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Original Research Article

Effect of kangaroo mother care on the growth and morbidity pattern of low birth weight infants: a hospital based cross sectional study

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ABSTRACT

Background: Kangaroo mother care provides Low birth weight babies with warmth, protection from infection and increases the success of breast feeding. Babies who had received KMC care were found to have better neurologic outcome. The aim of the study is to compare the outcome of Kangaroo mother care and conventional method of care among Low birth weight babies in terms of growth and reduction of morbidities such as length of hospital stay, hypothermia and hypoglycemia.
Methods: This cross-sectional study included 48 neonates with a birth weight of <2000 grams. Out of them 24 babies received KMC and the other 24 babies were given conventional care with a radiant warmer. The weight gain, length of hospital stay, occurrence of hypothermia and hypoglycaemia were monitored for all babies till discharge.
Results: Babies who received KMC had a better weight gain (21.11±2.8 grams/day) versus (15.61±2.6 grams/day) those who received conventional care, and this was found to be statistically significant (p=0.001). Kangaroo mother care provided a statistically significant reduction in the risk of having hypothermia (p=0.03) and hypoglycemia (p=0.04). The babies who received Kangaroo mother care had a shorter length of hospital stay and this was found to be statistically significant (p=0.03).
Conclusions: Kangaroo mother care improved the growth and reduced the problems of low birth weight babies such as hypothermia, hypoglycaemia and prolonged hospital stay. Hence, it should be recommended in the care of all these high-risk neonates.

Keywords: Hypoglycemia, Hypothermia, Kangaroo mother care, Length of hospital stay, Low birth weight, Postnatal growth

INTRODUCTION

Low Birth Weight (LBW) is defined by the WHO as a birth weight of less than 2500 g.[1] Globally about 20 million low-birth-weight babies are born every year and most of them are in the low and middle income countries.[2] At present, the prevalence of low birth weight in India is 18.6% which contributes to about 40% of the global burden.[3,4] The care of these high risk newborns is a burden to the health care system. Kangaroo Mother Care (KMC) for low birth weight infants was first implemented in the year 1978 by Rey and Martinez, in Bogotá, Colombia.[5] KMC is characterized by four important components namely early skin to skin contact between the mother and the baby, exclusive breastfeeding, early discharge from the hospital and close follow-up at home. KMC can be started as soon as baby is stable. The baby wears only the nappy and the bonnet and is kept upright for almost 24 hours a day. Babies who had received Kangaroo mother care were found to have better neurologic outcome on follow up. They were less aggressive and less impulsive than the control group of

infants.[6] The mothers were motivated and were more involved in the care of their babies. KMC is a powerful, cost effective, scientifically based intervention that can be used in all settings, particularly so in the middle- and low-income countries.[7]

Although low birth weight is a major public health problem in India and KMC helps in the care of these high-risk neonates, there is a paucity of studies in this direction. Hence, this study was done to compare the outcome of Kangaroo mother care and conventional method of care among Low birth weight babies (<2000 grams) in terms of growth and reduction of morbidities such as length of hospital stay, hypothermia and hypoglycemia.

METHODS

Study design was a hospital based cross sectional study. Study area was this study was conducted in a level III Neonatal Intensive Care Unit (NICU) of a teaching hospital in Chennai. Study population was the study population included 48 LBW babies weighing <2000 grams. Out of them 24 babies received KMC and the other 24 babies were given conventional care with a radiant warmer. The allocation into the two groups was done by simple randomization. Period of study was 12 months from September 2017 to August 2018.

Tools for data collection

The data collection was done using a pre-structured questionnaire. Anthropometric measurements, clinical examination and laboratory investigations of the subjects were also done. All the babies were monitored for weight gain, occurrence of hypothermia, hypoglycemia and other morbidities. Weight was measured using a portable electronic weighing machine to the nearest 100 g. The weights of the babies were taken every morning till discharge.

Inclusion criteria

- Intramural singleton neonates weighing <2000 grams and whose mothers were willing to participate in the study.

Exclusion criteria

- Babies who needed ventilator care and babies who had major congenital anomalies were excluded from the study. Babies of mothers who were critically ill were also excluded.

Definition of terms used

Kangaroo Mother Care (KMC)

The mothers provided skin to skin contact using a specially tailored Kangaroo bag that was made of soft flannel cloth. They were encouraged to do it day and night. The side rooms next to the NICU were assigned for KMC care. The babies were monitored by the NICU staff. Mothers kept a chart to note the hours of KMC given.

Conventional care group (CCG)

Babies were managed under the radiant warmer with the servo control mode.

Discharge criteria

Babies who had started feeding well, maintaining temperature and gaining weight of 10-15 g/kg/d for three consecutive days were discharged.

Socio economic classification was done based on the modified BG Prasad's scale.[8]

The institutional ethical committee approval was obtained prior to starting the study. An informed consent was obtained from the parents to participate in the study.

Statistical analysis

Data analysis was done using SPSS version 16. Statistics including frequency, percentage, mean with 95% CI were done. Chi square test was calculated to observe the association between columns and rows. Continuous variables were compared by student's t-test. A p-value <0.05 was considered statistically significant.

RESULTS

Forty-eight low birth weight babies were included in the study. Among them 24 babies received KMC and 24 babies received conventional care. It was found that 22 (46%) were males and 26 (54%) were females. All the mothers and 86% of the fathers accepted and practiced KMC. The mean duration of KMC given was 8.2 hours per day.

The mean age of enrollment in the study was found to be 3.3±1.7 days for babies received Kangaroo mother care and 3.8±1.9 days for those who received conventional care. In the present study, the mean gestational age of babies belonging to the KMC group was found to be 33.4±2.1 weeks and for those belonging to the conventional care group was 33.5±2.3 weeks. The birth weight of the neonates ranged from 1800 grams to 3930 grams. The mean birth weight of babies who received Kangaroo mother care was 1745±220 grams and those who received conventional care was 1720±243 grams. It was found that majority of them (44%) had a birth weight between 1500-1799 grams and majority of them (35.4%) had a gestational age of 33-34 weeks (Table 1).

Maternal anthropometry and socio-demographic characteristics

In the present study, the mean age of the mothers was found to be 23.9±3.4 years. The mean BMI of the

mothers was found to be 22.2±3.4 kg/m^2. It was found that 16 % of the mothers in the study group were underweight with a BMI of <18.5 kg/m^2. The mean height of the mothers was found to be 153±5.4 cm. It was found that 9% of the mothers in the study group were short with a height of <145 cm. The educational status of the mothers was obtained from all the respondents. Among them, it was found that 8.3% of the mothers were illiterate, 70.8% of them had attended school and 20.8% had attended college.

Table 1: Newborn baseline characteristics.

Variable	KMC (n=24)	CCG (n=24)
Age at enrollment (days, mean±SD)	3.3±1.7	3.8±1.9
Gestational age (weeks, mean±SD)	33.4±2.1	33.5±2.3
Birth weight (g, mean±SD)	1745±220	1720±243
Birth weight n (%)		
<1500 g	5 (20.8)	6 (25)
1500-1799 g	11(45.8)	10 (41.7)
1800-1999 g	8 (33.3)	8 (33.3)
Gestational age n (%)		
<32 weeks	8 (33.3)	8 (33.3)
33-34 weeks	8 (33.3)	9 (37.5)
35-36 weeks	6 (25)	4 (16.7)
>37 weeks	2 (8.3)	3(12.5)

Socio economic classification was done based on the modified BG Prasad's scale. It was found that majority of them belonged to (38 %) Class III, followed by (29%) class IV and (17%) class II. Figure 1 The information regarding religion was obtained from all the respondents. Among them, it was found that 79.2% of the mothers were Hindus, 8.3% of them were Christians and 12.5% of them were Muslims (Table 2).

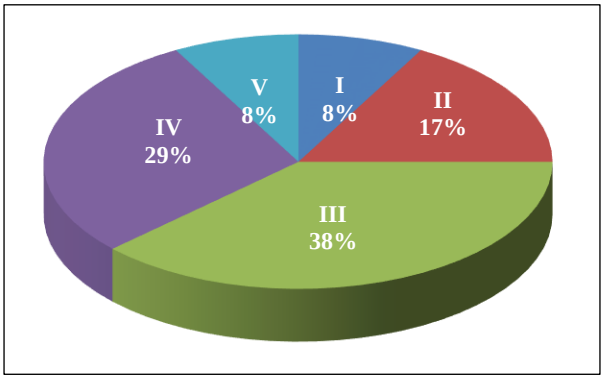

Figure 1: Socio-economic status of the subjects.

Effect of Kangaroo Mother Care (KMC) on growth and morbidity pattern

In the present study, the mean weight gain among babies who received KMC was 21.11±2.8 grams/day and those in the conventional care group was 15.61±2.6 grams/day. Babies who received KMC had a better weight gain and this was found to be statistically significant (p=0.001).

Table 2: Maternal anthropometry and socio demographic characteristics.

Mother's age (years)	Mean age ± SD	23.9±3.4 yrs
	% of mothers below cut-off (19 years old)	1%
Mother's BMI	Mean BMI ± SD	22.2±3.4 kg/m^2
	% of mothers below cut-off (18.5 kg/m^2)	16 %
Mother's height (cm)	Mean height ± SD	153±5.4
	% of mothers below cut-off (145 cm)	9%
Mother's education n (%)	Illiterate	2 (8.3)
	School	17 (70.8)
	College	5 (20.8)
Mother's religion n (%)	Hindu	19 (79.2)
	Christian	2 (8.3)
	Muslim	3(12.5)

It was seen that 8.3% of babies who received KMC and 33.3% of those who received conventional care had hypothermia. Kangaroo mother care provided a statistically significant reduction in the risk of hypothermia (p=0.03). Authors found that 4.2% of babies who received Kangaroo mother care and 25% of those who received conventional care had hypoglycemia. KMC was found to be protective against hypoglycemia (p=0.04).

The mean duration of hospital stays among babies who received KMC was 12±4.2 days and among those who received conventional care was 15±4.8 days. The babies who received KMC had a shorter length of hospital stay and this was found to be statistically significant (p=0.03) (Table 3).

Table 3: Effect of kangaroo mother care on growth and morbidity pattern.

Variable	KMC (n=24)	CCG (n=24)	p
Mean weight gain (g/day)	21.11±2.8	15.61±2.6	0.001
Hypothermia (n %)	2 (8.3)	8 (33.3)	0.03
Hypoglycemia (n %)	1(4.2)	6 (25)	0.04
Duration of hospital stay (days, mean±SD	12±4.2	15±4.8	0.03

DISCUSSION

Kangaroo Mother Care (KMC) is a safe, effective and a feasible method of care for low birth weight babies. In the present study, it was found that all the mothers and 86% of the fathers accepted and practiced KMC. Kadam et al, and Rasaily et al, reported that Kangaroo mother

care was acceptable to most of the mothers and their families at home.[9,10]

Babies who received KMC achieved better growth and weight gain (21.11±2.8 grams/day) versus (15.61±2.6 grams/day) those who received conventional care, and this was found to be statistically significant (p=0.001). This study is in concurrence with the findings of the previous study by Mazumder et al, where they reported improved growth of LBW who received KMC.[11] Bera et al, also found that the infants in the KMC group showed better physical growth and development than the conventional control group.[12]

Kangaroo mother care provides effective thermal control and may be associated with a reduced risk of hypothermia. In the present study, authors found that providing Kangaroo mother care resulted in a significant reduction in the risk of these LBW babies having hypothermia (p=0.03). Boundy et al, also found that KMC was protective against hypothermia.[13] Similar observations were made by Kanodia et al, in a study from Nepal.[14]

Authors found that 4.2% of babies who received KMC and 25% of those who received conventional care had hypoglycemia. KMC care was found to be protective against hypoglycemia (p=0.04). This is in concurrence with the study done by Suman et al, in Bangalore where they found a significantly higher number of babies in the conventional care group suffered from hypoglycemia.[15] Similarly, Udani et al, reported that KMC at birth prevented hypoglycemia in preterm as well as term neonates.[16]

The babies who received KMC had a shorter length of hospital stay (12±4.2 days) and this was found to be statistically significant (p=0.03). This is in concurrence with the study by Udani et al, who reported a clinically meaningful and statistically significant reduction in the duration of hospital stay by 6.2 days.[17] Jafari et al, also reported a reduction in the length of hospital stay and a reduced rate of readmission.[18]

Kangaroo mother care was thus found to be an effective alternative to conventional care for the management of stable low birth weight infants.

CONCLUSION

Kangaroo Mother Care improved the growth and reduced the problems of low birth weight babies such as hypothermia, hypoglycaemia and prolonged hospital stay. Hence, it should be recommended in the care of all these high-risk neonates. Thus, kangaroo mother care is an effective alternative to conventional care for the management of stable low birth weight infants. This practice can be continued at home and is a very feasible option in the Indian scenario.

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REFERENCES

1. World Health Organization. Global nutrition targets 2025: low birth weight policy brief WHO/NMH/NHD/14.5). Geneva: World Health Organization; 2014.
2. Kangaroo mother care: a practical guide. Available at: https://www.who.int/maternal_child_adolescent/documents/9241590351/en. Accessed 30 January 2020.
3. Park K. Nutrition and Health. In: Park K, eds. Park's Textbook of Preventive and Social Medicine. 25th ed. Jabalpur: Bhanot Publications; 2019:695-697.
4. Dayanithi M. Low birth weight and premature births and their associated maternal factors. Int J Community Med Pub Health. 2018 Jun;5(6):2277.
5. Whitelaw A, Liestøl K. Mortality and growth of low birth weight infants on the kangaroo mother program in Bogota, Colombia. Pediatrics. 1994 Dec 1;94(6):931-2.
6. Charpak N, Tessier R, Ruiz JG, Hernandez JT, Uriza F, Villegas J, et al. Twenty-year follow-up of kangaroo mother care versus traditional care. Pediatrics. 2017 Jan 1;139(1):e20162063.
7. Akhtar K, Haque M, Khatoon S. Kangaroo mother care: a simple method to care for low-birth-weight infants in developing countries. J Shaheed Suhraw Med Coll. 2013 Aug 27;5(1):49-54.
8. Pandey VK, Aggarwal P, Kakkar R. Modified BG Prasad Socio-economic Classification, Update-2019. Ind J Commun Health. 2019 Jan 1;31(1).
9. Kadam S, Binoy S, Kanbur W, Mondkar JA, Fernandez A. Feasibility of kangaroo mother care in Mumbai. Ind J Pediatr. 2005 Jan 1;72(1):35-8.
10. Rasaily R, Ganguly KK, Roy M, Vani SN, Kharood N, Kulkarni R, et al. Community based kangaroo mother care for low birth weight babies: A pilot study. Ind J Med Res. 2017 Jan;145(1):51.
11. Mazumder S, Upadhyay RP, Hill Z, Taneja S, Dube B, Kaur J, et al. Kangaroo mother care: using formative research to design an acceptable community intervention. BMC Pub Health. 2018 Dec;18(1):307.
12. Bera A, Ghosh J, Singh AK, Hazra A, Mukherjee S, Mukherjee R. Effect of kangaroo mother care on growth and development of low birthweight babies up to 12 months of age: a controlled clinical trial. Acta Paediatr. 2014 Jun;103(6):643-50.
13. Boundy EO, Dastjerdi R, Spiegelman D, Fawzi WW, Missmer SA, Lieberman E, et al. Kangaroo mother care and neonatal outcomes: a meta-analysis. Pediatrics. 2016 Jan 1;137(1):e20152238.
14. Kanodia P, Bora R, Gupta A. Kangaroo Mother Care-A Cost Effective and an Alternate Method to

Manage Hypothermia in Low Birth Weight Babies for Better Clinical Outcome. Value Health. 2016 Nov 1;19(7):A405.
15. Suman Rao PN, Udani R, Nanavati R. Kangaroo mother care for low birth weight infants: a randomized controlled trial. Ind Pediatr. 2008;45(1):17.
16. Udani RH, Hinduja AR, Rao S, Kabra NS, Kabra S. Role of kangaroo mother care in preventing neonatal morbidity in the hospital and community: A review article. J Neonatol. 2014 Oct;28(4):29-36.
17. Udani RH, Kabra N, Nanavati RN, VR A. Kangaroo Mother Care (KMC): A cohort follow up study on impact of duration of KMC on mortality, morbidity, hospital stay and breastfeeding. J Neonatol. 2013 Mar;27(1):5-10.
18. Jafari M, Farajzadeh F, Asgharlu Z, Derakhshani N, Asl YP. Effect of Kangaroo Mother Care on hospital management indicators: A systematic review and meta-analysis of randomized controlled trials. J Edu Health Promo. 2019;8.

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