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Effectiveness of kangaroo mother care on physiological parameters of low-birth-weight infants in government hospital of Chittoor district - A Pre-Experimental study

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Abstract
Background of the Study: Low birth weight (LBW2500g regardless of gestational age) is a significant predictor of neonatal mortality within 28 days of birth. It is estimated that out of 139 million live births each year, more than 20 million infants are born with low birth weight.
Aim: This study was conducted to determine the efficacy of Kangaroo mother care for neonates with low birth weight.
Methodology: The pre-experimental design was selected for the investigation. The investigation was conducted at Chittoor's Government Hospital. The infants with low birth weight were selected using a convenient sampling method, and the efficacy of kangaroo mother care was evaluated using an observational checklist. Using descriptive and inferential statistics, the collated data was analyzed and interpreted.
Results: The data collected was analyzed and interpreted. This study revealed that 5(16%-67%) infants have weight 1-2kg. 24 (80%) infants have weight >2-2.5kg, 1(3.33%) infant has weight >2.5-3 kg and 2(26.67%) infants have body temperature 36.5◦C-37.5 ◦C and 22(73.33%) infants have body temperature <36.5 ◦C.
Conclusion: The results of the current study indicate that kangaroo care is effective in boosting the birth weight of infants who were born prematurely and in fostering maternal attachment in these infants.

Keywords: Effectiveness, kangaroo mother care, low birth weight, infants

Introduction
Every year, around 20 million babies are born around the world with a low birth weight, which places a significant strain on the healthcare and social systems of poor nations [1]. The medical treatment of infants who were born with a low birth weight is difficult, requires an expensive infrastructure and highly qualified professionals, and may be an extremely upsetting experience for the families involved [2]. Babies born prematurely in environments with insufficient resources frequently find themselves in neonatal care units that are understaffed and poorly equipped. These units have the potential to become potentially lethal death traps due to a variety of factors working together, such as defective incubators and monitors, overcrowding, nosocomial infections, and so on [3].
Edgar Rey, a pediatrician from Colombia, was concerned with the problems that a shortage of incubators and the impact of separating women from newborns in neonatal care units would cause, so he established Kangaroo Mother Care (KMC) in 1978. KMC stands for "kangaroo mother care [4]." In KMC, infants weighing less than 2000 g at birth and unable to regulate their body temperature are kept with their mothers as incubators, primary source of stimulation, and food. Newborns are placed in skin-to-skin contact with their mothers and other caretakers, wearing only a diaper and a baby bonnet, and are kept upright 24 hours a day. Without disrupting breastfeeding routines, mothers can share the provider role of the kangaroo position with others, particularly the fathers of the infants. The carer should slumber in an almost-sitting position.

The KMC begins when the infant no longer requires additional support from the neonatal care unit, although intermittent skin-to-skin contact has been used with ventilated infants [5]. KMC often begins in the hospital with an adaption procedure. Carers attend a day clinic where they are trained, newborns are watched, and the carer integrates into a social peer network during adaption and after discharge. Following that, care is provided at home, with follow-up visits as needed. KMC can be applied at a variety of settings at varying levels of care [6].

KMC has been shown to be effective and safe for use in preterm infants that are stable. KMC is at least as safe and successful as conventional treatment with incubators for babies born with low birthweights of 2000 g or less who are unable to regulate their own temperature. The long-term therapeutic effects of KMC were evaluated in a randomised controlled trial of 746 infants with low birth weights in Bogotá, Colombia. Children with KMC had higher rates of effective breastfeeding and milder illnesses when followed up with at 12 months of age adjusted for gestational age (93% of children). Babies who were born "Kangaroo" style and weighed less than 1500 g spent less time in the hospital [7].

Acceptance of the procedure has risen as a means of dealing with poor and insufficient incubator care for extremely little newborns whose sole medical concerns stem from being born underweight. The benefits of KMC for LBW newborns, as well as its simple acceptability by mothers and nurses, and the early release of these babies with good long-term outcomes, prompted us to investigate the benefits of KMC at our centre, which serves the Chitoor District of Andhra Pradesh.

Objectives

1. To evaluate the physiological parameters [weight and temperature] of newborns at a Chittoor government hospital.
2. To assess the efficacy of KMC on physiological parameters in newborns at a selected Government Hospital in Chittoor.

Methodology

The research design used for the present study is pre-experimental pre-test posttest design. The study was conducted in Government Hospital, Chattier. This is a 200 bedded hospital and it has all the specialties like obstetrics and gynecology, general medicine, pediatrics and orthopedics with advanced technology. The population of study includes all low-birth-weight babies in Government Hospital, Chittoor district. The sample selected for the present study is 30 low birth weight admitted in maternal child health block in Government Hospital, Chittoor. Convenient sample technique was used to select low birth weight newborns based on inclusive and exclusive criteria.

Criteria For Sample Selection

Inclusive criteria

1. New born with low birth weight
2. New born with very low birth weight
3. New born with exclusive low birth weight
4. New born with low birth babies with respiratory distress syndrome
5. New born with birth asphyxia
6. New born with jaundice

Exclusive Criteria

1. Normal baby
2. The baby's who's not sitting in kangaroo mother care position
3. Mothers who are not willing to participate in study
4. Mothers absent at the time of data collection
5. The new born attending for outpatient department
6. The new born with congenital anomalies

Description of the Instruments

Part-1

Demographic variables of baby like age of the baby, sex, weight and type of feeding.

Part-2

Observation checklist on parameters of newborn consists of [Temperature, pulse, respiration, weight, sleep, cry, motor activity, feeding.

Data collection procedure

The information was gathered in July of 2018. Mothers were interviewed to acquire data on the demographic characteristics of the research samples. Physiological parameters of newborns and the efficacy of kangaroo mother care for infants born prematurely or with low birth weight were evaluated using an observational checklist. The researcher briefed her on the participants and the study's rationale. Temperature, respiration rate/minute, heart rate, and oxygen saturation [SPO2] were measured just before and after kangaroo mother care for a total of 6 days, with initial sessions lasting 2 hours and subsequent sessions occurring every hour.

Data analysis

The answers provided by the mothers were recorded on a master data sheet. The frequency and percentage responses to the question in the demographic data were compiled. Descriptive statistics were used to analyse the demographic factors. Inferential statistics were used to evaluate the impact of kangaroo mother care on the physiological parameters of newborns.

Results and Interpretation

Table 1: Distribution of demographic variables among infants (n = 30)

S.NO	Demographic variable	Number	Percentage
1.	**Age**		
a)	0-7 days: Newborn	20	66.67%
b)	8-16 days: Early Neonate	8	26.67%
c)	17-28 days: Late Neonate	2	6.67%
2.	**Sex**		
a)	Male	14	46.67%
b)	Female	16	53.33%
3.	**Weight**		
a)	1-2 kg	5	16.67%
b)	>2-25 kg	24	80%
c)	>2.5-3 kg	1	3.33%
d)	>3-3.5 kg	0	0
4.	**Type of feeding**		
a)	Exclusive Breastfeeding	11	36.67%
b)	Expressed Breast milk feeding	15	50%
c)	Artificial feeding	1	3.33%
d)	Parenteral feeding	3	10%

The frequency and percentage distribution of infant demographic variables are displayed in Table 1.
20 infants (66.67%) are 0-7 days old, 8 infants (26.67%) are 8-16 days old, and 2 infants (6.67%) are 17-28 days old. Regarding gender, there are 14 (46.67%) male infants and 16 (53.33%) female infants. Regarding weight, 5 (16.67%) infants weigh between 1-2 kg, 24 (80%) infants weigh between >2-2.5 kg and >2.5-3 kg, and none of the infants weigh between >3-3.5 kg. 11 infants (36.67%) are exclusively breastfed, 15 infants (50%) are fed expressed breast milk, 1 infant (3.33%) is given artificial nutrition, and 3 infants (10%) are given parenteral feeding.

Table 2: Distribution of physiological parameters among infants (n = 30)

S.NO	Physiological parameter	Number	Percentage
1.	**Weight**		
a)	1-2 kg	5	16.67%
b)	>2-2.5 kg	24	80%
c)	>2.5-3 kg	1	3.33%
d)	>3-3.5 kg	0	0
2.	**Temperature**		
a)	36.5 ◦C-37.5 ◦C	8	26.67%
b)	<36.5 ◦C	22	73.33%

The frequency and percentage distribution of physiological markers in babies is shown in Table 2.
In terms of weight, 5(16.67%) infants weigh 1-2 kg, 24(80%) infants weigh >2-2.5 kg, 1 (3.33%) infant weigh >2.5-3 kg, and none weigh more than 3-3.5 kg. In terms of temperature, 8(26.67%) infants have a body temperature of 36.5 C-37.5 C, whereas 22(73.33%) infants have a body temperature of 36.5 C.

Table 3: Mean difference of posttest and pre-test score and t-value (n = 30)

S.no	Score	Mean value	Standard deviation	Mean difference	T-value
1.	Pre-test	1.8	0.875	4.76	33.71
2.	Post test	6.56	0.61		

Table 3 shows the mean difference of posttest and pre-test score and t-value.
Calculated t-value is 33.71 which is more than tabulated t-value (2.05). It is inferred that effectiveness of KMC on physiological parameters of infants is highly significant.

Discussion

The discussion was predicated on the study's objectives.
The primary purpose of the study was to evaluate the infants' physiological parameters (weight and temperature) at the Government Hospital in Chittoor. In this investigation, 5 (16.67%) newborns have a weight between 1 and 2 kilograms. 24 (80%) of infants weigh more than 2-2.5 kg. 1 (3.33%) infant is heavier than 3-3.5 kg, 2 (26.67%) newborns have a body temperature between 36.5 and 37.5 degrees Celsius, and 22 (73.33%) newborns have a body temperature below 36.5 degrees Celsius.
This research was supported by the 2017 investigation conducted by Drs. Deepa S. Phrike and Sudhakar Banteward. In India, an observational investigation was conducted in the neonatal care unit of a tertiary care facility. Before and after KMC, the vital parameters including temperature, heart rate, and spo2 were also recorded. A total of 80 newborns participated in this investigation. There were 40 infants with a gestational age between 32 and 34 weeks, and their average birth weight was 1.62 kilograms. After 4 days of KMC, weight gain was observed in 40 of 57 infants, and after 8-12 days of KMC, the average weight gain was 14.53 g [8].
The second goal of the research was to see how well KMC worked on newborns' physiological indicators at a few different Government Hospitals in Chittoor. Researchers found that KMC participants gained more weight on average. The calculated t-value of 33.71 between the post- and pre-test scores is larger than the reported t-value of 2.05. The significance of KMC's effect on infant physiological parameters is inferred.
Praveen Kumar Jain and D. Sarkar's 2015 research provided important background for this one. The goal of this research was to compare the pre- and post-kme deparament of physiologyl values of LBW infants in the NICU in Raipur, Chattisgher, India. Babies who were admitted to the neonatal intensive care unit (NICU) or postnatal ward during the study's 6-month observational period were considered LBW. KMC was begun on the first day for an hour (at a time) and increased during the next two days. Prior to and after KMC, vital signs including axillary temperature, respiratory rate (RR/min), heart rate (Hr/mm), and oxygen saturation (spo2) were measured. All four measured physiological markers improved during the KMC sessions. The effects of kangaroo mother care on heart rate were not statistically significant (P > 0.0001) [9].
It was therefore hypothesized that after receiving kangaroo care, newborns' physiological parameters would be significantly different.
Immediate kangaroo mother care may benefit in various ways. From birth, the mother and infant are in close touch, making the baby more likely to be colonised by her protective microbiota and breastfed early. Less people handle the baby, minimising infection risk. The mother's constant monitoring, more frequent glucose monitoring, and lack of mother–infant separation stress may have lowered mortality. Further studies in well-resourced settings could verify if these higher survival results in low- and middle-income nations apply to settings with low mortality and intensive baby monitoring. Infants with more skin-to-skin contact had a decreased chance of death. However, medical concerns in the newborn may have prevented extended skin-to-skin contact.

Conclusion

The current study came to the conclusion that kangaroo mother care has an influence on boosting the weight of infants who were born with a low birth weight as well as the bonding between mothers and their children.

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