

General-Attitude/General Finding

Citation	Design/N	Page	Finding
Thomson, Hartsock, Larson, 1979	Double blind, quasi exp. (randomization not specified)	1376	All KC moms attempted BF in the delivery room. 9/15Controls and 13/15Kcers had happy maternal reaction to infant.
Whitelaw, 1986	Descriptive, VLBW. Routine monitoring done when infants <1500g were stable breathers without oxygen.	246	Mothers have commented that their lactation is better following a period of skin-to-skin contact
Sleath & Whitelaw, 1987	Descriptive, 5 KC pre-term infants <1500g.	Abstract	After kangaroo care and breastfeeding, "...mothers gained more confidence and made comments such as 'Now I feel like a Mummy' and 'Now I feel he's getting to know me.'"
Affonso et al., 1989	Comparative survey of KC moms and non-KC moms. Infants were healthy and stable. Interview during hospitalization for KC group and 1- 1 ½ years after discharge for non-KC group.	49-50	KC mothers felt confidence in breast feeding, comfortable in nursery, and eager for discharge verses frequently abandoned breastfeeding, anxious in nursery and about discharge.
Colonna et al., 1990	Descriptive, 100 KC preterm infants <1500g admitted to KC ward for 24 hr/day KC when VS stable and sucking demonstrated. Infants got adlib BF during KC (at least q 2 hrs)for 16 days.	337	95/100 exclusively breastfeeding low birth weight babies (1329g +/- 208g) were discharged alive after 16.3 days of kangaroo care starting at day 11.6 of life

Citation	Design/N	Page	Finding
Colonna et al., 1990	Descriptive, 100 KC preterm infants <1500g admitted to KC ward for 24 hr/day KC when VS stable and sucking demonstrated. Infants got adlib BF during KC (at least q 2 hrs)for 16 days.	338	Successful lactation, no gavage feeds, and limited use of formula supplements
Anderson, 1991	Review of literature and summation of state of science.	217	"Mothers were more inclined to breastfeed"
Hamelin & Ramachandran, 1993	Report of their experience with KC in NICU. Stable infants 800-1500g BW have contact with parents - as much as 3hrs/day, as tolerated.	16	"This [let-down during kangaroo care] encourages mothers to continue expressing milk, promotes early breastfeeding and enhances breastfeeding success."
Shiau & Anderson, 1997	Experimental, KC=29, standard nursery care = 20. Fullterms KCers got 8 hrs KC on Days 1,2,3 of life.	Abstract	Better breastfeeding status (by some unstated scale or scoring system) p =0.000 and lower Six Point Breast Engorgement Scale score (p=0.016) in KC dyads vs control dyads.

Meyer & Anderson, 1999	Case report, 3 KC mother-baby dyads	192	KC helped the baby latch on appropriately and enhanced mother-infant bonding.
Mikiel-Kostyra & Mazur, 2000	Data from 11,784 FULLTERM newborns, some given rooming in and some give KC.		KC was strong independent predictor of BF initiation. Influence of KC and rooming-in more evident in lower birth weight newborns.
Furman, Kennel et al., 2000 Acta Paediatrica			
Schanler, 2001	Review article of use of human milk for preemies.		The potential stimulation of an enteromammary pathway thru KC provides species-specific antimicrobial protection for preemies. Neonatal centers should encourage feeding of fortified milk together with KC as reasonable methods to enhance milk production.
Ramanathan et al., 2001	RCT of KMC 4 hrs/day in NICU and at home. Mother's attitude toward KMC taken by likert scale on Day 3 and Day 7		Abstract does not have result on this variable. Article has been ordered.

INITIATION OF BREAST FEEDING

CITATION	DESIGN/N	PAGE	FINDINGS
Mikiel-Kostyra & Mazur, 1998	Descriptive correlational between maternity ward practices and breastfeeding initiation. N = 11,750 FULL TERM newborns.	783	Factors identified as being related to ARTIFICIAL FEEDING , rather than BF are: -BW <2500 gm(Odds ratio 28.2) -neonatal complications (OR=10.3) -Cesarean birth (OR 4.3) -Mother/newborn separation >1hr/24hr (OR13%) -Lack of KC after birth (OR8.5)
Mikiel-Kostyra & Mazur, 2000	Data of 11,784 infants (FULL TERM and PRE-TERM). Newborns analyzed by logistic regression with wgt as continuous variable. Two hospital practices: KC vs. rooming-in, has their influence examined on BF.	Pg. 337	-97.2% of all newborns were BF -72.5% of LBWs were BF -Independent predictors of BF initiation were BW (continuous), rooming-in (OR 5.5), KC after birth (OR 3.4), lack of neonatal problems (OR 2.1). -Influence of rooming-in and KC on BF initiation was more evident for LBW newborns.

Breastfeeding at Discharge

Citation	Design/N	Page	Finding
Thomson, Hartsock, Larson, 1979	Quasi-exper., double blind (randomization not specified). Kcers held term infant for 15-20 min in delivery room; control held wrapped infant for 5 min.	1376	14/15 controls and 15/15 Kcers were breastfeeding at discharge.
Bosque et al., 1988	Descriptive, 6 KC mother-baby pairs. Data collected during 4hrs of KC and 4hrs of incubator care. All babies got KC and incubator care.	111	“6/8 (KC) (67%) were breastfeeding at the time of discharge.”
Tuomikoski-Koiranen, 1988	Experimental, N=16, 8 KC, 8 no skin to skin contact. KC x 20-60minutes several times a day to every other day for 18-20 days.	10	4/8 KC mothers and babies exclusively breastfed at discharge, versus 3/8 in control group. Also, 4/8 mothers were breastfeeding with supplement at discharge versus 3/8 of control group mothers.
Colonna et al., 1990	Descriptive, 100 KC preterm infants <1500g admitted to KC ward for 24 hr/day KC when VS stable and sucking demonstrated. Infants got adlib BF during KC (at least q 2 hrs) for 16 days.	337	“Almost all of them [newborn infants receiving KC] were exclusively breastfed at discharge.”
Wahlberg et al., 1990	Experimental, N=66, 33 KC of unreported duration, 33 no skin to skin contact. Same study as Affonso et al., 1989 and Wahlberg, et al., 1992	289	77% KC mothers and infants (n=33) breastfeeding at discharge versus 42% in control group (n=33)
Wahlberg et al., 1992	Retrospective/ comparative, N=66, 33 KC, 33 no skin to skin contact. All pre-terms with healthy mothers. Same study as Affonso et al., 1989 and Wahlberg, et al., 1990.	36	82% KC vs 45% control mothers breastfeeding at discharge (p=0.005). Enhanced opportunities for breastfeeding & continued success up to time of hospital discharge are benefits of KC.

Citation	Design/N	Page	Finding
Gale et al., 1993	Report of experience giving 25 intubated infants KC. Made comparisons to babies in NICU who previously did not receive KC.	55	Increased breastfeeding at discharge in KC babies (29% versus 11% in non KC infants).
Ludington-Hoe et al., 1993	Descriptive, 6 KC low-risk, pre-term infants given 6 hrs of KC beginning at birth	241	All infants were competent breastfeeders and only breastfed by 6 hrs postbirth. No supplementation needed unless signs of respiratory distress occurred.
Villalon & Alvarez,	Randomized control trial with full term	126	55/59 (93.2%) of KC babies BF at discharge vs 40/60

1993	infants , 59 KC, 60 control. Results were analyzed and were found to be independent of maternal parity.	128	(66.7%) in control (p<0.001) KC is an interesting method to stimulate maternal lactation.
Bell et al., 1995	Protocol implementation, descriptive, 102 KC mothers of pre-term or ill infants	314	80% of 102 pre-term or ill babies undergoing kangaroo care are breastfeeding at discharge
Bier et al., 1995	Experimental, N=44, 21 KC, 13 no skin to skin contact LBW	103A	1/21 KC mothers stopped breastfeeding before discharge compared with 7/13 control mothers
Bosque et al. 1995	Descriptive, pre-test-posttest design with subjects as own control. N=8 dyads had 4 hrs KC/day x 6days/wk x 3 wks	222	All infants breastfed first day of study in KC; 6/8 dyads partially breastfeeding at discharge.

Citation	Design/N	Page	Finding
Bier et al., 1996	Experimental, N=50 breastfeeding infants <1500g, 25 KC, 25 held in blanket LBW	126	90% of KC moms and babies are breastfeeding at discharge vs 61% in the control group (p<0.05).
Hurst et al., 1997	Repeated measures, ANOVA, N=23 breastfeeding mothers, 8 KC, 15 no KC, ventilated LBW	215	3/8 kangaroo care mothers and infants are exclusively breastfeeding at discharge vs 1/15 control group. 3/8 (37.5%)KC moms quit breastfeeding at discharge vs. 6/15 (40%) control group moms (no sig. diff.).
Hann et al, 1999	Experimental, controlled trial, clinical report. 28 infants with birth weight <1500g. 14 KC, 14 non-KC (2/14 received KC on one occasion each) Both groups were introduced to the breast as soon as possible; supplementation was provided either by NG tube or cup feeding.	38	Significantly more mothers in the KC group (100%) were breastfeeding at discharge than the control group (71%). (p≤ 0.05)
Roberts, Paynter, & McEwan, 2000	Experimental, N=30 dyads, 15 skin to skin contact, 15 contact through clothing	34	At discharge, 10/15 KC babies were breastfeeding, and 11/15 clothing contact babies were breastfeeding. No significant difference.

Breastfeeding Post-Discharge for Non-Uniform Durations

Citation	Design/N	Page	Finding
Thomson, Hartsock, Larson, 1979	Quasi-Experiment, double-blind (randomization not specified). KC group given 15-20 min of KC in delivery room; controls held wrapped infant for 5 minutes.	1376	Sig. More women in KC (9/15) group were BF without daily supplementary feeding at 2 months than controls (3/15).
Whitelaw et al., 1988	Experimental, N=71, 35 KC, 36 no KC	1380	Lactation longer than 6 weeks was 55% in KC vs 28% in control group. Mean duration in KC was 9.2 wks vs. 5.1 wks in control group (p=0.0167)
Whitelaw, 1990	Review of lit & commentary	604	Duration of lactation in KC group was significantly longer than in normal contact (clothed contact) group.
Anderson, 1991	Review of literature and summation of state of science.	217	KC babies breastfeed longer.
Syfrett et al., 1993	Experimental, N=8 34-36weeks gestation, 4 KC, 4 routine nursery care	Abstract	KC breastfeeding an average of 4.6 months after discharge vs only 2 months in control group.
Villalon & Alvarez, 1993	Randomized control trial with full term infants , 59 KC, 60 control. Results were analyzed and were found to be independent of maternal parity.	126	54/59 (89.9%) of KC babies were BF at 24h of life, versus 38/60 (63.3%) in control group (p<0.001). 27/33 (78.8%) KC babies were BF at 2 wks of life, versus 18/32 (56.2%) in the control group (p<0.001).

Citation	Design/N	Page	Finding
Bier et al., 1996	Experimental, N=50 breastfeeding infants <1500g, 25 KC, 25 held in blanket (control group)	1267	50% KC mothers breastfeeding 1 month after discharge, versus 11% in the control group.
Thompson, 1996	Case study of post-nec infant who started BF at 27 days.	234	Relactating mother continued to breast feed past the infant's first birthday.
Charpak et al, 1997	Experimental, N=1084. 382 continuous KC, 364	685	46% of KC babies were exclusively breastfeeding at

	stayed in nursery until discharge		term age. 45% of KC babies were partially breastfeeding at term age (No significant difference). Fewer KC babies received formula than control babies.
Hann et al, 1999	Experimental, controlled trial, clinical report. 28 infants with birth weight <1500g. 14 KC, 14 non-KC (2/14 received KC on one occasion each) Both groups were introduced to the breast as soon as possible; supplementation was provided either by NG tube or cup feeding.	38	2months after discharge, significantly more KC mothers (93%) than control group mothers(57%) were still breastfeeding. (p≤ 0.05)

Citation	Design/N	Page	Finding
Gloppstad, 2000	Descriptive, report from interviews with 108 mothers of KC infants with mean birth weight 1447.5g.	15	“A longer lactation period showed a significant relationship with early skin to skin holding of infants (p=0.0055).”
Roberts, Paynter, & McEwan, 2000	Experimental, N=30 mother-infant dyads, 15 KC; 15 contact through clothing	34	9/15 KC babies were breastfeeding at 6 wks, & 6/15 clothing contact babies were breastfeeding at 6 wks. (No significant difference in # breastfeeding at 6 wks).
Ramanathan et al., 2001	RCT of 14 KMCer and 14 incubator care. KMCers got 4 hrs/day over 3 sittings of KMC during intermediate care and at home. Incubator care babies got standard care.	Pg. Not in abstract. Article ordered.	At 6 weeks postdischarge, the # of moms EXCLUSIVELY BF was double (12/14) for KMCers than for controls (6/14).
Furman, Minich, and Hackman, 2002	Survey of 119 moms of VLBW infants who intended to breastfeed. Questionnaires at 3 wks postnatal age, 35 and 40 wks CA, and 4 months CA (Corrected age).	696	Of 87 moms who intended to BF, 30 (34%) continued lactation beyond 40 weeks CA. A significant correlate of lactation beyond 40wks CA was Kangaroo Care and increased maternal support for Kangaroo Care may improve the rate of successful lactation among mothers of VLBW infants who choose to BF.

Breastfeeding at 3 months Post-Discharge

Citation	Design/N	Page	Finding
Mulet, Figueroa de Leon, & Bran Gonzalez, 1992	Randomized controlled trial, Hospital de Obstetrician del Seguro Social. 111 infants weighing <1800g	58	78% of KC infants are exclusively breastfeeding at 3months of age, versus 34% in the control group (p 0.0003)
Bosque et al., 1995	Descriptive, subjects as own control in pretest-test-posttest design. N=8 dyads Who got 4 hrs KC/day x 6 days/wk x 3 weeks	222	3/6 dyads breastfeeding for 3-6 months postdischarge; the other 3 dyads breastfed for 1-3 months postdischarge.
Roberts, Paynter, & McEwan, 2000	Experimental, N=30 mother-infant dyads, 15 KC, 15 contact through clothing	34	7/15 KC babies were breastfeeding, and 5/15 clothing contact babies were breastfeeding at 3 months. (No significant difference in # breastfeeding at 3months)
Renfrew, Lang, Woolridge, 2001	Meta-analysis of 3 randomized controlled trials comparing early KC with BF (within 30 min of birth) to later KC & BF (4-8 hrs postbirth).N=209 women		No diferece detected for # of women BF 12 weeks postbirth between grps. Early contact was associated with greater communication between mom and baby.

Breastfeeding at 6 months Post-Discharge

Citation	Design/N	Page	Finding
Bier et al., 1996	Experimental, N=50 breastfeeding infants <1500g birth wgt, 25 KC, 25 held in blanket	1267	AT 6 months, 20% KC mothers versus 10% of control mothers continued to breastfeed.
Roberts, Paynter, & McEwan, 2000	Experimental, N=30 dyads, 15 KC, 15 contact through clothing	34	At 6 months, 4/15 KC babies and 4/15 clothing contact babies were breastfeeding. (No significant difference).

Milk Production

Citation	Design/N	Page	Finding
Schmidt & Wittreich, 1986	Experimental, N=33 premature infants, 12 KC, 11 standard incubator care	12	Milk production in KC group is 640 mL vs 400 mL in control group. (no p value reported)
Tuomikoski-Koiranen, 1988	Experimental, N=16, 8 KC, 8 no skin to skin contact. KC x 20-60minutes several times a day to every other day for 18-20 days.	10	Increased milk production in KC mothers.
Anderson, 1991	Review of literature and summation of state of science.	217	“The KC mothers produced more milk.”
Gale et al., 1993	Report of experience giving 25 intubated infants KC. Made comparisons to babies in NICU who previously did not receive KC.	55	No increase in milk production in KC mothers based on reports by mothers.
Hamelin & Ramachandran, 1993	Report of their experience with KC in NICU. Stable infants 800-1500g BW have contact with parents - as much as 3hrs/day, as tolerated.	16	“Mothers who have been expressing breast milk for their infant since birth often experience milk let-down during KC.”

Citation	Design/N	Page	Finding
Bier et al., 1995	Experimental, N=44, 21 KC, 13 no skin to skin contact	103A	No difference in milk production between KC and control groups.
Bier et al., 1996	Experimental, N=50 breastfeeding infants <1500g, 25 KC, 25 held in blanket	1265	“A more stable milk production was noted in the KC group” than in those swaddled in blankets.”
Thompson, 1996	Case report, N=1, 29wk gestation, birth wgt = 1390g receiving KC	234	“Mother felt tingling in breasts with an increase in milk production after each KC session,” when started with her 27 day old infant. AT discharge mom had 36 oz breastmilk/24hr – no supplementation needed. KC

			provided an “easy transition to breastfeeding.”
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Citation	Design/N	Page	Finding
Hurst et al., 1997	Repeated measures, ANOVA, N=23 breastfeeding mothers, 8 KC, 15 no KC	215	<p>“The KC group had a strong linear increase in milk volume in contrast to no indicative change of the control group’s milk volume.”</p> <ul style="list-style-type: none"> • at 2 weeks, 574 +/- 211mL in KC, vs. 462 +/- 222mL ctrl • at 3 weeks, 690 +/- 387mL in KC, vs. 485 +/- 349mL ctrl • at 4weeks, 851 +/- 259mL in KC, vs. 421 +/- 315mL ctrl
Shiau & Anderson, 1997	Experimental, KC=29, standard nursery care = 20. Fullterms KCers got 8 hrs KC on Days 1,2,3 of life.	Abstract	Contact with infants increased milk volume and stimulated the let-down reflex. In hospital
Hill, Aldag, & Chatterton, 1999	Experimental, randomized controlled trial of 20 moms in SINGLE PUMPING grp; 19 moms in double pumping grp. Average freq. of KC/wk was co-variant.	Abstract	KC was SIGNIFICANTLY influential on milk yield from 2-5 months.

Milk Maturation Time

Citation	Design/N	Page	Finding
Shiau & Anderson, 1997	Experimental, KC=29, standard nursery care = 20. Fullterms KCers got 8 hrs KC on Days 1,2,3 of life.	Abstract	No significant difference was found in breast milk maturation between the KC and control groups ($p < 0.05$).

Number of Feedings

Citation	Design/N	Page	Finding
Schmidt & Wittrich, 1986	Experimental, N=33 premature infants, 12 KC, 11 standard incubator care	12	Kangaroo care group fed twelve times a day verses 9 in the incubator group. (no p value).
Ludington-Hoe et al., 1993	Descriptive, 6 KC 34-36 wk preterms given 6 hrs of KC soon after birth	241	KC infants were fully breastfeeding by 6 hours postbirth. Findings of Syfrett & Anderson pilot cited in article were that fullterm infants given continuous KC for 4 days starting at birth breast fed 12.5 times /day vs. 2 times/day for control infants given standard nursery/mother's bedside care.

Number of Infants Breastfeeding

Citation	Design/N	Page	Finding
Wheeler, et al., 1999	Descriptive, 41 preterms of 32-37 wks GA, recorded BF activities daily	17	22.2% of infants had KC with tube feeding while at breast on day 1 of study. On Days 10-12, “kangaroo cuddle is not necessary because this is replaced by attempting to breastfeed.”
Ransjo-Arvidson et al., 2001	Tested 3 groups of FULLTERM newborns immediately after birth given KC. Videotaped for BF behaviors and sucking. Grp1 had no analgesia, grp 2 pudendal, grp 3 multiple analgesia during labor.		All grp infants made finger movements, multiple analgesic infants had significantly less hand-to-mouth behavior and sig. Fewer of them touched nipple and sucked. 50% of analgesic grps DID NOT BF in 1 st 2.5.hrs of life.

Nippling/Suckling at Breast

Citation	Design/N	Page	Finding
Thomson, Hartsock, Larson, 1979	Quasi-experiment, double blind, term infants in delivery room	1376	13/15 KC infants sucked eagerly and two only mouthed nipple when in KC for 15-20 min. starting 15-30 min after delivery. No controls sucked eagerly.
Moeller-Jensen et al., 1987	Report of experience with KC for pre-term infants <1500g	14	KC infants were more awake, seeking, and eager to suck than other infants.
Sleath & Whitelaw, 1987	Descriptive, 5 KC pre-term infants <1500g	Abstract	2/5 infants independently found the nipple, latched on, & started sucking.”
Righard & Alade, 1990	Experimental, N=72, 38 KC, 34 non KC Full-terms observed for 2 hrs post birth. KC given till 1 st nipping.	1105	More KC infants than separated infants showed the correct sucking technique (24-38 vs 7-34). Separated infants were naked on mom’s abdomen for 20 minutes, then dressed and returned to mother. KC infants did not leave the abdomen until first breastfeeding ended.
Ludington-Hoe & Swinth, 1996	Review of lit review & summation	699	Breastfeeding and on-demand suckling are self-regulatory behaviors that are constantly available to the infant during maternal KC
Meyer & Anderson, 1999	Case report, 3 KC mother-baby dyads	192	Successful breast suckling of all three KC dyads.

Glucose Control

Citation	Design/N	Page	Finding
Christensson et al., 1992	Experimental, N=50 fullterms given KC or cot care for 1 st 90 minutes postbirth	492	KC group had significantly higher level of glucose at 90 minutes postbirth than infants separated from moms and in cots.
Durand et al., 1997	Experimental, N=50 full-term infants without complications, 25 KC and breastfeeding, 25 radiant warmers and glucose water	26	Kangaroo care and control groups both maintained mean blood glucose levels (at 2.5h) that were within normal limits.

Weight Gain

Citation	Design/N	Page	Finding
Thomson, Hartsock, Larson, 1979	Quasi-experimental, double blind.	1376	Wgt at discharge and at 2 months not different between Kcer and controls. 9/15 Kcers & 3/15 controls were BF at two months.
Schmidt & Wittreich, 1986	Experimental, N=33 preterm infants, 12 KC, 11 standard incubator care	22 (In Table III)	Growth in KC infants is slightly better than in control infants (28.7g/day vs. 27.4g/day)
Armstrong, 1987	Report of practice at Kenyatta National Hospital. in Nairobi, Kenya, where adlib KC was encouraged among breastfeeding mothers and preterm infants.	36	Infants are discharged between 1850 and 2000 gm when gaining 20-30 gm/day on BF alone. No data can be attributed directly to KC vs. non-KC, as no measures of amount of KC or comparisons were made.
Colonna et al., 1990	Descriptive, 100 KC preterm infants <1500g admitted to KC ward for 24 hr/day KC when VS stable and sucking demonstrated. Infants got adlib BF during KC (at least q 2 hrs)for 16 days.	337	Infants were exclusively breast-fed (birth weight 1329g +/-208g) and gained a mean 12.8g/day.
Wahlberg et al., 1990	Experimental, N=66, 33 KC of unreported duration, 33 no skin to skin contact. Same study as Affonso et al., 1989 and Wahlberg, et al., 1992	289	KC infants had greater weight gain and were discharged eight days sooner than control.
Charpak, Pelaez, & Charpak, 1994	Experimental, Follow-up at several points during first year of life. N=332, 162 KC, 171 control. KC infants were lower SES and more ill at start of study.	809	Exclusively breast-fed infants born to low SES women require supplementation for acceptable weight gain.
Sloan, Camacho, Rojas et al., 1994	Experimental, Follow-up for 6months. N=275, 128 KC, 147 standard incubator	784	No significant differences between KC and control in growth indices during 6-month follow-up..
Charpak et al., 1997	Randomized controlled trial. 1084 infants \leq 2000g birthwgt, 764 randomized: 382 KC (24 hrs/day), 364 no KC and stayed in premature nursery til discharge. Followed for 12 months but this paper reports term age findings	685 686	Somatic growth indices were identical in the 2 groups. "We demonstrated that there is no reduction in early physical growth with the KC." (159/ 382 were exclusively breastfed, breast milk was supplemented in 177/382 infants, those who showed growth of <20g/day; 7/382 received formula only.) (No p available.)

Weight gain, cont'd

Citation	Design/N	Page	Finding
Hann et al, 1999	Randomized controlled trial, clinical report. 28	37-38	"Weight gain in both groups was within limits

	infants with birth weight <1500g. 14 KC (1.9 hrs/day until discharge at 1900gm), 14 non-KC (2/14 received KC on one occasion each) Both groups were introduced to the breast as soon as possible; supplementation was provided either by NG tube or cup feeding.		acceptable in standard neonatal care...there was a statistically significant gain of 3.42g per day more in the experimental (KC) group.” (p≤ 0.05)
McMaster & Vance, 2000	Descriptive comparative study of last 19 yrs of stats compared to last 1 year of stats when KC and BF were strictly adhered to for all	Abstract	KC seemed to have beneficial effects in rate of weight gain in LBW infants

Bradycardia Events

Citation	Design/N	Page	Finding
Bosque et al, 1988	Descriptive, 6 KC mother-baby pairs. Data collected during 4hrs of KC and 4hrs of incubator care. All babies got KC and incubator care.	402A	Bradycardia events were less common during BF when compared to either gavage or bottle feeding during early KC (p<0.005).

Description of Studies

Citation	Source	Design	N	KC	Control
Thomson, Hartsock, Larson, 1979	Canadian Family Physician 25	Quasi-experimental, double blind. Randomization not specified, but had treatment and control group. Observed in delivery room, at 2-4 days postpartum, and home visit at 2 months for baby's weight.	15 control, 15 KC. Term infants within 30 min. of birth	15 recd KC for 15-20 minutes after newborn care and episiotomy repair (started about 15-30 min postbirth)	Controls held wrapped for less than 5 minutes then taken to nursery and not seen again until 12-14 hrs later.
Schmidt & Wittreich, 1986	Euro-Amro Symposium on Appropriate Technology Following Birth	Experimental, Children's Hospital NIC of Univ. of Dusseldorf. Data collected daily in hospital and questionnaires completed by parents at discharge, 3 and 6 months age.	33 premature and SGA infants, between 1000-1500g with stable respiration and completely on oral feeds.	12 received KC when infants out of incubator and continued ad lib until discharge at mean of 34.9 days. Received mean 1.65 hrs/day with range from 0.67-2.84 hrs/day.	11 received standard incubator care, taken out for swaddled holding and feeding for mean of 0.76 hrs/day (R= 0.3-1.16 hrs/day). Were in study for 41.1 days.
Whitelaw, 1986	Maternal and Child Health	Descriptive, VLBW. Routine monitoring done when infants <1500g were stable breathers without oxygen.	20 infants <1500 g when breathing was stable and O ₂ no longer required.	20 got KC for up to three hours a day for unknown # of days.	N/A

Authors	Source	Design	N	KC	Control
Armstrong, 1987	Journal of Human Lactation	Report of practice at Kenyatta National Hospital, Nairobi, Kenya with <1500g preterms.	Unknown	Ad lib KC during breastfeeding by moms who came to nursery every three hours for feeding. BF began at 1700 g. Discharge at 1850g and 20-30g daily wgt gain. # of days of KC unknown.	N/A
Moeller-Jensen et al., 1987	UNICEF Publication	Report of experience at	Unknown	Received early and intermediate KC two	N/A

		Soenderborg Hospital, Denmark with preterms >1000g, stable breathing.		times/day for ad lib amounts while hospitalized. # of days of KC unknown.	
Sleath & Whitelaw, 1987	ANA Council of Nurse Researchers Abstract	Descriptive. Subjects part of larger study.	5 preterm infants, GA range = 26-31 wks; M BW = 1100 gms, M age – 15 days. Three infants were on VENTILATORS	5 were undressed and placed prone against mother's skin between breasts for a mean 32 mins/day for unknown # of days.	N/A

Authors	Source	Design	N	KC	Control
Bosque et al., 1988	Pediatric Research	Descriptive. Data collected once each week during 4hrs of KC and 4 hrs of incubator care. All subjects got both KC and Incubator care.	6 mother baby pairs. Mean GA 28weeks, range=24-32weeks. Infants were 1250-1750g birth weight, with stable respirations and temperature, without apnea and bradycardia, and could tolerate handling.	6 mother baby pairs; babies held in KC position and breastfed ad lib. KC for 4h/d,6d/wk, for 3 wks.	N/A
Tuomikoski-Koiranen, 1988	International Conference for Maternity Nurse Researchers: Presentation of entire study.	Experimental	16	8 with mean GA 29weeks and mean birth wight 1130g. KC on mother's breast for 20-60min at a time. 3 got KC every day, 1 nearly every day, and 4 every other day. KC continued for 18-20 days usually (R=8-29days).The KC babies were smaller and younger at start of study than control group	8 with mean GA 32 weeks and mean birth weight 1600g.; No KC.

Authors	Source	Design	N	KC	Control
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Whitelaw et al., 1988	Archives of Disease in Childhood	Experimental (RCT)at Hammersmith Hospital in London, England.	71 preterms less than 1500g with stable breathing, no oxygen requirement, and at least one parent who spoke fluent English.	35 (mean GA 29 wks, mean BW 1152g). Got KC for mean 2.1 visits/day for mean 0.6 hrs each visit (R- 0-1.5 hrs) until discharged and then at home.	36 (mean age GA 29 wks; Mean BW 1132g) with normal handling while clothed for M of 2.2 visits/day for 1.8hrs/visit (R=0.5- 5.2hrs).
Affonso et al, 1989	Neonatal Network	Comparative survey of group of mothers who gave KC vs. those who did not. Infants were healthy and stable ,between 1- 30 days of age, and put in open cribs. Semi-structured interview during hospitalization for KC group; 1-1.5 years after discharge for non-KC group.	66 mother-infant pairs	33 got KC for unknown duration and frequency after infant transferred to crib. KC group stayed in hospital for mean 41.58 days.	33 got routine neonatal intensive care nursery care before introduction of KC to nursery. This group stayed in hospital a mean 49.36 days.

Authors	Source	Design	N	KC	Control
Colonna et al., 1990	International Journal of Gynaecology and Obstetrics	Descriptive evaluation of KC at Mapto, Mozambique	100 LBW infants, mean BW 1329g, mean GA 32.5weeks who started KC at mean 11.6 days age and continued until discharge.	100 infants consecutively nursed in KC on a q 2hr schedule, # and duration of KC BF sessions unknown. 95 infants discharged at mean 28 day age after mean 16.3 days of KC breastfeeding (five died – 3 of diarrhea and 2 SIDS).	N/A
Righard & Alade, 1990	The Lancet	Descriptive comparative study of fullterm infants born	72 fullterm infants delivered normally to healthy mothers with	38 received uninterrupted skin contact with naked	34 rested on mother's abdomen after birth for 15-20 min., then

		by NSVD. Watched for first 2 hrs postbirth in the delivery room.	uncomplicated pregnancies	infant on mom's abdomen for at least one hour after birth or until first breast feeding had been accomplished. Most spontaneously breastfed by 49 mins postbirth.	removed for assessment and dressing over 20 minutes, then returned to mother clothed. Mothers initiated unsuccessful breastfeeding by 1 hr postbirth.
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Authors	Source	Design	N	KC	Control
Wahlberg et al., 1990	Lakartidningen	Experimental –same study as Affonso et al., 1989 and Wahlberg et al., 1992.	66 premature infants with BW <1500g, GA 26-38weeks.	33 got KC of unreported frequency and duration.	33, no skin-to-skin contact, held while dressed with blanket or under heating pad for ad lib duration and frequency.
Whitelaw, 1990	Pediatrics	Review of Literature and Commentary	N/A	N/A	N/A
Anderson, 1991	Journal of Perinatology	Review of literature and summation of state of science.	N/A	N/A	N/A
Christensson, 1992	Acta Paediatr	Experimental (randomized controlled trial) of fullterm infants born by NSVD were observed q 15 mins for 90 minutes postbirth	50 healthy fullterms	25 received KC for first 90 minutes after birth starting 8-11 minutes after birth	25 received cot care for first 90 minutes after birth
Wahlberg et al., 1992	European Journal of Public Health	Retrospective/ Comparative study in Helsinborg, Sweden begun when infants first taken out of incubator until discharge. Same study as Affonso et al., 1989 & Wahlberg et al., 1990	66 preterms with healthy mothers, healthy stable status, and between 1-30 days of age when initially removed from incubator.	33, frequency and duration of KC was ad lib and unknown.	33, dressed with blanket or heating pad, held babies before KC introduced to nursery. Frequency and duration of holding was adlib and unreported.

Authors	Source	Design	N	KC	Control
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Mulet, Figueroa de Leon, & Bran Gonzalez, 1992	Rev. Latin. Perinatol.	Randomized controlled trial, Hospital de Obstetrician del Seguro Social. Followed at 3 months post discharge for growth, development, and BF	111 infants BWt <1800g	51 given KC during hospitalization	61 given incubator care
Gale et al., 1993	Neonatal Network	Descriptive study as part of 3 year Special Start Program investigation at Oakland Children's Hospital	25 intubated infants with stable temperature and vital signs, and without apnea, or desaturation with handling. 25 Mothers of whom 15 were substance abusing moms and 7 FATHERS.	6/25 Moms & 2/7 Dads gave KC only once. Moms gave KC for 10-20 hours x 20-30 min each session.	NA
Hamelin & Ramachandran, 1993	The Canadian Nurse	Report of experience with KC at Health Science Center, Winnipeg. At 1500 g weight, parents hold dressed & bundled infant.	Hospital has 700 prematures admitted per year; unspecified number received KC.	Stable infants (as low as 800g wgt) with birth weight <1500g have contact with parents' skin starting at 30min/d and increasing up to 3hrs/d as tolerated until 1500 gram weight.	N/A
Ludington-Hoe et al., 1993	Journal of Human Lactation	Descriptive, in Cali, Colombia.	6 low-risk, pre-term infants, 34-36weeks GA	6 experienced six continuous hours of KC beginning within 30 minutes of birth until 6.5 hours postnatal age.	N/A

Authors	Source	Design	N	KC	Control
Syfrett & Anderson, 1993	Presentation at ANA biennial conference of Council of	Experimental, randomized controlled trial, 34-36 wks GA, AGA, 5 min APGAR	8	4 (MGA 35 wks; MBWt 2326g). Started KC at mean of 30 min postbirth. The infants were in KC for an	4 (MGA 34.5 wks, MBWt 2288g). Received routine nursery care after 30 mins of KC for remainder of observation

	Nurse Researchers	>7, no respiratory assistance or IV. All infants got 30 min of KC prior to group assignment; Observation period was mean 47 ±14 hours.		average of 84% (39.5 h) of the mean observation period.	period.
Villalon & Alvarez, 1993	Rev. Chil. Pediatr.	Experimental, randomized controlled trial at the Regional Hospital of Coyhaique, Chile. Data collected at 24h after birth, at discharge, and at 2 weeks of life.	119 full term infants 28-41 weeks GA weighing 2500-4250g and their mothers	59 KC starting immediate newborn care, wearing only diaper and covered by one blanket x 4 hrs	60 dressed and wrapped in observation nursery x 4 hrs
Charpak, Pelaez, & Charpak et al., 1994	Pediatrics	Experimental, follow-up at several points during first year of life. MGA was 35 wks for both groups, MBWt=1700 gms.	332 infants ≤2000g BWt with no serious congenital abnormalities or respiratory, metabolic, or infectious disease.	162 infants were kept in KC 24hrs/d until KC not tolerated anymore (Verbalized as 38-40 wks postconceptional age).	170 kept in incubators until discharge for Mean of 7 days.

Authors	Source	Design	N	KC	Control
Sloan et al., 1994	The Lancet	Experimental, randomized controlled trial. Follow-up at 1, 1.5, 2, 3, 4, 5, 6 months post-discharge	275 infants <2000g BWt, at least 24h of age, ingesting 50% of feed volume, stable weight	128 held upright in KC starting in hospital for a few days and then 24hrs/day until 3 months of age for most.	147, standard incubator care in hospital then open crib at home
Bell et al., 1995	MCN	Description of program (that included KC during NG/OG feeding phase)	102 mothers	NA	N/A

		prior to suckling) to promote BF at Univ. of Iowa Hospital and Clinics for prematures.			
Bier et al., 1995	Pediatric Research	ABSTRACT of Experiment, Randomized Controlled Trial- (same as Bier et al., 1996 that has 16 more subjects). Mean BWt 990gm, MGA 28wks. Every one minute observations during KC or incubator care for 13 ± 4 mins x 10 days .	34	21, KC every day for 13+/- 4minutes x 10 days = 140 KC sessions	13, standard care in incubators, 71 sessions evaluated

Authors	Source	Design	N	KC	Control
Bosque et al. 1995	JOGNN	Descriptive 4 hrs pretest (incubator) – 4 hr test (KC)- 4 hr posttest (incubator) each day x 6 days/wk x 3 wks (18 data collection periods per subject of polygraph data of 8 hr/day once each wk)	8 mother-infant pairs. Infants were AGA, >1250 BWt and non-intubated.	8, each infant acted as his own control during the pretest and posttest periods.	NA
Bier et al., 1996	Arch Pediatr Adolesc Med	Experimental, randomized controlled trial of LBW (MBWt = 942-993g, MGA = 27-28wks) observed once each weekday x 10 minutes until BF or bottle feedings initiated & at discharge, 1,3, 6 months post-discharge	50 infants with birth weights less than 1500g whose mothers planned to breast-feed	25, infant clothed only in a diaper and hat held upright between the mother's breasts with the mother and infant covered with a blanket. Observed for ten minutes x 10 days (176 KC sessions).	25; fully clothed infant wrapped in a blanket and held cradled in his or her mother's arms. Observed for ten minutes x10 days (137 sessions).
Ludington-Hoe &	JOGNN	Review of literature	N/A	N/A	N/A

Swinth, 1996					
Thompson, 1996	Journal of Human Lactation	Case Report of a post-nec infant who started breastfeeding at 27days of life.	1	One 29 week GA, BWt = 1390g. APGAR = 6, 8. Resolving NEC, mother had PIH and gestational diabetes. KC initiated day 27, for 30-60 min 2x/day	N/A

Authors	Source	Design	N	KC	Control
Charpak et al., 1997	Pediatrics	Experimental, randomized controlled trial, follow-up for 12 months, results here are 40 wk PCA results.	1084 newborns ≤ 2000g BWt	382 KC (MBWt = 1705 gm, MGA = 33.6 wks). Discharged immediately after randomization. Gave KC 24hrs/day & breastfed in KC until infant no longer tolerated KC.	364 (MBWt = 173 g, MGA = 33.9 wks) Stayed in premature nursery until discharge at 1700 g wgt
Durand et al., 1997	Neonatal Intensive Care	Ex post factor, quasi experiment (no randomized assignment. B1. Glucose sampled after 2 hours of KC or radiant heater care.	50 FULLTERM healthy infants, 2895-4365 gms.	25, exclusively fed in KC who required no additional oral intake & had 5+ LATCH score. Placed in KC within 30min after birth. KC continued for next 2 hrs. BF initiated during this two hour period.	25; taken to transition nursery, placed under radiant warmers x 2h, fed, and received 15mL glucose water. Blood glucose was then checked.

Authors	Source	Design	N	KC	Control
Hurst et al., 1997	Journal of Perinatology	Quasi-experiment, retrospective control group. Examined 24 hr milk volumes of moms of VENTILATED LBW infants in	23 breastfeeding mothers with similar lactation consultation within 24-48h of delivery	8 breastfeeding mothers gave KC within first four weeks of life (when infant stable) for 30min/day	15 breastfeeding mothers from the twelve month time period before KC started in NICU

		KC and control groups at 2,3,& 4 wks postdelivery			
Shiau & Anderson, 1997	International Breastfeeding Conference, Australia's Breastfeeding Assoc.	Experimental, randomized controlled trial	58 full term healthy infants	29 received KC for 8hrs/day on post-partum days 1-3	29 received routine nursery care (in newborn nursery, separated from Mom except at feeding times)
Hann, et al., 1999	SAMJ	Experimental, controlled trial and clinical report of findings	28 infants <1500g birth weight	14 infants receiving an average of 1.9hrs of KC per day until discharge at 1900g (M of 14.5 days)	12 infants receiving no KC, 2 infants received KC on one occasion each (Mean 17.0 days til discharge)

Authors	Source	Design	N	KC	Control
Hill, Aldag, & Chatterton, 1999	Birth-Issues in Perinatal Care	Experimental, randomized controlled trial of 20 moms in SINGLE PUMPING grp; 19 moms in double pumping grp. Average freq. of KC/wk was co-variant.	39	N/A Frequency of KC was CO-VARIANT only in this study.	N/A
Ludington-Hoe et al., 1999	JOGNN	Descriptive	6	Six 34-36 wk GA preterms (5 min APGAR = 6 or more) given continuous KC beginning soon (14-43 min) after birth and continuing for 6 hours.	N/A
Meyer & Anderson, 1999	MCN	Case Study of 3 mothers	3 Full term healthy infants	3, Case #1 KC initiated at 20hrs of life x1hr, Case #2, KC started at 30h of	N/A

				life x2hrs, and in Case #3 at an unspecified time for an unspecified duration	
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Authors	Source	Design	N	KC	Control
Wheeler et al., 1999	Breastfeeding Review	Descriptive, recorded BF activities and KC daily in study to establish pattern of progression from gavage to full nipple feedings.	41 pre-term infants 32-37 wks GA,	41 On days 1-10 of pre-breastfeeding KC was offered; but on Day 11 when BF started, KC was stopped.	N/A
Furman & Kennell, 2000	Acta Paediatr				
Gloppstad, 2000	Vard I Norden I	Descriptive, report from interview of mothers. Formed 4 groups based on BW and tracked BF duration.	108 infants with MBWt 1447.5g	102 received M of 92.1 ± 99.3 hours of KC over course of hospitalization.	N/A
McMaster & Vince, 2000	J. Tropical Pediatrics	Descriptive comparative study of last 19 yrs of stats compared to last 1 year of stats when KC and BF were strictly adhered to for all but the sickest babies.		N for last one year when KC and BF were strictly adhered to = ???	N for previous 19 years of statistics = ??
Roberts, Paynter, & McEwan, 2000	Neonatal Network	Experimental, randomized controlled trial by Zellen technique	30 premature, SGA infants (MBWt = 1524 gm, MGA = 31.5 wks)	16, KC for at least 2hrs/day x 5 days/wk x 4 wks.	14, cuddled (contact thru normal clothing) for at least 2hrs/day x 5 days/wk x 4 wks

References

Furman L, Kennell J. (2000). Breastmilk and skin-to-skin kangaroo care for premature infants. Avoiding bonding failure. Acta Paediatr. 89(11), 1280-1283.