Original Research
Medical Journal of Islamic Republic of Iran, Vol. 25, No. 1, May 2011, pp. 11-15

Advantages of kangaroo mother care in less than 2000 grams low birth weight neonates

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Received: 23 Nov 2009 *Revised: 31 July 2010* *Accepted: 17 Aug 2010*

Abstract

Background: The aim of study was to compare the effect of Kangaroo mother care (KMC) and conventional methods of care (CMC) in low birth weight babies less than 2000 grams.

Method: One hundred babies with birth weight less than 2000 grams and without clinical problem were randomized in two groups; the intervention group (N=50) who received Kangaroo mother care and the control group (N=50) with conventional care. Two groups were compared in daily weight gaining, self confidence of mother, duration of hospitalization, clinical cyanosis and nosocomial infection. Collected data was analyzed by SPSS 11.5 software. Irct ID: IRCT201101091162N16.

Results: The KMC babies had better daily weight gaining average [18.31±7.57gm vs. 4.8±16.57gm (P< 0.001)] CMC: and also, self confidence of mother in KMC group was significantly higher than CMC group (p<0.001). A significantly longer duration of hospitalization observed in CMC group [27.18±12.07 day vs. 16.24±10.04 day (P<0.001)]. There was no significant difference between the two groups for clinical cyanosis and nosocomial infection (both P>0.05).

Conclusions: In this study Kangaroo mother care had better effect on daily weight gaining, mother confidence and shorter duration of hospitalization.

Keywords: Kangaroo mother care, low birth weight, Newborn, conventional methods of care.

Introduction

About 20 million low-birth-weight (LBW) babies are born each year, because of either preterm birth or impaired prenatal growth, mostly in less developed countries. They contribute substantially to a high rate of neonatal mortality and morbidity [1-6]. Therefore, proper care for these infants becomes a heavy task for health care and social systems especial in developing countries. The LBW rate has been decreased due to better socioeconomic conditions, lifestyles and nutrition, resulting in healthier pregnancies, modern neonatal care technology and highly specialized and skilled health workers. In less developed countries prevalence of LBW is decreasing

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slowly, because modern technology is either not available or cannot be used properly. Incubators, for instance, where available, are often insufficient to meet local needs or are not adequately cleaned. Purchase of the equipment and spare parts, maintenance and repairs are difficult and costly. The power supply is intermittent, so the equipment does not work properly. Under such circumstances good care of preterm and LBW babies is difficult, and hypothermia and nosocomial infections are frequent. Frequently and often unnecessarily incubators separate babies from their mothers, depriving them of the necessary contact. Unfortunately, there is no simple solution to these problems since the health of an infant is closely linked to the mother's health and the care she receives during pregnancy and childbirth [7-9]. For many small preterm infants receiving prolonged medical care is important. However, kangaroo mother care (KMC) is an effective way to meet baby's needs for warmth, breastfeeding, protection from infection, stimulation, safety and love.

The aim of this clinical trial study was to assess the effect of KMC on body temperature, daily weight gain, clinical cyanosis, nosocomial infections and confidence of mother.

Methods

One hundred preterm infant with birth weight less than 2000 grams enrolled and divided into kangaroo mother care (KMC) and conventional method care (CMC) group. The sample size was determined according to previous studies and confidence coefficient of 95%. Generally infants were in a good condition without any need for oxygen therapy or other treatment. The CMC group received routine care in the incubator during the period of admission and observed for variables, but if the mother tends to arm her baby then the time was recorded. In KMC group in addition to routine care, mothers had to be positioned in a special place to provide skin to skin contact for baby to mother chest. The baby had no dressing except a cap and a nappy. They put in incubator just when mother want to rest or eat or special nursing cares. Babies with birth weight less than 2000gr and stabilized in first 72 hr of age were included and babies requiring ventilatory support, suffering from apnea, unstable temperature, and intravenous nutrient were excluded. Babies' age ranged from 3-10 days of old. Duration of mother contact, clinical cyanosis, body temperature, daily weight gaining, nosocomial infections, self confidence of mother (mother satisfies with baby care in home) and duration of hospitalization were all recorded. Discharge criteria comprised of:

Self confidence of mother in baby care by satisfaction; no intravenous medication in recent 3 days; baby who received all calories requirement via breast feeding or per orogastric tube by own mother; absence of: clinical cyanosis, hypothermia, apnea and bradycardia in recent three days, and daily weight gaining of 10-30 gram (15g per kg) in recent three days. Collected data was analyzed by SPSS Software ver. 11.5. The anthropometric data are presented as mean ± SD. For quantitative variables, the comparison between groups were performed by using independent T-test and Mann Whitney T-test .The categorical variations were analyzed using the chi-square and Fisher's exact tests.

Results

Fifty infant in KMC group and fifty in CMC group were studied. The mean duration of KMC was 16.52±8.32 days (minimum 5 days and maximum 49 days). There was no significant difference between two groups in gender, gestational age, mother age and gravity but birth weight, height and birth circumference in control group were higher (Table 1). For controlling the confounding variables such as birth weight, birth height and gestational age we used general linear model. Results showed that salary group had almost significant effect on daily weight gaining and effect of birth weight and birth heights were

controlled in two groups. There were no significant difference between two groups in way. The recommended weekly increment of 0.75 cm in head circumference was

Table 1. Maternal and neonatal demographic characteristics.

variable	Groups		P- value
	Control group n=50 Mean±SD	KMC group n=50 Mean±SD	
Birth weight(gm)	1499±346	1264.8±270.9	P<0.001
Birth height (cm)	41.05±3.31	39±3.47	P= 0.003
Birth head circumference(cm)	29.08±2.36	28.32±3.21	P<0.001
Gestational age(week)	32.26±3.57	30.64±3.13	P=0.181
Mother age(yr)	27.3±5.32	27±4.94	P=0.756
Gravity pregnancy	2.08±1.65	1.64±1.45	P=0.161

diseases of mother during pregnancy (infection, diabetes, preeclampsia or others p=0.17). In pregnancy no significant difference was found for complications such as rupture of membranes, umbilical cord prolapsed, placental previa and placental abruption. Clinical cyanosis and nosocomial infection were not significant between two groups (P=0.5, P=0.121 respectively), but daily weight gaining, self confidence of mother and duration of hospitalization were significantly different between two groups (All P<0.05, Table 2).

Discussion:

This study showed KMC has better effect on daily weight gaining, self confidence of mother and duration of hospitalization. Evidence also backs the effectiveness and safety of KMC in stable preterm infants. The goal of nutritional management of the infants less than 2000 grams is to achieve accelerated growth rate since most of these newborns admitted because of their low weight gaining. If intervention leads to an accelerated weight gaining without any side effect, then it plays an important role in this achieved only in the KMC group [4]. Ramanatha et al showed that Infants in the KMC group had better weight gaining after the first week of life [3]. Head circumference has been emphasized to be one of the most important growth parameters in LBW babies [5] being a reflection of the underlying brain growth. In this study although control group had more birth weight but daily weight gaining in KMC group was more. This was our ideal goal in LBW Infants because weight gaining is a parameter of health, which led to better sensation of mothering and increase in well mothering. The present study demonstrated a significantly effects on maternal self confidence. Roller studied mother's experiences of providing kangaroo care for their preterm newborns [7]. Videotape recording was done and semi structured interview was used. He concluded that kangaroo care facilitated bonding and enhanced maternal infant acquaintance even in the neonatal intensive care unit environment. Indeed mothers found the kangaroo care calmed them as well as their newborns. Feldman et al conducted a study

Table 2. The effect of KMC on cyanosis, infection, mother confidence, hospitalization and weight gaining.

variable	Groups		P-value
	Control group n=50	KMC group n=50	
Clinical Cyanosis No (%)	1(2)	2(4)	P=0.5
Nosocomial Infection No (%)	0(0)	3(6)	P= 0.121
Low self confidence of mother No (%)	14(28.6)	0 (0)	P<0.001
Duration of Hospitalization (day) mean± SD	27.18±12.07	16.24±10.04	P<0.001
Daily weight gaining (grams) mean± SD	4.89±16.57	18.31±7.57	P<0.001

to measure the effect of KMC on parenting outcome and preterm infant development. Their results showed the importance of maternal body contact for infants, physiological, emotional, and cognitive regulatory capacities [8]. In Roberts study mothers providing KMC also gained confidence in the care of their LBW babies [9]. The KMC, in all countries where the studies were done deemed socially acceptable. It resulted an observed change in the mother's perception of her child, attributed to the closeness of the skin- to-skin contact and the bonding effect by the empowering nature of kangaroo mother care [10]. In Parmar et al study KMC was accepted by 96% mothers, 82% fathers and 84% other family members. Ninety four percent of health care workers considered it to be safe and conservative method in care of low birth weight. Benefits of KMC on the maternal behavior and on maternal confidence and lactation were reported as 57%, 94% and 80% respectively [11]. Skin to skin contact as provided in KMC may alleviate the infant's physiological and psychological stress. Less stressed babies may show better interactive behavior and a greater mother - baby interaction. A greater mother -infant interaction would in turn result in greater mother - baby attachment. The similar results of better attachment between mother and baby with KMC have been reported by several authors. Kennell et al stated that a bond between mother and her newborn was essential for the infant to grow and thrive in mother's care [12]. A newborn in fetus life gets nutrient from umbilical cord for growth and development. After birth for continuing growth and development well mothering with high confidence is required. In this study staying in hospital was significantly shorter in KMC group. Charpak et al [5] also showed that it was reduced by as much as 50% with this technique. In Roberts et al's study, there was no difference in mean hospital stay between the two groups [9]. In present study like Kadam and Worku [10,13] studies, the average length of stay in hospital was reduced. Gathwala [14] also found the duration of hospital stay in KMC group was shorter .Since shorter stay in hospital led to decrease of expense in developing countries therefore which is an important goal of KMC. Though just one LBW infant in our study suffered from hypothermia, this technique is successful in prevention of hypothermia. Blackwel and Cattaneo [1] in a review article found "Infants managed by kangaroo mother care exhibited more temperature stability as found in three studies. Hypothermia was significantly more common in conventional methods of care infants [RR 0.74, 95% CI 0.62-0.88, P= 0.0005). A significant reduction in episodes of hyperthermia was seen in babies nursed by the kangaroo mother care method (10/44 vs. 21/45, p<0.01)". Another study showed significant reduction of hypothermia in KMC group [10]. It has been demonstrated that the risk of hypothermia was reduced by more than 90% when nursed by KMC rather than conventional care [15]. Chwo et al [16] also showed KMC infants compared to control infants had higher meant tympanic temperature (37.3 degrees C vs. 37.0 degrees C). Hypothermia is one of the most common causes of death in first hours of life in low birth weight infants especially in developing countries; therefore KMC is a golden goal for prevention of hypothermia in these countries.

Charpak study [5] showed that infection was milder in children receiving the KMC but in present study there was no difference between two groups in nosocomial infection. In kadam study [10] also there were no significant differences in the incidence of sepsis. In all studies there was no significant difference in the number and severity of overall infection with only one study showed a significant reduction in six respiratory infections at seven months [1]. However , there was a significant difference seen in one study from Columbia [10] between those infections that could be managed as an outpatient; 6.7% in the kangaroo mother care group compared to 2.8% in the conventional care group (p=0.019).

In this study there were no statically differences in clinical cyanosis between two groups. Other study [17] showed an improvement in tissue oxygenation, as shown by the increased O_2 saturation after performing the KMC. It interpreted that better oxygenation may have occurred because the newborns were calm and comfortable in contact with their mothers, which probably decreased the consumption of oxygen. Parmar et al [11] and Gazollo et al [18] also obtained increased O_2 saturation through KMC which could improved tissue activities.

In our study, Kangaroo mother care has better affect on weight gaining, mother confidence and short hospitalization. According to these results, the KMC is recommended for LBW preterm newborns.

Acknowledgment

We are very thankful of vice chancellor of Mashhad university of medical science for financial support also Miss Fereshteh Yazdanpanah for data collection , Rana Amiri for data analysis , Najma Saberi for type and Miss Mojdeh Mahmoodi for her cooperation.

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