Effectiveness of KMC on Success of Breastfeeding in Preterm Low Birth Weight Neonate

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Abstract

Background: Kangaroo mother care (KMC) is a low cost method for care of low birth weight infants particularly for those weighing less than 2000 g at birth. It includes thermal care through continuous skin-to-skin contact, support for exclusive breastfeeding and prevention of infection.

Objective: To determine whether the implementation of KMC to low birth weight infants would improve early and exclusive breastfeeding.

Materials and methods: A randomized controlled trial was conducted in Dhaka Shishu (Children) Hospital, Bangladesh over 6 months period. Eighty neonates were randomized into KMC group and control group forty in each. Intermittent KMC was given in KMC group with average time of 10-12 hours a day. Neonate in conventional care was managed under radiant warmer and incubator. During hospital stay, both the groups were monitored for daily weight gain by electronic weighing machine, episodes of hypothermia, apnoea, nosocomial infection, physiological parameters (heart rate, respiratory rate, and axillary temperature) and feeding practice. These were measured during hospital stay by the help of a nurse assigned for KMC only.

Results: The mean time of initiation of KMC 1.80±1.09 days. Average birth weight of babies in both the groups was between 1200-1400 gm. The mean time to achieve full enteral feeding in KMC group was 9.35±3.95 days and in control group 14.35±6.06 days (p < 0.001). Exclusive breastfeeding during discharge was significantly higher in KMC group (38/95%) than control group (24/60%) (p<0.001). There was also significant higher rate of weight gain in KMC group (18.35±7.81 gm) than control group (13.55±4.89 gm) (p<0.001).

Conclusion: KMC is more effective in early establishment of feeding as well as achievement of exclusive breast feeding successfully in preterm babies. Better weight gain and lesser infection are associated benefits.

Keywords: KMC; Breast feeding; Preterm-LBW

Introduction

A global health recommendation is that infants should be exclusively breast fed for the first six months of life as because breast milk mediates unequalled beneficial effects regarding nutritional, immunological, and cognitive outcomes [1]. This recommendation extends to preterm infants because they are often at increased risk for infections and long-term ill health and because the positive effects of breast milk is even more prominent in these infants [2,3]. Managing these preterm babies are clinically more challenging in initiation and sustainability of breastfeeding as their suckling behavior is not mature and requires neonatal care for a sustainable period. In Bangladesh exclusive breastfeeding rate has declined from 62 to 54 [4] and there is no data on Preterm breastfeeding rate. As PT rate is high in Bangladesh it might have influence on declining exclusive breastfeeding rate [5]. In Sweden and Germany it was found that 3% to 17% of the PT infants were breastfed exclusively at 5 or 6 months of corrected age [6]. Transitional process from gavage feeding alone to breastfeeding alone is not smooth. However Kangaroo Mother Care (KMC), which has an extensive research base, is regarded as a successful way to empower mothers to become familiar with their infants, strengthens their mothering at their own pace, and increases breastfeeding rate and duration [7,8]. A few studies from both low and high income countries have shown that preterm babies who experience KMC are breastfed more at discharge compared to those who receive conventional care.
The aim of this study was therefore to find out the association of KMC with breastfeeding at discharge.

**Methods**

This prospective randomized controlled trial was conducted in a tertiary hospital, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh over 6 months period from August 2014 to January 2015. Babies weighing 1250gm to 1800gm and stable were enrolled for study. Babies with congenital anomalies, birth asphyxia were excluded. After enrollment according to the inclusion and exclusion criteria the subjects were divided into 2 groups: Kangaroo mother care group and conventional care group. Randomization was achieved by simple randomization and allocation was concealed by sealed envelope. KMC was initiated as soon as the baby was stable. Mother/caregivers were counseled and trained on KMC procedures. The mother provided skin to skin contact to the baby in upright position dressed with a cap, socks and diaper and supported in bottom with a sling/binder. Intermittent KMC was given with duration of each period of at least 2 hours and repeated at least six times a day. Adequate privacy was ensured. Comfortable bed or chair was provided. A KMC chart was maintained. Neonate in conventional method care was managed under radiant warmer and incubator.

Data about infant feeding (Time of commencement of first feed, days to achieve full enteral feed, episodes of feed intolerance, rate of exclusive breastfeeding), weight and episodes of problems if any (Hypothermia, sepsis, apnoea) were recorded. These were measured during hospital stay by the help of a nurse. Sign symptoms of sepsis were monitored and if any of the study neonate in either group developed features of sepsis the following investigations were done- complete blood count, CRP, blood culture and sensitivity and other supportive investigations.

Infant in both the groups were discharged when following criteria were achieved: Baby’s general health was good, no evidence of infection and no I/V medications. Baby was feeding well and receiving breast milk directly or by cup and spoon gaining weight (at least15gm/kg/day) for 3 consecutive days. Maintaining body temperature well without assistance for at least 3 consecutive days and Mother and family members were confident to care the baby.

**Results**

Total 80 preterm babies according to inclusion criteria were randomized into 2 groups – KMC group and Incubator group. Their average age on admission was 1-2 days and 60% of them were male. Birth weight of 70 % the babies were with-in 1250-1500gm in KMC case and 80% in control group (Table 1).

### Table 1: Comparison of Base line datas between KMC and conventional care group.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Case (n=40)</th>
<th>Control (n=40)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at admission (mean±SD)</td>
<td>1.80±1.09</td>
<td>2.10±1.19</td>
<td>0.244**</td>
</tr>
<tr>
<td>Sex of the baby</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>24(60.0%)</td>
<td>28(70.0%)</td>
<td>0.348ns</td>
</tr>
<tr>
<td>Female</td>
<td>16(40.0%)</td>
<td>12(30.0%)</td>
<td></td>
</tr>
<tr>
<td>Birth weight (gm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1250-1500</td>
<td>28(70.0%)</td>
<td>32(80.0%)</td>
<td>0.127ns</td>
</tr>
<tr>
<td>&gt;1500-1800</td>
<td>12(30.0%)</td>
<td>8(20.0%)</td>
<td></td>
</tr>
</tbody>
</table>

In 35% cases of KMC group feeding could have been started earlier in comparison to control group which was 20%. Rate of exclusive breastfeeding was high in KMC group which was 90% whereas it was 60% in control group which was statistically significant (p <0.001) (Table 2).

### Table 2: Feeding outcome between KMC and conventional care group.

<table>
<thead>
<tr>
<th>Hospital Course</th>
<th>Case (n=40) No. (%)</th>
<th>Control (n=40) No. (%)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of first feed on 1st day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-3 days</td>
<td>14(35.0%)</td>
<td>8(20.0%)</td>
<td>0.162ns</td>
</tr>
<tr>
<td>4-5 days</td>
<td>20(50.0%)</td>
<td>20(50.0%)</td>
<td></td>
</tr>
<tr>
<td>6(15.0%)</td>
<td>12(30.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Episode of feed intolerance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8(20.0%)</td>
<td>12(30.0%)</td>
<td>0.302</td>
</tr>
<tr>
<td>No</td>
<td>32(80.0%)</td>
<td>28(70.0%)</td>
<td></td>
</tr>
<tr>
<td>Time of achieve full enteral feeding in days</td>
<td>9.35±3.95</td>
<td>14.35±6.06</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Exclusive breast feeding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>36(90.0%)</td>
<td>24(60.0%)</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>No</td>
<td>4(10.0%)</td>
<td>16(40.0%)</td>
<td></td>
</tr>
</tbody>
</table>

Among the complications apnea was more common in control group though the difference was not significant statistically. Development of sepsis was significantly lower (35%) in KMC group in comparison to conventional methods (65%) (Table 3).
Babies received KMC started early weight gain and their rate of weight gain was significantly better than babies who received conventional care (Table 4).

Table 4: Showing rate of weight gain between KMC and conventional care group.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Case (n=40) Mean±SD</th>
<th>Control (n=40) Mean±SD</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight gain started</td>
<td>6.60±1.74</td>
<td>8.45±2.14</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Birth weight regained</td>
<td>10.35±3.09</td>
<td>13.50±3.70</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Rate of gain</td>
<td>18.35±7.81</td>
<td>13.55±4.89</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

Discussion

Although there are countless benefits of breastfeeding for preterm babies, the prevalence of breastfeeding in this group is still not satisfactory. A study showed that among Canadian babies weighing less than 2500g only 58% had been breastfed at birth, compared to 73% in term group. Among LBW infants only 3% were discharged on exclusive breastfeeding [9]. Study done in Malaysia showed, only 40.2% of VLBW babies were being breastfed at the time of discharge from hospital despite breastfeeding incentive programs adopted by the hospital [10]. That means LBW and prolonged hospital stay have negative effect on mother’s decision on breastfeeding.

An important mainstay of KMC is encouragement of breastfeeding. In this study we have found that early breastfeeding could have been stared in LBW and VLBW babies who were managed in KMC and also rate of exclusive breastfeeding was found higher in these babies. In 85% of KMC babies breastfeeding could have been started within 2-3 days of hospital stay when in conventional methods it was 70%. In KMC group 90% babies were being exclusively breastfed at the time of hospital discharge, whereas this rate was 60% in babies who were managed in conventional methods. (Table 1) This study suggests that mothers who establish a skin-to-skin contact with their preterm babies have a significant higher milk production than the mother who do not. A study from Sweden done by Whitelaw et al found that 71 preterm babies weighing less than 1500 g submitted to KMC had a two time higher prevalence of breast feeding than the control group at six weeks of life (55 versus 28%) [11].

Study in India found similar result, in which the frequency of breastfeeding at six weeks rose to 86% for babies managed in KMC versus 43% for control babies [12]. One Cochrane Review by Conde-Agudele et al. [13] on three randomized trials found that KMC was a protective factor for exclusive breastfeeding at hospital discharge (RR 0.41; 95% CI 0.25-0.68) [13]. Udani et al. [14] found that KMC intervention increased exclusive breastfeeding rates in LW infants -95% mothers practiced exclusive breastfeeding and 5% gave mixed feeding [14]. KMC proved to be an ideal stepping towards early and prolonged breastfeeding for preterm infants which has been proved by various studies that reported higher breastfeeding rates ranging from 77% to 100% with KMC as compared with no-KMC ranging from 42% to 71% [15-17]. These prove that KMC has an important role in the maintenance of the mother’s lactation. The continuous and intense mother-infant contacts make the mother more sensitive and responsive to the breastfeeding and resulting in increase of milk volume attributed to the increased oxytocin level s during KMC.

Sepsis rate in KMC babies was less (35%) in this study in comparison to conventional methods (65%). Ali SM et al found sepsis rate 7% in KMC babies whereas it was 23% in conventional babies [18]. Cochrane meta-analysis revealed that KMC was associated with reduction of nosocomial infection/sepsis (RR 0.45, 95% CI 0.27to0.76) [19]. KMC contributes to better hydration of stratum corneum and may be an occlusive factor to promote skin barrier thereby minimizing nosocomial infections. Apneic spells are common in preterm infants due to various environmental and systemic causes. The rate of apneic spells reduces in KMC babies. In our study we have found that LBW babies in KMC had lower incidence of apnea (25%) as compared to conventional care babies (35%). Ali SM et al found apneic rate of 2% in KMC babies whereas it was 14% in conventional babies [18]. Suman RP et al. [16] found reduced episodes of apnea during KMC when compared to babies in incubator care in their RCT.

Weight gain was significantly higher in KMC babies than the conventional babies (p<0.001). KMC babies also started weight gain.
early (p<0.1) Meta analysis of KMC studies confirmed greater wt gain in KMC infants than in infants not managed in KMC [13].

**Conclusion**

Intermittent KMC is effective in early establishment of feeding as well as achievement of exclusive breast feeding successfully. Better weight gain and lesser infection are associated benefits.

**References**

4. Bangladesh Demographic Health Survey (BDHS).

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