

# Effects of Kangaroo Mother Care Combined with Breastfeeding on Short-Term Clinical Outcomes of Premature Infants with Very/Extremely Low Birth Weight

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## ABSTRACT

**Objective:** To assess the effects of kangaroo mother care (KMC) combined with breastfeeding on the short-term clinical outcomes of premature infants with very/extremely low birth weight (VLBW/ELBW).

**Methods:** A total of 80 VLBW/ELBW premature infants in our hospital from January 2017 to December 2019 were enrolled, and divided into control group (n=40) and observation group (n=40) using a random number table. All infants were fed with breast milk. Control group was given routine nursing, while observation group was given KMC. The exclusive breastfeeding rate, sleep quality indices, physical development indices and neuro behavioral scores were compared between the two groups. The psychological state scores and nursing satisfaction rates were also compared.

**Results:** At 1, 2 and 3 months after birth, the exclusive breastfeeding rate was higher in observation group than that in control group ( $P < 0.05$ ). After nursing, the sleep time was earlier and the sleep duration was longer in observation group than those in control group ( $P < 0.05$ ). After nursing, the body weight, length and head circumference were all larger and neuro behavioral scores were higher in observation group than those in control group ( $P < 0.05$ ). Meanwhile, both self-rating anxiety scale and self-rating depression scale scores were lower in observation group than those in control group ( $P < 0.05$ ). The total nursing satisfaction rate in observation group (95.00%) was higher than that in control group ( $P < 0.05$ ).

**Conclusion:** KMC can effectively increase the exclusive breastfeeding rate, improve the sleep quality, and promote the physical and neurobehavioral development during breastfeeding for VLBW/ELBW premature infants. It can ameliorate the psychological state and raise the nursing satisfaction rate of newborns' parents.

**KEYWORDS:** newborn; kangaroo mother care; breast feeding; premature infant; low birth weight

## INTRODUCTION

Very low birth weight (VLBW) infants refer to newborns whose birth weight is less than 1500 g, while extremely low birth weight (ELBW) infants refer to newborns whose birth weight is less than 1000 g. Premature infants often suffer from

VLBW at birth, and they have a higher risk of growth retardation [1-3]. To ensure the growth and development of premature infants, breastfeeding is clinically recommended. In practice, however, some puerperas give up exclusive breastfeeding for subjective or objective reasons. How to improve the exclusive breast-feeding rate is an important issue to be solved in obstetrics. Kangaroo mother care (KMC) is a humanized nursing model specially for infants. In this study, 80 VLBW/ELBW premature infants in our hospital from January 2017 to December 2019 were enrolled to explore the role

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of KMC in breastfeeding for such infants.

## MATERIALS AND METHODS

### Baseline clinical data

From January 2017 to December 2019, a total of 80 VLBW / ELBW precocious infants were enrolled and divided into a checkpoint (n=40) and observational group (n=40). This was carried out using a random number table. 21 males and 19 females were aged 2-10 ( $6.73 \pm 2.09$ ) days at birth, and 33-36 ( $34.58 \pm 1.20$ ) and  $0.670-1,253$  kg ( $0.912 \pm 0.274$ ) kg were pregnant and nursing weights were pregnant at the weighing age at birth. In the Observatory group, 22 ( $34,49 \pm 1,26$ ) and  $0,659 \pm 1,157$  ( $0.914 \pm 0,283$ ) kg were 33-36 ( $34,49 \pm 1,26$ ) weeks of age at birth and gestational age at birth and birth weights, respectively. The age at birth, sex and gestation at birth and birth weight of each group were comparable ( $P > 0.05$ ). The study was approved by the Committee on Medical Ethics and the neonate's parents agreed to cooperate with the research and signed an informed consent.

### Methods

All infants were fed with breast milk, and those in control group were given routine nursing. The knowledge related to breastfeeding was explained to parents, such as the importance and methods of breastfeeding. KMC was adopted on the basis of routine nursing in observation group. The bed head was raised at an angle of 60 degrees to the horizontal. The mother first was hand and disinfected her hands, lay on the bed, opened the coat, and held the newborn in her arms, so that the newborn's skin was in direct contact with the mother's skin. The newborn's posture was adjusted to the most comfortable state, during which the newborn's face was turned to one side, and the back was covered with a soft quilt to keep warm. KMC was performed twice a day (10:00-12:00 am, and 16:00-18:00 pm, about 60 min/time) for 3d.

### Observation indices

The exclusive breastfeeding rate (1 month, 2 months, 3 months after birth), indices of sleep quality (time of sleep and time for sleep), indices of physical development (weight, length and head circumference) and neuroscience scores were compared. Neurobehavioral score: The neonatal neurobehavioral evaluation scale 0-10 points for each article were evaluated for compliance ability, passive muscular tension, active muscle tensions and primitive reflex and the overall reaction of the novices, while improved results were obtained from a higher score [4]. The parents' psychological

state scores and nursing satisfaction were also compared between the two groups, specifically as follows: (1) Psychological state score: Self-rating anxiety scale (SAS) with a total score of 100 points (cut-off value: 50 points) was used to assess anxiety, and the higher the score, the severer the anxiety. Self-rating depression scale (SDS) with a total score of 100 points (cut-off value: 53 points) was used to assess depression, and a higher score means severer depression [5]. (2) Nursing satisfaction: A self-made questionnaire (validity: 0.90, reliability: 0.88) was used for the satisfaction survey for parents. The highest score was 100 points, and 3 ranges were obtained (<60 points: no satisfaction, 60-80 points: general satisfaction, >80 points: high satisfaction) with 60 points and 80 points as the cut-off values. Total satisfaction rate = high satisfaction rate + general satisfaction rate.

### Statistical analysis

SPSS22.0 software was used. Numerical data (n) were analyzed using  $\chi^2$  test, and quantitative data ( $\bar{x} \pm s$ ) were analyzed using  $t$  test.  $P < 0.05$  was considered to be statistically significant.

## RESULTS

### Exclusive breastfeeding rate

At 1 month, 2 months and 3 months after birth, the exclusive breastfeeding rate was higher in observation group than that in control group ( $P < 0.05$ ) (Table 1).

### Sleep quality indices

Sleep and sleep have both improved compared with those before nursing in both nursing groups ( $P < 0.05$ ). After nursing, sleep was earlier, and in the observation group the duration of sleep was longer ( $P < 0.05$ ) (table 2).

### Physical development indices

In both groups the head weight, length and circumference were higher after nursing than before ( $P < 0.05$ ). Following nursing body weight, length and head range in the observation unit were all greater than in the control unit ( $P < 0.05$ ) (Table 3).

### Neurobehavioral scores

Neurobehavioral scores were higher in both groups after nursing than those before nursing ( $P < 0.05$ ). The observation group had higher neurobehavioral scores after nursing than the control group ( $P < 0.05$ ) (Table 4).

### Psychological state scores

The two groups had lower SAS and SDS scores

after nursing than those before nursing ( $P < 0.05$ ). After nursing, both SAS and SDS scores were lower in observation group than those in control group ( $P < 0.05$ ) (Table 5).

#### Nursing satisfaction rate

Total nursing satisfaction in the observation group (95.00%) was higher than that of the control group (80.00%) ( $P < 0.05$ ) (Table 6).

#### DISCUSSION

Premature infants refer to newborns born at a gestational age of less than 37 weeks, and VLBW/ELBW infants are newborns whose birth weight is less than 1500/1000 g. These newborns have a small body weight, so they are the key crowds monitored for extrauterine growth retardation after birth due to a higher risk [6-8]. Breastfeeding is a scientific feeding pattern for newborns, which can reduce complications such as feeding intolerance and necrotizing enteritis in VLBW infants, and ensure adequate nutritional intake for newborns to promote physical and neurobehavioral development [9, 10]. However, the exclusive breastfeeding rate is affected by multiple factors, and its decline is not conducive to the growth and development of newborns.

The key to their growth and development is how to raise exclusive breast-feeding rates for premature VLBW infants. In the Department of Neonatology, different types of intervention were done for exclusive breastfeeding. Routine nursing is dominated by basic medical education during breastfeeding for premature infants in VLBW, but the nursing measures are less targeted and little impact on new born breast feeding alone. New kinds of health care have continuously developed in the clinic in recent years. KMC, a parent children's nursing model originating from kangaroos in the 1980's, is mainly suitable for infants and young children. For example, it is an ideal solution. The skin is the human body's most sensitive organ, and it stimulates information in the brain that regulates the immune functions, endocrine systems and nervous system [11]. Here, skin contact between the new born and his mother is advocated in KMC to continually and gently stimulate the neuronal system conducive to the improvement of the muscle tension of the baby and the development of neuro-compliance and intelligence [12].

The study found that, at 1 month, 2 months and 3 months of birthing, the exclusive breastfeeding rate was higher than that of the control group ( $P < 0.05$ ). In this study it was found. The sleep time after nursery was earlier and the sleep time in the

observer group was longer than in the control group ( $P < 0.05$ ). KMC can effectively enhance the exclusive breastfeeding rate of newborns and contribute to improve newborn sleep quality. After infancy body weight, length and head circumference in the observing group were all greater than those in the control group ( $P < .05$ ), and the neurobehavioral results were higher than those of the control group ( $P < 0.05$ ), indicating that the physical and neurobehavioral development of newborns could be effectively enhanced by KMC. The main reason for that is that KMC can stimulate the tissue and nervous systems of new born and thus enhance the growth and development of newborns through direct skin contact between the newborn and its mother [13]. Following the nursing period, SAS and SDS values were both less than those of the control group in the observation group ( $P < 0.05$ ). In the observation group, total nursing satisfactory levels (95.00%) were higher than in the checking group ( $P < 0.05$ ). The above findings show that KMC is able to improve the sleep and facilitate neonate's growth and development, thus relaxing and satisfying their parents.

KMC can effectively raise the exclusive breast-feeding rate, improve the quality of sleep and promote the physical and neurobehavioral growth of newborns for VLBW / ELBW premature infants during lactation. In addition, the psychological condition and the care of newborn parents can be improved.

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## Tables

Table 1. Exclusive breastfeeding rate [n (%)]

Group	n	1 month	2 months	3 months
Control	40	28 (70.00%)	25 (62.50%)	22 (55.00%)
Observation	40	36 (90.00%) *	34 (85.00%) *	31 (77.50%) *

\*P&lt;0.05 vs. control group.

Table 2. Sleep quality indices ( $\bar{x} \pm s$ )

Group	Time	Sleep time (min)	Sleep duration (h)
Control (n=40)	Before nursing	17.95±3.27	12.29±1.57
	After nursing	14.67±2.45 <sup>#</sup>	14.63±2.14 <sup>#</sup>
Observation (n=40)	Before nursing	17.80±3.19	12.40±1.63
	After nursing	12.13±2.26 <sup>#*</sup>	17.49±2.76 <sup>#*</sup>

P&lt;0.05 vs. the same group before nursing, \*P&lt;0.05 vs. control group.

Table 3. Physical development indices ( $\bar{x} \pm s$ )

Group	Time	Body weight (kg)	Length (cm)	Head circumference (cm)
Control (n=40)	Before nursing	0.912±0.274	45.79±0.40	32.54±0.35
	After nursing	0.917±0.517 <sup>#</sup>	57.09±0.64 <sup>#</sup>	38.39±0.58 <sup>#</sup>
Observation (n=40)	Before nursing	0.914±0.283	45.87±0.39	32.59±0.34
	After nursing	6.076±0.631 <sup>#*</sup>	57.93±0.82 <sup>#*</sup>	39.14±0.76 <sup>#*</sup>

P&lt;0.05 vs. the same group before nursing, \*P&lt;0.05 vs. control group.

Table 4. Neurobehavioral scores ( $\bar{x} \pm s$ , point)

Group	Time	Behavioral ability	Passive muscular tension	Active muscular tension	Primitive reflex	General reaction
Control (n=40)	Before nursing	5.04±1.26	4.59±1.02	4.82±1.21	4.35±1.14	4.67±1.40
	After nursing	7.21±1.55 <sup>#</sup>	6.54±1.35 <sup>#</sup>	6.85±1.43 <sup>#</sup>	6.39±1.50 <sup>#</sup>	6.72±1.63 <sup>#</sup>
Observation (n=40)	Before nursing	5.17±1.32	4.67±1.14	4.89±1.25	4.47±1.16	4.70±1.38
	After nursing	8.35±1.59 <sup>#*</sup>	8.13±1.56 <sup>#*</sup>	8.42±1.47 <sup>#*</sup>	8.02±1.63 <sup>#*</sup>	8.29±1.54 <sup>#*</sup>

\*P&lt;0.05 vs. the same group before nursing, #P&lt;0.05 vs. control group.

Table 5. Psychological state scores ( $\bar{x} \pm s$ , point)

Group	Time	SAS score	SDS score
Control (n=40)	Before nursing	54.39±6.86	55.47±6.53
	After nursing	47.10±5.27 <sup>#</sup>	48.59±5.42 <sup>#</sup>
Observation (n=40)	Before nursing	54.21±6.90	55.28±6.61
	After nursing	40.74±4.93 <sup>#*</sup>	42.16±5.07 <sup>#*</sup>

\*P&lt;0.05 vs. the same group before nursing, #P&lt;0.05 vs. control group.