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Original Research Article

A HOSPITAL BASED PROSPECTIVE STUDY TO COMPARE THE KANGAROO MOTHER CARE (KMC) WITH CONVENTIONAL METHOD OF CARE (CMC) IN THE CARE OF LOW BIRTH WEIGHT INFANTS (LBWI) AT TERTIARY CARE CENTER

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ABSTRACT

Background: Low birth weight (LBW) is a global problem particularly in developing countries. Kangaroo mother care is defined as early, prolonged & continuous skin to skin contact between mother and baby. Our aim of this study to compare the Kangaroo mother care (KMC) with conventional method of care (CMC) in the care of low birth weight infants (LBWI) at tertiary care center.

Materials & Methods: A hospital based randomized controlled study was conducted in Department of Pediatrics, JNUIMSRC, Jaipur, Rajasthan, India during one-year period. The study population included 80 consecutive singleton intramural neonates with birth weight <2000g. 40 infants who fulfilled the inclusion criteria were selected in each group. Group 1 receiving Kangaroo mother care and Group 2 receiving Conventional method of care in open radiant warmers. For the physiological parameters, the average readings in the KMC and CMC group for each parameter (oxygen saturation, temperature and weight gain) were compared with by unpaired, two-tailed 't' test and chi^2 test wherever applicable. The analysis was done using the SPSS version 21.0 for windows.

Results: The mean saturation of oxygen was 94.56% whereas in the CMC group it was 92.68% with a 'p' value of <0.01 which is statistically significant. The mean daily weight gain in the KMC group was 9.29 grams as against 7.13 grams in the CMC group with a 'p' value of 0.0001.

The mean body temperature in the KMC group was 37.18^{0}c as against 37.02^{0}c in the CMC group which is not statistically significant. The episodes of hypothermia measured twice a day for one week were 120 in the KMC group (17.15%) as against 160 (22.85%) in the CMC group with relative risk in the CMC group being 1.33 times that in KMC group.

Conclusion: We conclude that KMC improves growth in low birth weight infants and has a significant role in protecting the LBW infant from hypothermia, hypoglycemia and sepsis. The present study has important implications in the care of LBW infants in the developing countries, where expensive facilities for conventional care may not be available at all places.

Keywords: KMC, CMC, LBW Babies, Hypothermia, Oxygen Saturation.

INTRODUCTION

Kangaroo mother care is defined as early, prolonged & continuous skin to skin contact between mother and baby. It is a simple & easy method of caring for newborn infants where the mother uses her own body temperature to keep her baby warm. The beneficial effects are better weight gain, improved

survival & adequate thermo regulation. It is humane, low-cost method of care of low birth weight (LBW) infants particularly for those weighing less than 2000 gm at birth.[1]

Low birth weight (LBW) is a global problem particularly in developing countries. LBW and preterm births are associated with high neonatal mortality and morbidity and are public health problems in developing countries. Approximately 25 million LBW babies are born each year all over the world because of either preterm birth or impaired fetal growth. Of the estimated 4 million neonatal deaths, preterm and LBW babies constitute 20 percent. India's share of the global burden of neonatal deaths is the highest for any single nation. India accounts for 12 lakh of the 50 lakh newborn deaths in the world annually. LBW babies therefore represent a burden for the health and social systems globally. Incidence of LBW is 30-40% which is amongst the highest in the world and nearly 2/3 of neonatal mortality occur in LBW infants.[2]

The goal of nutritional management of the LBW infants is the achievement of postnatal growth at intra-uterine growth accretion rates.[3]

Though there have been several studies done comparing the effects of kangaroo mother care with conventional methods of care, either incubator or open radiant warmer care in the care of low birth weight infants, these studies have been done in foreign countries.

In our country neonatal mortality rate remains high in spite of the decline in the child mortality rate, a significant number of this being contributed by low birth weight. Also, conventional methods of care require maintenance of equipment, staff and manpower, which in our country is limited. Kangaroo mother care is a more economical alternative in these terms and if shown to be effective in caring for low birth weight infants can be applied in several tertiary care centers of our country.

Kangaroo mothers require the placement of the baby directly on the mother's breast for several hours a day, which should be acceptable by the mother. Also, in a culturally conservative society like India, the placement of the baby on the breast and mere covering of the baby and the breast by a bag or a pallu brings about certain restrains in its acceptability. Our aim of this study to compare the Kangaroo mother care (KMC) with conventional method of care (CMC) in the care of low birth weight infants (LBWI) at tertiary care center.

MATERIAL AND METHODS

A hospital based randomized controlled study was conducted in Department of Pediatrics, JNUIMSRC, Jaipur, Rajasthan, India during one-year period. The study population included 80 consecutive singleton intramural neonates with birth weight<2000 g. Critically ill babies requiring ventilatory or inotropic support, babies with life threatening congenital anomalies, babies requiring transfer, or whose mothers were critically ill, or unable to comply with the follow up schedule were excluded.

40 infants who fulfilled the inclusion criteria were selected in each group. Group 1 receiving Kangaroo mother care and Group 2 receiving Conventional method of care in open radiant warmers. The 40 mother infant dyads were observed for a period of seven days each.

Methods

All neonates with birth weight of 1000 to 1800 gm, stable cardiopulmonary status in air, Apgar's score of 7 at 5 minutes and on feeds (breast feeds or spoon *wati* feeds with expressed breast milk) were included in the present study.

Details of the antenatal period and delivery were recorded. Gestational age was assessed in both the groups by the new Ballard's score, within 24 hours of life by a single observer. Babies were weighed immediately after birth, length was measured at 24 hours of life with an infantometer and head circumference was measured at 48 hours of life with a non-stretchable cloth tape by the same observer.

In the KMC group the baby was placed on mother's chest in between the breasts in vertical position supported by a cloth designed for this purpose by the hospital, with mothers sitting in a semi-reclining position. KMC was given for a minimum of one hour at a stretch and continued for as long as comfortable to the baby and mother. The weights of the babies were recorded daily using the electronic weighing scale.

Babies were continuously monitored for oxygen-saturation and heart rate by pulse-oximeter and the saturation of oxygen was recorded twice daily for a period of 7 days.

Axillary temperature was measured by keeping the bulb of the thermometer in the axilla and the thermometer kept vertically along the long axis of the body. It was taken twice in a day at 7am and 7pm for three minutes during the observation period in

kangaroo care and episodes of hypothermia (temperature 36^{o}C) were recorded. Babies were monitored for apnea, sepsis, hyperbilirubinemia, serious illness, onset of breastfeeding, weight gain. KMC was discontinued if infant demonstrated 'discomfort', crying, pushing out legs or the mother was uncomfortable.

All babies assigned to CMC group were managed under radiant warmers. Mothers in both groups were allowed to enter and handle the babies at any hour of the day, change diapers and breastfeed the babies. Babies were discharged from the hospital when they were maintaining temperature without need for warmer, feeding well on breastfeeds or *wati* spoon-feeds and mother confident of taking care of the baby at home.

Statistical Methods

Characteristics of infants included in the present study were tabulated as averages (means) with

standard deviation (SD). For the physiological parameters, the average readings in the KMC and CMC group for each parameter (oxygen saturation, temperature and weight gain) were compared with by unpaired, two-tailed 't' test and chi^2 test wherever applicable. The analysis was done using the SPSS version 21.0 for windows.

RESULTS

Our study showed that out of the 40 babies in the KMC group, the mean saturation of oxygen was 94.56% whereas in the CMC group it was 92.68% with a 'p' value of <0.01 which is statistically significant. The mean daily weight gain in the KMC group was 9.29 grams as against 7.13 grams in the CMC group with a 'p' value of 0.0001.

The mean body temperature in the KMC group was 37.180c as against 37.020c in the CMC group which is not statistically significant.

The episodes of hypothermia measured twice a day for one week were 120 in the KMC group (17.15%) as against 160 (22.85%) in the CMC group with relative risk in the CMC group being 1.33 times that in KMC group. The 'p' value in this is less than 0.01, hence the episodes of hypothermia are significantly less in the KMC group. [Table 1]

Table 1: Comparison of variables in KMC & CMC groups

Variables		KMC (N=40)	CMC (N=40)	P-value
Oxygen saturation (%)		94.56±0.69	92.68±0.52	<0.01*
Daily weight gain (Kg) (Mean±SD)		9.29±2.81	7.13±2.56	<0.0001*
Body Temperature (^{0}C)		37.18±0.63	37.02±0.71	>0.01 (NS)
Hypothermia episodes	**No (n=1120)**	580 (82.85%)	540 (77.15%)	<0.01*
	Yes (n=280)	120 (17.15%)	160 (22.85%)	

DISCUSSION

The goal of nutritional management of the LBW infants is the achievement of postnatal growth at intra-uterine growth accretion rates.[3] We demonstrated a significantly higher daily weight gain in infants who received the KMC intervention. Kangaroo care by promoting exclusive breastfeeding, ensuring temperature maintenance, facilitating physiologic stability and decreasing neonatal morbidities, could result in improved physical and cognitive growth.[4]

The type of milk and the method of feeding were similar in both the groups with more than 95 % of babies receiving exclusive breastfeeds and the remaining was supplemented by banked human-milk.

Babies in KMC group had lesser episodes of hypothermia as compared to CMC group (120 vs 160) and this was statistically significant and also is similar to observations were made by Cattaneo et al., and Ludington-Hoe et al.[5,6] Baby is in contact with warm maternal skin and receives heat from mother's breast on each side and from her chest in front and rise in skin temperature is as a result of conductance of heat from mother to the infant.[7] This is due to the phenomenon of thermal synchrony which is maintained in Kangaroo mother care.

Placement of the infant underneath a blouse or shirt improved insulation and prevents heat loss during the maternal kangaroo care. Higher temperature in the skin-to skin contact in the present and the earlier studies provide evidence that maternal body is an efficient heat source for the baby.

Babies in the KMC group had significantly higher oxygen saturation as compared to the CMC group (94.56 vs 92.68) and these findings are in accordance with Acolet et al., Bier et al., and Fohe et al.[8-10]

Babies who were allotted in the KMC group had higher mean daily weight gain than the babies in the CMC group (9.222 grams as against 6.946 grams) and this was statistically significant and also is similar to observations were made by Cattaneo et al.[5]

In the present study, maternal acceptance of KMC was good and concurred with other studies. All the mothers were able to practice KMC at home. The response of the family and/or the father was supportive. This study has demonstrated that KMC is feasible in the Indian household. However, KMC was initiated in the hospital under close supervision and guidance and only later continued at home.

CONCLUSION

We conclude that KMC improves growth in low birth weight infants and has a significant role in protecting the LBW infant from hypothermia, hypoglycemia and sepsis. We recommend Kangaroo care for low birth weight infants. The present study has important implications in the care of LBW infants in the developing countries, where expensive facilities for conventional care may not be available at all places.

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