

To study the short-term outcome of kangaroo mother care in newborn with birth weight less than 1.5 kg

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Received – 06 January 2016

Initial Review – 29 February 2016

Published Online – 28 May 2016

ABSTRACT

Introduction: Kangaroo mother care (KMC) is an effective way to meet babies need for warmth, breastfeeding, and protection from infection, stimulation, safety, and love in resource-limited settings. **Objective:** To assess the effect of KMC on newborns weighing <1.5 kg on weight gain, duration of stay in hospital, and breastfeeding. **Methods:** A prospective case-control study was conducted in a tertiary care hospital of central India over 11-month period. A total of 70 newborns weighing <1.5 kg were included (35 each cases and controls) and were evaluated for short-term outcome of KMC on weight gain, breastfeeding, and duration of stay in hospital. **Results:** Mean daily weight gain was more in KMC group (16.94±3.84 vs. 4.29±6.94 g) ($p<0.05$). Mean weight at the time of discharge was more in KMC group (1.46±0.64 vs. 1.34±0.11 kg) ($p>0.05$). Breastfeeding was established 68.5% of babies in KMC group and in 34.2% in control group on discharge ($p<0.05$). The study showed that babies in KMC group were discharged earlier than controls (11.4±4.3 vs. 17.68±8.64 days) ($p<0.05$). **Conclusion:** Our study showed that babies in KMC group demonstrated more weight gain, both daily and on discharge. Duration of stay was shorter in them and more babies were shifted to breastfeeding earlier in KMC group. We conclude KMC as significant method of caring very low birth weight baby in resource-limited settings.

Key words: Breastfeeding, Kangaroo mother care, Weight gain

Kangaroo mother care (KMC) or maternal infant skin to skin contact is a low-cost method of care of low birth weight (LBW) babies. Factors that prompted this method of care were shortage of staff and equipment, an unacceptably high mortality and infection rate in the neonatal unit and overcrowding in the hospitals [1-3]. KMC is an evidence-based technology proposed as an “alternate care for LBW infants” which might be employed to ameliorate the effect of LBW on mortality and morbidity [1-4]. For many small preterm infants, receiving prolonged medical care, it is important to develop a method which is simple, acceptable to mothers, and can be continued at community/home for longer time [4]. Despite said advantages, it is still not a widely practiced method of care of LBW babies in India [5]. Hence, our aim was to assess the effect of KMC on weight gain, duration of hospital stay, and establishment of breastfeeding in the newborns weighing <1500 g in our setup.

METHODS

This prospective case-control study was conducted in a teaching institution with a tertiary level neonatal intensive care unit (NICU) in Central India over an 11-month period from

November 2012 to September 2013. Approval from Institutional Ethics Committee was obtained before starting the study. Consent was obtained from all the mothers before recruitment. The study population included consecutively born singleton intramural neonates weighing <1500 g. Chromosomal and life-threatening malformation, hypoxic-ischemic encephalopathy/pulmonary hypertension, poor mother compliance, and unhealthy mothers were excluded from the study. The primary outcome variable was “weight gain.” Secondary outcome measures were breastfeeding and duration of hospitalization.

All the mothers were motivated for KMC and were given information about KMC including methods of KMC and its benefits. We also took the help of visual mediums such as charts and videos. Special bag or kangaroo pouch made up of cotton cloth was designed to keep the baby in close contact with mother to provide KMC. Mother who was ready to do KMC was allocated to KMC group. An equal number of newborns from the same setting, matched for weight and gestational age received routine care (under servo controlled radiant warmer or in cradle with room heaters or blanket), who refused to do KMC were allocated to the control group. Randomization was not possible due to lack of resources and institutional problems.

Mode of feeding at admission to either group was noted down, whether on tube feed, spoon-feed, or breastfeed also received calcium and multivitamin supplements. Before allocating to either group, it was assured that baby was tolerating enteral feeds and there was no regurgitation. Gestational age assessment was done according to the Expanded New Ballard Score and accordingly neonates are classified as term and preterm. In both groups, birth weight and weight at the time of inclusion in the study were noted. Weight of the baby was recorded after removing all the clothes on electronic weighing machine (MEDITRIN) with accuracy of 5 g at least 2 h after the last feed. Head circumference was recorded by non-stretchable measuring tape with accuracy of 0.1 cm.

After allocating the babies in KMC or control group, they were observed daily and observations were recorded in a case record. Temperature measurement (taken 10 min after skin to skin care) and complete clinical examination was done in a minimum time to prevent hypothermia. Duration of skin to skin care (in h/day) and minimum 6 h/day of KMC was provided to the baby. If any problem was detected during KMC, either it was rectified or the baby was excluded from the study. Babies were discharged when they were suckling exclusively from the breast and gaining more than 15 g/day for at least three successive days. On discharge, we routinely advised mothers for follow-up, immunization, and exclusive breastfeeding till 6 months and complementary feeding after that.

The data were recorded in pre-designed proforma, tabulated and results were subjected to statistical analysis. This was performed using, mean, standard deviation, error of difference between two means and Z-test to test the significance (p value) between the two groups.

RESULTS

Baseline characteristics of newborns were matched and there was no significant difference between the groups observed in these variables (Table 1). The number of male babies in KMC group was less compared to control group (40% vs. 60%). Weight at the time of inclusion was slightly less in KMC group (1.25±0.125 vs. 1.26±0.13 kg), and these were slightly older (16.7±8.2 vs. 13.4±7.83 days). More number of babies was on the tube feeds in control group (91.4% vs. 65.7%). The minimum duration of skin to skin contact was 6 h in 3-4 sittings. There was no upper limit for the duration. KMC was acceptable to the most of mothers and their families. A feeling of happiness was experienced by (69.5%) mothers while practicing KMC and it was easily doing by (65.5%) mothers without assistance.

In the present study, mean daily weight gain was significantly more (p<0.05) in KMC group (16.94±3.84 vs. 4.29±6.94 g). Babies in KMC group were discharged earlier than the controls

Table 1: Baseline newborn characteristics

Variables	Mean±SD, n=35		p value
	KMC group	Control group	
Post-natal age (days)	16.7±8.2	13.4±7.83	0.03
Gestational age (weeks)	32.69±2.11	32.29±1.69	0.04
Birth weight (kg)	1.30±0.18	1.32±0.15	0.2
Weight at recruitment (kg)	1.25±0.125	1.26±0.13	0.19

KMC: Kangaroo mother care, SD: Standard deviation

Table 2: Comparison of weight gain, duration of stay, and breastfeeding

Characteristics	Mean±SD		p value
	KMC group	Control group	
Weight gain velocity (g/d)	16.9±3.84	4.297±6.94	<0.05
Weight on discharge (g)	1.46±0.64	1.34±0.11	>0.05
Duration of stay (days)	11.4±4.37	17.68±8.64	<0.05
Discharge on breastfeeding (%)	65.8	34.2	<0.05

KMC: Kangaroo mother care, SD: Standard deviation

(11.46±4.32 vs. 17.68±8.64 days) (p<0.05). Mean weight at the time of hospital discharge was significantly (p<0.05) more in KMC group (1.56±0.64 vs. 1.34±0.11 kg) but difference was not statistically (Table 2).

Breastfeeding was established 68.5% in KMC group and in 34.2% cases in control group on discharge favoring KMC group (p<0.05). Exclusive breastfeeding was found to be more prevalent in the KMC than the control group. Proportions of infants who were exclusively breastfed were higher at 40 weeks (KMC: 94.4%, control: 72.0% p=0.002), 3 months (KMC: 89.6%, control: 62.2% p=0.002), and 6 months (KMC: 84.6%, control: 55.5% p=0.006) post-conception age, the difference being statistically significant. No episode of apnea and hypothermia reported in KMC group and there was no death in KMC group.

DISCUSSIONS

The aim in the management of LBW infants is to achieve post-natal growth at intrauterine growth accretion rates. We had demonstrated a significant high daily weight gain in our KMC group which is comparable with other studies [5-8]. Suman et al. [3] found that KMC babies had better average daily weight gain (23.99 vs. 15.58 g, p<0.0001). Ramanathan et al. [8] also reported better weight gain after first week of life in KMC than control group (15.9±4.5 vs. 10.6±4.5 g/day). In our study, more babies were shifted to breastfeeding on discharge, which is

similar to the results (27.2±7 days vs. 34.6±7 days; p<0.05) of study done by Ramanathan et al., [8] Cattaneo et al. [7] KMC babies were discharged earlier (13.4 vs. 16.4 days) after enrollment.

We also found shorter duration of stay in babies who received KMC. Ramanathan et al. [8] also reported shorter hospital stay (16.6 vs. 20.7) in KMC group of babies. Similar results of shorter duration of hospital stay were found in various studies [9-12]. In the present study, the mean duration of KMC provided was 12.4 h per day which was similar to the duration (13.5 h per day) reported by Suman et al. [3]. Other advantages of this technique are low cost, promotes exclusive breastfeeding practice, increases mothers confidence in handling small babies, and builds good mother and infant bonding [7-9].

The positive facts realized were as follows: Mothers were able to understand and implement KMC with simple and clear oral instructions in local language. Positive feelings such as closeness to the baby and feeling of goodness were noted among the mothers since the very first day. KMC has a place of its own even in high tech environments such as ours. The parents (both the mother and father) of the KMC cases felt physically and emotionally closer to their babies and more confident in handling them as compared to the controls. In the present study, the maternal acceptance of KMC was good and concurred with other studies [8-13].

Limitations of the study were that the nursing staff had not received any formal training in KMC and social and cultural factors sometimes caused limitations in practicing KMC. On the other hand, many fallacies were overcome about the doubts and difficulties of initiating, implementing KMC in a resource-limited setting which caters to a population with rural background and low literacy rates.

CONCLUSIONS

KMC is a useful method of caring very low birth weight baby in respect of early weight gain and decrease in hospital stay. KMC improves growth in low birth weight infant and has a significant role in protecting the infant from various morbidities; hence, we recommend KMC for low birth weight infants as it is feasible, acceptable to mothers, and can be continued at home in the Indian set up.

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Funding: None; Conflict of Interest: None Stated.

How to cite this article: Biswas M, Malpani P, Ekka AS. To study the short-term outcome of kangaroo mother care in newborn with birth weight less than 1.5 kg. *Indian J Child Health*. 2016; 3(2):171-173.