

# Comparison of Radiant Warmer Care and Kangaroo Mother Care Shortly after Birth on the Neurobehavioral Responses of the Newborn

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## ABSTRACT

*Background of the study:* In 1978, kangaroo mother care (KMC) was proposed as a caring alternative for low birth weight infants. The method of skin to skin contact has shown physiologic, cognitive and emotional gains for preterm infant, however, kangaroo mother care has not been studied adequately in term newborns. The present study reporting early outcomes of comparing the kangaroo mother care to radiant warmer care.

*Objectives of the study:*

- To assess the neurobehavioral response of the newborn during radiant warmer care (RWC) and kangaroo mother care
- The effect of radiant warmer care and kangaroo mother care on neurobehavioral response of the newborn.

*Methods:* A quasi-experimental post-test design was used in this study to compare the effect of kangaroo mother care and radiant warmer care on neurobehavioral response of term newborn. A total of 40 subjects who met the inclusion criteria were randomized—20 to KMC and 20 to RWC by simple random sampling technique. The data was collected by using the following tools:

1. Observational check list
2. Modified Brazelton Behavioral Assessment Scale.

*Results:* Both study groups were similar regarding all physiologic state variables. There is a slight difference in the behavioral state, the mean behavioral response scores of the RWC and KMC were 5.6500 and 5.9500 respectively, and the mean difference was 0.300.

*Interpretation and conclusion:* The findings of the study showed that kangaroo mother care seems to influence state organization and physiologic state regulation of the newborn infant shortly after birth.

**Keywords:** Neurobehavioral response, Kangaroo mother care, Term newborn.

## INTRODUCTION

At birth, newborns enter a foreign environment that lacks the close containment of extremities and continuous nourishment available in the womb.<sup>1</sup> For 9 months of pregnancy, mother and fetus have been one entity. In the womb baby is warm, fed and protected, and that is all it needs to develop. When it is newborn, it still needs to be warmed, fed and protected, and when placed skin to skin on mother's chest, a newborn baby is in the place where warmth, food and protection are best available.<sup>2</sup> Newborn's face major tasks during the 6-hour transitional period after birth. These tasks include conservation of energy, adaptation to the extrauterine environment and recovery from birth related fatigue. Successful completion of each task is reflected in minimal activity and stable physiologic measurements that are within the optimal range.<sup>3</sup>

Two researchers, Dr Peter Wolff of Boston and Professor Heinz Prechtl of the Netherlands, classified patterns of infant behavior into six different states of consciousness according to the baby's wakefulness to sleep. They are: 1—quiet alert, 2—active alert, 3—crying, 4—drowsiness, 5—quiet sleep, 6—active sleep.<sup>4</sup> Early skin to skin contact begins ideally at

birth and involves placing the naked baby covered across the back with a warm blanket, prone on the mother's bare chest. According to the mammalian neuroscience, the intimate contact inherent in this place evokes neurobehaviors ensuring fulfillment of basic biological needs. This time may represent a psychophysiological sensitive period for programming future behavior.<sup>2</sup>

India is at the threshold of an unprecedented scaling up of neonatal health services. Complimenting the house hold and community level interventions, a massive, country wide strengthening of newborn care is envisaged in government facilities in the 2nd phase of reproductive and child health program (2005-2010). Nearly 1200 primary health centers and 2000 first referral units will provide neonatal services in conjunction with emergency obstetric and sick child care by 2010, and nurses will be the key providers attending deliveries and providing care to inborn babies. Nurses play an important role in perinatal-neonatal care at health care facilities from being skilled attendants at birth. Nurses contribution to newborn care at district and subdistrict facilities is even more critical because

of shortage of physicians. They conduct most newborn deliveries and are responsible for intrapartum, postpartum and neonatal monitoring. Nurses are interface with the community and the family in regard to the promotion of healthy newborn care practices. On the whole, nurses form the backbone of newborn care.<sup>5</sup>

As the 21st century is in its threshold medical and nursing knowledge keeps changing rapidly. The evidence-based principles of newborn care were carefully adapted for application in the operational milieu of small facilities. In this background, the researcher felt that though KMC started for low birth weight babies, the principles apply equally to well grown full term babies and can be practiced in all country wide perinatal-neonatal care units. The investigator during her clinical practice observed that in routine newborn care the mother and the infant are separated immediately after the delivery and it affected the mother infant bonding or attachment. Few studies had reported that kangaroo mother care immediately after the birth help the newborn to regulate himself/herself through maternal skin to skin contact. In support of this view, the investigator hypothesized that kangaroo mother care would be superior to standard care in terms of neurobehavioral responses of newborns after birth. Hence, the aim of this study is to investigate the effect of KMC experience shortly after birth on self regulation and neurobehavioral expression of the term newborn during the 1st postnatal hours.

## METHODS

The data was collected from 30.06.08 to 05.08.08. A prior permission was obtained from the Departmental heads, Medical Superintendent and Nursing Superintendent. The investigator located the mothers in the antenatal ward. A handout about kangaroo mother care was distributed and the procedure, preparation and timings of kangaroo mother care were explained to them and informed consent was obtained. One or two babies were selected per day. For all the newborns, immediate newborn care was provided as per hospital routine. Shortly after birth (10 minutes) the KMC group infants were undressed except for a diaper placed between the mothers breast for 1 hour and was covered with the mothers gown and a baby sheet. With the infant's head close to mother's neck and the infant's feet on her abdomen. Mothers were bedded comfortably in a fully recumbent position on the delivery bed in the delivery room. The RWC group infants were dried and they were placed under a radiant warmer set to 37°C for 1 hour duration. The room was maintained at a calm, low sound level throughout the procedure. The data was collected using the following tool:

- **Section A:** Demographic proforma
- **Section B:** Modified Brazelton Behavioral Assessment Scale.

*Part 1:* Physiological state

*Part 2:* Behavioral state.

In the present study, the observation methodology was used as a physiologic and behavioral recording tool. After the 1 hour

procedure all the infants were brought to the newborn nursery. The assessment of outcome took place for all infants, the RWC and the KMC groups took place after 4 hours of intervention. It consisted of one 60-minute physiological and behavioral observation. During physiologic state observation, the temperature was measured by electronic thermometer. The respiratory rate, heart rate and O<sub>2</sub> saturation values were observed from the monitor. Modified Brazelton Behavioral Assessment Scale was used for the assessment of behavioral state. They are as follows: Deep quiet sleep state (score 6), active sleep state (score 5), drowsy state (score 4), quiet alert state (score 3), active alert state (score 2) and crying state (score 1).

## RESULTS

With regard to parity, majority 12 (60%) of the infants on RWC and 9 (45%) on KMC were born to primi mothers. With regard to gestational age, majority 14 (70%) in RWC and 12 (60%) in KMC were between 37 and 38 weeks of gestation. With regard to gender of newborn, majority 13 (65%) in RWC were females and in KMC, majority 11 (55%) were males. Majority of newborn 19 (95%) had birth weight between 2.5 and 3.5 kg.

All the infants, both in KMC and RWC, had a heart rate between 120 and 160 bpm. All the infants in RWC and KMC had a respiratory rate between 40 and 60 breaths/minutes. All the infants in RWC and KMC had oxygen saturation between 95 and 100% (Fig. 1).

The mean neurobehavioral response score of the radiant warmer care infant was 5.6500 and KMC was 5.9500, and the mean difference was 0.300. The calculated 't'-value (2.135) was more than the table value (2.064) at 0.05 level of significance. Since the independent sample 't'-test showed that there is a significant difference in neurobehavioral response of radiant warmer care infants and kangaroo mother care infants (Table 1).

The study findings showed that there is a significant difference between radiant warmer care infants and kangaroo mother care infants on neurobehavioral response. Hence, it is

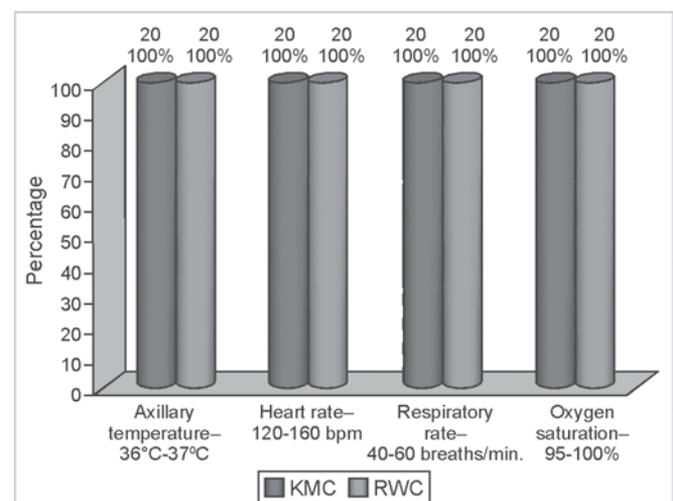


Fig. 1: Distribution of samples based on physiological parameters

**Table 1** Independent t-test showing the comparison of newborn

Comparison of infants neurobehavioral response during kangaroo mother care and radiant warmer care (n = 40)						
Variable	Mean	Mean difference	Standard error SE(D) deviation	t-value	d.f.	Level of significance
RWC	5.6500	0.300	0.1405	2.135	24	0.000 p < 0.05 significant
KMC	5.9500					

concluded that kangaroo mother care is superior to radiant warmer care on attaining neurobehavioral response.

## DISCUSSION

### Physiological State

The results of this study show that all the infants in RWC and KMC group had normal physiological parameters. There was no case found with hypothermia, bradycardia and apnea.

For 85 to 90% of newborns, transition from fetal to neonatal life is a time of rapid physiologic change. Much of the work of transition is accomplished in the first 4 to 6 hours after delivery. During that time most fetal lung fluid is absorbed, a normal functional residual lung capacity is established, and the heart sustains steady cardiac output.<sup>6</sup> The results of this study suggest that for the healthy newborn infant, much effort in the first 5 hours after delivery in current postpartum settings engenders a high degree of physiological state fluctuations. Balanced regulation of physiological state depend more on environmental stimuli than on the cardiac and respiration adjustment only. These domains seem to be very sensitive to maternal facilitation.

### Behavioral State

The findings of the study revealed that there was a significant difference in neurobehavioral response of radiant warmer care and kangaroo mother care infants. The mean neurobehavioral response score of the radiant warmer care infant was 5.6500 and KMC was 5.9500, and the mean difference was 0.300. The calculated 't'-value (2.135) was more than the table value (2.064) at 0.05 level of significance.

Recent reports addressed the issue of the quiet sleep during the first day after birth and interpreted this state as a newborn adaptive response to the stress of the birth. Thus, maintenance of quiet sleep in the KMC group infants may suggest that maternal touch during KMC may enhance a competent response in the newborn infant, which is an adaptive healthy behavior. Because the sleep-wake cycle of the newborn is characterized by 50% of active sleep state, and deep quiet sleep implies better control of brain stem.<sup>7</sup>

## RECOMMENDATIONS

In view of the findings and limitations of the present study following recommendations are offered for further research.

- A study on the effectiveness of kangaroo mother care on the weight gain of term babies may be done
- A study can be done to evaluate the issue of continued KMC during the first postnatal weeks and mother infant interaction
- A study can be done on kangaroo mother care and effectiveness of breast feeding
- A study can be done on kangaroo mother care and cost effectiveness
- A study can be done on predicting outcome on high risk newborn with neonatal behavioral assessment.

## CONCLUSIONS

In the last few decades, several health services have adopted KMC, thus showing that it is possible to adapt this practice to different contexts of access to neonatal care technology. KMC has accepted as an integral part of standard neonatal care in health care facilities. The nurse should take initiative in formulating clinical practice guidelines for kangaroo mother care. In affluence, kangaroo mother care is a precious gift. In financial constraints it is a useful addition to infant care. In poverty it may be the only means of survival.

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