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Effectiveness of Kangaroo Mother Care with and without thermal blanket on physiological parameters among preterm neonates

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ABSTRACT: Premature babies are anatomically and functionally immature and therefore their

Neonatal mortality is high. So they need early intervention and proper treatment to avoid further complications. They usually suffer problems like hypothermia, feeding problems, inadequate weight and so on. This study was conducted with purpose of assessing the effectiveness of Kangaroo Mother Care and Kangaroo Mother Care with thermal blanket on physiological parameters among preterm neonates and to find out which is more effective. 1. To assess the physiological parameters before and after kangaroo mother care among preterm neonates. 2. To assess the physiological parameters before and after kangaroo mother care with thermal Blanket. 3. To assess the effectiveness of Kangaroo Mother Care on physiological parameters. 4. To assess the effectiveness of Kangaroo Mother Care with thermal blanket on physiological parameters. 5. To compare the effectiveness of Kangaroo Mother Care with thermal blanket and Kangaroo Mother Care without thermal blanket on physiological parameters in both experimental group. Material and Method: Quasi experimental two group pre-test post-test design was used for the study. This study was conducted in selected Neonatal Intensive Care units.50 preterm neonates with 25 were assigned to experimental group I & experimental group II. Non probability purposive sampling technique was used.Validity of the tool was done by 20 experts from related field. Result and Conclusion: In experimental group I preliminary assessment on Day 1 and post assessment on Day 10 showed a significant difference in the physiological parameters like Temperature, Heart rate, Respiration rate SPO2 and Weight as the p value is less than 0.05. In experimental group II Pre assessment on 1st day result and post assessment on 10th day result showed a significant difference on all five parameters as the p value is less than 0.05.Comparing the effectiveness of Experimental group I& Experimental group II the result shows that Temperature, Heart rate, Respiration rate and SPO2 have significant difference but w.r.t. weight there is no significant difference. Even though there is no statistical difference, the mean score shows the babies in experimental group II have stability in physiological parameters and gain in weight. Weight didn't show significant difference that may be due to shorter time duration of the study i.e. 10days. Result of the study proves that Kangaroo Mother Care with thermal blanket and Kangaroo Mother Care, both the interventions are effective for preterm neonates on Stabilizing physiological parameters. But KMC with thermal blanket results shows more effective than only routine KMC.

KEYWORDS: Assessment, Kangaroo Mother Care, Preterm neonate, Physiological parameters Thermal Blanket.

I. INTRODUCTION

Child health is said to be the base of family and wealth of the Nation. When the little one comes into the world, parents and family members give him or her warm welcome. The world at the turn of the new millennium facing the major child health problems is high neonatal mortality.[1]The global burden of newborn deaths is estimated to be a staggering five million per annum. Only 2% of this death occurs in developed countries, the rest 98% take place in developing countries. The neonatal mortality rates were seen more in countries of South Asia resulting in almost 2 million newborn deaths in the region every year, in that India contributing 60% of it.[2]

The baby born before 37 weeks of gestation is called as preterm babies. More than any other single cause preterm related causes of death together accounted for 35% of all infant deaths in 2010. Recent statistics of WHO shows there is range of 5% to 18% preterm birth in a year and global prevalence of low birth weight is 15.5%. Pre-term and Low birth weight babies suffer with many early and late problems like hypothermia, feeding problems, infections, respiratory problems, learning difficulties, neurological problems etc[3].

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An effective and important intervention in caring for preterm babies weighing less than 2 kg is Kangaroo Mother Care. It helps in exclusive and frequent breastfeeding in addition to skin-to-skin contact. Advantages of KMC are not only limited to neonates, the mothers too get benefits from it. The bond between a mother and neonates will improve and mother gets satisfaction through this intervention. KMC, also helps the mother to overcome the trauma of the birth that did not go as desired.Maintaining temperature by a cost effective method of care called Kangaroo Mother Care. In India, most of the population are below poverty line, which gives lots of stress to the family for the long term care for their low birth weight infants. Kangaroo Mother Care safeguards people from all economic standards to give the needed care for their preterm babies. Kangaroo Mother Care helps the preterm babies to gain temperature slowly and prevent hypothermia.9 Therefore, the preterm baby becomes calm and relaxed. It also helps the baby to conserve energy and it helps the neonate in growing.[4]

According to the report published recently by WHO,India has the highest number of deaths due to preterm births and ranks 36th in the list of preterm births globally. The ranking included 199 countries of the 27 million babies born in India annually , 3.6million are born preterm, of which 303,600 don't survive due to problems complications. Nearly half of all child mortality is due to preterm births says a new report by Save the Children, titled 'Born Too Soon". Above 60% preterm births occur in South Asia and Africa , but preterm birth is a worldwide problem.$_2$ In lower income countries12%of babies are born too early and on average, 9% of babies are in higher income countries. Within countries, poorer families are at great risk.[5]

Thermal blanket is a device used to reduce heat loss in baby's body caused by thermal radiation, water evaporation and convection. Kangaroo Mother Care and thermal blankets are the measures taken to prevent hypothermia and helps to improve the physiological parameters of preterm infants in Neonatal ICUs and even at home. Thermal blanket is designed low bulk blanket, light weight made of heat reflective thin plastic sheeting. These sheets are not the typical foil which we get at the grocery store, but derived from NASA technology, also called as Mylar blankets, or emergency blankets. [6]

Thermal blankets are used to cover the neonates by covering the trolley to prevent hypothermia together with radiant warmer. It is proven that it prevents hypothermia both in extreme preterm and low birth weight babies. Thermal blankets are cheaply available today. They work to keep extra heat out and also works to keep heat in. Because these thermal blankets reflect the wearers body heat back toward the wearer, these blankets have potential and have multiple uses. Hospitals find them useful because it keep the patients warm during surgery, as anesthesia tends to make people shiver. Many hospitals use these thermal blankets as mattress cover for babies in ICU as well as postnatal wards to keep the neonate warm.[7]

It was identified by the investigator during her clinical experience that a number of low birth weight and preterm babies die within neonatal period due to the complications. Three quarters of neonatal deaths can be prevented with these cost effective interventions .As KMC increase the bonding between the mother and the baby to help the neonate to fulfil the psycho social developmental stage of trust VS mistrust which will help the child to achieve the further stage.

Literature Review

Literature review for the present study included published and unpublished articles, researchable and non-researchable articles, reviews from national and international journals, Books from different authors. Review of literature for the present study was presented under Literature related to statistics of preterm birth. Literature related to problems of preterm. Literature related to KMC on physiological parameters and Literature related effect of thermal blanket on preterm neonates.

Bera et alconducted a cohort study to assess the preterm babies' physiological state before and after KMC. Setting selected was a teaching hospital. Study consisted of in-born pre-term babies and their mothers .Sampling was done by purposive sampling technique and the sample size were 300 mother-baby pairs. KMC was started for 1 hour duration on first day. (at a stretch) and then each day duration increased up to two hours for next 2 days. Immediately before and after KMC, Axillary temperature, Respiration rate (RR/ min), Heart rate (HR/ min), and Oxygen saturation (SpO_2) assessment were done. Analyzed the data from 265 mother-baby pairs.Result reveals that during KMC sessions improvements occurred in all 4 recorded physiological parameters.On all these 3 days babies receiving KMC showed the result of modest but statistically significant improvement in all these vital physiological parameters [8]

Hsu et al determined the effectiveness of temperature-controlled thermal blanket as additional thermo protection. Inborn very low-birth-weight infants were assigned to thermal blanket group or control at 1:1 ratio, a pre warmed blanket of Blanketrol II was applied as mattress for thermal blanket group in addition with warmer. The result showed that the use of thermal blanket as an additional thermal protection for very low-birth-weight infants, helps to improve the degree of hypothermia ,which also showed fewer hypertensive cases and less dopamine usage.[9]

Research Methodology and Procedure

The research approach adopted for the study was quantitative research approach as the data collected and analysis were on numerical forms. Quasi experimental two group pre-test post-test design was used for the study.[10] 50 pre term neonates with their mothers were selected and 25 each were assigned to experimental group I (KMC with thermal blanket)) and experimental II (Routine KMC).The sample size was calculated by using power analysis. Probability purposive sampling technique was used for the present study. After preliminary assessment baby kept in KMC position and both mother and baby covered with thermal blanket.1st day only one hour Kangaroo Mother Care was given. Second to fourth day 2 hours and fifth to tenth day 4 hours were given. Fifteen minutes after completion of each session physiological parameters were assessed on 3rd, 5th &10th day. In experimental group II, only Kangaroo Mother Care was given .Assessment of physiological parameters done as same like Experimental group 1.Assessment was done till 10th day. Procedure followed for both group were same except thermal blanket The reliability of the tool was determined by intra rater method with interval of 10 days. The reliability coefficient 'r' of the each parameter were more than 0.76..Hence the tool was found to be reliable.

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Data collection tool

Data collection tool had two sections that is section I and section II. Section I contains Demographic variables of preterm neonates which includes Age (in days), Sex, Weight (in Gms) and Gestational age (in weeks).Section II contains observation checklist for assessing physiological parameters of pre term that is temperature, Heart rate, Respiration, SPO2,and Weight.

Ethical considerations

Research proposal with data collection tool was presented in front of the ethical committee for approval. After approval from the ethics committee permission from the concerned authority of hospitals was taken. Written informed consent were taken from each parents . Confidentiality maintained by giving code numbers to data collection tool .

Data Collection

In each group every sample was assessed for 4 times by using observation checklist in which the 1st assessment was done before starting the intervention in both groups and remaining 3 were on 3rd ,5th and 10th day 15 minutes after intervention in both the groups.

Analysis and Interpretation of the Data

Table No. I

N=50

Variables	**Groups**	**Group I**		**Group II**	
		Frequency	**Percentage (%)**	**Frequency**	**Percentage (%)**
Age(In days)	8-14	2	8.00	12	48.00
	15-21	15	60.00	11	44.00
	22-28	8	32.00	2	8.00
Sex	Male	12	48.00	14	56.00
	Female	13	52.00	11	44.00
Weight(In Gms)	1500-2000	18	72.00	14	56.00
	2001-2500	7	28.00	11	44.00
Gestational age(In weeks)	30-33	4	16.00	6	24.00
	34-37	21	84.00	19	76.00

Table No.1 shows the frequency and percentage distribution of demographic variable

Table No. 2

Physiological parameters before and after Kangaroo Mother Care

N=25

Parameter		**Mean**	**SD**
Temperature (F)	Before	97.69	0.34
	After	98.36	0.21
Heart rate (Min)	Before	149.28	4.61
	After	142.24	4.87
Respiration (Min)	Before	43.86	4.85
	After	38.00	3.16
	Before	92.64	2.17

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SPO2 (%)	After	96.32	2.56
Weight (Gms)	Before	1814.20	285.50
	After	1902.60	283.60

Table No 2 shows that there is change in each physiological parameters after Kangaroo Mother Care.ie. on 10th day of intervention. Here mean value in each physiological parameter after Kangaroo Mother Care shows a good difference compared with pre assessment.

Table No. 3

Physiological parameters before and after Kangaroo Mother Care with thermal blanket

N=*25*

Parameter		**Mean**	**SD**
Temperature (F)	Before	97.72	0.32
	After	98.52	0.11
Heart rate (Min)	Before	142.52	12.71
	After	134.16	4.20
Respiration (Min)	Before	38.00	10.47
	After	30.40	3.21
SPO2 (%)	Before	98.64	2.28
	After	99.72	0.61
Weight (Gms)	Before	1832.60	236.90
	After	1944.50	240.30

Table No.3 shows change in parameters after giving Kangaroo Mother Care with thermal blanket i e. on 10th day of intervention.

Table No. 4

Effect of kangaroo mother care on physiological parameters after KMC

(Day 1& 10) **N=25**

Parameter		**Mean**	**SD**	**T Value**	**P Value**
Temperature (f)	Before	97.61	0.34	7.90	0.00
	After	98.36	0.21		
Heart rate (min)	Before	149.28	4.61	5.86	0.00
	After	142.24	4.87		
Respiration (min)	Before	43.36	4.85	5.33	0.00
	After	38.00	3.16		
SPO2 (%)	Before	92.64	2.17	5.57	0.00
	After	96.32	2.51		

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Weight (Gms)	Before	1814.20	285.50	38.52	0.00
	After	1902.60	283.70		

Above table shows that in each physiological parameters Temperature, Heart rate, Respiration, SPO2 and Weight there is significant difference after giving KMC.

Table No. 5

Effect of kangaroo mother care on physiological parameters with thermal blanket

(Day 1& Day 10)

N=25

Parameter		**Mean**	**SD**	**T Value**	**P Value**
Temperature (F)	Before	97.72	0.32	12.85	0.00
	After	98.52	0.11		
Heart rate (Min)	Before	142.52	12.71	3.85	0.00
	After	134.16	4.20		
Respiration (Min)	Before	38.00	10.47	4.35	0.00
	After	30.40	3.21		
SPO2 (%)	Before	98.64	2.28	14.76	0.00
	After	99.72	0.61		
Weight (Gms)	Before	1832.60	236.90	16.15	0.00
	After	1944.50	240.30		

Above table shows that there is significant difference in each physiological parameters after Kangaroo Mother Care with thermal blanket as p value is less than 0.05in all five parameters

Table No.6

Comparison between group KMC and KMC with thermal blanket on physiological parameters ((Day10)

N=50

Parameters		**Mean**	**SD**	**t value**	**p value**
Temperature(F)	KMC with thermal blanket	98.52	0.11	3.27	0.00
	KMC	98.36	0.21		
Heart Rate (Min)	KMC with thermal blanket	134.16	4.20	6.28	0.00
	KMC	142.24	4.88		
Respiration(Min)	KMC with thermal blanket	30.40	3.21	8.43	0.00

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	KMC	38.00	3.16		
SPO2 (%)	KMC with thermal blanket	99.72	0.61	6.57	0.00
	KMC	96.32	2.51		
Weight(Gms)	KMC with thermal blanket	1944.00	240.00	0.56	0.58
	KMC	1903.00	284.00		

Table No.9 shows that there is significant difference in physiological parameters ie. Temperature, Heart Rate, Respiration, SPO2 between the group of KMC with thermal blanket and routine KMC as the p value is less than 0.05. But in Weight there is no significant difference as the p value is more than 0.05.

Conclusion

In the present study concludes with assessment of the effectiveness of Kangaroo Mother Care and Kangaroo Mother Care with thermal blanket on physiological parameters and comparison between these two groups, findings among pre-term neonates**.** Findings of the study clearly indicate that there are changes in physiological parameters in both the groups and KMC with thermal blanket is more effective than routine KMC.

In both groups the researcher found difference in physiological parameters. It may be due to adjustment in extra uterine life and as the age increases the physiological parameters improves. Here Kangaroo Mother Care with thermal blanket was found more effective. Thermal blanket can be used for additional thermal protection while giving KMC and it is less expensive and can be affordable for a middle class family.

In the present study, maternal acceptance of KMC was good and the response of family members and the father was supportive. Most of the families and mothers accepted the KMC and KMC with thermal blanket and expressed happiness and gave feedback. Most of the mothers showed interest in continuing KMC with thermal blanket at home.

Present study time duration was up to 4 hours and duration of intervention was up to 10 days. Time duration was shorter in this study and only 10 days were there for observation. Drop out of samples and to get the sample within one month time duration was also slightly difficult.

Strength of the present study was active participation and involvement of pre term babies' mothers and their families during KMC session and the families were eager to know about the thermal blanket. Many families showed interest and were ready to continue the practice at home. Other positive factor is that the settings the researcher selected for the study allowed the doctors and nurses active participation and continuing the KMC practice for preterm neonates and also advised the families to use the thermal blankets for a better effect.

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