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Original Research Article

Feasibility and efficacy of early KMC in very low birth weight babies receiving noninvasive respiratory care in NICU: is it the way forward in resource limited setting?

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ABSTRACT

Background: Objective of the study was to assess the feasibility and efficacy of early KMC in VLBW babies receiving respiratory care in NICU.
Methods: This is a prospective observational study conducted in a Multispecialty hospital with a level 3B NICU.
Results: A total of 19 babies on non-invasive respiratory support and partial parenteral nutrition through PICC line were included in the study. Most of the babies (84%) had birth weight of less than 1250 gm. Forty eight percent of the babies were less than 30 weeks of gestation at the time of commencement of KMC. Average weight gain in our study was 11.27gm/kg/day which was comparable to others. KMC was initiated at an average of 7.91 days of age and the average duration was1.69 + 0.6 hour/day. 84.2% of the mothers did KMC for less than 3 hrs per day while 15.8% of them did KMC beyond 3 hrs per day. Of the 19 babies, 17 of them were on High flow nasal canula Oxygen and 13 of them on CPAP during KMC. Only one baby succumbed to NEC during the study. The most common reason for discontinuation of KMC in the study group was lack of confidence in the mother (31%) which was overcome by constant support from the nursing staff and the family members.
Conclusions: Kangaroo mother care was found to be a feasible and effective method of care of VLBW babies even while on non-invasive respiratory support in NICU.

Keywords: KMC, NICU, VLBW

INTRODUCTION

Globally, India contributes to 27% of neonatal deaths; 40% of low birth weight (LBW) babies and a quarter of preterm births.[1,2] More than one-third of these deaths are due to premature births. A recent survey found the median survival rates of 58% and 88% among ELBW and very low birth weight (VLBW) infants, respectively.[3] There is increasing disparity where the 'well to do' and the 'increasingly affordable middle class' is able to get the most advanced care for their sick neonates. The underserved urban poor and those in rural areas still contribute to the overall high neonatal morbidity and mortality in India.[4] Hence to overcome this disparity Kangaroo mother care (KMC) could be widely practiced on babies while still on respiratory support. This would reduce the cost involved in the care of these sick babies and also would reduce the mortality and morbidity.

KMC is a low cost method of care of low birth weight infants particularly less than 2000gm at birth. It consists of skin- to skin contact, exclusive breast feeding and early discharge with adequate follow up.[5-8] The original KMC method with ideally 24 hour per day of mother–infant skin-to-skin care, namely, continuous KMC, was intended as an alternative to conventional care in

incubators in low-income setting.[9-15] In spite of the proven benefits of KMC, it is not been practiced widely in small and sick newborns treated in NICU. Hence this Pilot study was done to assess the feasibility and efficacy of early KMC in very low birth weight babies receiving respiratory care in NICU.

METHODS

This prospective observational study was conducted in a teaching institution with tertiary level 3B Neonatal intensive care unit in Southern India over a period of 1 year.

Sick babies with illness such as respiratory distress, infection, asphyxia, on free flow oxygen or CPAP or High flow nasal cannula oxygen, on IV fluid, Partial parenteral nutrition through PICC Line were included in this study.

Babies on ventilator, haemodynamically unstable, with major congenital anomalies, with UVC, UAC in situ were excluded from the study.

The nursing staff and the doctors working in the NICU were educated about KMC.

19 babies who satisfied the criteria were included in this study. Once the babies were haemodynamically stable, not on invasive ventilation or inotropes, mothers were approached to do KMC. The mothers, fathers and family members were apprised about the procedure and the benefits of KMC.

Kangaroo position

The baby with a front open dress, cap and socks was placed on mother's bare chest. The baby was secured with a wrap that secures the torso of the mother, providing the baby with proper support and positioning, constant containment without pressure points or creases. Temperature, heart rate, respiratory rate, oxygen saturation and complications were recorded 15 min before, during and after the termination of KMC. Reasons for termination of KMC were also recorded.

The primary outcome variable in our study was reduction in duration of hospital stay. Our secondary outcome was to look into the weight gain in the babies on early KMC.

Statistical analysis

Data were recorded on a predesigned proforma, tabulated and the results were analyzed statistically.

RESULTS

Out of the 19 babies, 6 were female and 13 were male.

In our study, most of the (84%) babies were less than 1249 gm and 15.8% were between 1000-1250 gm. Forty seven percent of them were between 30-32 weeks of gestation and 15.8% of them were lesser than 28 weeks of gestation as shown in the Table 1.

Table 1: Neonatal baseline characteristics.

Variable	KMC (n=19)
Birth weight groups n (%)	
<1000 g	42.1
1000-1249 g	15.8
1250-1500 g	42.1
Gestational age groups n (%)	
<28 weeks	15.8
28-30 weeks	31.6
31-32 weeks	47.4
>33 weeks	5.3
Gender n (%)	
Female	31.6
Male	68.4

KMC- Kangaroo mother cares, Figures in parentheses indicate percentages.

Delay in initiation of KMC was associated with prolonged NICU stay and higher rates of complications ($p<0.05$) as shown below in Table 2.

Table 2: Significant positive correlation between KMC Initiation and NICU stay, complications.

	KMC initiation (Spearmann Rho)	p-value
NICU stay	0.514	< 0.05
Complications	0.520	<0.05

Of the 19 babies, 17 of them were on High flow nasal canula Oxygen and 13 of them on CPAP at the time of KMC.

35.7% of the babies were on partial parenteral nutrition via PICC line at the time of KMC.

The average weight gain in the study group was 11.27 gm/kg ($p<0.313$).

The mean age of commencement of KMC was 7.91 days. The duration of KMC was 1.69+0.6 hour/day. 84.2% of the mothers did KMC for less than 3 hrs per day while 15.8% of them did KMC beyond 3 hrs per day. The average duration of NICU stay was 33 days. The most common reason for discontinuation of KMC in the study group was lack of confidence in the mother (31%) followed by mother being tired (27.6%), feeling unwell (17.3%), mother was hungry (12%), to change diapers (8.6%) and for procedures (3.4%).

The average rate of complications during KMC was 18.79%, the most common being temperature instability.

One baby succumbed to Necrotising enterocolitis during the study period.

DISCUSSION

High tech neonatal care for low birth weight infants (LBWI) is demanding on the manpower, resources and finances in the developing countries. Kangaroo mother care (KMC) has been documented to be a safe and effective alternative comprehensive method for the care of LBW. The main objective of this pilot study was to determine whether KMC is feasible and effective in the babies on respiratory support in a NICU setting.

The age at KMC initiation was comparable to others.[16] The average weight gain of 11.27 gm/kg/day was similar to that reported by M. Anchieta et al.[17] Our study demonstrated that delay in initiation of KMC was associated with prolonged NICU stay and higher rates of complications.

Though the mean age of commencement of KMC was 7.91 days, most of the babies were ready 48 hours prior for KMC. The reason for the delay was the hesitancy in the treating clinicians, nursing staff and the mothers in handling these VLBW babies for early KMC. The average duration of KMC was found to be 1.69+-0.6 hour/day which was very less compared to other Indian studies.[18] The reason could be due to the inclusion of the babies requiring respiratory support or on partial parenteral nutrition through PICC line in our study compared to the stable premature babies in the previous studies.

We found that 89.4% of the babies were on HHHFNC and 68.4% were on CPAP at some point during the study. Initially the nursing staffs were apprehensive about displacing the baby from under the warmer or incubator care for providing Kangaroo mother care. They were worried about accidental displacement of the respiratory circuit and fear of losing peripheral or central venous access. But this was overcome by constant training .Hence we could demonstrate that KMC is feasible on sick babies, even when on respiratory support.

The average rate of complications during KMC was 18.79%, the most common being temperature instability. Hence even though there were fewer complications during KMC, continuous vitals monitoring would still be recommended during a KMC session in NICU.

At the time of commencement of KMC, 31 % of the mothers were not confident about giving KMC. The mothers were reassured and were counseled about the benefits of the KMC to the mother as well as to the baby, thereby encouraging them to continue KMC even after discharge.

CONCLUSION

Kangaroo mother care was found to be safe, feasible and effective in VLBW babies on respiratory support in NICU. Further research should investigate the implementation of KMC in babies on mechanical ventilation.

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