubator, and lower (but not sig) SaO2, but the data are not given as these are reported in another study and just mentioned here.


Sontheimer, D., Fischer, C.G., Buch, K.E. (2004). Kangaroo transport instead of incubator transport. Pediatrics 113 (4), 920-923. 31 stable preterm and term infants were given “in transports” (n=13) and “back transports’ (n=18). 27 were maternal KC transports, 1 paternal transport, 2 by RNs and one by MD. No differences between surrogate and maternal/paternal KC outcomes. HR, RR, SaO2(taken every 5 minutes throughout transport)and rectal temp (B4 and After transport- after transport was 36.5-37.4) were stable in all KC transports. One baby had HR increase from 130-165 after 1 hr of transport due to warming (so blanket was removed). No crying or agitated behavior observed. Parents felt comfortable and safe and appreciated this type of transport. Transports were by ambulance and helicopter and weights were 1220-3720 grams and took 2-400 km and 10-300 minutes. KC reduces jarring but may not be appropriate for critically ill infants who need repeated handling and therapeutic interventions during transport. Baby is tied to mother using a sling and two blankets. KC transport is safe, effective, and inexpensive method of transport. Article includes many pictures. Descriptive, PT, FT, HR, RR, SaO2, Rectal Temp,crying, agitation, Maternal feelings,Pat KC, surrogate KC.

Sosa R, Kennell JH, Klaus M. Urrutia JJ. 1976. The effect of early mother-infant contact on breastfeeding, infection, and growth. In Elliott K, Fitzsimmons DW (Eds.) Breastfeeding and the Mother. Ciba Foundation Symposium vol. 45, NY: Elsevier Excerpta Medical, 1976: 170-193. This is a report of 3 studies conducted in Guatemala. Primip moms of NSVD of 37-42 weeks GA. Study #1: KC group (n= 30) given 45 minutes KC under radiant warmer beginning after episiotomy repair; control (n= 30) had mom and baby separated for 12-24 hours with FU at 35 days, 3,6,9,12 mos. KC group BF for mean 173 days during 1st year, controls for 274 days. Fewer infections in KC. Early postnatal KC did not result in an increase in BF. Study #2: KC (n=34) got 45 minutes post delivery, control (n=34) separated for 12-24 hours. KC group BF for mean 159 days over 1st year, control for 109 days: KCers BF longer, & fewer infections in KC. Study #3: KC (n= 20)also got 45 minutes of KC, and controls (n=20) were separated for 12-24 hours and third group (n=20) got nude infant at 12 hrs age. KC group BF for mean
# of 96 days over 1st year of life, controls Bf for mean of 104 days. KCers did not BF longer in Study #3. Observations at 36 hours in study #3 showed KC moms had sig more maternal affectionate behavior (being en face, looking, talking, fondling, kissing, smiling to infant), but no diff in proximity behavior (keeping baby in mom’s bed or holding it close) or in taking care of baby (burping, wiping mouth). Conclusion: KC moms BF 50% longer than controls (p.183). Wgt gain sig more at 6 months (4.5kg kc VS. 3.7kg non-KC) and sig. More at 1 yr (6.0kg vs 5.7kg) maternal sensitive period is <12 hours and early Mat-infant contact PP has far-reaching effects on infant health during 1st yr. 

RCT's Full-term, BF, Infection, Wgt gain.

Spatz, DL 2004. Ten steps for promoting and protecting breastfeeding for vulnerable infants. J Perinatal Neonatal Nursing, 18(4), 385-396. This is a review of the author’s ten rules to promote BF with vulnerable infants. Rule #5 is Skin—to-skin care. On page 390 she provide a brief review of KC benefits to gas exchange, heart rate, apnea, weight gain, sleep, length of stay, infection rate, mental/motor development, maternal stress, and lists several Randomized controlled trials. She also states that KC improves milk production, BF initiation, BF duration, and then goes on to relate the QI project to increase KC at Children’s Hospital of Philadelphia that had 8 implementation parts: 1) random chart audits each month, 2) daily chart review, 3) patient packets about KC [they call it skin-to-skin contact], 4) Nursing staff education, 5) KC resource binder, 6) Visual cues at the bedside, like a calendar and pictures and recording form, 7) parent education, and 8) qualitative interviews with nursing staff. The QI project resulted in only a modest increase in use of SSC (from a mean of 1 to a mean of 4 babies doing SSC over the course of 10 months (Figure 3 on page 391). Nurses do not document holding and SSC as often as it is done. Says “infant should be positioned skin to skin at the breast and mother should manually express a few drops.” (pg. 391) PT, Rev, BF, QI, Implementation, KCBF


Stening W, Roth B. 1999. Dissemination of the Kangaroo Method in Germany. J Perinatology 19(6): 450-451. 91% of German NICUs offer KC; % of those to ventilated infants with “good or very good” experiences. Most offer it for 30-60 minutes, but they think this is too short. Hypothermia is infrequent, infection is not found, spontaneous extubation of ventilated pts. is a problem. Implementation, Infection,

Stevens B, Yamada J, Ohlsson A. 2004. Sucrose for analgesia in newborn infants undergoing painful procedures. Cochrane Database Syst Rev 2004;(3): CD001069. Not a KC study, but a referral to KC. A meta-analysis of sucrose to reduce procedural pain. At end of meta-analysis, it says “The use of repeated administrations of sucrose in neonates needs to be investigated as does the use of sucrose in combination with other behavioural (e.g. facilitated tucking, kangaroo care) and pharmacologic (e.g. Morphine, fentanyl) interventions. Sucrose Meta-analysis. Refers to KC


Sule SS & onayade AA. 2006. Community-based antenatal and perinatal interventions and newborn survival. Nigerian Journal of Medicine, 15(2), 108-114 (Apr-June). Review of neonatal mortality (constitutes 40-70% of infant deaths; 99% of these deaths occur in developing countries, highest neonatal mortality rate is in sub-Saharan Africa, 4 million babies die in developing countries each year, 42% of deaths due to infection, 21% to perinatal asphyxia, 11% birth injuries, 10% LBW and prematurity, 11% congenital anomalies). 2/3 of deaths are in first week of life (2/3 of these
occur in first 24 hours). Skin to skin care (KC) needs to be incorporated into a functional and sustainable health care delivery system. Preterm, review, mortality, infection, developing countries, community KC. Not on charts yet.

Svejda MJ, Campos JJ, Emde RN, 1980. Maternal-infant “bonding”: Failure to generalize. Child Development, 51, 775-779. Randomized controlled trial. Extra contact or routine care. KC (n=15) for 15 min after episiotomy repair and then gowned moms had nude infant with them for 45 min when in own room. Then 90 min of wrapped contact at each feeding for breastfeeding. Control (n=15), 1-5 min of contact at delivery with wrapped infant and 30 min at each feed starting 4-6 hrs after delivery. In the first 36 hrs, extra contact moms had 10 additional hours of contact as compared to 15 gowned mothers who looked at baby in a crib while still in the DR, held the wrapped infant briefly before going to nursery. No differences in maternal behavior between groups or between situations were seen. RCT, fullterm.

(SAREC) Swedish Agency for Research Cooperation with Developing Countries. (1985). Breathing and Warmth at Birth: Judging the Appropriateness of Technology (Sarec Report R2. Sterky G, Tafari N, Tunell R (Eds.). This report says that one of the best way for developing countries to keep babies warm is Kangaroo Care and it recommends that for prevention and recovery from Hypothermia.

Swinth JY, Anderson GC, Hadeed AJ. (2003). Kangaroo Care with a preterm infant: Before, during and after mechanical ventilation. Neonatal Network, 22 (6), 33-46. Case study of infant with mild RD at 2-18 hrs postbirth without improvement til KC began. 4.75 hrs of pre-ventilation KC, 4.0hr of Vent KC, and 6.0 hrs of post-ventilation KC given. KC assisted in recovery from RD and fostered maternal relaxation and reduces maternal stress. Vent KC, Case study, Maternal relaxation, Mat stress, sleep, crying, FiO2, SaO2, protocol for positioning and securing lines on pg.35.

Swinth JY, Nelson LE, Hadeed A, & Anderson, GC. (2000). Shared kangaroo care for triplets. MCN Amer. J. Maternal Child Nursing, 25(4): 214-216. Mom had 4 kids at home, had naturally occurring triplets at 35 weeks. One was IUGR. Held all 3 simultaneously at 6 days of life and quickly came to know each baby as an individual. Babies nuzzled up easily in KC. Vital Signs stable??? Triplets were co-bedded in nursery. Triplet preterm KC. Shared KC, attachment, co-bedding, HR, RR, temperature.


Tessier R, Cristo MB, Velez S., Giron M, Nadeau L, Figueroa de Calume Z, Ruiz-Palaez JG, Charpak, N. 2003. Kangaroo mother care: A method for protecting high risk, low birth weight and premature infants against developmental delay. Infant Behavior and Development 26 (3), 384-397. Randomized trial of 431 LBW and premature (<1801 g) given KMC (start when able to breastfeed, and off of all breathing support, did it for 24 hours a day until 37-38 weeks PCA, and other Kcers i.e father, grandmother) or incubator care (kept in incubator til appropriate wgt gain and discharged at 1700gm). At 12 month 336 took Griffiths test . At 12 months KMCers had higher IQ, and the more premature the infant (30-32 weeks) and sicker and for those with diagnosed abnormal or doubtful neuro develop at 6 months age, the higher the significance. The main kmc effect was on 3 subscales: Hearing and Speech, Personal-Social development of personal relations and Performance. and on planning functions related to brain developmental stage at birth. KMC provides BRAIN CARE. RCT, 24 hr KC, Development, Paternal KC, Surrogate KMC, Mixed fullterms with Preterm and LBW, LOS, Grandmother.

Tessier R et al. See under ABSTRACTS for KMC as method of protecting high risk preemies against developmental delay. Also published as Tessier, Cristo et al., 2003 in Infant Behavior and Development.

Theilig, P. 2003. The kangaroo method. Kinderkrankenschwester 22(8), 331-334. Review of KC as practiced in German NICUs and talks about 24 hr/day KC. A clinical review. PT, Review, GERMAN

Thomson ME, Hartsock TG, Larson C. 1979. The importance of immediate postnatal contact: Its effect on breastfeeding. Canadian Family Physician, 25 (Nov.), 1374,76,78. 15 control term infants were delivered, placed in heated crib, given silver nitrate, wrapped in blanket and held by mom for 5 min before going to nursery. Primip Mom next saw infant at 12-14 hrs postbirth. 15 KC term infants (called early contact group) had same routine but given to mother 15-30 min postbirth, unwrapped and held against her bare chest for 15-20 min covered by warm blanket. Given after delivery of placenta, repair and transfer to stretcher bed. After 15-20 min of KC infant taken to nursery. BF success defined as BF for minimum of 2 months with daily supplementary feeding. 100% of KC were BF at discharge, 93% of control. Sig more KCers were successful BF at 2 months (60% KC vs. 40% control). All KCers attempted BF in delivery room, most sucked eagerly but 2 only mouthed nipple (pg. 1376). Greater BF success attributed to closer bond formed during early sensitive period. RCT, FULLTERM, BF Success, Birth KC


Tofteland, L. 2006. Conceiving care. How the desires of nursing mothers transformed the delivery of our care. Lifelines 10(4), 312-319. Descriptive. A lactation program to increase BF initiation rate in fullterm infants was started in 1994 and evaluated in 2001. BF initiation rate in 2005 was 85%. 292 moms completed the evaluation. The most helpful thing contributing to mothers reaching their BF goals was lactation support after discharge. Then in 2003 they evaluated the program again; 167 (45%) moms returned questionnaires. In hospital lactation consultant visits were most helpful in increasing BF initiation rates and post discharge lactation services (by phone & visits) for sustaining BF. Barriers to BF were going back to work, insufficient prenatal BF education, disruptive hospital practices (PG. 317) & policies. Skin-to-skin time was noted by 3 mothers in 2003 as being influential (in 2001 only one mother identified it as such (pg. 318). Fullterm, Descriptive, Breastfeeding influences, breastfeeding barriers.

Toma, T.S. (2003). Kangaroo mother care: The role of health care services and family networks in a successful program. Cad Saude Publica, Rio de Janeiro, 19 (supple 2), S233-S242. 14 men and women answered questionnaires about how to get KC done for their infants. Health workers needed to address personal and family problems that prevented KC, and consider history of perinatal death, other kids in household, paternal/family involvement, and household management so that KC can be implemented. Descriptive, implementation.


Tornhage CJ, Stuge E, Lindberg T, Serenius F (1999). First week Kangaroo care in sick very preterm infants. Acta Paediatrica 88(12), 1402-1404. Took 17 infants (12 on CPAP, 1 on vent, 4 no 02 support) conveniently sampled from other study. Had pretest-test-posttest design, 60 min or more of KC on median age of 3 days of life. Infants were median age 28 weeksGA, median BW 1238g, median wgt on study day 1072 g. 8 infants were fed 4-20 ml human milk by NG. KC did not stop due to infant deterioration in any subject (1403). One infant had brief apneic spell during blood
sampling after study ended. During KC SaO2 was 88-98, FiO2 had to be decreased by 0.09 in one infant, increased by 0.05 and by 0.12 in two infants. TcPO2 increased spontaneously in 9/17 infants and varied in others. TcpCO2 changed <0.5kPa in 15/17 infants (in two infants went from 5.2-6.3 or 6.5kPa). No difference in PaO2 (pg. 1403). PaCO2 changed <0.8kpa in 15/17. In one infant paCO2 increased from 5.7 to 7.5 and decreased from 5.9 to 4.4 kpa in another. Arterial pH changed <0.06 in 15/17 infants, and decreased from 7.35 to 7.28 and 7.31 in two infants. HR range 130-180, Before KC and 135-190 after KC. No bradycardia occurred. Temp was unchanged or increased <0.2C in 8/15; decreased <0.5C in 6 and 0.5-0.9 in 2/15. The lowest post-KC temperature was 36.2 after a drop of 1.0C in one infant. Before KC, 7/17 infants were crying, awake. AT 30 minutes of KC 16/17 were quiet sleep, 1 was drowsy. AT 60 minutes or more of KC 15/17 quietly slept 2 were awake. NG feed tolerated without adverse effects. Sick and very preterm infants tolerate KC early in life (1404). 

Descriptive, VENT KC, KC +NG, Apnea, Behav state, HR, SaO2, temp, TcPO2, Bradycardia, arterial pH, and arterial CO2, FiO2., sleep, crying, awake, CPAP, micropreemie


Tunell R. 2004. Prevention of neonatal cold injury in preterm infants. Acta Paediatrica 93 (3), 350-355. A commentary on an RCT using a heated, water-filled mattress in the same issue. This commentary says KMC should be tested instead. Cold injury contributes to neonatal death. KMC is effective, affordable, available method to prevent neonatal hypothermia in developing countries. In developed countries use of incubators does the job but incubators overstimulate babies. This is randomized controlled trial of KMC and cot-nursing with a heated, water filled mattress. KMC is as good a tool as incubator, radiant warmer, and heated mattresses in providing warmth to preterms in modern neonatal intensive care lunits. Commentary PT, temp.


Uvnas-Moberg K, Widstrom AM, Nissen E, Bjorvell H. 1990. Personality traits in women 4 days postpartum and their correlation with plasma levels of oxytocin and prolactin. J Psychosomatic Obstetrics & Gynaecology, 11, 261-273. The personality profiles of BF women differ from those of nonpregnant, nonlactating women of same age. BF mothers describe themselves as more open, more interactive, and calmer than nonpregnant, nonBF women. This temporary shift in personality begins a few days after delivery and lasts as long as BF is continued, and is in part dependent on KC after birth and is reinforced by BF. Full term, BF, Maternal personality. See also Nissen article.
Get this one, we don’t have it.

Vaidya K, Sharma A, & Dhungel S. 2005. Effect of early mother-baby close contact over the duration of exclusive breastfeeding. Nepal Medical College Journal. 7(2), 138-140. 92 lactating mother-infant pairs were followed for six months to determine effect of perinatal factors on duration of exclusive breastfeeding. Early postpartum KC had powerful influence (p<.001) over duration of exclusive BF up to 4-6 month and was more significant than early initiation of BF (p<0.05). Mode of delivery had no effect on duration of exclusive BF. Recommends that a “few minutes of early postpartum KC and early initiation of BF to promote BF”. Fullterm, descriptive, exclusive BF, BF duration, birth KC? (Says early postpartum but until we get the article we don’t know if early postpartum = birth KC or later), third world, 6 month follow-up.

Vaivre-Douret L, Papiernik E, & Relier JP. (1996). Kangaroo method and care. Archives Pediatrics, 3(12),1262-1269. Review article of its development, its use in many countries, its advantages (temperature regulation, better BF, promotion of maternal infant interactions, decreased mortality) In Europe it is mostly intermitted for a few hours each day and suggests putting the incubator in the mother’s room, and KMC requires qualified and devoted staff. Review, temperature, BF, maternal-infant interactions, 24 hour KC, KC staff requirements, use in countries. NOT ON CHARTS YET.


Van Rooyen, E., Pullen, A.E., Pattinson, R.C., Delport, S.D. 2002. The value of the kangaroo mother care unit at Kalafong Hospital. Geneeskunde, The Medical Journal, April 2002, 6-10. This is a report of 18 months of mandated practice of KC with low birthweight PRETERM infants in South Africa at the public hospital. 466 infants were admitted to the 24-hour/day KC unit over 18 months. 81% (n=375) of the infants weighed less than 1751 grams; 12% weighed less than 1251 grams.Average Length of stay was 13 days, average wgt gain was 23g/day. 85% were fully BF at discharge(the other 15% had HIV). One infant died in the KMC unit and 32 were transferred back to NICU for infection. Length of stay for infants <1300 g was decreased by 3 days when compared to LOS prior to KMC. Before KMC follow up was <50%; after KMC follow-up was 321 (69%), and 47% attended more than once. Implementation, Preterm, 24 hr/day KMC, wgt gain, length of stay, BF, infection, follow-up.

Vaughans, B. (1990). Early maternal-infant contact and neonatal thermoregulation. Neonatal Network 8: 19-21. Newborns dried and placed under radiant warmer immediately after birth were compared to ll other fullterms who were dried, covered with warm blanket and put into KC immediately after birth. After 10 minutes, no sig. diff. in axillary temperatures. Keepers had temps similar to those under radiant warmer. FULLTERM, axillary temps.

Venancio SI, de Almeida H. 2004. Kangaroo Mother Care: scientific evidence and impact on breastfeeding. J. Pediatr (Rio de Janeiro) 80(5 Suppl), S173-S180. Review article of KMC history and review of Cochrane review by Conde-Agudelo et al. Reports that Cochrane found KMC is protection factor for breastfeeding at discharge, reduced risk of nosocomial infection at 41 wks PCA, reduced risk of severe illness, reduced risk of lower respiratory tract disease at 6 months, and better weight gain/day. Psychomotor dev at 12 months was same and no difference in infant mortality. PT, Review, Portuguese.


studied, 47 got KC immediately after birth for 4 hours; controls got routine maternity ward care. No diff between groups in HR, RR and ability to regulate body temp. 93.6% (n=44) of KC moms and ALL STAFF “expressed very good opinion about KC”. KC can be used safely with fullterm healthy newborns with environmental temp as low as 19 degrees C.

**FULLTERM RCT, TEMP, HR, RR, Maternal feelings, Staff Impression, Birth KC/VEKC**

Villalon, UH, Alvarez, CP. (1993). Short term effects of early skin-to-skin contact (kangaroo care) on breastfeeding in healthy fullterm newborns. *Rev. Child Pediatr.* 64(2), 124-128. Randomized controlled trial of 119 dyads (KC=59) who got early KC (started 2-4 hrs postbirth) vs controls who stayed in observation nursery for first 4 hrs postbirth in Chile. 89.9% KC vs. 63.3% control breastfeeding at 24 hrs postbirth; 93.3% KC vs. 66.7% control BF at discharge; 78.8% KC vs. 56.2% control BF at 14 days postdischarge. Maternal self confidence at discharge (89.9 KC vs. 53.3 control p<.001) and at 14 days (97%) was better for KC.

**FULLTERM RCT, BF duration (24 hrs postbirth, discharge, 14 days postbirth), maternal confidence, early KC.**

Victor, L., & Persoon, J. (1994). Implementation of kangaroo care: A parent-health care team approach to practice change. *Critical Care Nursing Clinics of North America*, 6(4): 891-895. This article discusses how the neonatal intensive care unit at Children's Health Care St. Paul became the first in the nation to successfully implement KC in a nonresearch based environment. This systematic process included use of research materials indicating positive outcomes, recruitment of primary nurses, and staff educational sessions that encouraged problem solving for potential adverse effects.

**IMPLEMENTATION**


**LITERATURE SUMMARY**

Wahlberg, V. (1991). The “kangaroo method” and breastfeeding in low birth weight babies. NU Nytt on Ulandshalsovard, 5(3), 22-26. Reports how KC began, that mortality and abandonment decrease (p.24), includes report of 33 Kcers in Sweden and less HR, lower o2 needs, less restlessness, better temp maintenance, fewer digestive probs, more milk, and 24/33Kcers (83%) BF at discharge vs 45% in control (p. 25. Has BF cycle wheel for KC. Clinical Report and review.

**Breastfeed.**


**Resuscitative/Consoling KC**


Wallin L, Rufberg A, Gunningberg L. 2005. Staff experiences in implementing guidelines for Kangaroo Mother Care – a qualitative study. *International J Nursing Studies*, 42(1), 61-73. A focus groups held to learn effect of change team to implement KMC guidelines in two units that had a facilitator working with the change team and in two units that did not have a facilitator working with the change team. The intervention being tested here was “facilitation” and facilitation promoted implementation activities and was appreciated by the change team. But, facilitation was no more effective than than a quality improvement focused organization in which nurse manager is involved in change. Learning about KMC and changes in practice of KMC is a social phenomenon that benefits from people’s interaction with each other. Lars told Dr. Ludington at the INK workshop in Brazil in Nov. 2004 that KMC really only being done at
delivery for fullterms in Sweden in 2004. **PT, Implementation**

Wallis, C. L. 2000. Kangaroo Care. *Neonatal Network* 19(7), 68. This is a letter to the editor that KC is used routinely and shows pictures of twins in KC. **TWIN KC, routine use in U.S.**

Weller, A., & Feldman, R. 2003. Emotion regulation and touch in infants: The role of cholecystokinin and opioids. *Peptides* 24 (5), 779-788. Cholecystokinin and opioids peptides mediate early learning about maternal odor, milk and contact in rats. This paper reviews all the work showing that neuropeptide systems mediate emotion regulation in human infants, thus playing a role in the emergence of stress-reactivity and other motivational systems such as feeding. Maternal handling, proximity, and touch benefits the development of emotion regulation in the human. KC has been shown to improve the infant’s ability to self-regulate and to moderate the effects of some risk factors. **Theoretical review. Stress, emotional development.**

Weller A, Rozin A, Goldstein A, Charpak N, Ruis-Pelaez JG, Figueroa de Calume Z, Charpak Y, Sack J. 2002. Longitudinal assessment of pituitary-thyroid axis and adrenal function in preterm infants raised by ‘kangaroo mother care.’ *Hormone Research* 57 (1-2), 22-26. A randomized controlled trial of KMC vs traditional care of 87 infants <2001 grms. Gave 3 blood spot samples on filter paper at entry (1-5 postnatal days), 2 weeks later, and @ 41 weeks PCA). Infants had been discharged within 1st postnatal week. 17 alpha-hydroxy-progesterone (17-OHP), thyroxine stimulating hormone (TSH) & thyroxine (T4) measured after complete KMC (24 hr/day KMC). 17OHP and TSH decreased significantly over time. KMC did not interact with the pattern of physiological change. Maturation of the pituitary-thyroid axis and adrenal function is not compromised by KMC in healthy preterm infants. **Complete KMC definition, RCT, Pituitary-Thyroid-Adrenal function, 17-OHP, T4, TSH.**

Wheeler JL, Johnson M, Collie L, Sutherland D, Chapman C. (1999). Promoting breastfeeding in the neonatal intensive care unit. *Breastfeeding Review, 7*(2): 15-18. Forty-one infants watched during feeds for 21 days. Infants were 32-37 wks (M=34.21wks, MBW=2225.02g). On day 1, 22.2% BF while nude on breast (called KC); days 2-9 % of babies in KC for BF dropped to 8.7%, 0% on days 10-14; and 18.2% on day 15 and no more after that. KC was not considered “necessary” on days 10-12 because infants were BF. **BREASTFEED, Descriptive.**


Whitelaw, A., Heisterkamp, G., Sleath, K., Acolet, D., & Richards, M. (1988). Skin-to-skin contact for very low birth weight infants and their mothers. *Archives of Diseases in Childhood, 63*, 1377-1381. Pilot studies showed that stable infants as small as 700 g could be safely held in KC and mother and bab enjoyed the experience. Moms’ said “Now I feel he’s getting to know me,” “I feel like a mummy now.” 71 infants (<1500g BW, stable breathing, no O2 support, and could have congenital anomalies, IVH, ventricular hypertrophy, and PVL). 35 moms gave adlib KC (swaddled holding for 1.4 hrs/day and KC mean of 36 mins/day from mean 16-61st day of life in KC group); 36 gave swaddled holding (1.8 hrs/day from mean 1-66th day for controls). LOS of stay for KC = 30 days, control = 37 days. Some twins kcled, but not necessarily simultaneously. At discharge mom asked about her confidence in looking after baby, being
depressed, feeling detached, feeling supported in looking after baby, and if she thought baby would die. At 6 months PMA moms asked about feeling detached from baby, knowing what baby wants, if baby wants to be carried, is baby contented, mom feels annoyed with baby, baby is easier to look at than in hospital, support in looking after the baby, has baby’s behavior caught up, worried if something will still happen to baby. Parents kept 48 hour diary of sleep, feeds, holding, playing, crying to the nearest 15 mins. No diff in visiting time, temp instability not a problem during KC, 6 kids in each group stopped study for apnea, nec, or sepsis during study but not necessarily during KC, no diff in questionnaires at discharge and 6 months, 67% of moms thought baby would die, 42% did not feel was theirs till baby was home. No diffs in 6 month sleeping (kc=13.6hr/day con=13.4 hr), feeding 2.5 hrs/day KC, con=2.5), being held (KC=3.0, con = 3.0 hrs/day), playing (4.5 hrs/day both grps) between grps. KC had 25 mins/day crying, con=38 mins/day(SIG). BF duration in KC =9.2wks vs. 5.1 wks in controls (SIG) 17/31 (55%) KC moms lactated >6wks, 9/32 (28%) controls lactated >6wks(SIG), follow-up of infants given KC in hospital. Prolonged lactation and decreased crying at 6 months.

Preterm, RCT, BF, crying, micropreemie, maternal feelings, infant pleasure, maternal empowerment/role development, twin KC, diary, sleep, play, visiting time, apnea, nec, sepsis


Whitelaw, A., & Sleath, K. (1985). Myth of the marsupial mother: Home care of very low birth weight babies in Bogota, Colombia. Lancet 1, (8439)May 25, 1206-1208. Descriptive report of how statistics were incorrectly calculated and thus, report a higher than actual reduction in mortality. This paper did much damage as many South American countries then abandoned KMC because they did not want to be associated with “bogus” science. Descriptive report, PT, mortality.


Wiberg B, Humble K, deChateau P. 1989. Long-term effect on mother-infant behaviour of extra contact during the first hour postpartum. V. Follow-up at three years. Scand J Soc Med 17(2), 181-191. Primips who had 15-20 minutes of KC and suckling contact during first hour after delivery behaved differently, had longer duration of BF, expressed different opinions on child rearing practices at 36 hrs, 3, 12, mos as compared to controls. AT three years control mothers reported that time with infant right after birth was insufficient, KC infants had earlier continence during the day, earlier stubbornness than controls, higher catecholamines (epinephrine, norepinephrine) levels in urine, and moms smiled/laughed more, were more encouraging, instructing than control moms. Articulated conflicts were more common in KC group and regardless of type of conflict, more conflicts were resolved in the KC group. Study differences were more pronounced for boy-mother pairs than girl-mother pairs. Denver Devl Screening was same in both groups. Fullterm, RCT, KCBF, Development, Early KC, Maternal behavior, Interaction, Catecholamines, Stress.


infant placed on maternal abdomen. Pictures of how infants spontaneously move up to breast to feed. Gastric suctioning disrupts this natural behavior.

**FULL TERM. RCT KC is part of routine care**

Widstrom, A-M, Wahlberg V, Matthiesen A-S, Eneroth P, Uvnas-Moberg K. Werner S, Winberg J. (1990). Short term effects of early sucking and touch of the nipple on maternal behavior. *Early Human Development*, 21, 153-163. All full term infants placed in KC immediately after birth and stayed there for 45 min. One group was placed at breast for KCBF (Kangaroo Care and Breastfeeding) (n=32) within 30 minutes of delivery, other group put in KC without being put to breast and then fed on postpartum ward (n=25). Only 6/32 sucked within 30 min of delivery at breast, but all infants who had touched or licked areola/nipple stayed with mother more, moms talked to them more, and maternal gastrin levels were lower before and after breastfeeding. Gastrin levels correlated with time the infant spent in the nursery rather than in KC: gastrin was higher the more time infant was left in nursery. Gastrin levels are controlled by vagal nerve. Thus, KC affects vagal nerve activity (maternal neuroendocrine functions) and therefore, maternal digestion and metabolism may also be affected by KC in early postpartum period. No change in prolactin levels before and after BF between groups. **RCT, fullterm, KCBF, SEARCH BEHAVIOR, maternal behavior, gastrin, prolactin**


Wimmer-Puchinger B, Nagel M. 1982. The importance of attitudes during pregnancy and early mother-child contact for breast-feeding behavior: An empirical study. In: Prill H, Stuber M (eds.) *Advances in psychosomatic obstetrics and gynaecology*, Springer Verlag, Berlin, pp. 482-487. In Austria, Primip mothers. KC got 15 minutes of KC at 1-2 minutes postbirth (n= unspecified, n for control unspecified, but N=95). Control babies were cleaned, dressed and held by mom. Third group babies cleaned, dressed, put to breast for 15 minutes immediately postpartum. Early KC groups resulted in BF for a mean of 98 days vs 36 days in control group. **RCT, Fullterm, BF, BirthKC**


Wise J. (1998). Hypothermia improves with skin-to-skin care. *British Medical Journal*, 317, p. 967. This refers to Christensoon & Bhat et al, Lancet 1998 article vol. 352, p. 1115 of the study in Zambia of 80 low risk, hypothermic infants who were given KC. After 4 hours, 90% were in Neutral thermal zone for temperature vs. only 60% who were in an incubator in neutral thermal zone.


World Health Organization, Dept. of Reproductive Health and Research. 2003. Kangaroo Mother Care: A Practical Guide. Geneva: World Health Organization. This is a practical book for KC’s use with low birthweight and premature infants and is an outcome of the 1996 Trieste WHO Consensus Conference on Kangaroo Care. Contents cover the nature of KC, evidence supporting KC’s use with this population, requirements for safe KC (Setting, policy, staffing, mother’s willingness, equipment and supplied, and how to feed babies in KC), and practice guide (when to start, how to start, the KC position, length and duration of KC, KC at home). ISBN: 92 4 159035 1 Available from Marketing and Dissemination, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel: +41 22 791 2476; Fax: +41 22 791 4857). **Preterm, Positions, Policy, and Breastfeeding, BF in KMC position**


Worku H, & Kassie A. 2005. Kangaroo mother care: a randomized controlled trial on effectiveness of early kangaroo mother care for the low birthweight infants in Addis Ababa, Ethiopia. Journal Tropical Pediatrics, 51(2), 93-97. LBW (<2000 gms, Mean birth weight of 1514 gms, mean GA = 32.42 wks, 58% on IV, 34% on OX by nasal cath) in KC; 61 (1471 gm birth weight, 331.59 wks GA, 52% on IV, 37% on O2 by nasal cath) in conventional care. Started KC at 10 hours postbirth, other group enrolled at 9.8 hours post-birth. Exit from study was at 4.6 days KC, 5.4 days control; discharge within 1st 7 days of life was 91% of KC, 88% of controls, 22.5% KC and 38% of controls died during study, majority of death occurring during first 12 hours of life. Early KMC group had significantly better survival than conventional care infants in 1st 12 hours and after. More than 95% of moms said they were happy to care for their LBW babies in KC. Further study at community level is needed. PT, 3rd world, RCT, Early KC, Community KC, length of stay, mortality, maternal feelings of KC.

Yang SC & Chang YJ. 2006. The relationship between sleep/awake rhythm development and caregiving activities. Hu Li Za Zhi 53(4), 5-10. [Article is in Chinese]. Recognizing an infant’s sleep pattern is essential for caregivers who want to provide developmental care. This review article relates development of biologic rhythms, describes infant sleep wake states, discusses factors influencing sleep states (5 major factors are noise, light, environmental temperature, physical contact [including skin to skin or KC contact] with caregivers (including medical/noxious and comforting/non-noxious types of contact), and body position (mostly prone). Close body contact with parents is recommended as an intervention to improve infant sleep quality. (Boy, did they get that right!!).

Preterm, review, developmental care, sleep quality, sleep/wake states. Not in charts yet.


NON-ENGLISH LANGUAGE ORIGINAL MANUSCRIPTS


Horiuchi, T. 1999. Kangaroo Care (Japanese Book). Available from Takeshi Horiuchi, M.D., Chairman, St. Marianna University School of Medicine, Yokohama City Seibu Hospital, Perinatal Center, 1197, Yasahi-ku Asahi-ku, Yokohama City, 241-0811 JAPAN. (045) 366-111. e-mail: isokichi@wf5.so-net.ne.jp


Kontos, D. 1978. A study of the effects of extended mother-infant contact on maternal behavior at one and three months. Birth and Family J 5(3), 133-140. FT. Very early KC or Birth KC.


Lindroth M (1990). [the kangaroo method is a good complement to traditional incubator care]. *Lakartidningen*, 87(6), 368.


Mazurek T., Mikiel-Kostyra K, Mazur J, Wieczorek P, Radwanska B, Pachuta-Wegier L. 1999. Influence of immediate newborn care on infant adaptation to the environment. *Med Wieku Rozwoj*, 3(2), 215-224. Three randomized groups n=22in each group) (KC, swaddled newborns beside the mother, swaddled and separated from the mother) of **FULLTERM** newborns observed for 75 min after birth. Skin Tem, bl.glucose, HR, RR, crying differences all favored KC group. PH not sig. Diff between groups. For all but two unseparated newborns (KC or lying besides) temp was increasing during the 75 minutes, in separated group temp was unstable and not growing in 6 (27%) of infants. Bl glucose highest in KC (60.1mg/dl),lower in swaddled lying beside (52.5) and lowest in separated (49.6). Crying was shortest in KC, and 3 times longer in separated group. Episodes of crying were 7,17,and 38 in KC, lying beside, separated groups respectively. KC is optimal for newborn adaptation and a protection agst hypothermia and hypoglycemia. **RCT, FULLTERM, Temp, HR, RR, crying, blood glucose**


Mikiel-Kostyra K, Mazur J. 1998. Determination of newborn feeding in maternity hospital care. Part I: Factors associated with breastfeeding initiation. *Ginekologia Polska*, 69(11), 783-788. Data from 11,750 **FULLTERM** collected from 427 polish hospitals in 1995 showed that lack of KC after birth (odds ratio 8.5; population attributable risk in percent = 60.9%) and maternal-infant separation longer than 1 hour/24 hrs (odds ratio 13%, PAR = 87.2%) are factors associated with artificial feeding.

Mikiel-Kostyra K, Mazur J. 2000. Birth weight as a factor influencing infant feeding in Polish maternity wards. *Med Wieku Rozwoj*, 4(3), 337-346. **(POLISH) FULLTERM**, 11,784 newborns from 427 maternity hosps were studied. 97.2% of all newborns breastfeed; 72.5% of preterms breastfeed. KC was compared to rooming-in and was strong predictor of initiating BF and KC and rooming in as influences for BF were more evident in lower birthweight infants than higher.


Pignotti MS, Rubaltelli FF. (1997). Kangaroo Care: Parents’ answers and staff problems. Riv Ital Pediatri 23, 1054-1057. In three years 95% of LBW and VLBWs (580-2000 gm, 25-38wkGA) got KC. Nurses had difficulty with organization and surface space and time for mothers; mothers firmly believe in KC and its help in forming relationship with infant and nurses. Italian with English Abstract

Pignotti MS, Rapisardi G, Rubaltelli FF. Kangaroo mother care: Parents’ and nurses’ opinions and problems. ITALY Need complete citation from Rapisardi on the researcher’s list or at gherapi@dada.it


SAREC (Swedish Agency for Research Cooperation with Developing Countries. 1985. Breathing and Warmth at Birth: Judging the Appropriateness of Technology. (Sarec Report R2. Sterky G. Tafari N., Tunell R (Eds.). Reports that skin-to-skin is as good as incubators in warming infants and keeping them warm after birth.


Shiau SH. (1999). The effects of kangaroo care on sleep and crying of healthy fullterm newborns. Nursing Research (China), 7(3): 198-208. 22 Kcers and 22 standard care infants (No sig difs between groups on demographics) were compared. Kcers had significantly less total crying (7.14 min vs 10.73, p=.000) on days 1 & 2 but not 3; Kcers had more sleep (total 47.64 min vs. 40.36, p=.000 on days 1,2,3) and less awake time (total 14.55 vs. 17.45 min, p=.046) and less awake time on day 3 but not on days 1,2. FULLTERM, RCT crying, sleep, wakefulness Chinese.


Wieland, Ch., Bauer, K., Bisson, K. & Versmold, H. (1995). Kanguruh-pflege bei 39 Frühgeborenen. Monatsschr Kinderheilkd 143:1099-1103. 39 spontaneously breathing preterms were given first 30 minute KC session on day 10. Rectal temp increased during KC by 0.23°C (p<=0.01). No other measures changed. Infants <1000 gram had significant increase in rectal temp. Of 16 infants with elevated FiO2 in incubator before KC, 13 needed FiO2 to be significantly increased (from 29% to 35%). Of 167 KC sessions, 7 were stopped due to busy nursery, 5 for baby restlessness, 4 for increasing apnea/bradycardia, 3 for hypothermia, one for infusion para, and one for rapidly increasing FiO2 need. “Over 90% of preterm infants remain clinically stable and normothermic. These results justify continuing KC” (p. 1100). PT, descriptive, HR, RR, FiO2, TcPO2, TcPCO2, SaO2, Rectal temp., apnea/bradycardia, restlessness

Yin Y, Wang R., Lee MM, Yuh Y. (2000). Influence of kangaroo care and traditional nursing care on premature physiologic parameters (Chinese). Nursing Research (China), 8(3), 362-374. Observations 5 min before leaving incubator, 5,15, and 30 min after starting KC (30 min), and 5 min after return to incubator each day x 7 days. No diff in HR (157.7 vs 161.4), RR (47.6 vs 48.9/min), SaO2 (by HP monitor) (96.2 vs 95.3%), and body temp (36.9 vs 37.0). Both seemed safe. Preterm, quasi-experimental pretest-test-posttest, HR, RR, SaO2, Temp.

Yin Y, Wang R, Lee MM, Yuh Y. 2003. Mothers’ satisfaction: KC vs. traditional nursing care for premature babies (Chinese). J Nurs (China), 50(2), 37-47. English abstract available: Preterms <2000 g and moms non-randomly assigned to traditional or KC care. No diff in mat satisfaction before test; both groups sig. Increased sats after 7 days of 30 min/day KC, but KC group increased satisfaction more (93.2 vs. 83.2, p<.001). Mothers are more satisfied with KC. PT, Quasi-Exp, maternal satisfaction.

The following research investigations of Kangaroo Care are reported in the 1990 UNICEF publication of the First International Conference on Mother Kangaroo Program, Bogota, 1990. The full text is available, free of cost, from UNICEF, 3 UN Plaza, N.Y., NY 10017. Also called Primer Encuentro Internacional-Programa Madre Canguro.

1. Martinez, H., Rey, E., Navarett, L., & Navarette, C.M. Mother kangaroo program at the Maternal-Infant Institute in Bogota, Colombia. p. 21-44.


4. Correa, J.A., & Ramirez, H. Mother Kangaroo program at the Leon the 8th Clinic neonatal service at the Social Security Hospital in Antioquia, Colombia. p. 63-86.

5. Valencia, M.L., & Velez, J.D. Mother kangaroo program at the San Rafael Yolombo Hospital in Antioquia, Colombia. p. 87-90.


7. Restrepo, f., & Lopez, L.S. Mother kangaroo program at the General Hospital of Medellín, Colombia. p. 103-106.
8. Gaviria, M. Mother kangaroo program: Evaluation and implementation at the San Juan de Turbo Hospital in Antioquia, Colombia. p. 107-126.


10. Lopez, J.M. Experiences with the mother kangaroo method at the Joaquin Paz Borrero Hospital in Cali, Colombia. p. 133-142.


13. Arandia, R., & Morales, L. Mother kangaroo program at the University of San Simeon in Cochabamba, Bolivia. p. 177-200.


17. Arestegui, R.U. Information about the mother kangaroo pilot program at the San Bartolome Hospital in Lima, Peru. p. 249-254.


31. Davanzo, R. Care of the low birth weight infant with the Kangaroo mother method in developing countries. p. 451-474.

32. Virgin, C. The kangaroo method brings the child back to its mother: Present and future in Denmark. p. 475-484.

Abstracts


Anderson GC, Burkhammer M, Morrison B., Ludington-Hoe, SM, Chiu, S-H. (2003) Skin-to-skin contact improves breastfeeding outcomes. Research ShowCASE abstract # 346. Case Western Reserve University, April, 4, 2003, Cleveland, OH. Report of 35 mothers who reported BF difficulties. KC was given before anticipated BF times and throughout BF for 3 consecutive Breastfeeds on Postpartum Day 1 and then again on Postpartum Day 2 prior to discharge from hospital. AT discharge, 80% were BF exclusively, 17% partially. 30 dyads completed one week followup: 20 were exclusively BF, 4 partially, 5 not BF, 2 lost to FU. 200 dyads followed up at 1 month postdischarge, and 11/22 exclusively BF, 4/22 partially, 5 not BF, 2 lost to FU. Fullterm, descriptive, BF at discharge, 1 week and 1 month of life.

Anderson, G.C., Chiu S-H. (2002). Early kangaroo (skin-to-skin) care improves preterm infant weight at 6, 12, 18 months. Paper presented at 25th Annual Conference of Midwest Nursing Research Society. Chicago, IL, March 2002. Significant improvement in weight gain due to minimal amounts of KC during hospitalization, KCn=51; control n=49 atw birth, then 42 at 6, 43 @12s, 43 @18 (KC Group n); Control grp n = 29 @6 mos, 33@12 mos, 33 @ 18 mos. Also presented CORTISOLS salivary which were (KC vs Con): 8.34 vs. 7.74 (p=.005)@ 6 mos; 10.36 vs. 9.89 @ 12 mos (p<.05), 11.61 vs. 11.18 @ 18 mos (p= NS). RCT, preterm, Wgt, Cortisol.


Anderson GC, Chiu S-H, Morrison B, Burkhammer M, Ludington S. 2003. Skin-to-skin care for breastfeeding difficulties postbirth. Paper presented at Midwest Nursing Research Society, Grand Rapids, MI, Feb. 2003. Report of first 35 mothers who reported BF difficulties. KC was given before anticipated BF times and throughout BF for 3 consecutive Breastfeeds on Postpartum Day 1 and then again on Postpartum Day 2 prior to discharge from hospital. AT discharge, 80% were BF exclusively, 17% partially. 30 dyads completed one week followup: 20 were exclusively BF, 4 partially, 5 not BF, 2 lost to FU. 200 dyads followed up at 1 month postdischarge, and 11/22 exclusively BF, 4/22 partially, 5 not BF, 2 lost to FU. Fullterm, descriptive, BF at discharge, 1 week and 1 month of life.

Anderson, GC, Chiu SH, Pagliotti F, Dowling D. (2000). Pretest-test-posttest randomized controlled trial: Effect of early Kangaroo (skin-to-skin) care on toe temperature in preterm infants. 23rd Midwest Nursing Research Society meeting. N=100 KC time was between 15-150 min; control holding time was 15-90 min and was swaddled holding. Toe temp recorded every 15 minutes. Mean temp was 31.5 (baseline), 32.4 (pretest), 33.4 (test) and 33.0 (posttest) for KC and 32.9 (baseline) 32.6 (pretest), 32.6 (test), 32.5 (posttest) for controls. RCT, toe temp.

Anderson GC, Chiu SH, Pagliotti F, Dowling D. (2001). Early kangaroo (skin-to-skin) care: Effect on toe temperature (Vascular perfusion) in preterm infants. Proceedings of Midwest Nursing Research Society meeting, Cleveland, OH, April 2001. Toe temp rose from 32.6 (prekc) to 34.2 (KC) and dropped to 33.9 (postkc), suggesting possibility of increased vascular perfusion of internal organs in 31 preterms. RCT, Toe Temp.


Bauer K, Pasel K, Versmold H. (1996). Chest skin temperature of mothers of term and preterm infants is higher than that of men and women. Ped Research, 39(4) Pt. 2, p. 195A. Recorded mean chest skin temperature of 10 women with premature infants, 10 women with term infants, and 10 men. Chest skin temperature increased with postnatal age and was significantly higher than that of men. Axillary temps were same in all groups and did not change over time. Chest skin temperatures of women is 1°C higher than in men.


Charpak, N., Figueroa, Z., Ruiz, J.G., & Charpak, Y. (1997). Kangaroo mother versus traditional care for newborn infants (~2000 grams). A randomized controlled trial. Pediatric Research, 41(4), Pt. 2, 192A. 382 KC started KC upon discharge and practiced it 24 hours/day. 364 infants in incubators in minimal care unit in hospital were compared to KCs at term, 3,6,9, 12 months. No differences in growth, developmental indices, or in length of breastfeeding beyond 3 months (at 3 mos, more KC breastfeeding than controls. Also no difference in infection.


Chiu S-H, Anderson GC. 2001. Quality of the maternal-infant relationship during the first year. Midwest Nursing Research Society Annual Meeting, Cleveland, OH, March 2-5, 2001. Maternal infant interaction at 6 months using NCAST Feeding and Teaching Scales on 53 dyads who received early, as often, and for as long as possible KC during hospitalization who were 32-36 weeks GA were tested. No differences found. RCT.


Chwo, Miao-Ju, 2000. Early kangaroo care for 34-35 week preterm infants: Effects on temperature, weight, behavior, and acuity. Presented at Biennial Convention of the 12th Biennial International Congress of Infant Studies, Brighton, England, July 2000. 34 healthy preterm infants in TAIWAN were randomly assigned before first feed. KC was done during BF, controls were clothed and wrapped and held that way for one hour, three times a day during feedings. KC had higher TYMPANIC temps, more quiet sleep, more inactive awake, less drowsiness, less crying. No diff in weight loss or acuity (LOS). PT, RCT, temp, sleep, wght, length of stay.

Chwo, Miao-Ju, & Huang, Li-Hung (2002). Effects of very early kangaroo care on infant’s extrauterine
adaptation and maternal birth-related fatigue. Presentation at International Conference on Tradition, Evidence, and Innovations in Nursing, March 21-23, 2002, Phuket, Thailand. 49 fullterm dyads randomly assigned to KC (n=24)(60 minutes of KC after newborn care) or control (n=25) (routine newborn care, no skin-to-skin contact). Temp, HR, SaO2 and Beh. State and maternal fatigue measured at beginning and every 15 minutes. KC had sig. Higher Temp (37.30 vs. 37.00 at 60 min), no sig diff in HR, or SaO2 at any time, no Bradycardia in either grp and KC had more quiet sleep (41%vs. 13.5%) and alert inactivity (27.6% vs. 2.8%) than controls. Controls had more drowsy and crying (38.5 vs. 15.1%) than KC. KC moms had less fatigue @ 60 min (37.67 vs. 42.36) RCT. Fullterm, temp, HR, SaO2, Brady, State, Fatigue. Delivery KC


Feldman R, Eidelman AI, Weller A, Sirota L. (2001). Mother-infant skin-to-skin contact promotes self-regulation in premature infants: Sleep-wake cyclicity, arousal modulation, and sustained exploration. Society for Research in Child Development biennial meeting, April 2001. Following KC, infants showed more organized sleep-wake cyclicity $ at term age, spent more time in quiet sleep and in alert wakefulness. KC has + longterm effect on infant’s arousal regulation and attention as expressed by more organized sleep-wake cyclicity, more adaptive responsiveness to environmental stimuli, improved m-I attention and exploratory skills.


Hales D, Kennell J, Klaus M, Mata L., Sosa R, Urrutia J. 1975. The effect of early skin-to-skin contact on maternal behavior at twelve hours. Pediatric Research, 9, 259. 9 Guatemalan mothers gave KC for 45 minutes once episiotomy repair complete and in recovery room under heat panel and then to nursery til 12 hours old; 10 controls got to see swaddled infant 12 hours later. At 12 hours postbirth, KC moms did more fondling,kissing, en face looking, looking, and talking to baby but not more caretaking. RCT FULLTERM Maternal Behavior, attachment behaviors. Abstract only.


Herzenstiel G. 2000. Introduction of KMC in Malawi, East Africa; An example of successful implementation of KMC in a 2nd/3rd level hospital in a country without resources. Presentation at 3rd International KMC congress, Jakarta, Indonesia, Nov. 22-25, 2000. Zomba Gen Hospital cares for 4500 newborns/yr, 20% are Preemies. This is report of how to implement KMC by building a K ward with 12 beds.

Hsieh, Y-H, & Huang, M-C. 2000. Preliminary study of KC for preterm infants: Effect on parent-infant relationship. Unknown presentation site. Write to author at Yu-Hui Hsieh, No. 539, Jong-Shiaw Rd, Chia-Yi City 600, Taiwan, ROC. 16 parents with KC experience completed 8 item open ended questionnaire to express experience with KC. Kc decreases parents’ anxiety, increases self confidence in caring for infants, and promotes relationship. See manuscript in J. Nursing Research (china) listed under foreign languages for full report.

Kojasuta, C. 1995. Effect of early skin-to-skin contact on maternal-infant bonding in different pain management groups. Masters Thesis abstract, CWRU. 120 mothers in four groups: KC + epidural; KC+ IM/IV; control + epidural; control + IM/IV. Given KC for 10 minutes within 30 min of birth. Two hours postpartum moms interviewed about bonding. In epidural group, KC moms had higher bonding score than controls; in IM/IV group, no different in bonding. FULLTERM, pain


Kostandy RR, Anderson GC. 2003 Kangaroo (skin-to-skin) care in healthy fullterm neonates: Effect on pain from hepatitis B vaccine injection. Presented at the Midwest Nursing Research Society Annual meeting in St. Paul, MN March 2003. 30 neonates randomized to 30 min of KC before Hepatitis Vaccine injection or bassinette. Infants rotated to supine position in KC for shot in thigh, post injection infants rotated back to prone KC. HR, behavioral state, crying time measured preinjection, during injection, and post.FULLTERM, pain. This abstract won 2nd place in the Best Abstract category.

Leon-Mendoza, S de. 2000. Impact of KMC on survival of LBW neonates. Presentation at 3rd International KMC Congress, Jakarta, Indonesia, Nov. 22-25, 2000. All neonates <2001 gm got KMC and breastmilk feeds only. Discharged in KMC once fully BF and 3 days of wgt gain. Compared one yr of KMC to previous yr stats: Sig. More survival of infants <1000gm (0 vs 7%), <1250 gms (11 vs 16%), <1500 gms (20 vs 26%), <1750gms (45 vs 51%) but not for 1750-2000 g (68 vs 68%).


Ludington, S.M. 2000. EEG-basd sleep before and during Kangaroo care. Presentation at the 12th Biennial meeting of the International Congress of Infant Studies, Brighton, England, July 2000. Data from 10 subjects shows that quiet sleep doubles, active sleep drops, delta brushes increase and indeterminate sleep does not change. Intensification of sleep is seen in KC.


Martinez, LYR. 2000. KM program in the civil hospital of Guadalajara. Presentation at 3rd Internl KMC Congress, Jakarta, Indonesai, Nov. 22-25, 2000. 325 LBW given KMC. Many morbidities still found, but KMC improved interaction and bonding, hospital stay was shorter, reduced nosocomial infections, and hospital costs. **Infections, cost.**


Narayana I, Bambroo A. 2000. Alternate methods of feeding LBW infants during the transition to BF. Presentation at 3rd Intntl KMC Congress, Jakarta, Indonesia, March22-25, 2000. This is a comparison of the paladai to cup and bottle feed, and only a reference is made to KMC, saying paladai can be used with KMC.


Punthmatharith B, Anderson GC. (2001) Randomized controlled trial of early Kangaroo care: Effects on
maternal feelings, maternal-infant interaction, and breastfeeding success in Thailand. Proceedings of Midwest Nursing Research Society Meeting, Cleveland, OH, April 2001. 196 fullterm newborns (97 KC, 99 control) randomly assigned to KC 60 min. postbirth and continued ad lib for two days or until discharge; control moms held swaddled infant adlib. On day 2 postbirth, no sig diff in MIBQ, IBS, H&Hlactation Scale; but Bonding Observation Check List was sig between groups.041. One month postbirth KC had high Attention and Connection to Infant (a subscale of Mat-Inf Bonding Questionnaire). No sig diff in BF success. KC might have weak effect on Mat-Inf Bonding.

Fullterm RCT BF

Rate AB. 2000. Parents’ experiences of providing KC to their preterm infants. Presentation at 3rd INTNL KMC Congress, Jakarta, Indonesia Nov. 22-25, 2000. Phenomenology study of interviews of maternal and PAT KC showed 6 themes; Premature birth experience, Kangaroo care unit/living in, what KMC meant, being informed, strength and support. Done a Groote Schuur Hospital. PAT KC, qual study

Rojas, M.A., Kaplan, M., Mayes, L., Sherwont, E., Quevedo, M.E., Ehrenkranz, R. (1998). Extended traditional holding (*TH) and skin-to-skin care (SSC) for newborn infants ≤ 1500 GRAMS. A randomized controlled trial. Results of an interim analysis Ped Res 43(4), Part 2, 191A. This team at Yale University had parents hold 45 infants up to 4hrs/day, twice a day until infant was 2000 gms or discharged. TH was wrapped and held supine; SSC was wearing only diaper, prone at 45° incline. No sig diff in daily caloric intake, rate of wgt gain, or incidence of positive cultures (even tho TH had 6 cases of sepsis; KC had 3 cases of sepsis). No deaths in either group. RCT with M & SD, WGT, Calories, Sepsis, mortality.

PT, RCT, Weight, length, head growth, BF, LOS.


METBOLIC OUTCOMES.


Shiau, S-H Hwang. 2000. The effects of kangaroo care on breastfeeding status and breastfeeding duration of full-term newborns from Day 3 after delivery to one-year of age. Paper presented at 12th Biennial International Congress of Infant Studies in Brighton, England July, 2000. 52 RCT to early KC (start at 4 hrs postbirth, 8 hrs/day x 1,2,3rd days of life) control had no rooming in dyads in study. More KC dyads BF longer and at one year, and have better BF status using Index of Breastfeeding Status. RCT, FULLTERM, BF


Swinth JY, Anderson GC, Hadeed AJ. 2003. Kangaroo (skin-to-skin) care with a preterm infant before, during, and after mechanical ventilation. Neonatal Network, 22 (6), 33-38. Case study of 33 wk GA infant who required supplemental O2 at 2 hrs postbirth and with no improvement started KC at 18 hrs of age for 1.25 hours, and then two hours later for another 3.5 hrs. AT 45 hours of age infant was intubated and then got more KC before extubation at 90 hrs postbirth. KC given before, during and after ventilation and it assisted in recovery from respiratory distress, fostered maternal relaxation, and minimized maternal stress. RCT, VENT KC, Resp. distress, Maternal relaxation, Maternal stress SaO2, FiO2


Syfrett EB, Anderson GC, Behnke M, Neu J, Hilliard ME. (1996). Very early kangaroo care beginning at birth for healthy preterm infants and mothers who chose to breastfeed: Effect on outcomes. Paper presented at the workshop on the kangaroo mother methods for low birth weight infants. World Health Organization. Maternal-child health collaborating center, Trieste, Italy. This is the same as the 1993 abstracts, and no paper was published of this report.


Biennial International Congress of Infant Studies, Brighton, England, July 2000. FULLTERM, BF,


All abstracts from the 2nd WHO KC Network meeting in Bogota, Nov. 1998 are now available on the Kangaroo care website at Javeriana listed under websites on this bib at the end.

TEXTBOOKS SPEAKING TO KC:

Beck D, Ganges F, Goldman S & Long P. 2004. Care of the Newborn. Reference Manual. Washington, DC: Save the Children Federation. Available through Saving Newborn Lives, Save the Children, 2000 M Street NW Suite 500, Washington, DC20036 or at www.savethechildren.org. Under chapter 5: Care of Low Birth Weight Babies, on page114 onward, in each “Decision making chart for LBW babies, All LBW, 1500-2500 grams, <1500 grams” the guidelines are to “Keep the baby warm by continuous skin-to-skin contact”(page 115) or “Put the baby skin-to-skin with the mother as soon as possible.”(pg. 114). On page 118 a full section entitled “Skin-to-skin or Kangaroo Mother Care” begins, with charts on how KMC helps mothers and babies, components of KMC, how to wrap the baby and mother, how to advise the KMC mother, Breastfeeding the LBW baby in KMC, and Fathers can also help with skin-to-skin contact.” They retrieved much of the information from www.kangaroomothercare.com.


Kenner C, Lott JW (Eds.) Comprehensive neonatal nursing: A physiologic perspective has a chapter: Holditch-Davis D Blackburn ST, Vandenberg K. Newborn and infant neurobehavioral development. St. Louis, Saunders, pp 236-284, has a recommendation to use KC.


Mattson S, & Smith J.E. (2004). Core Curriculum for Maternal-Newborn Nursing- 3rd Ed. St. Louis, MO: Elsevier Saunders. On page 423 in chapter 16 by N.D. Cheffer “Adaptation to extrauterine life and immediate nursing care” is lists KC as a means of achieving a neutral thermal environment for the fullterm newborn, stating “Kangaroo care: direct skin-to-skin contact by placing the infant against the mother’s skin to provide thermal support.” That’s all I can see as to a reference to skin-to-skin contact or KC for fullterm infants in the entire book. FULLTERM, temperature.

Merenstein G.B., Gardner, S.L. (2002). Handbook of Neonatal Intensive Care. 5th Edition. In Chapter 12: Pain and Pain Relief on page 210 “skin-to-skin contact (Kangaroo Care) between mothers and healthy newborns during heelstick is a potent analgesic intervention that reduces cry (by 82%), grimace (by 65%), and heart rate.” And in Chapter
The Neonate and the Environment: Impact on Development by Gardner SL and Goldson E. There is a whole paragraph and Box 13-3 called “Benefits of Kangaroo Care/Skin-to-skin contact” that lists parental and numerous neonatal benefits of KC.

Verklan TM, Walden M (Eds.) 2004. Core Curriculum for Neonatal Intensive Care Nursing. St. Louis, MO: Elsevier. On page 68 it states “13. Provide Kangaroo Care (skin-to-skin) time if mother desires” as a nursing intervention for mothers with perinatal substance abuse. On page 243-244 it says “therapeutic touch may include: Kangaroo Care, or skin-to-skin holding. NICU parents perform skin-to-skin contact with their diaper-clad infant who is resting prone and semi-upright against the mother or father’s bare chest covered by a blanket. Warmth, rise and fall of the chest, tactile sensation of skin-to-skin, smell of parents, and maternal breast, and the parent’s tender, quiet, vocalizations, breathing sounds, and heartbeat comprise the sensory modalities stimulated during KC. This provides low-intensity stimulation to the earlier developing senses and is most appropriate for the NICU infant. It has controversial use with extremely premature infants during acute illness phase. Maintaining physiologic and behavioral stability during transfer from bed to parent and back remains a challenge.” It lists positive physiologic benefits (pg. 243) and positive developmental benefits on page 244. Review, PT, Substance Abuse.

Vergara E.R., Bigsby, R. (2003). Developmental and Therapeutic Interventions in the NICU. Baltimore, MD: Brookes Publ. On page 25, 199-208, 234, 235 the authors, occupational therapists, talk about KC as part of developmental care to promote sleep, breastfeeding, maternal infant contact etc. This is an interesting book for occupational and physical therapists. Book has good tips for easing the transition to home too.

VIDEOS


Bergman, N. 2000. Kangaroo Mother Care: Restoring the Original Paradigm for Infant Care and Breastfeeding. U.S. $45.00 Available from Dr. Nils Bergman, 8 Francis Rd, Pinelands, 7405, South Africa or by email at bergman@xsinet.co.za or by calling 27-21-531-5819. (60 minutes). See Bar Yam, N.B., 2002. Kangaroo mother care: Restoring the original paradigm for infant care and breastfeeding. J. Human Lactation, 18 (3), 289 for a review of this film.


Dougherty & $105.00 interactive CD on Kangaroo Care as practiced in Canada with infants 23 weeks and up, so many of the guidelines are appropriate to infants under 28 weeks, but not for infants older than 28 weeks. This takes about 30 minutes to complete, you answer questions, listen to nurses’ comments about KC, many helpful pictures of transfer technique (watch for flailing arms and uncovered infants, however), and read about mother’s responses. Beautifully done, easy to complete, comprehensive for families and staff. An engaging, succinct, never boring presentation. Available through AnglersThree at www.e-educationalssolutions.com

Gloppestad, K. (1987). From Separation to Closeness: Parent's Experiences with Closeness. Available in English or Norwegian from Kari Gloppestad, Dept. of Pediatrics, National Hospital University of Oslo, Pilestredet 32, 0027 Oslo 1, Norway (25 minutes) $140.00 Shows parents doing KC with ventilated infants long before anyone thought
this was possible. **VENTILATED**


Morton, J.A. 2003. A Premie Needs His Mother. Available from Videotransform, Palo Alto, CA whose website is [www.breastmilksolutions.com](http://www.breastmilksolutions.com). Cost is $125.00 and you can email the author, a Clinical Professor of Pediatrics, School of Medicine, Stanford University at jantmorton@vermotel.net. Comes in two parts: Part 1: Benefits of BF which is best for prenatal viewing. This section includes how to pump your breasts. Part 2: Learning to BF-Coming Home to be viewed after birth and talks about transition from tube to breastfeeding. History and integration of KC into care is shown with paternal KC in NICU and at home, while the father is vacuuming. The challenge to return to work is also included. 60 minute video. Good review of it by Out, C., 2003. Review of “A Premie Needs His Mother” in J. Perinatology, vol. 23, p. 88-89.

**Presbyterian Hospital of Plano, TX.(2006). A Parent’s Tender Touch: Caring for your baby in the NICU.** Informative DVD for parents that presents practical ways for them to help their baby froma developmental perspective. Parental involvement demonstrated through KC, importance of maternal scent, swaddled bathing, reading baby’s cues, breastfeeding, and preparing for discharge. 24.95 Checks payable to Presbyterian Hospital of Plano, phone 972-981-3788 (fax is 972-981-3787).


**Rosenberg, Susan (1995). Kangaroo Care: A Parent's Touch.** Available from Susan Rosenberg, 333 E. Superior Street, Room 484, Chicago, Ill. 60611 (312) 908-7398 (18 min). $65.00 Fax: 312-926-8081.

**Shigeta, Yoshiro (2001). Kangaroo Care in Japan.** NHK Japan Broadcasting Corp. 2-2-1 Jinnan, Shibuya-ku, Tokyo, 150-8001, JAPAN. Tel: 81-3-5455-3358.

**Warwood, Teresa. (1998). Kangaroo Care Educational Program (KCEP).** This is a video orientation for health professionals. A 28-minute video covering basic information to be used in orientation of personnel in sites where Kangaroo Care is offered or planned to be offered. If one wants uniform implementation of a treatment, the best way to insure that is to include the guidelines in the orientation of all new staff and update existing staff. This video does an excellent job of reflecting the current findings and clinical issues related to KC implementation in NICUs. Available from Teresa Warwood, 2638 E. 1600 North, Layton, Utah 84040, 801-546-4253.

**PROTOCOLS**

Protocols are published in the following journal articles:

**Anner, J. (1994).** See this on the Lay literature list. The protocol is from UCSF and is on page 16, and 17.

**Children’s Hospital, 300 Longwood Ave., Boston, MA 02115 (617) 355-6000.** Ms. Ann Coangula is the Nurse Manager and they have “Guidelines for Kangaroo Care for 7 North: Newborn Intensive Care”. It lists eligibility and exclusion criteria and requires doctor order. The protocol and documentation to follow are included.

**Cleary et al. (1997).** Protocol from Thomas Jefferson University Hospital in Philadelphia, PA. **Mechanically Ventilated.**
Drosten-Brooks. F. 1993 in MCN on page 253 has elements of a protocol with any infant, not just those ventilated.

Evanston Hospital, 2650 Ridge Ave., Evanston, Ill. 60201. Protocol lists criteria, implementation, guidelines for transfer, including transfer of intubated infant, and documentation. **Mechanically ventilated.**

Gale, Franck, and Lund 1993 in Neonatal Network. **Mechanically Ventilated Protocol from Children’s Hospital of Oakland.**


Martin Luther Hospital-Anaheim, Ca. Neonatal Intensive Care Kangaroo Care Policy # NIC302.9 (3 pages) Neonatal Intensive Care Unit, Martin Luther Hospital-Anaheim, 1830 W. Romney Dr., Anaheim, CA 92801-1854.


The JOHNS HOPKINS HOSPITAL protocol can be obtained from Dr. Ludington, as can the Univ.of Maryland Medical System protocol.


Saginaw General Hospital. Clinical Practice Guidelines for Kangaroo Care. Saginaw General Hospital 1447 N. Harrison St., Saginaw MI 48602

St. Agnes Medical Center, Protocol for Kangaroo Care. Write to Ms. Sheri Fogarty, Neonatal Intensive Care Unit Nurse Educator, St. Agnes Medical Center, 900 Caton Ave., Baltimore, MD 21229 (410) 368-2630.

St. Joseph’s Hospital, PO Box 4227, Tampa, FLA 33677-4227 has “Protocol: Kangaroo Care” with assessment, reportable conditions, safety, care, consult, patient instruction and documentation guidelines included.

St. Mary’s Hospital Med Ctr., Infant ICU,707 S. Mills St Madison, Wisconsin 53715-0450. Includes list of inclusion and exclusion criteria.

St. Mary’s Hospital, 901 45th Street, West Palm Beach, FL. 33416-4620. Includes purpose, description, procedure, parent readiness, implementation, and documentation.

Sarasota Memorial Hospital NICU, Ms. Deborah Hanson, RNC, 1700 S. Tamiami Terrace, Sarasota, FL 34239-3555


**PAMPHLETS**


Promina Cobb Hospital Special Care Nursery, 3950 Austell Road, Austell, GA 30001. (404) 732-4414 Fa: (404) 732-4421. Ms. Pat Beckett, RNC, Dept. Manager of Special Care Nursery.

Larimer, Krisanne 1401 Washington St., #18, Canon City, CO 81212. Has wonderful pamphlet for parents, done in part by parents of formal premies, and it tells what KC is all about and how to do it with ventilator infants and all others, even those of OSCILLATING Ventilation.

Martin Luther Hospital-Anaheim.Patient Information Sheet (in English and in Spanish) Neonatal Intensive Care Unit, 1830 W. Romney Dr., Anaheim, CA 92801-1854.

Robles, M. (2004) Kangaroo Care: A Pocket Guide to KC. Available from www.unmanitoba.ca/womens_health/kangaroo.htm. This is a pamphlet from the Univ. of Manitoba Dept. of OB,Gyn,Reprod. Sciences, Women’s Hospital in Manitoba, Canada. It covers, What is KC? Why KC? Where is KC practiced? Who can KC? When can KC be initiated? (Policy is “stable babies who are less than 1500 grams and breathing on their own. Babies needing O2 OR CPAP may also be eligible. Cardiorespiratory monitoring and oximetry may be continued during KC. Bedside nurse will be nearby to monitor the infant as necessary.” How do you do KC? And concludes with some maternal comments on KC. They did a similar pamphlet in 2000 that was excellent too.

Policy/Pamphlet.

Related Articles

Abrams R, Caton D, Calpp J, Barron D. Thermal and metabolic features of life in utero. This article reports the warm environment of the womb and Silverman suggests that the warm temp of baby in KC might be advantageous; perhaps surfactant production proceeds more rapidly at the fetal-like temperatures, and less apnea when warm than cold. No citation available but the article is. WHAT IS SOURCE OF THIS ARTICLE?


Craig AD, Chen K, Bandy D, Reiman EM. 2000. Thermosensory activation of insular cortex. Nature Neuroscience 3, 184-190. Warmth conveyed to the skin is a pleasant experience as this message is sent to the limbic area of the brain, seat of emotional, affiliative, love behaviors, and where hormonal responses (i.e. oxytocin) originate.

Kennell, JH, Jerauld R, Wolfe H, Chesler D, Kreger NC, McAlpine W, Steffa M, Klaus MH. 1974. Maternal behavior one year after early and extended postpartum contact. Developmental Medicine & Child Neurology, 16, 172-179. Moms given swaddled holding in 1st Postpartum hour had more attentive behavior toward infant during physical exam at one year than controls – but all other maternal behaviors were similar at one year. Ringler did FU at 2 years and found early contact moms had different (better) speech patterns (Ringler NM, Kennell JH, Jarvella R, Navorosky BJ, Klaus MH 1975, Mother-to-child speech at 2 years – effects of early postnatal contact. Behavioral Pediatrics 86, 141-144). FullTerm, RCT, Maternal Behav RCT
Liu D., Diorio J, Day JC, Francis DD, Meaney M. (2000). Maternal care, hippocampal synaptogenesis and cognitive development in rats. Nature Neuroscience, 3(8): 799-806. A direct relationship between maternal behavior and hippocampal development is present: rat pups who had high levels of licking, grooming and nursing showed increased expression of NMDA receptor subunit and brain-derived neurotrophic factor (BDNF) mRNA, increased cholinergic innervation of the hippocampus and enhanced spatial learning and memory.

Olausson H, Lamarre Y., Backlund H, Morin C, Wallowlin BG, Starch G, Ekholm S, Strigo I, Worsley K, Vallbo AB, Bushnell MC. 2002. Unmyelinated tactile afferents signal touch and project to insular cortex. Nature Neuroscience 5 (9), 900-904. Human hairy skin has dual tactile innervation: fast-conducting myelinated afferent fibers, and slow conducting unmyelinated (C) afferents that respond to light touch, creating the sensation of pleasant touch. These fibers activate the insular cortex (LIMBIC system), but not the somatosensory areas S1 and S2. C touch afferents is a system for limbic touch that may underlie emotional, hormonal, and affiliative responses to caress-like, skin-to-skin contact (emotional aspects of touch). Gentle, caressing skin-to-skin touch, especially on arm and in palms, is pleasant experience.


Co-sleeping/Co-bedding


Mace S. 2006. Where should babies sleep? Community Practice 79(6), 180-183. Review article of some of the most relevant research about co-sleeping. Three main areas are reviewed: sleep position, maternal smoking and alcohol consumption, and breastfeeding. Recent concerns highlighting sofa sleeping are presented too.


Gynecologic Neonatal Nursing, 27, 450-456.

Richard CA, Mosko SS. 2004. Mother-infant bedsharing is associated with an increase in infant heart rate. Sleep. 27(3), 507-511. HR recorded in 15 infants in bed sharing night vs solitary night. 8 infants routinely bedshared with mother the other 7 slept alone. Fullterm infants at 11-15 weeks old. HR is lower when solitary sleeping. Infant temperature was significantly the cause (by regression analysis), and HRV was higher during solitary sleeping than bed sharing in QS and AS and REM sleep. Increased sympathetic activity in states 3,4 (drowsy and awake) and in REM sleep due to temperature. Sensory differences account for some physiologic differences between infant sleep in the two conditions. FT. HRV, Temp, HR


Touch SM, Epstein ML, Pohl CA, Greenspan JS. 2002. The impact of co-bedding on sleep patterns in preterm twins. Clinical Pediatrics (Phila), 41(6), 425-431. 12 hrs preCB and 12 hrs of CB cardiorespiratory recording. 22 CB infants (11 sets of twins) at 31.8wks GA studied at 33.5 wks corrected age. # of central apnea decreased (57 pre CB, 18 CB) with CB, no diff in Bradys, PB, No temp instability, no increase in O2 requirements during CB. Decrease in central apnea probably due to more frequent arousal by twin. RCT, Apnea, Brady, PB, temp, oxygen requirements.


REFERENCE TO KANGAROO CARE
______, 1995. Appropriate technologies can help make motherhood safer. Safe Mother, 18, 4-8. Review of available technologies and KC is one that is identified as keeping the infant warm against the mother’s skin and is recommended. Review. Temperature.

Als, H, Gilkerson L. Developmentally supportive care in the neonatal intensive care unit. 1995. Zero to Three, 15(6): 1-10. This has one small paragraph on "Opportunities for skin-to-skin holding" on page 5 saying that these opportunities are regularly provided as a part of developmental care. Developmental Care.

Anand, KJS, & Scalzo, FM. (2000). Can adverse neonatal experiences alter brain development and subsequent behavior? Biol Neonate, 77, 69-82. Repetitive pain, sepsis, maternal separation in rodents and other species have been associated with multiple alterations in the adult rat brain. He proposes that NMDA receptor activity from maternal separation leads to increased apoptosis in multiple areas of the immature brain, and exposure to repetitive pain may cause excessive NMDA activation resulting in excitotoxic damage to developing neurons. On pg. 72 “kangaroo care may provide additional physiological and neurodevelopmental benefits in critically ill neonates.” Pg 73 “Improved clinical and neuromaturational outcomes have resulted from developmentally supportive nursing care and “KC” in preterm infants” and cites Ludington and Swinth, 1996.


Retardation and Developmental Disabilities Research Reviews, 8(4), 298-308. On page 304 are 1.33 columns of KC, mostly citing the Conde-Agudelo 2002 Cochrane Review. Says that parent disenfranchisement is biggest NICU problem, and KC corrects this on page 304. There is a whole column devoted to KC history (very brief) and outcomes of the 2002 Conde-Agudelo meta-analysis. Review

Bakewell-Sachs, S., Blackburn, S. 2003. State of the Science: Achievements and challenges across the spectrum of care for preterm infants. J Obstet Gynecol Neonatal Nursing, 32 (5), 683-695. On page 688 it states “Many developmental strategies were implemented before undergoing adequate scientific testing. More research is needed, but the evidence base is growing for interventions such as cycled lighting, kangaroo care, nonnutritive sucking, containment, touch, and positioning, due in large part to the work of nurse researchers”.

Bowie BH, Hall RB, Faulkner J, Anderson B. 2003. Single-room infant care: future trends in special care nursery planning and design. Neonatal Network 22 (4), 27-34. On page 28 it states: “Also in the early 1990s several articles were published documenting the benefits of skin-to-skin(kangaroo) care, and for the first time in many nurseries, parents were encouraged to participate in the care of their preterm infant.” And “Privacy became limited; movable screens were used to give a sense of privacy for breastfeeding mothers and for parents providing Kangaroo Care.” They have drawing of KC in a single-room on page 31. PT. Not KC study per se.

Christensson Bhat et al.. 1995


Feldman R, Eidelman AI. (1998). Intervention programs for premature infants. How do they affect development? Clinics in Perinatology, 25(3): 613-626. This review article states that “Kangaroo Care is suggested as the intervention that most logically meshes the premature infant’s need to develop state regulation while facilitating sequential sensory development and promoting mother-infant attachment.


Freda, M.C. 2003. Nursing’s Contribution to the literature on preterm labor and birth. J Obstet Gynecol Neonatal Nursing, 32(5), 659-667. On page 664 she writes “Another intervention for the preterm infant that has been studied often by nurses is skin-to-skin care or kangaroo care (KC). It is thought that this intervention decreases neonatal energy expenditure and promotes infant growth. Ludington-Hoe et al. (1999) found that beginning in the delivery room, KC could be done safely and that infants’ temperatures rose rapidly to the thermoneutral range while the infants were receiving KC. They concluded that KC was conducive to recovery from birth fatigue in 34- to 36- week preterm infants. Chwo et al (2002) randomly assigned preterm infants to groups, those receiving KC and those not receiving KC, and found that infants receiving KC had higher mean tympanic temperature, more quiet sleep, and less crying than those who
did not receive KC. In one survey of 537 NICUs in the United States (Engler et al., 2002), 82% of the NICUs were practicing KC. Engler found that nurses perceived some barriers to its use, such as lack of scientific knowledge about whether KC care was appropriate for all neonates, as well as some nurses’ concerns about infant safety.” Then it goes on for another whole paragraph relating Gene Anderson’s case studies, saying KC has positive parental and infant outcomes with a depressed mother, when begun within 4 hours of birth in an NICU, for twins and adolescent parents, for adoptive parents, for triplets and a mom with pre-eclampsia.


Hackman, P.S. 2000. Recognizing and Understanding the Cold-Stressed Term Infant. Mother-Baby Journal, 5(4), 10-16. On page 13 there is one paragraph that says “A neutral thermal environment can be achieved by using skin-to-skin contact, a radiant warmer…” and that “the use of this technique has several advantages, including stabilizing vital signs and temperature, promoting bonding between infant and parent, and improving lactation.”

Harrison, L. (1997). Research utilization: Handling preterm infants in the NICU. Neonatal Network, 16(3): 65-69. On page 66 & 67 she discusses Kangaroo Care and its benefits. On page 68 she states more research is needed to answer the question: When is it safe to initiate KC for preterm infants? She says KC is gentle human touch, not the stressful type of touch subject to minimal handling protocols.


Hill ST, Shronk LK. 1979. The effect of early parent-infant contact on newborn body temperature. JORN Nursing Sept/Oct. 1979, 287-290. This was study comparing 50 dried, wrapped infants in parental arms to 50 dried, wrapped infant under radiant warmer just after birth. No differences in temperatures.


Kovach, A.C. (2002). A 5-year follow-up of hospital breastfeeding policies in the Philadelphia area: A comparison with the ten-steps. J Human Lactation, 18(2), 144-153. On page 145 they list a question in their survey of 35 Philadelphia hospitals, “Are babies’ temperatures stabilized skin-to-skin with the mother rather than under radiant warmers?” and on page 150 report: “only 3 hospitals(9%) regulated a baby’s temp skin to skin and 11 (31%)reported doing this sometimes. When asked about skin to skin contact following delivery, most hospitals placed babies skin to skin with their mothers all or most of the time (10 or 29%) or sometimes (14, 40%). Some hospitals did the APGAR score while the baby was skin to skin with the mother all or some of the time (n=10,29%).”(150). KC FOR WARMING INFANTS, BIRTH KC, FULL TERM

McCain G. 2003. Evidence based practice for neonatal nursing. Neonatal Network 22 (6), 5-6. On page 5 she states “early Skin-to-skin contact between mother and newborn has a positive effect on BF at 1 and 3 months after birth (citing Anderson et al, 2003 Cochrane review results). She says evidence supports adoption of skin-to-skin care, but nurses must first be educated about the benefits of the practice and then develop a guideline or protocol.

On page 166: “Evidencyl based nonpharmacologic techniques to help prevent low milk volume, such as pumping at the infant’s bedside, skin-to-skin care, and suckling at the emptied breast, are routinely employed by bedside nurses. **PT, implementation evaluation, BF.**

Mellien, A.C. (2001). Incubators versus mothers’ arms: body temperature conservation in very-low-birthweight premature infants. *JOGNN, 30*(2), 157-164. Has a big review of KC literature, but this is a study of clothed mothers holding swaddled infants close. Axillary temps did not differ between incubator and holding in VLBW infants. **VLBW, SWADDLED HOLDING.**


Perlman, JM. 2003. The genesis of cognitive and behavioral deficits in premature graduates of intensive care. *Minerva Pediatrics 55*(2), 89-101. Increased survival has led to deficits into school age and adolescents. One cause of deficits is prolonged hospitalization and the stress that it causes. The stress can be minimized by positive maternal-infant interactions. Positive interactions enhance neurobehavioral development. KC is recommend as a positive parent infant interaction and related to improved neurodevelopmental outcome.

**Review, development**

Schanler, RJ. (1995). Suitability of Human Milk for LBW Infants. *Clinics in Perinatology, 22*(1): 207-222. A nursery policy that advocates early skin-to-skin contact between LBW infant and mother may improve host defense of the infants”(211). “Guidelines for feeding LBW infants must include skin-to-skin contact to promote development of maternal antibodies”(217). Premise is that baby’s skin picks up NICU pathogens and when in contact with mom’s skin passes them to her. She then makes antibodies, “it is possible that the mother may make specific IGA antibodies against nosocomial pathogens in the infant’s environment and pass them along to the infant in her breastmilk”.

Stevens BJ, Franck LS. 2001. Assessment and Management of Pain in Neonates. *Pediatric Drugs 3*(7), 539-558. On page 546 it refers to KC, saying it has “improved survival, increased the incidence and duration of breastfeeding, resulted in improved respiratory and temperature control, and enhanced maternal-infant interaction.’ However, only 1 study has investigated KC as a pain management strategy during acute painful stimuli…given the encouraging results of this study, further investigation of this technique as a potential source of analgesia in human neonates is most certainly warranted.”

Stevens BJ, Yamada J, Ohlsson A. 2001. Sucrose for analgesia in newborn infants undergoing painful procedures. *Cochrane Database Systematic Reviews, #4, CD001069.* “The use of repeated administrations of sucrose in neonates needs to be investigated as does the use of sucrose in combination with other behavioural (facilitated tucking, kangaroo care) and pharmacologic (morphine, fentanyl) interventions.”

Weller A, Feldman R. 2003. Emotion regulation and touch in infants: the role of cholecystokinin and opioids. *Peptides, 24*(5), 779-788. In rats and humans, maternal proximity enables infant to smell maternal odor. Mat odor activates cholecystokinin and opioids (neuropeptides) that help infant learn that this is feeding time and help infant regulate his emotions, particularly stress reactivity as opioids are endogenous narcotics that calm the infant and reduces state level. KC is mentioned as it helps infants self-regulate and moderate effects of some risk factors. Thus, KC is probably quieting due to opioid secretion.
Whitby C., de Cates, C.R., Roberton, NRC (1982). Infants weighing 1.8-2.5 kg: Should they be cared for in neonatal units or postnatal wards? The Lancet, 1 (Feb. 6, 1982), pp 322-325. Infants without problems do well in cot care in regular postnatal wards, similar to the very early Kangaroo Care studies.


Lay Publications


_____ (1997) Bare hugs: Skin-to-skin snuggling aids preemies. Prevention Magazine, June 1997, pg. 40-41. Quote the findings of a study of 50 moms, 25 who held infants in KC for 10 minutes each day and 25 who held swaddled infants. Better VS and higher O2 and more stable milk supply were in the KC group. Citation not provided.


Anner, J. (1994). Kangaroo care: A father’s story of caring for his premature daughter. Childbirth Instructor Magazine, Spring 1994, pg. 12-17. He reports that to him “Kangaroo Care was the greatest thing that could have happened.”


Bassi J. 1995. Award-winning kangaroo care: Skin-to-skin contact creates gentle communication Mount Sinai Medical Center and Miami Herald Medical Reports. January 1995. Reports on Dr. Patricia Messmer's study of physiologic stability in kangaroo care preterms.


Funderburg, L. 2000. Saving Jason. *LIFE, Collector’s Edition*, May 200, pg. 49-62. Shows pictures of KC at Children’s Hospital of Philadelphia and all the pictures show really naked KC, not with the back covered to prevent heat loss. Good article for mothers to read about KC.


Mettler, L. 2001. Kangaroo Care. Help for Preterm Infants and Hope for their Parents. *Baby Years, Sept. 2001*. This is a general article with many references to Dr. Ludington and her book and how to give KC to premature infants. Copy available from lynmaddox@mindspring.com

Norton, D. (1995). Kangaroo love for prem babies. *Living and Loving*, September 1995. 133-135. This is the story of triplets born at 27 weeks. Parents, mother and father, gave Kangaroo Care after Nils Bergman told them about it. Mother said “The skin-to-skin contact made them feel so much more like MINE!” (pg. 134). The babies seemed to find it soothing and reassuring and inevitably went to sleep. Nurses found that body temperatures were maintained and there was no deterioration in their oxygen levels” (pg. 134). Peter (the father) complained that even the tiniest infant had a monkey-like tendency to grip his chest hairs!(pg 134).


**Notable Presentations**

Researchers

Gene C. Anderson, R.N., Ph.D., FAAN
Professor Emerita
Case Western Reserve University School of Nursing
Cleveland, OH
office: (216)-368-3343 gene.anderson@case.edu

2002-2003: Studying the effect of KC placement 1-1.5 hours before a feeding on improving breastfeeding outcomes in fullterm newborns in women who report breastfeeding difficulty.

2004-2006 Studying the breastfeeding behavior in fullterm newborns who spontaneously awaken for feeds or are aroused by others for feeds.

Bergman, Nils. Family physician in South Africa who did a study in Zimbabwe and now runs a maternity hospital where KC is practiced regularly for all fullterm newborns. Recently completed randomized controlled trial of KMC beginning at birth in preterm infants.

Best, Paige. Fall 2001 Doctoral student at Johns Hopkins University School of Public Health. She is studying infant care practices in Bangladesh, identifying how rural mothers recognize prematurity and then how they care for them to prevent hypothermia. Second phase of study will be to teach practices to avoid hypothermia, including KC and use of tempadots (if baby is warm enough, the tempadot shows a smiley face)to insure warmth. Will try to teach KC to them too. pbest@jhspoh.edu

Ann Bigelow. July 2002 got approval to study maternal infant interaction in the newborn period, 1 month, 2, and 3 months postbirth. KC grp will KC 6hrs/day for 1st month beginning KC within 1 hour of birth. Salivary cortisol at birth and 1 month and measuring developmental outcomes. Contact her at abigelow@stfx.ca

Joy Browne, R.N. Ph.D.
Children’s Hospital of Denver
Email: Browne.Joy@tchden.org (Browne, Joy)
They conducted research on the physiologic disorganization associated with transfer into and out of kangaroo care (Neu et al., Nursing Research, August 2000) and has wonderful article on the meaning of KMC to parenting published in 2005.

Cattaneo, Adriano.
Unit for Health Services Research and International Cooperation
Instituto per l’Infanzia, Vil dell’Istria 65/1, 34137 Trieste, Italy
Phone; +39 040 3785 236; Fax: +39 040 3785 402, Email: cattaneo@burlo.trieste.it

Chia, Pauline (Summer and Fall 2000- masters student at The University Lodge (Room B101) La Trobe University, Bundoora, 3083, Australia. Studying nurses attitudes toward KC. Home address is 1 Brockhampton Drive, Singapore 559095. Email: chiasioktin@hotmail.com

Gerard Cleary, D.O.
Division of Neonatology
Abington Memorial Hospital
In 1997, conducting a randomized controlled trial of KC with intubated infants and those receiving oxygen support by cannula. Looking at physiologic outcomes. See his article in J. American Osteopathic Association, vol. 97 #8, p. 457-460.

Ms. Patricia Clifford—See Clifford & Barnsteiner, 2001 citation.
Children’s Hospital of Philadelphia. (215)-590-3083
They are studying 1-2 hours of KMC with ventilated infants as young as 23 weeks and as small as 550 grams testing weight. Doing chart control comparison, looking at HR, RR, SaO2, and temp. Results to date show no difference between KC and chart review infants. I spoke with her in Fall 1997 and she was getting ready to write her results of 9 infants studied as of Nov. 1997.

Cooper, Sharla, RNC, NNP, MSN. 3247 Woodview Rd. S.W. Roanoke, VA 24018. Email is scooper@runet.edu

DeMarco, Patrice
79 Beach Rd.
Shelburne, VT 05482
In Dec. 2000 starting a study of KC on serum values (glucose etc.) in fullterm neonates.

Dutcher, Janet F., RNC, NNP, MN
134 Kirkcaldy Drive
Elkton, MD 21921
410-620-0948
In 1997 she conducted a survey of nurses attitudes toward KC in the United States. She wrote a wonderful paper, but it has not reached publication yet. Contact her directly.

Marsha L. Ellett, DNS, RN
Asst. Profs Nursing
Indiana University School of Nursing – Pediatric Gastroenterology
1111 Middle Drive
Indianapolis, IN 46202
317-274-0051  Fax is 317-274-4928  email is mikellett@iupui.edu
Feb. 2001 she is conducting an internet research study of mothers who use KC to help with colic. It is called the Infant Colic Study. You can learn of this study at http://www.iupui.edu/~nursing/research/infantcolic.html. Dec. 10, 2002 update: has enrolled only two subjects who completed protocol. Moms keep record of infant state for 3 days and then they KC at first sign of colic. “In both babies the amount of crying time was greatly decreased and the amount of quiet sleep was greatly increased. Parents who quit mid study report that kangarooing helped decrease crying.” She is now trying to local access to get more subjects.

Teresa Farley, MSN, CPNP
Developmental Pediatric services
8210 Walnut Hill Lane, suite 604
Presbyterian Hospital
Dallas Texas 75231
(214) 345-4156
Fax: 214-696-3014
In 1995 started a study of HR, RR, SaO2 and temperature during transfer into and out of KC and during KC and rest periods with ventilated preterm infants.

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Goubet, Nathalie, Ph.D.
Dept. of Psychology
Gettysburg College
Ph: 717-337-6148
Fax 717-337-6172 email: ngoubet@gettysburg.edu
Beginning work Sept. 2000 for two years in the states to study olfactory learning in preterm newborns who have KC and to measure pain responses during KC.

Hanson, Deborah email: nphanson@hotmail.com. Began in June 1999 studying end tidal CO2, tidal volume and minute volume of KC vs. incubator condition in ventilated infants. Also has experience with KC for dying babies.

Harris, Judy, June 2006. She is part of a Bachelor of Science in Nursing group of students working on the evidence base for Kangaroo Care practice with 32-36 week infants, particularly interested in heart rate, respiratory rate, oxygen saturations, and temperature outcomes. Carole Kenner’s response to her inquiry revealed that Cindi Acree (Cindi.Acree@cchmc.org) at Cincinnati Children’s Hospital did a similar review in 1991 and found that HR, RR, SaO2 and temps were better during KC. Judy Harris can be reached at Judy-Harris@ouhsc.edu

Pamela Green Henderson CNS/NNP
Neonatal Intensive Care Unit.
Women’s College Hospital
Toronto, CANADA
Email: nprd@ftn.net or phone: 416-323-6400 ext. 4568
Doing research on KC with ventilated infants in Fall, 1998

Holditch-Davis, Diane (working with RoseMare White-Traut
University of North Carolina, Chapel Hill

March 2005 submitted RO1 grant to compare KC versus the Ruth Diane Rice massage technique as interventions for VLBW. Mothers will do KC in NICU and continue at home for 2 months or the Rice Massage Technique. 380 mothers in three groups: KC, Massage, Attention Control. Outcomes are infant health and development (length of stay, growth, occurrence of health problems, and BAYLEY II), maternal well being (depressive symptoms, posttraumatic stress symptoms, worry about child health, parenting stress), maternal-child relationship (interaction videotapes, HOME, maternal perception of child vulnerability) Cost-effectiveness of interventions will be studied too. Study to begin Jan 2006 and run for 5 years

C. Celeste Johnston
Assoc. Professor, School of Nursing
McGill University
3506 University St.
Montreal QC H2X 3PY
phone: (514) 398-4157
Fax: (514) 398-8455
email: md28@music.mcgill.ca

Ms. Lisa Klein, R.N.C., MSN.
Clinician III, FCC
Began a study with 58 FULL TERM INFANTS who require rewarming when more than 90 minutes old. Kangaroo Care was compared to radiant warmer for efficacy in rewarming, using axillary temps. Preliminary data on 4/10/99 show that KC is as good as radiant warmer when continued for 90 minutes to bring babies from 97.1–97.5°F back to neutral thermal zone.

Juhyun Lee  
Doctoral Student, School of Nursing Johns Hopkins University  
525 N. Wolfe Street, Baltimore, MD 21205-2110  
(410) 467-4477; email is jleej@jhmi.edu  
Fall 2000 she is starting study of KC’s efficacy in increasing breastfeeding in preterm population, and changes in quantity and quality of milk, and immunological markers.

Susan M. Ludington, CNM, Ph.D., FAAN  
Professor and Walters Chair of Pediatric Nursing  
Case Western Reserve University, FP Bolton School of Nursing  
10900 Euclid Ave. Cleveland, OH 44106-4904  
office: (216) 368-5130  
email: sml15@po.cwru.edu  
Has studied effect of KC during phototherapy on bilirubin profiles, effect of one hour of KC with ventilated preterms on pulmonary function test outcomes, and general physiologic outcomes. Now she is funded (2002-2005) to study effect of 3 hours of KC on EEG measures of sleep and is piloting a study of effect of KC on pain responses.

Patricia Messmer, R.N.C, Ph.D.  
Director of Nursing Research at Mount Sinai Medical Center  
Miami, Florida. Published her study on behavioral state and cardiovascular stability.

Aline da Rosa Miltersteiner, Pediatria Fisioterapia  
Clinica Vita Di Bambini  
Rua Julio de Castilhos, 1051 sala 43  
Caxias do Sul, BRASIL  
Phone: 011-country code-54-228-3854  
vitadibambini@terra.com.br or alinemilt@terra.com.br

Elizabeth Moore, R.N, Ph.D.  
161 Clifftop Drive  
Hendersonville, TN 37075  
Phone: 615-824-7054  
In August 1998 she submitted an NINR NRSA to examine the effects of KC with FULLTERM infants beginning immediately at birth and continuing for two hours on breastfeeding performance. BIRTH KC. Finished study in December 2004. Get results from her.

Lucila Mora, R.N., BSN, 1421 Clement Street  
San Francisco, CA. 94118  (415) 750-1463  email: lmora@itsa.ucsf.edu  
Doing some sort of Kangaroo Care research as part of her ms degree at UCSF.
Madalynn Neu, RN, Ph.D., April 2002 received K award to study 3 sessions over an 8-wk period of KC holding vs. swaddled holding and measuring vagal tone and salivary cortisol levels of mothers and babies during the three sessions.

Alma Ohl, RN, NNP student
4300 Stratford Drive
Center Valley, PA 18034
Home: (610)-282-4692
In Spring 1999 she will be conducting a master’s thesis study to measure maternal empowerment during Kangaroo Care. She recommends a listserv on the email that targets nursing research and reports KC studies: listserve@listserv.Kent.edu. Type in SUBSCRIBE NURSERESSUSAN and send.

Ortman, Bethany : See Schmidt, Catherine below

Jacqueline Page, BScN, MHSc, NNP
and Renee-Louise Franche, Ph.D. Dept. of Psychology
Ottawa General Hospital
501 Smyth Rd.
Ottawa, ONTARIO
Canada K1H 8L6
Page: 613-737-8039
613-737-8943
Franche: 613-737-8651

Premature infant's physiologic response (50 ventilated preterms- looking at HR, RR, SaO2, and vent settings) and Maternal stress. Infant stress measured by physiologic homeostasis.


Hadi Pratomo, MPH, Dr.P.H.
Perinasia, Perumpulan Perinatologi Indonesia
Jl. Tebet Utara 1A/22
Jakarta 12820, Indonesia
Phone: (62)(21)828.1243
Fax: (62) (21) 828-1245 or 830-6130
PO Box 8163 JKSTT 12820
Dr. Pratomo and his group have just (nov. 1998) completed two studies on KC in their country.

Marta Prochnik- Brazilian researcher following outcomes of the national program for KMC in Brazil
Rua Cap. Cesaar de Andrade 40c01
22431-010 Rio de Janeiro, Brasil
prochnik@bndes.gov.br

Dr. Gherardo Rapisardi – does work in Italy with Dr. Pignotti. Can be reached at gherapi@dada.it

Kathryn Roberts, R.N., Ph.D.
Professor of Nursing, School of HECS, Faculty of SITE
Northern Territory University
Darwin, Northern Territory, Australia 0909
Office: (089) 46-6071
Fax: (089) 46-6595 email: kay.roberts@ntu.edu.au

Cindy Roller, R.N., MSN. Doctoral student of Gene Anderson’s at Case Western Reserve who was NRSA funded in Fall 1997 for phenomenology study of the meaning of Kangaroo Care to teenage mothers.

Margie Sanford, R.N., BSN
Neonatal Intensive Care Staff Nurse
Kadlec Medical Center
333 Swift Ave.
Richland, WA 99352
e-mail: msanford@mail.wsu.edu
Studying nursing factors affecting utilization of KC research results.

Schmidt, Catherine (And Ortman, Bethany). 20 Ashbury Court, Dahlonega, GA 30533 email:clschm1353@ngcsu.edu.
Two physical therapists who evaluated long term effects of KC and found no differences in mental and motor functioning in their work at North Georgia College and State University, Dept. of Physial Therapy. Abstract appears in A.J. Physical Therapy, 2000.


Shiau, SH. Randomized controlled trial of Kangaroo care with FULLTERM infants. Effects on maternal anxiety, breastmilk maturation, breast engorgement, and breastfeeding status.

Sloane, Nancy L. 2005. Doing KC at community level in Bangladesh. Contact her at Nancy.Sloan@tufts.edu
Community KC.

Sandra Smith, University of Utah. email: SLeeSmith@msn.com. Doing a study looking at RR, SaO2, FiO2 and heart rate variability of ventilated preterm infants before, during, and after Kangaroo Care. Dissertation finished in spring 1999. expect results soon. Early indications are that KC is infant temperature rises and that SaO2 might fall. Study was finished June 1999 and is being reported on Feb. 16, 2000 in Salt Lake city.

Amy Wallig NNP MS, Kathy Leef RNC MS, Susan Imam NNP MS, and Robert Locke DO
Medical Center of Delaware
4755 Ogletown-Stanton Road
Newark, DE 19718
Amy Wallig phone: 302-733-2396
Susan Imam phone: 302-733-4387 Page Op:302-733-1900 beeper 2431
This Medical Center of Delaware is a complete NIDCAP unit with several NIDCAP certified staff RNs and they are doing a study of ventilated KMC with a 15 minute pretest, KMC, 15 minute postest of non-invasive pulmonary function testing: SaO2,HR, RR, temp, resistance, compliance, pCO2, pO2. Length of KMC unknown. Study was up and running with 4-5 ventilated preterms at any time in their nursery in Fall 1997.

Wallin, Lars RN, Ph.D.
Post Doctoral Fellow, Faculty of Nursing in 2004-2005
University of Alberta
5-112 Clinical Sciences Bldg.
Edmonton, Alberta
See his paper published in 2005. He studies best methods to implement evidence and is conducting randomized controlled trial of facilitation to a change group versus usual method of quality improvement for implementing change.

Terry Zeilinger doing data collection of age, wgt, FiO2 and SaO2 before and during KC, along with length of session and skin temp range. Martin Luther Hospital-Anaheim, 1830 W. Romney Dr., Anaheim, CA 92801-1854.

Judy Harris

OTHER NOTABLES IN KANGAROO CARE WORK

Christensson, Kyllike NMTD.Dr. Med. Sc. Karolinska Institutet, Dept. of International Health and Social Medicine, S-171 77 Stockholm, Sweden  Phone +46 6 728 77 88; Fax: +46 8 31 15 90; email: Kyllike.Christenss@Phs.Ki.sc

Fundacion Canguro, Carrera 7 No.46-20, Apto. 2001, Bogota, Colombia. Telephone: +57 1 221-5572; email: herchar5@colomsat.net.co

Wahlberg, Vivian. Nodiska Halsovardshogskolan, The Nordic School of Public Health, Box. 12133, S-402 42, Goteborg, Sweden

WEBSITES FOR KANGAROO CARE

1. www.kangaguru.com has many items for sale for Kangaroo Care as does www.kangaroowraps.com

2. Krissanne Larimer has a website for KC and the KC bib is available off this web site. The site is http://www.geocities.com/roopage and a list of Dr. Ludington’s outcomes chart is at http://www.geocities.com/roopage/kcresearch.html.
   Krissane Larimer also has another web site, and the document on it is Kangaroo Care Benefits. http://www.prematurity.org/baby/kangaroo.html

3. www.pathfinder.com/NY1/living/health/kangaroo_baby_care This is New York city health site that reports where one can get Kangaroo Care in New York City and its outcomes. A very brief site.

4. KangarooCare@aol.com has some articles by Nils Bergman on it.

5. Kangaroo.javeriana.edu.co is the major KC Network website and is maintained by the Bogota group. It has many updates and should be checked regularly. It published as version of Dr. Ludington’s KC bib. This site is maintained by Natalie Charpak and Natalie Charpak’s email is herchar5@colomsat.net.co

6. Kcare@yahoogroups.com has Dr. Ludington’s and Dr. Andersons’ bibs on it.

7. http://preemienews.com is a website that in July 2000 had an article on KC that reports the opinion of several doctors and developmental specialists on KC and all opinions are positive.

8. 1998 BBC. “Kangaroo Care Counters the Cold.” This is a summary of Christensson’s 1998 article in the LANCET. http://news.bbc.co.uk/hi/english/newsid_184000/184480.stm

10. 2003 Bergman, Nils. Kangaroo Mother Care website, listing his tour dates, the KMC Shop with videos, postcards, Kangacarrier Shirts for sake, and reference list. Go to www.kangaroomothercare.com

11. March of Dimes in 2005 started a prematurity campaign and developed a website that has much about the good of Kangaroo Care in it. Go to: www.marchofdimes.com/prematurity to see what they have.

Hospitals with Seasoned, Active Programs of KC

WASHINGTON
Kadlec Medical Center, 333 Swift Ave., Richland WA 99352
RN: Mrs. Joan Swinth    MD: Anthony J. Hadeed

PENNSYLVANIA
Thomas Jefferson University
NICU: (215)-955-8346

MARYLAND
Anne Arundel Medical Center
Franklin Square Medical Center
RN: Ms. Wood    MD: Dr.

NIPPLE LEAKAGE CONTROL METHODS
-Prolac Inc. has created BLIS (breast milk leakage inhibitor system) which is a soft plastic shield that keeps the nipple dry and limits bacterial growth.

Self Stick breastpads are useful. Two brands are available: \\
-Lansinoh disposable nursing pads, 60 pads to a box. Manufactured by Pigeon Industries (Thailand)Co., LTD. Distributed by Lansinoh Laboratories, Inc. 599-B Oak Ridge Turnpike, Oak Ridge, TN 37830 (800-292-4794) or www.lansinoh.com or

-Soothies Avilable through Puronyx, 990 Park Center Drive, Suite E., Vista CA 92083. 800-944-4006 or 760-597-1460, Fax: 760-597-1466, www.puronyx.com or www.sooties.com


CARRYING DEVICES and CHAIRS:

Carrying Devices-
KanGuru wraps, pouches, and incubator transfer units. Wraps cover the mother’s entirely so she can continue the infant in KC and infant can go to breast to feed without being moved and without having mother exposed, no matter how many people come to visit her or interrupt. Wraps come in micropreemie size (with extra support for small infant’s head), preemie (1000-2500 grams or 2-5 pounds), and fullterm size (5-8 pounds). KanGuru LLC, phone: 440-247-6690; Fax: 440-247-6690; email: KangaGuru.com (WATCH THE SPELLING here, it is not what you expect!)

Nurtured by Me, Ellen Shatzkin, 53 Beverly Rd. White Plains, NY 10605, (914) 328-2226 or (914) 686-3203. This is an elaborate blouse and pouch. $65.00

Kanguruproducer, is a lovely little pouch for preemies from Scandinavia. Address is 4570 Hjortshog, 260 34 Morarp Country:?? Tellophone: 042/23 50 22 (kvallstid), postgiro: 456 98 80-0
Dr. Nils Bergman has a carrying device that includes a blouse that is available from his website (See under websites, 2000, Nils Bergman).

Dr. Elise Van Rooyen makes a simple carrying device that is used in all northern province hospitals of South African. It is machine washable, wraps easily, comes with good instructions, and is available for $10.00 from S. Ludington, Bolton School of Nursing, 10900 Euclide Ave., Cleveland, OH 44106-4904. email her at susan.Ludington@case.edu to order.


**Chairs**
La Napoule or La Fuma Lounge Chair (it goes by both names) or Zero-Gravity lounger. Folds to 7” for easy storage, and mothers can sit in these all day without episiotomy discomfort. All movement control is from legs, not arms and moms love this chair and can stay in it for 24 hours without fatigue, discomfort, or episiotomy pain. This is the one they use in Europe and it works well, folds up into extremely little space and is easy to move about. Comes in white, black or dark green. This can often be bought in Patio and Pool or Boat shops. Or you can order it from

1) Hammacher-Schlemmer, item # 67821G in the SKYMALL catalog of United Airlines, cost is $199.95. call 1-800-sky-mall. Or go to www.skmall.com

2) Plow & Hearth, item #2087A (The Original La Fuma)for $179.95 in the SKYMALL catalog, 1-800-759-6255 or www.skmall.com. Plow and heath has an extra wide (2 inches) and longer (3 inches) one as well and it is called the extra large chair. They also have one with extra padding on top of the mesh. Extra large chair is $209.95 (item #2490) These are all on page 63 of the February 2005 catalog. Comes in Green, blue, or black.

3) Frontgate is also selling the Zero Gravity chair in yellow, white, or beige. Item # 14225A $179.00 each (or two for $169.00 each) on page 20 of February 2005 Skymall catalog. Call 1-800-759-6255 or www.skmall.com

4/11/04 I just saw the La Fuma/La Napoule chair at COSTCO yesterday for $88.00. The chair they have there is called the Fabric Lounger and is available from CWC, PO BOX 34535, Seattle WASHINGTON, 98124-1535, ask for item # ITM ART 306122.

-The Kangaroo Care Chair- comes with 10 year warranty. Looks like regular padded chair. Get it from www.ioahealthcarefurniture.com or write to Mr. Fabio Delmestri, Executive Vice President, IoA Healthcare, 829 Blair Street, Thomasville, NC 27360. Phone 336-475-7106 or Fax 336-476-3016.

**FOUNDATIONS**
Fundacion Canguro
Transversal 39A No 46-29
Santafe de Bogota, COLOMBIA
Tel-fax; 57-1-222-70-45
Tel: 57-1-222-01-30
Home page is http://kangaroo.javeriana.edu.co

The KC mailing list is a forum to seek and exchange informaton on KMC. To suscribe to the KMC email list, send a message to: majordomo@hermes.javeriana.edu.co with no subject and write in the body of the message: subscribe kangaroo.