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ORIGINAL ARTICLE

Effect of post-discharge online kangaroo care training on breastfeeding self-efficacy in mothers with preterm infants: A randomised controlled study

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Abstract

Background: Preterm newborns face many health problems due to their incomplete intrauterine development and the immaturity of their systems. One of these problems concerns nutrition. This study aimed to determine the effect of online kangaroo care (KC) training provided post-discharge on breastfeeding self-efficacy in mothers with preterm infants.

Methods: This research was conducted as an experimental study with a randomised control group. Two groups were formed: kangaroo care and control. The sample of the study consisted of 68 mothers of preterm infants. The mothers in the KC group were given online KC training after discharge from the hospital. The mothers were asked to perform KC regularly, at least once a day, for 20 min, 7 days a week. The Breastfeeding Self-Efficacy Scale was administered to the mothers before and after training.

Results: The results of the study revealed that the difference between the pre-test and post-test breastfeeding self-efficacy scores was statistically significantly higher among the mothers who received online KC training compared with the controls ($p < 0.001$).

Conclusion: According to the results of our research carried out in this context, the mothers who received online KC training had increased breastfeeding self-efficacy compared to those in the control group.

KEYWORDS

kangaroo care, mother, nurse, online training, preterm infant

INTRODUCTION

Infants born before the 37th week of gestation are referred to as preterm. The nutrition of preterm infants in the neonatal intensive care unit is of great importance for their growth and development. The provision of enteral nutrition is essential immediately after birth, with breast milk being the only food that has a regulatory effect on the development of the gastrointestinal tract [1]. Breastfeeding provides a multitude of benefits for newborns, especially those born preterm. In contrast to term infants, preterm infants have less frequent and shorter duration of breastfeeding both at the time of discharge and in the post-discharge period, despite the well-documented advantages of breastfeeding [2].

Kangaroo care (KC) is the practice of early and continuous skin-to-skin contact between the mother and the newborn [3]. KC is performed by placing the baby, wearing only a hat and diaper, on the parents' bare chest. KC performed regularly every day contributes positively to the infant's physiological, psychological and social development [4]. KC is recommended in the routine care of preterm infants in the neonatal intensive care unit (NICU) due to its numerous benefits, including the regulation of the physiological parameters of the newborn; promotion of physical growth; improved oxygenation of tissues; regulation of the gastrointestinal system; protection against infections; reduction of pain response; and positive contribution to the development of breastfeeding and mother–baby bonding, thereby reducing the costs of newborn care and mortality and morbidity rates compared to classical incubator care [4–8].

Preterm newborns face many health problems due to their incomplete intrauterine development and the immaturity of their systems. One of these problems concerns nutrition. Breast milk provides the most ideal nutrition in the care of preterm infants. However, the frequency and duration of breastfeeding in preterm infants is very low [9]. It has been proven that KC applied to preterm infants has a positive effect on breastfeeding [10]. In a study conducted in India, following KC applied to 265 preterm infants, it was reported that there was a significant increase in breastfeeding rates compared with the control group [11].

Preterm birth has several negative effects on the mother, such as feelings of inadequacy, anxiety, stress, sleep disturbances, guilt, fear, anxiety and the inability to breastfeed. Preterm birth negatively affects the mother, reducing the amount of breast milk production and decreasing breastfeeding self-efficacy [12–14]. Breastfeeding self-efficacy refers to a mother's confidence in her capability to breastfeed her infant and the higher breastfeeding the mother's self-efficacy perception is the long sustainable breastfeeding [15]. Moreover, breastfeeding serves as a fundamental mechanism for establishing and nurturing the link between the mother and the newborn and plays an active role in mother–infant bonding. KC is a practice that contributes positively to mother–infant bonding and the development of parental roles by increasing the perception of breastfeeding self-efficacy in mothers of preterm infants [16, 17]. KC is one of the most effective nursing interventions in the NICU [18, 19]. The instruction of KC techniques to mothers of preterm infants by NICU nurses is of utmost importance, as is the subsequent encouragement of continued KC practice following the release of these infants from the hospital [20, 21]. Multiple studies have demonstrated the significance of engaging in KC, that is, facilitating regular skin-to-skin contact between the mother and the preterm infant, in order to effectively ensure the transition to direct breastfeeding [14, 20–22]. The current study aimed to determine the effect of online KC training provided post-discharge on the breastfeeding self-efficacy of mothers with preterm infants born at 30 to 36+6 weeks of gestation.

METHODS

Study design and participant selection

This research was conducted as an experimental study with a randomised control group. The sample of the study consisted of the mothers of preterm infants who were discharged from the NICU of a hospital located in Balıkesir province, from 3 May 2023 to 24 December 2023. Power analysis (G*Power, v. 3.1.9.2) was used to determine the sample of the research. During this analysis, a reference article [23] was taken into account. At a power $(1-\beta)$ of 90%, alpha value of 0.05, and effect size coefficient (d) of 0.89, the effect size was calculated to be larger than the largest effect size (0.80). Accordingly, it was determined that at least 34 preterm infants and their mothers should be included in each group.

Two randomised groups were formed: KC and control. The group of each mother was determined using the simple randomisation method on the website www.randomizer.org. The researchers talked to the mothers of the preterm infants who were planned to be discharged from the NICU, informed these mothers about the study, and asked for their contact information after obtaining their written consent for participation in the study. Using the contact numbers, the online survey forms were sent to the mothers via WhatsApp. In addition, a training video that was prepared by the researchers and contained general information about KC was sent to the mothers in the KC group. The mothers in this group were asked to perform KC regularly, at least once a day, for 20 min, for 7 days a week. Before sending the training video to the mothers in the KC group, they were asked to complete a maternal descriptive information form and the Breastfeeding Self-Efficacy Scale. After a 7-day KC application, the Breastfeeding Self-Efficacy Scale was completed again by the mothers in the KC group on the seventh day.

Preparation of the KC training video

The KC training video was prepared by expert researchers in the field. In the study, these researchers who prepared

the kangaroo care video are experts in their fields with a degree of PhD in paediatric nursing. The video was recorded in the skills laboratory of the Nursing Department of the Health Sciences Faculty The video was completed after approximately 60 min of work. The total duration of the video was 1 min and 26 s. Written and audio presentations were used as instructional aids to enhance clarity. Adobe Premiere was used to edit the video and synchronise it with the voiceover. The prepared video was shown to two professors who are experts in the field, and their opinions were taken. Before the study, the instructional effectiveness of the video was assessed by presenting the final version to a group of five mothers with preterm infants.

Outcome measurements

Maternal Descriptive Information Form

This form comprised 11 questions concerning age, educational level, occupation, income level, gender of the preterm infant, history of preterm birth, previous engagement with KC, whether their most recent pregnancy was intended, method of delivery, and breastfeeding status and whether they received KC training before discharge from the hospital.

Breastfeeding Self-Efficacy Scale

This 33-item scale was developed by Dennis and Faux (1999) and later transformed into a 14-item short form by Dennis (2003). This scale assesses the perceived maternal competence in relation to breastfeeding. All items on the scale are based on positive statements. The short form of the scale was adapted to Turkish by Tokat and Okumuş (2010), and the Cronbach alpha value was found to be 0.86. The minimum score that can be obtained from the scale is 14, and the maximum score is 70, with a higher score indicating a higher level of breastfeeding self-efficacy [24].

Statistical methods

The data obtained from the research were analysed using the Statistical Package for the Social Sciences (SPSS) for Windows, v. 21.0. Descriptive statistical methods (number, percentage, mean and standard deviation) were used when analysing the data. Skewness and kurtosis values were determined for the normality test. The skewness value varied between −0.159 and −1.281, and the kurtosis value varied between −1.336 and 1.824. The independent-samples *t*-test was used in the analysis of the differences between the pre-test and post-test scores. The significance level was determined as $\alpha = 0.05$.

RESULTS

Table 1 presents the findings concerning the descriptive characteristics of the mothers of preterm infants. The mean age of the mothers included in the study was 29.47 ± 5.62 years. In the KC group, 52.9% of the mothers were high-school graduates, 82.4% were unemployed/self-employed, 67.6% had a middle-level income, 50% had a female preterm infant, 79.4% did not have a previous history of preterm birth, none had experienced KC before, 82.4% had an intended pregnancy, 76.5% had caesarean section delivery, 85.3% had received breastfeeding training before discharge and 70.6% had not received KC training before discharge. Of the mothers in the control group, 79.4% were high-school graduates, 76.5% were unemployed/self-employed, 58.8% had a middle-level income, 64.7% had a male preterm infant, 79.4% did not have a previous history of preterm birth, none had experienced KC before, 85.3% had an intended pregnancy, 70.6% had a caesarean section delivery, 88.2% had received breastfeeding training before discharge and 79.4% had not received KC training before discharge. No statistically significant difference was found between the experimental and control group in terms of sociodemographic characteristics ($p > 0.05$). The groups were homogeneously distributed (Table 1).

Table 2 shows the comparison of the KC and control groups in terms of the mean pre-test scores of the groups on the Breastfeeding Self-Efficacy Scale. The mean Breastfeeding Self-Efficacy Scale pre-test scores of the KC and control groups were 51.35 ± 4.51 and 51.64 ± 4.34, respectively. As a result of the independent-samples *t*-test, no statistically significant difference was detected between these two groups ($p > 0.05$), indicating that the KC and control groups were similar to each other before the study (Table 2).

Table 3 shows the comparison of the KC and control groups in terms of the differences the pre-test and post-test between scores on the Breastfeeding Self-Efficacy Scale. The mean pre-test-post-test between score difference was determined to be 10.26 ± 7.25 for the KC group and 1.88 ± 6.16 for the control group. According to the significance value of the paired-samples *t*-test, there was a statistically significant difference between the pre-test and post-test score differences of the two groups ($p < 0.001$) (Table 3).

TABLE 1 Distribution of the sociodemographic characteristics of the mothers.

Variables	KC group ($n=34$)		Control group (n = 34)		Test statistic*	p
	n	%	n	%		
Education						
High school	18	52.9	27	79.4	0.062[b]	0.571
University	16	47.1	7	20.6		
Employment						
Unemployed/self-employed	28	82.4	26	76.5	0.389[b]	0.438
Civil servant	6	17.6	8	23.5		
Income level						
Good	11	32.4	14	41.2	3.387[b]	0.071
Middle	23	67.6	20	58.8		
Infant's gender						
Girl	17	50.0	12	35.3	2.061[a]	0.141
Boy	17	50.0	22	64.7		
Had a preterm infants before						
Yes	7	20.6	7	20.6	0.344[b]	0.450
No	27	79.4	27	79.4		
Prior KC experience						
Absent	34	100.0	34	100.0		
Intended pregnancy						
Yes	28	82.4	29	85.3	2.015[b]	0.205
No	6	17.6	5	14.7		
Mode of delivery						
Normal birth	8	23.5	10	29.4	0.330[b]	0.435
Caesarean section	26	76.5	24	70.6		
Breastfeeding training before discharge						
Yes	29	85.3	30	88.2	0.383[b]	0.488
No	5	14.7	4	11.8		
Had a KC training before discharge						
Yes	10	29.4	7	20.6	0.768[b]	0.330
No	24	70.6	27	79.4		

Abbreviation: KC, kangaroo care.

*,[a]Pearson Chi-squared test was used, [b]Fisher–Freeman–Halton test was used.

DISCUSSION

This research was conducted to determine the effect of online KC training provided post-discharge on the breastfeeding self-efficacy of mothers with preterm infants born at 30 to 36+6 weeks of gestation. Upon examination of the descriptive characteristics and pre-study mean scores of the mothers in both the KC and control groups, it was determined that there was no statistically significant difference between the groups, and the groups were homogeneously distributed. Given that the study used a randomised controlled design and took measures to assure homogeneity between the groups, introductory information about the mothers is not discussed.

TABLE 2 Comparison of pre-test scores between groups on Breastfeeding Self-Efficacy Scale.

	KC group ($n=34$)	Control group ($n=34$)	Test statistic[a]	p
Variables				
Pre-test	51.35 ± 4.51	51.64 ± 4.34	−0.274	0.785

Abbreviation: KC, kangaroo care.

[a]Paired-samples t-test.

On completion of the research, the mothers of preterm infants in the KC group were found to have statistically significantly higher differences between the pre-test and post-test scores compared to the control

TABLE 3 Inter-group comparison of the differences between the pre-test and post-test scores on the Breastfeeding Self-Efficacy Scale.

	KC group ($n = 34$)	Control group ($n = 34$)	Test statistic[a]	p
Pre-test to post-test difference scares	10.26 ± 7.25	1.88 ± 6.16	5.133**	0.000**

Abbreviation: KC, kangaroo care.

**$p < 0.001$.

[a]Paired-samples t-test.

group. This result shows that online KC training had a positive effect on the breastfeeding self-efficacy of the mothers of preterm infants. The mothers' breastfeeding self-efficacy improved positively compared to the beginning of the study. KC is known to have numerous benefits for maternal and infant health [25], with one of the most important effects being on the amount of breast milk production and breastfeeding. To the best of our knowledge, there is no study in the literature concerning the effect of a KC training prepared and presented online on the breastfeeding self-efficacy of mothers with preterm infants. However, the effect of KC training on the breastfeeding self-efficacy of mothers has been previously investigated.

In a study conducted with 48 mothers with low-birthweight infants, Amaliya et al. [26] provided the mothers with newborn healthcare package training, including KC, before discharge and reported that the breastfeeding self-efficacy of the mothers in the training group increased at the end of training. In a quasi-experimental study investigating the effects of skin-to-skin contact between newborn term infants and their mothers, Safari et al. [27] found that early skin-to-skin contact positively affected the breastfeeding adequacy of the mothers. In a randomised controlled study including 884 mothers of late preterm infants, Zhang et al. [21] determined that the breastfeeding self-efficacy of the mothers in the group who were provided KC training in the hospital environment before discharge was better than that of the control group on the 42nd day of follow-up. Yılmaz et al. [12] conducted a quasi-experimental study with 30 postpartum mothers who received postpartum KC training and reported that the breastfeeding self-efficacy of the mothers in the experimental group was higher than that of the controls. In a randomised controlled study on KC, Küçükkaya (2022) asked the mothers of preterm infants to perform KC for 30 min at least twice a day from the first month to the sixth month. The author found that the mothers included in the KC group had higher postpartum breastfeeding self-efficacy than the remaining groups [25]. Sinha et al. (2020) in another randomised controlled trial conducted with 252 mothers of infants with low-birth-weight infants, Sinha et al. [28] reported that the mothers in the experimental group were more successful in breastfeeding . In a study conducted by Karakoç Geçici and Geçkil [23] with the mothers of 60 preterm infants, it was determined that the breastfeeding self-efficacy perceptions of the mothers in a hospital where KC training was provided were higher compared to those in a hospital where this training was not provided. The findings of our study corroborate the assertion in the literature that providing KC training and encouraging KC practice for mothers with preterm infants enhances their perception of breastfeeding self-efficacy.

Strengths and limitations

The strength of the study is online KC training that was used by preterm infants mothers to learn KC. Thanks to online KC training, the nurse reaches a wider audience and contributes to the improvement of mother–baby health. Online education and consultancy services have become widespread, especially after the pandemic. Our study contributes to online health education and is an exemplary study. The results of this study are limited to the data obtained from 68 preterm infants mother discharge from the NICU; they can only be generalised to groups with similar characteristics to the sample.

Clinical implications and conclusion

Preterm birth has negative consequences for the mother and the newborn. While the preterm infant receives NICU care, the mother may experience many issues, including stress, anxiety, depression, anxiety, attachment problems and the inability to breastfeed. The mother's breast milk supply and breastfeeding self-efficacy are also negatively affected. KC is a practice that contributes positively to mother–infant bonding and the development of parental roles by increasing the perception of breastfeeding self-efficacy in the mothers of preterm infants. According to the results of our research carried out in this context, the mothers who received online KC training had increased breastfeeding self-efficacy compared to those in the control group. It is recommended to provide KC training, a practice known for its numerous advantages for both the mother and the infant. Our research indicates that

implementing KC for preterm infants at home following discharge from the hospital enhances mothers' breastfeeding self-efficacy by promoting increased breast milk consumption by infants. Based on the research findings, it is recommended to (1) educate mothers with preterm infants about KC in the NICU through practical demonstrations, (2) provide training for mothers to continue KC practices at home and (3) include nurses in KC practices in the routine care of newborns in the NICU and offer training on this subject for the family at the time of discharge.

AUTHOR CONTRIBUTIONS

Both authors were involved in all planning, writing and revision stages of the study. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing interests.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICAL APPROVAL

Ethical approval was received from the Health Sciences Non-Interventional Research Ethics Committee of Balıkesir University (Decision number: 2023/32, Decision date: 11 April 2023). The principle of 'protection of confidentiality' was upheld by preserving the confidentiality of the data, and the principle of 'respect for autonomy' was fulfilled through voluntary participation in the research. The study ensured the protection of individual rights by conforming to the principles outlined in the 'Declaration of Helsinki'. In addition, the voluntariness principle was applied, and written consent was obtained from the mothers included in the study.

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