Original Research Article

Comparison of variation in body temperature between standard care and kangaroo mother care after sponge bath in stable preterm neonates

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Abstract

Objective: To determine the impact of kangaroo mother care after sponge bathing on thermoregulation in stable preterm neonates admitted in the Neonatal Intensive Care Unit. **Methods:** This prospective comparative study was conducted at Ramaiah Medical College Hospital in the Neonatal Intensive Care Unit. All stable preterm neonates between gestational age of 28-36 weeks at birth, postnatal days 7-30 days, weighing less than 2000 grams at birth, admitted to the NICU for preterm care and who are on full nasogastric or pallada feeds were included. Neonates with major congenital anomalies, chromosomal abnormality, and neurological disorders were excluded. Neonates were given sponge bath followed by standard incubator care and kangaroo mother care on two consecutive days, thereby each neonate acts as a control for itself. The axillary temperature was measured before bath, 15mins,30mins and 60mins after bath. The difference in temperature between various time periods were compared between standard care and Kangaroo Mother Care. **Results:** The mean temperature ± SD (in °F), before bath in standard care and kangaroo mother care was found to be 98.56±0.18 and 98.52±0.29 respectively (P value=0.380) The mean difference in temperature ± SD (in °F), between 15 mins and 30 mins after bath in standard care and kangaroo mother care was found to be 0.093±0.37 and 0.234±0.23 respectively (P Value=0.01) **Conclusions:** The two methods of care- standard care and kangaroo mother care were found to be effective in raising the temperature of the neonate towards the baseline following sponge bath. However, kangaroo mother care was found to increase the temperature earlier than standard care. This reduces the period of stress the neonate undergoes thereby potentiating growth and development.

Key Words: Kangaroo mother care, hypothermia, sponge bath.

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INTRODUCTION

The World Health Organisation estimates that annually 15 million babies are born preterm[1]. It is also estimated that the number of deaths from preterm birth complications to be around 1 million[2]. Three quarters of these deaths can be prevented with simple, inexpensive timely interventions[1]. Preterm birth is one of the leading causes accounting for 12% of neonatal deaths.[3] Complications of preterm birth are the single largest direct cause of neonatal deaths, responsible for 35% of the world's 3.1 million deaths a year.[1] One of the most important cause of mortality is hypothermia. The prevalence of hypothermia in neonates born at hospitals ranges between 32%-85%.[4] These preterm neonates are

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born with systems inadequately prepared to support life in an extrauterine environment. Hence, they are cared for in the Neonatal Intensive Care Unit wherein ambient environment is provide for their growth and development. One of the aspects of routine preterm care in the NICU is bathing. Daily sponge bathing of stable preterm neonates and providing standard post bath care is a routine practice in our NICU as part of standard protocol. Fall in temperature and hypothermia during and after bathing in the NICU is a major concern. This fall in temperature and neonatal hypothermia (Core body temperature <36.5˚C)[5] lead to increased metabolic rate in these preterm neonates which leads to inadequate weight gain, hypoglycaemia and metabolic acidosis[6]. Various methods have been tried to minimise the disturbance in thermoneutral environment of the neonate. However, during and after bath, a drop in the body temperature has been observed[7]. One of the modes of thermoregulation is Kangaroo Mother Care (KMC). Kangaroo mother care is routinely practised in the care of preterm infants where in skin-to-skin with the mother is provided for the neonates. It is an effective method of care for term and preterm neonates. Providing KMC instead of standard incubator care post sponging not only helps in thermoregulation, it also provides other benefits of KMC. The purpose of this study was to determine the impact of kangaroo mother care on thermoregulation following standard sponging in the NICU. Thereby, exploring methods to provide thermoneutral environment for the neonate.

MATERIALS AND METHODS

This prospective comparative study was conducted at Ramaiah Medical College and Hospitals. It was approved by the institutional ethical committee and informed consent was taken. All stable preterm neonates between gestational age of 28-36 weeks at birth, postnatal days 7-30 days, weighing less than 2000grams at birth admitted to the NICU for preterm care and who are on full nasogastric or pallada feeds were included in the study. Neonates with major congenital anomalies, chromosomal abnormality, and neurological disorders were excluded. Sample size was calculated based on a pilot study. According to the data, assuming a mean difference of 0.2, alpha error of 5% (Confidence Interval: 95%) and beta error of 20% (Power: 80%) the sample size was calculated to be 66. Neonates satisfying the inclusion criteria were selected and basic demographic details, birth weight, gestation, and postnatal age were recorded in a pro forma. All stable neonates were under incubator care with the incubator temperature pre-set at 34°Cin air mode. Neonates were given sponge bath as standard NICU protocol in the morning between 6-6.30 AM by the nurse. Bath was given within the incubator with door open and at the pre-set mode as defined. Neonates were undressed, except for the nappy and all probes and electrodes were removed. Sterile gauze soaked in warm water (37-38 °C) were used for sponge bathing and the process of bathing took 2 mins to be complete following which the neonates were immediately dried with warm dry gauze, following which electrodes and probes were reattached. On day 1, neonates were given regular incubator care. On day 2, the same neonates were given KMC care after the bath. Hence, every neonate acted as a control for itself. Axillary temperature of all neonates was recorded before bath and at 15, 30 and 60 minutes after the bath using digital thermometer.

OBSERVATION AND RESULTS

Table 1: Baseline parameters

Parameter	STANDARD	KMC
Total neonates	66	66
Male neonates	38	38
Female neonates	28	28
Average Gestational Age	33.38±1.846	33.35±1.835
Average Birth Weight	1358±300.186	1392±206.768

Table 2: Comparison of difference in temperature between standard care and kangaroo mother care

Difference in temperature	Standard Care Mean±SD (in °C)	Kangaroo Mother Care Mean±SD (in °C)	P value
Average Temperature before bath	98.56±0.18	98.52±0.29	0.380
Before bath and 15 mins after bath	-0.236±0.33	-0.242±0.34	0.91
15 mins and 30 mins after bath	0.093±0.377	0.234±0.23	0.01*
30 and 60 mins after bath	0.071±0.33	0.080±0.25	0.862
Before bath and 60 mins after bath	-0.071±0.41	0.0727±0.29	0.022*

*P value statistically significant - Independent samples T test

The mean temperature before bath was recorded to be 98.52±0.29 and 98.56±0.18 with a P value of 0.380. The mean difference in temperature 15 minutes after bath and before bath was found to be -0.242±0.34 and -0.236±0.33 in Kangaroo Mother Care and standard care respectively (Mean difference in temperature ± SD [in °F]) and P value was 0.91. The mean difference in temperature 30 minutes after bath and 15 minutes after bath was found to be 0.234±0.23 and 0.09±0.38 in Kangaroo Mother Care and standard care respectively (Mean difference in temperature ± SD [in °F]) and P value was 0.01 (Statistically significant) The mean difference in temperature 60 minutes after bath and 30 minutes after bath was found to be 0.080±0.25 and 0.071±0.337 in Kangaroo Mother Care and standard care respectively (Mean difference in temperature ± SD [in °F]) and P value was 0.862. The mean difference in temperature 60 minutes after bath and before bath was found to be 0.072±0.29 and -0.071±0.41in Kangaroo Mother Care and standard care respectively (Mean difference in temperature ± SD [in °F]) and P value was 0.022 (Statistically Significant)

DISCUSSION

The aim of the current study was to determine the impact of kangaroo mother care in thermoregulation in preterm neonates following sponge bathing. The analysis of mean difference in temperature at various time periods showed that both standard care and kangaroo mother care bring the temperature back to baseline at around 60 mins after bath. However, a comparison between these temperature differences at various time periods shows a faster increase in temperature towards the baseline with kangaroo mother care than standard care. There is a statistically significant difference in the mean difference in temperatures between 30 minutes and 15 minutes after bath between the two modes of care. As per the above-mentioned results, in both care groups the baseline temperatures are comparable. There is an initial fall seen in both groups in the next 15 minutes which are also comparable. Following the fall in temperature, a rise in temperature is seen in both groups between 15 and 30 minutes, the increase being significantly higher in Kangaroo Mother Care than in standard care. There is a rise in temperature between 30 and 60 minutes in both groups. Tapia-Rombo CA *et al*. conducted a study in seventy-nine preterm neonates to study the variations of vital signs, skin colour, behaviour and oxygen saturation after sponge bathing. They noticed significant change in physiological parameters, but no complications were noted.[8] Hence, sponge bathing was used in our study. Kangaroo Mother Care is an established method of care for preterm neonates for thermoregulation. In a study conducted by Bera A *et al*.[9], it was found that during KMC, there are improvements in vital physiological parameters which are heart rate, respiration, oxygen saturation and temperature. A correction of abnormalities during KMC was also noted along with an increase in mean temperature of 0.4˚C[9] Apart from thermoregulation. kangaroo mother care has known to increase bonding between the mother and child. It has been reported to reduce mortality, increase weight gain, maternal satisfaction with infant care method[10]. Owing to these advantages, kangaroo mother care was used in our study. So, in our study sponge bathing was combined with kangaroo mother care and the efficacy of this combined method to maintain a thermoneutral environment was studied. In a study conducted by Edraki M *et al*.[11], they compared the variation in temperature between swaddle bathing and conventional bathing 10 minutes before and after the bath. It was found that in conventional bathing, the temperature before was 36.55 ±0.24 and after was 35.96 ± 0.26 with a body temperature change of -0.59 ± 0.25 which falls in the hypothermic range of temperature (Mean ± Standard deviation [in ˚C]. Neonatal hypothermia is defined by the World Health Organisation as a temperature below 36.5 ˚C[5]. Hypoglycemia, respiratory distress, hypoxia, metabolic acidosis, coagulation defects, delayed readjustment from fetal to newborn circulation, acute renal failure, necrotizing enterocolitis, failure to increase weight or weight loss and in extreme cases death are the potential consequences of hypothermia in neonates.[6] Although, in our study, even though a reduction in temperature was noted, neonates did not become hypothermic. But the possibility of hypothermia cannot be completely ruled out with sponging method[11]. Irrespective of the absolute temperature, Kangaroo Mother Care is effective in bringing the neonate back to the baseline temperature. When compared to standard care, the return of the temperature to the baseline is faster in KMC which reduces the duration of lowered body temperature. Hence, in hospitals equipped with incubators, warmers and in resource poor settings, kangaroo mother care is an effective, inexpensive mode of warm care following bathing in neonates.

CONCLUSION

Kangaroo Mother Care is an effective, inexpensive mode of warm care after bathing for preterm neonates. It can be used effectively in well-equipped hospitals and resource-poor settings.

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