ORIGINAL ARTICLE

The effect of kangaroo mother care applied to the healthy newborns in the early postpartum period on breastfeeding: A randomized controlled trial

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Abstract

Objective: To determine the effect of kangaroo mother care applied to the healthy newborns in the early postpartum period on breastfeeding.

Methods: The randomised controlled experimental study was conducted from June 1 to August 25, 2016, at a training and research hospital in Istanbul, Turkey, and comprised healthy newborns and their mothers equally divided into study group A and control group B. The newborns in group A were administered kangaroo mother care for 3 hours after birth, while group B newborns were cared for using the unit's standard postpartum procedure. The time the newborns in both the groups first started to breastfeed, the frequency of breastfeeding within the first 24 hours, the duration of their breastfeeding and suckling skills were evaluated. Data was analysed using the Number Cruncher Statistical System 2007.

Results: There were 112 sets of newborns and their mothers; 56(50%) in each of the two groups. Group A newborns started suckling at the breast sooner, for longer duration, and more frequently compared to the newborns in group B ($p<0.05$). There was no difference between the groups in terms of initial suckling skills ($p= 0.862$), but those in group A were better at suckling 24 hours later ($p=0.001$).

Conclusion: Kangaroo mother care administered to healthy newborns immediately after birth encouraged the newborns to take to the breast sooner, more frequently, and for longer periods. It also increased their suckling skills.

Trial registration: ClinicalTrials.gov Identifier: NCT04619459.

Keywords: Kangaroo mother care, Breastfeeding, Postpartum period, Term newborn. (JPMA 71: 2124; 2021)

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Introduction

It is known that breastfeeding in the first one hour of life protects newborns against fatalities arising from infection, sepsis, pneumonia, diarrhoea and hypothermia.[1] Because of this, the World Health Organisation (WHO) and the United Nations International Children's Emergency Fund (UNICEF) recommend the initiation of breastfeeding in the first hour after delivery, as well as exclusive breastfeeding for the first 6 months, to be continued with the addition of supplementary foods until the age of 2 years.[2] In spite of this, however, it is reported around the world that breastfeeding rates are not at the desired levels and that there are problems both in initiating and maintaining breastfeeding.[2] Studies show that hospital routines interrupting contact between the mother and the infant have an adverse impact on breastfeeding.[3,4] Also, studies[5-7] have shown that newborns provided Kangaroo mother care (KMC) early after delivery have better success at breastfeeding and achieve this success sooner. For this reason, the WHO recommends placing newborns on their mother's chest for skin-to-skin care immediately after birth and maintaining this posture at least until the first successful breastfeeding occurs.[2]

Although postpartum skin-to-skin contact is widely implemented around the world, it is not a practice included in routine postpartum care in Turkey. This delays the bonding between the mother and the child and also the initiation of breastfeeding.[3] Only 50% of infants in Turkey are breastfed in the first one hour after delivery and 30% are not even breastfed in the first 24 hours after birth.[8] A study[3] in a baby-friendly hospital in Turkey found that newborns were exposed to their mothers on an average at Minute 69 and that the first breastfeeding takes place on an average at Minute 78. Research findings demonstrate that some factors, such as the baby's physical examination and admitting the infant into the nursery for routine care, cause a delay in the newborn's contact with the mother and results in the late initiation of breastfeeding. It is unfortunate that the practice of standard post-delivery care is widespread in hospitals all over Turkey. When it is considered that about 97% of births in Turkey occur in hospitals,[8] it is clear that improving the post-delivery care given to infants in hospitals will do much to promote breastfeeding.

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The current study was planned to determine the KMC effect on breastfeeding in healthy newborns in the early postpartum period. Of the four hypotheses, the first (H1) was that infants administered KMC start to breastfeed sooner, H2 was that they breastfeed more frequently, H3 was that they breastfeed for longer periods, and H4 was they they are more successful at breastfeeding than infants receiving standard postpartum care (SPC).

Subjects and Methods

The randomised controlled experimental study was conducted from June 1 to August 25, 2016, at a training and research hospital in Istanbul, Turkey. After approval from the institutional ethics review committee, the sample size was calculated using G*Power v3.1.9 in the light of literature,[9] with effect size (d) 0.566, effect level of α 0.05 and power 80%. Taking into consideration possible dropouts, the sample was incremented by 10%.

Those included were healthy mothers ages 18-42 years who had delivered normal vaginal birth at gestational week 38-40. Cases of instrumental vaginal deliveries were excluded. The newborns of these mothers were those with a birthweight of 2500-4000gr, who had no serious asphyxiation, an Appearance, Pulse, Grimace, Activity, and Respiration (APGAR) score of at least 7 at Minute 1 and Minute 5, and no health problem preventing the newborn from breastfeeding, like cleft palate, harelip, oesophageal atresia etc. Newborns showing a health issue following the birth were excluded. In their place, the same randomisation method was used until the required number of cases were completed.

The researcher met with the mothers who fulfilled the selection criteria prior to the birth and took informed and voluntary consent for participation in the study. Those who refused to furnish consent were excluded. Those who consented were randomised into two equal KMC and SPC groups using the computerised randomisation method. Post-delivery, data was collected using a form designed in line with literature.[10] The infants' suckling skills were assessed with the 'Latch on breast, Audible swallowing, Type of nipple, Comfort breast/nipple, Hold/help (LATCH) breastfeeding assessment tool[11] for which the Turkish version was generated and validated in 2003.[12] LATCH has five parameters and each item is assessed on a 0-2 scale. The highest possible score on the scale is 10; the lowest is 0. LATCH was used to evaluate the newborns' suckling skills at the first breastfeeding and then at the 24th hour on the basis of the researchers' one-on-one observations.

Newborns in the intervention KMC group were given an APGAR evaluation at Minute 1, right after they were cleaned and dried and started breathing. The newborns that had an APGAR score of <7 at Minute 1 were excluded. The newborns were weighed after their umbilical cords had been clamped and cut; their footprints were taken and bracelets were tagged on. Their vital signs were assessed and recorded, including peak heart rate, respiration rate, body temperature and oxygen saturation. The pre-KMC procedures took approximately 3-4 minutes. The newborns' diapers were tied, their caps were put on and then they were positioned on their mother's bare chest for KMC. At Minute 5, the newborns' APGAR scores were assessed and recorded during KMC. The newborn's examination and injections, Hepatitis B and vitamin K, were postponed until the first breastfeeding took place. A paediatrician performed a detailed examination of the newborns under the radiant infant warmer after the first breastfeeding. Following the examination, the newborn was positioned on the mother's breast for KMC. During this KMC, the newborn was administered 1mg vitamin K in the right leg and 0.5ml Hepatitis B vaccine in the left leg via intramuscular (IM) injections. The KMC session was continued for 3 hours. Care attempt of mothers, such as episiotomy repair, was taken in the same KMC position.

Newborns in the control SPC group were given an APGAR evaluation at Minute 1, right after they were cleaned and dried and started breathing. The newborns having an APGAR score <7 at Minute 1 were excluded. The newborns were weighed after their umbilical cords had been clamped and cut; their footprints were taken and bracelets were tagged on. Their vital signs were assessed and recorded, including peak heart rate, respiration rate, body temperature and oxygen saturation. After the evaluation, the newborns were placed in their mothers' laps for the first breastfeeding attempt. The newborns' examination and Hepatitis B and vitamin K injections were postponed until the first breastfeeding took place. A paediatrician performed a detailed examination of the newborns under the radiant infant warmer after the first breastfeeding attempt. Following the examination, the newborn was wrapped in a warm blanket (60x90cm) and taken to the observation room for the injections. After the injections, the newborns were placed in their mothers' laps for the second breastfeeding attempt.

All the women in the KMC and SPC groups received care in the same delivery room and maternity service of the same hospital, and were served by the same healthcare professionals. An effort was made to avoid contact between the mothers in the KMC and SPC groups in view of the possibility that the results might be influenced.

The researcher assessed and recorded the meetings of the

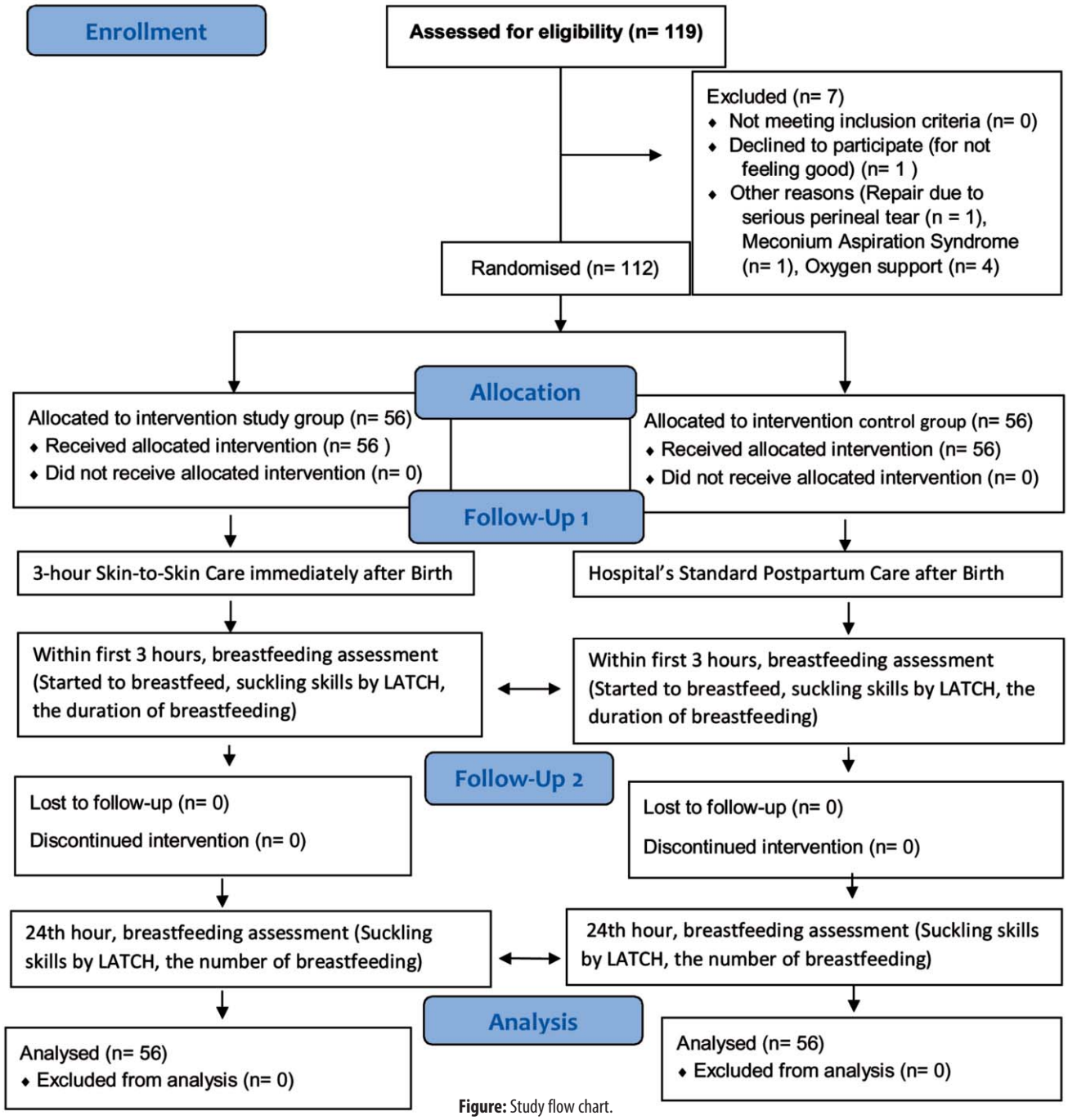

Figure: Study flow chart.

babies in both the groups with their mothers, the number of their breastfeedings in the first 3 hours, the duration and the success of the breastfeedings. To determine the number of breastfeeding the mothers engaged in between the 3rd and 24th hour, a 24-hour Evaluation and Observation Form was used as a checklist. The mothers marked this form each time they breastfed. The researcher followed up on the newborn in the 24th hour prior to discharge. Physiological parameters, like peak heart rate, respiration rate, oxygen saturation and body temperature, were recorded. The newborns' breastfeeding skills at the first and 24th-hour breastfeedings were evaluated by the researcher using the LATCH tool (Figure).

Data was analysed using the Number Cruncher Statistical System (NCSS) 2007. Besides descriptive statistics, like

means, standard deviation, median, frequency and percentages, Shapiro-Wilk test and box plot graphs were employed in testing normality. Independent samples t test was used to analyse the two groups of quantitative data displaying normal distribution, such as the newborns' weight, height, head circumference, number of breastfeedings received, mother's age. Mann-Whitney U test was used in the case of variables not showing normal distribution, such as the newborns' APGAR scores at Minutes 1 and 5, the first interaction of the mother with her infant, the first time of breastfeeding, the number of breastfeedings in the first 3 hours and their duration. The comparison of qualitative data such as the infants' gender, the mother's educational status, the status of being breastfed in the first half-hour and hour was undertaken with Pearson's chi-square test, while Fisher's exact test was used to compare the mothers' eagerness to breastfeed. The results were analyzed at a confidence interval (CI) of 95% with significance expressed at $p<0.05$.

Results

There were 112 sets of newborns and their mothers; 56 (50%) in each of the two groups. There was no significant difference in baseline characteristics, like mother's age, educational status, newborn's gender, birthweight, or Minute 1 APGAR ($p>0.05$) (Table-1).

Mothers in the KMC group were more eager to breastfeed ($p=0.008$), the newborns in the KMC group had a higher rate of breastfeeding in the first 30 minutes, and all in the

Table-1: Comparison of descriptive characteristics of the kangaroo mother care and standard postpartum care groups (N=112).

Descriptive Characteristics	Kangaroo mother care (n=56)	Standard Postpartum Care (n=56)	P Value
Mother			
Mean age (years)	29.95±4.24	26.70±5.23	[a]0.406
Educational status, n (%)			
Illiterate	5 (8.9)	14 (25)	[b]0.176
Literate	11 (20)	7 (12.5)	
Elementary School	16 (29)	20 (35.7)	
Middle School	14 (25)	9 (16)	
High School	7 (12.5)	4 (7.2)	
University and higher	3 (5)	2 (3.6)	
Infant			
Gender n (%)			
Female	39±39.2	39±39,3	[b]0.080
Male	26 (46.4)	17 (30.4)	
Mean gestational age at delivery	39 (39.2)	39 (39.3)	[a]0.873
Mean Birth weight(G)	3210,4±391.4	3314.1±426.7	[a]0.183
Mean Head circumference (cm)	34.161.3	34.3±1.2	[a]0.469
Mean Length (cm)	49.8±1.3	49.5±1.6	[a]0.284
Minute 1 APGAR score, min-max (median), mean (SD)	8-9 (9) 8.9 (0.2)	8-9 (9) 8.8 (0.3)	[c]0.114

[a]Independent Samples T test. [b]Pearson Chi-Square Test. [c]Mann Whitney U test; SD; Standard deviation.
SD: Standard Deviation.

Table-2: Comparison of breastfeeding characteristics of the kangaroo mother care and standard postpartum care groups (N=112).

Breastfeeding Characteristics	Kangaroo mother care (n=56)	Standard Postpartum Care (n=56)	P Value
Mother's eagerness to breastfeed, n (%)			
Undecided	5 (8.9)	13 (23.2)	[d]0.008
Eager	51 (91.1)	39 (69.6)	
Not eager	0 (0)	4 (7.1)	
Newborns' breastfeeding over time, n (%)			
Breastfeeding in first 30 minutes	50 (89,3)	2 (3,6)	[b]0.001
Breastfeeding in first 1 hour	56 (100)	31 (55,4)	[b]0.001
First meeting between newborn and mother (min), min-max (median), mean (SD)	1-10 (3.5) 3.61 (1.96)	1-120 (54) 52.55 (29.47)	[c]0.001
Time of first breastfeeding (min), min-max (median), mean (SD)	1-45 (11) 15.36 (11.22)	23-145 (65) 67.46 (27.16)	[c]0.001
Number of breastfeedings in first 3 hours, min-max (median), mean (SD)	2-8 (4) 4.21 (1.17)	1-4 (1) 1.66 (0.82)	[c]0.001
Breastfeeding duration in first 3 hours (min), min-max (median), mean (SD)	20-125 (82) 79.61 (23.22)	4-86 (20) 21.77 (14.35)	[c]0.001
Number of breastfeedings between 3rd-24th hours, mean (SD)	13.13 (3.81)	10.96 (4.39)	[a]0.006
Number of breastfeedings in first 24 hours, mean (SD)	17.34 (3.88)	12.61 (4.48)	[a]0.001

[a]Independent Samples T test. [b]Pearson Chi-Square Test. [c]Mann Whitney U Test. [d]Fisher Freeman Halton Test.
SD: Standard Deviation.

Table-3: Comparison of LATCH scores of newborns in the kangaroo mother care and standard postpartum care groups (N=112).

LATCH Scores	Kangaroo mother care (n=56)	Standard Postpartum Care (n=56)	[c]P Value
First suckling, min-max (median), mean (SD)	6-10 (9) 8.38±0.95	6-10 (9) 8.36±1.02	0.862
Suckling at the 24th hour, min-max (median), mean	8-10 (10) 9.89 (0.38)	7-10 (9) 9.35(0.71)	0.001

[c]Mann Whitney U Tes. SD: Standard Deviation.
LATCH: Latch on breast, Audible swallowing, Type of nipple, Comfort breast/nipple, Hold/help.

group had breastfed within 1 hour, met with their mothers sooner, and started to breastfeed earlier (p=0.001).

Newborns in the KMC group recorded a higher number of breastfeeding and longer breastfeeding duration per session in the first 3 hours (P=0.001). Also, the newborns in the KMC group had a higher number of breastfeedings between the 3rd and the 24th hour (p=0.006) and a significantly higher number of breastfeedings in the first 24 hours (p=0.001) (Table-2).

When the groups were compared in terms of breastfeeding skills, there was no significance found between the groups in terms of LATCH scores at the first breastfeeding (p=0.862), but KMC group's LATCH scores at the 24th hour were significantly higher (p=0.001) (Table-3).

Discussion

Mother's age, educational status, baby's gestational week, birthweight and other characteristics have an effect on breastfeeding.[13] The results of the current study indicated that the characteristics that can affect breastfeeding were similar in both KMC and SPC groups.

A study in Turkey reported that SPC delays the meeting of mothers and their infants after birth and consequently leads to the late initiation of breastfeeding.[3] Such findings make it clear that postpartum care practices must be reviewed in the country.

The results of the current study demonstrated that babies given KMC were exposed to their mothers sooner than newborns receiving SPC, started breastfeeding earlier, had higher rates of breastfeeding in the first 30 minutes, and that all KMC infants had breastfeed within 1 hour. The results confirm the H1 hypothesis and is consistent with literature.[7,14-17] It might be recommended that midwives and nurses who provide breastfeeding guidance must be made more aware of KMC so that they may create opportunities to apply KMC to newborns with the aim of promoting breastfeeding.

It is known that frequently breastfeeding a baby increases the flow of mother's milk.[18] The number of breastfeedings KMC newborns achieved between the first 3-24 hours was more than SPC newborns, confirming the H2 hypothesis.

Besides an infant's ability to suckle effectively, the duration of breastfeeding plays an important role in the success of breastfeeding.[19] By administering KMC to the newborns for 3 hours, the current study was able to determine how many times they suckled. It was observed that the breastfeeding duration of KMC newborns was longer than the breastfeeding duration of SPC newborns, confirming the H3 hypothesis. A review of the literature revealed only a single study that measured the effect of KMC on the duration of breastfeeding. The randomised controlled trial (RCT) with 92 primiparae and their term newborns, applied KMC for approximately 2 hours and looked into the effect of KMC on the duration of the first breastfeeding. It found that the KMC newborns had a longer initial breastfeeding.[19] The results of the current study, we believe, will make a significant contribution to literature as it is the first study to demonstrate that KMC causes infants to breastfeed more frequently and for longer periods.

Effective emptying of the breasts plays an important role in the production of milk. And for the breasts to empty effectively, the baby must be breastfeeding effectively.[20] The current study did not find a difference in newborns' initial breastfeeding skills, but the KMC group had significantly better breastfeeding skills in the 24th hour, confirming the H4 hypothesis.

Another study used LATCH to assess the breastfeeding success of term newborns exposed to KMC immediately after birth for 45-60 minutes.[17] It found that KMC babies had higher LATCH scores. In several studies using the Infant Breastfeeding Assessment Tool (IBFAT) to evaluate the effect of KMC on breastfeeding success,[5,7,21] it was reported, similar to our results, that newborns given KMC had better suckling skills.

The strength of the current study is its pioneering finding that immediate KMC post-birth meant longer breastfeeding duration.

The current study has some limitations as well. The first is the possibility of a minimal influence on the study outcome because of the overly curious attitudes of healthcare professionals who might have found the practice of KMC novel and interesting. To reduce this limitation, the study groups were randomly selected and the healthcare personnel did not participate in the

evaluation process. Another limitation was that the effect of KMC on breastfeeding was observed over 24 hours. This was because the average hospital stay of normal births in the study hospital is 24 hours. Due to limited research opportunities, we could not have a longer follow-up for the period after discharge. There is a need for longer follow-ups to determine the long-term effects of KMC. Thirdly, because of the limited facilities available to the unit, the research could not be conducted as a blind study. To minimise this, the infants' APGAR scores, vital signs and other parameters were obtained from their medical files, and the researcher assessed the breastfeeding skills of the infants with a valid and reliable inventory in the Turkish language.

Conclusion

The practice of KMC applied immediately after birth caused newborns to breastfeed sooner, more frequently and for longer periods, leading to improvement in their suckling skills.

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Conflict of Interest: None.

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