Original Article

Experience with Kangaroo Mother Care in a Neonatal Intensive Care Unit (NICU) in Chandigarh, India

Veena Rani Parmar, Ajay Kumar, Rupinder Kaur, Siddharth Parmar, D. Kaur, Srikant Basu, Suksham Jain and Sunny Narula

Department of Pediatrics, Government Medical College Hospital, Chandigarh, India

ABSTRACT

Objective. To study the feasibility and acceptability of Kangaroo mother care (KMC) on the low birth weight infants (LBWI) in the neonatal intensive care unit (NICU) by the mothers, family members and health care workers (HCW) and to observe its effect on the vital parameters of the babies.

Method. A observation in the NICU.

Results. A total of 135 babies (74 boys and 61 girls) who completed minimum of 4 hrs of KMC/day, were included. The mean birth weight and gestation were 1460gm and 30 week respectively. 47% babies started KMC within first week of age. Mean duration of KMC was 7 days (3 -48) days. The O_2 saturation improved by 2-3%, temperature (^oC) rose from 36.75 ± 0.19 to 37.23 ± 0.25, respiration stabilized ($p<0.05$ for all) and heart rate dropped by 3-5 beats. No episodes of hypothermia or apnea were observed during KMC. KMC was accepted by 96 % mothers, 82% fathers and 84% other family members. 94% HCW considered it to be safe and conservative method of care of LBWI. Benefits of KMC on the babies' behavior and on maternal confidence and lactation were reported by 57%, 94% and 80% respectively. A decline in use of heating devices in the NICU was reported by 85% and 79% said it did not increase their work load.

Conclusion. KMC was found to be safe, effective and feasible method of care of LBWI even in the NICU settings. Positive attitudes were observed in mothers, families and HCW. **[Indian J Pediatr 2009; 76 (1) : 25-28]***E-mail:parmarveena@hotmail.com*

Key words : *KMC; LBWI; NICU; Feasibility and acceptability*

High tech neonatal care for low birth weight infants (LBWI) is demanding on the manpower, resources and finances in the developing countries. Kangaroo mother care (KMC) has been documented to be a safe and effective alternative comprehensive method for the care of LBWI in developing as well as in developed countries.[1-7] In addition, the beneficial effects of KMC on babies such as, stabilization of vital parameters (heart rate, respiration and oxygen saturation), better weight gain, improved survival and adequate thermo-regulation has been documented world over and so is improved maternal confidence and lactation.[7-10, 11-12.]

In our hospital, KMC is in practice since April 2002 and all LBWI in NICU as well as post natal wards are offered KMC. There is paucity of data on its use in the NICU setting from our country; therefore, we share our experience of a prospective study of experience with KMC in a NICU in Chandigarh. The aim of the present study was to evaluate the feasibility and acceptability of KMC in the intensive care setting, the attitudes of nurses, doctors, mothers and other family members towards this practice and the effects of KMC on babies.

Correspondence and Reprint requests : Dr Veena Rani Parmar, MD, Department of Pediatrics, Government Medical College and Hospital, Chandigarh, India

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METHODS

All neonates once out of critical illness (may still be on intravenous fluids and oxygen) were subjected to KMC. The (HCW) *i.e.,* doctors and nurses working in the neonatal unit had been educated about KMC. The health care workers HCW apprised the mothers, fathers and family members about its need and benefits to the baby and demonstrated the method of giving KMC. The naked baby clad in cap, booties and nappy was placed on the mothers' bare chest and held in position by using innovations like dupatta (stole), sports bra, loose blouse

or a specially designed sling. Temperature, heart rate, respiratory rate and oxygen saturation were recorded before and every ½ hour during KMC. Out of 353 admissions during the study period, the data of 135 babies who received minimum of 4 hours of KMC/day (at least one hour continuously in each sitting) were analyzed. Acceptability of KMC by mothers, the family members and the attitudes of HCW were assessed on a pre-designed questionnaire using the Likert's scale.[13]

Statistical analysis

Means and standard deviations were calculated for birth weight, gestation and changes in physiological parameters i.e. heart rate, respiration, temperature and oxygen saturation before and during KMC. p value < 0.05 was considered significant.

RESULTS

Out of the 135 babies there were 74 boys and 61 girls. Table 1 shows the distribution of babies as per their birth weight and gestation. The mean gestation was 30 (range 26-37) weeks and birth weight 1460 (range 550-2500) grams. Seventy-six percent babies were below 1500 grams and 75% below 32 weeks of gestation. Age at commencement of KMC was ≤ 3 days in 21%, from 4 to 7th day in 26%, 8th to 15th in 31% and beyond 2 weeks in 22%. The mean duration of KMC was 7 (range 3-48) days.

Influence of KMC on vital parameters of baby

During KMC, the oxygen saturation improved by 2-3% (95±0.96 to 97±1.50; p<0.05), respiratory rate decreased from 62±5.3 to 52±4.8 (p<0.05) and the body temperature (°C) rose from 36.75± 0.19 to 37.23±0.25; (p<0.05) and was sustained during the period of KMC. None of the babies developed cold stress, hypothermia or apnea during KMC. The heart rate dropped by 3-5 beats per minute (150 ±8.5 to 147±7.50, p>0.05) but remained within the physiological limits.

Acceptability of KMC by mothers and families (Table 2)

KMC was provided by mother (n=60), father (n=40), mother-in-law (n=32) or close relative (n=21). KMC providers were interviewed using a pre-specified questionnaire. Ninety-six percent mothers understood the method very well, but 12% required more than one session. Fifty percent mother showed initial apprehension but subsequently 98% were able to maintain their baby in KMC position comfortably and reported that they not only felt close to their baby but also it removed their stress of having been separated from the baby. Mood elevation, better confidence and a feeling of positive contribution towards the care of their LBW was reported by 96% and 94% mothers

Table 1. Distribution of subjects as per birth weight and gestation N=135

	Birth weight (grams)			Gestation in weeks		
	<28	28-30	31-32	33-34	35-37	Total
< 1000	8	17	9	2	nil	36
1000-1500	7	25	23	9	3	67
1501-2000	Nil	6	5	7	5	23
2001-2500	Nil	nil	nil	2	6	8
>2500	Nil	nil	nil	nil	1	1
Total	**15**	**48**	**37**	**20**	**15**	**135**

*103 (76%) babies were < 1500grams and 100(75%) < 32 weeks gestation.

Table 2. Acceptability of KMC by the Mothers N=60

S.N	Questions	Not at all n (%)	No n (%)	Not sure n (%)	Yes n (%)	Very much n (%)
1	Did you understand the method satisfactorily?				33 (55)	27 (45)
2	Should more sessions be held?				7 (12)	
3	Were you scared of adopting it for the first time?	21 (35)	9(15)		6 (10)	24 (40)
4	Did you feel closer to your baby?			1(1.6)	20 (33)	39 (65)
5	Were you able to maintain baby in KMC comfortably?		1(1.6)		38 (63)	21 (35)
6	Did KMC elevate your mood?			2(3)	31 (52)	28 (46)
7	Are you now more confident to handle your LBWI?				18 (30)	42 (70)
8	More confident in taking care of your baby at home			2(3)	18 (30)	40 (67)
9	Did it hamper your activities (Visit to toilets/bathing)	39 (65)	10 (17)		7 (12)	4 (6.6)
10	Was privacy a concern?	31(52)	23(38)	3(5)	3 (5)	
11	Will you advise it to others?				28 (47)	32 (53)
12	Will you continue it at home?		2(3)	2(3)	18 (30)	38 (63)
13	Is it useful for you & your baby?				21 (35)	39 (65)
14	Is it messy (baby's urine or stool)	12(20)	32(53)		11 (18)	5 (8.3)
15	Do you feel tired doing KMC?	36(60)	21(35)	nil	3 (5)	nil

respectively. Ninety-eight percent felt empowered to handle their babies at home and agreed to continue KMC at home. Interference into their routine activities, (visits to toilets, bathing *etc.*) and concerns of privacy were reported only by 18% and 6% mothers respectively.

The practice of KMC was not only accepted but also supported by 82.5% husbands, 84% mother-in-laws, and 81% other family members and many substituted for the mothers as KMC providers. All of them reported it to be an effective method of care for LBWI and useful for the baby, mother and family (Table 3).

Attitudes of Health Care workers (HCW) Table 4

Thirty health care workers (14 doctors and 16 nurses) were interviewed. Since the responses of both were similar, they were clubbed together for analysis. Ninety-four percent of HCW considered it to be a useful alternative/ adjunct method of care for LBWI and they were successful in motivating most of the mothers in first go. No increase in the work load or interference into the care of other sick neonates was reported by 79% but 18% were not sure of it. A definite decline in the use of heaters and hot air blowers in the NICU was reported by 93% and it reflected a saving on resources. Elevation of maternal mood, improved confidence to handle their LBWI and better lactation was reported respectively by 94%, 97% and 80% HCW. Ninety seven percent did not observe any episode of hypothermia/apnea during KMC. A positive response of KMC on the behavior of the babies (fewer episodes of crying and disturbed sleep) was observed by 57% but 37% were not sure and 7% said it made no change. All HCW were of the opinion that the babies who received prolonged sittings of KMC gained weight faster, had fewer illnesses, and went out of NICU earlier. They all said," KMC was effective in taking care of the vitals and temperature regulation of the LBWI and It was worth putting efforts to promote and continue KMC in the unit". All these observation were contrary to their initial apprehensions such as; KMC would increase the work load particularly that of frequent monitoring, it might interfere with care of other critically ill neonates in NICU and increase the risk of infection due to increased traffic in NICU by the KMC providers.

DISCUSSION

The demographic profile, age at commencement and mean duration of KMC in the present study was comparable with others.[4-6, 8-10] In experimental models, removal of the baby from correct habitat in all mammals exhibit a pre programmed response referred to as "Protest Despair response". Protest response being

Table 3. Opinion of Family Members*

SNo.	Family members	No use (%)	Cumbersome (%)	May be useful (%)	Useful (%)	Very useful (%)
1	Husbands N=40		2 (5)	5 (12.5)	14 (35)	19 (47.5)
2	Mother- in laws N=32			5 (15.6)	12 (37.5)	15 (46.5.)
3	Others: (father-in-laws =7 sister/sister in law=14			4 (19.2)	12 (57.2)	5 (23.8)

*16 husbands (one even with a plastered hand), 9 mothers-in-law, 2 sisters in law and 2 siblings substituted the mothers as KMC providers.

Table 4. Attitudes of Health Care Workers N=30

S.N	Questions n (%)	Not at all n (%)	No n (%)	Not sure n (%)	Yes n (%)	Very much
1	Will KMC ↑ the work load?		2(6.6)	6(20)	17 (57)	5 (16.6)
2	Will it compromise care to other sick babies?	3 (10)	3 (10)	11(37)	10 (33)	3 (10)
3	Did mothers feel happy doing KMC?			2(6.6)	23 (77)	5 (17)
4	Did they accept it easily?			3(10)	18 (60)	9 (30)
5	Did it ↑ lactation in mother?		2(7)	4(14)	20 (67)	4 (13)
6	Were mothers more confident to handle their LBWI after KMC?			3(10)	17 (57)	10 (33)
7	Effect of KMC on behavior of baby (↓cry, ↑ sleep)		2(7)	11(37)	15 (50)	2 (7)
8	Is it a useful method of care for LBWI?			1(3.3)	15 (50)	14 (47)
9	Would you recommend its use in community and hospitals?			4(14)	21 (70)	5 (16.6)
10	Would you advise mothers to continue KMC at home?			5(16.6)	24 (80)	1 (3.3)
11	Can mothers do it at home without supervision?			5(16.6)	25 (83)	
12	Was KMC effective in taking care of baby's temperature and Vitals?				30 (100)	
13	During KMC, did you observe any apnea/ hypothermia?		29 (96.6)	1(3.3)		
14	Did it ↓ the use of warming gadgets?			2(6.6)	21 (70)	7 (23.3)
15	Is it worth putting efforts in advocating KMC?				23 (77)	7 (23.3)
16	How use full is family education about KMC?				3 (10)	27 (90)
17	Was group KMC better?			2(6.6)	6 (20)	22 (73)

intense activity seeking re-uniting with the habitat and "despair response" a withdrawal and survival response manifested as decreased body temperature and heart rate mediated *via* a massive surge of stress hormone [14] A Similar response in human babies has been demonstrated by Christensson et al from Madrid [15] where they showed that human babies when separated from mothers give a 'separation distress call and a 'comfort response' upon reunion with the mother and KMC provides the opportunity to overcome the separation response. Effective and stable thermal control, improvement in oxygen saturation, stabilized heart rate and respiratory rate during KMC as observed by us has amply been documented in literature.[4, 6, 9-12, 15-17] Absence of hypothermia and apnea in our babies during KMC is in agreement with lesser or no episodes of hypothermia or apnea reported by Kadam S *et al*[6] Ludington Hoe *et al* [11] and Catteneo *et al*.[12]

A higher percentage (95-97%) of mothers in the present study accepted the KMC in comparison to 70-86% reported from India.[4-6] This was, however, similar to 95% reported from other countries.[7, 12, 17] The maternal empowerment, improved confidence, feeling of closeness to their babies and happiness expressed by more than 90% mothers in the present study was comparable to 83- 95% reported in literature.[4, 6-8, 18-20]

Acceptability and support for KMC by 82% husbands in the present study was much higher than 64% reported from Mumbai[4] but similar to 83% of Cattaneo *et al*.[12] The higher percentage of a positive attitude of husbands and that of mother-in-laws (84%) in the present study was perhaps responsible for a high acceptance of KMC by the families. Similarly, the positive and supportive attitudes of 90% of HCW were in agreement with 88-92% reported in literature.[4, 12] Improvement in lactation, better behavior of babies and improved confidence of mothers observed by 80%, 57 % and 88% respectively reported by our HCW too is in accordance with reports in literature.[18-20]

CONCLUSION

Kangaroo Mother Care was found to be acceptable, effective and safe method of care for very low birth weight infants by the families and health care workers. It was found to be safe and feasible even in the neonatal intensive care setting.

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