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Effect of a Complementary Kangaroo Mother Care Education on Mothers' Knowledge and Attitudes Toward KMC in a Neonatal Intensive Care Unit

Shabnam Zadehashem[1], Masoumeh Azami[2], Niusha Nazari[3], Atefeh Tajari[4], Mir Hadi Mousavi[5], Mohammad Taha Saadati Rad[6] *, Farinaz Saeidi[7], Rojhaye Makouei[8], Zeinab Torani[4]

[1] Faculty of Medical Management and Informatics, Tehran University of Medical Sciences, Tehran, Iran
[2] Shahid Beheshti University of Medical Sciences, School of Nursing and Midwifery, Tehran, Iran
[3] Community Health Research Center, Isf.C., Islamic Azad University, Isfahan, Iran
[4] Islamic Azad University, Aliabad Katul Branch, Aliabad Katul, Iran
[5] Department of Pediatric, Pediatric Health Research Center ،School of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran
[6] Student Research Committee, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran
[7] Department of Nursing, Pediatric Health Research Center ،School of Nursing and Midwifery,Tabriz University of Medical Sciences, Tabriz, Iran
[8] Department of Statistics, Faculty of Mathematical Sciences, University of Tabriz, Tabriz, Iran

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ABSTRACT

Kangaroo mother care (KMC) is a family-centered intervention recommended for preterm and low-birth-weight infants; however, successful implementation depends partly on parents' knowledge and attitudes. This study evaluated the short-term effect of complementary KMC education on mothers' KMC-related knowledge and attitudes and described perceived motivators and barriers. A single-group pretest-posttest quasi-experimental study was conducted among 300 mothers of neonates admitted to the NICUs of Al-Zahra Hospital, Tabriz, Iran. In addition to routine ward education, mothers attended five structured sessions using explanations, demonstrations, and supervised practice. A researcher-developed questionnaire was completed before and after the program. Knowledge and attitude scores improved significantly after the education program (p=0.01 and p=0.03, respectively). Overall, 70% of mothers were classified as having a favorable attitude toward KMC. Increased infant sleep duration was the most frequently reported motivator (97.7%). Inability to attend or remain in the hospital for all required hours was the most frequent barrier (84.7%), whereas infant clinical instability was reported by 147 mothers (49.0%). In conclusion: complementary KMC education was associated with short-term improvement in mothers' knowledge and attitudes. The findings should be interpreted cautiously because the study had no comparison group and outcomes were assessed immediately after education.

Keywords: Education; Kangaroo Mother care; Knowledge; Attitude; Mothers; Neonatal Intensive Care Unit; Preterm Infant

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* Corresponding author: Mohammad Taha Saadati Rad . Student Research Committee, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran E-mail: farinaz_saeidi@yahoo.com

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Introduction

Kangaroo mother care (KMC) is a package of care centered on early, continuous, and prolonged skin-to-skin contact between a preterm or low-birth-weight infant and a parent or other caregiver, together with support for exclusive breast milk feeding and appropriate follow-up. The World Health Organization recommends KMC as routine care for preterm or low-birth-weight infants and emphasizes family involvement from birth whenever feasible [1]. Large randomized trials and evidence syntheses have shown that KMC can improve survival, thermal stability, breastfeeding, growth, and other neonatal outcomes [2-5].

Clinical effectiveness alone does not guarantee implementation. In neonatal intensive care units (NICUs), parents may hesitate because they fear harming a medically fragile infant, lack practical skills, have limited access to the unit, or face environmental and family constraints. Nurses are central to explaining eligibility and safety, demonstrating positioning, supporting return-demonstration, and correcting misconceptions. Studies among mothers and neonatal nurses show that knowledge, attitudes, perceived barriers, and staff support influence whether KMC is initiated and sustained [6-13].

In Iran, implementation work has also identified maternal discomfort, fear, staff attitudes, infrastructure limitations, and family circumstances as barriers to continuous KMC [14]. Although routine education was provided in the study NICUs, the original manuscript suggested that mothers still had knowledge gaps and uncertainty about KMC. A structured, complementary education program may therefore help mothers understand the purpose and safe practice of KMC and may improve their willingness to participate.

The primary objective of this study was to evaluate the change in mothers' KMC-related knowledge and attitude scores from before to immediately after a five-session complementary KMC education program. The secondary objective was to describe mothers' perceived motivators and barriers to KMC implementation in the NICU.

Materials and Methods

Study Design and Setting

This single-group, pretest-posttest quasi-experimental study was conducted in NICUs 1 and 2 of Al-Zahra Hospital, a teaching hospital affiliated with Tabriz University of Medical Sciences, Tabriz, Iran. The report was structured with reference to the TREND statement for nonrandomized intervention evaluations [17].

Participants, Eligibility, and Sampling

The target population comprised mothers of neonates admitted to the two NICUs during the study period. Eligible mothers were approached during morning, evening, and night shifts and enrolled by convenience sampling until 300 participants had been recruited. All participants received the educational intervention; there was no control group and no random allocation.

The inclusion criteria were being the mother of a neonate admitted to NICU 1 or 2 of Al-Zahra Hospital and willingness to participate. Mothers who declined participation, withdrew consent, or did not complete both assessments were excluded.

Educational Intervention

After completing the baseline questionnaire, participants attended five complementary KMC education sessions in addition to routine ward teaching. Mothers were grouped according to educational level, and the content was presented in simple language. Teaching methods included explanation, illustrated instruction, demonstration with a neonatal model, supervised practice, and return-demonstration.

1. Session 1: Definition and components of KMC, indications, common misconceptions, and benefits for preterm and low-birth-weight infants.

2. Session 2: Maternal and infant preparation, infection prevention, clinical readiness, monitoring during KMC, warning signs, and situations requiring staff assistance.

3. Session 3: Safe transfer and positioning, airway alignment, securing the infant, privacy, and supervised return-demonstration.

4. Session 4: Breast milk feeding, thermoregulation, infant comfort and sleep, parent-infant bonding, and family participation.

5. Session 5: Common barriers, practical problem-solving during hospitalization, continuation of KMC, review of key points, and questions.

The post-intervention questionnaire was administered after completion of the fifth session.

Data Collection Instrument

Data were collected using a 50-item researcher-developed questionnaire with three sections. Section 1 contained 10 maternal and neonatal demographic and clinical items. Section 2 contained 20 yes/no items

addressing perceived motivators and barriers to KMC; yes, was scored 1 and no was scored 0. Section 3 contained 20 items assessing KMC-related knowledge and attitudes on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating greater knowledge and more favorable attitudes.

Validity and Reliability

The questionnaire was developed from KMC literature and educational materials. Face and content validity were evaluated by 10 faculty members and pediatric or neonatal specialists at Tabriz University of Medical Sciences. Items were revised according to their recommendations. Internal consistency was acceptable, with an overall Cronbach alpha of 0.89.

Statistical Analysis

Data were analyzed using SPSS version 16. Continuous variables were summarized using mean and standard deviation, and categorical variables were summarized using frequency and percentage. Pre- and post-intervention knowledge and attitude scores were compared using paired t tests. Pearson correlation was used to examine the relationship between knowledge and attitude scores. All tests were two-sided, and $p<0.05$ was considered statistically significant.

Potential influences on the observed pre-post change included maternal age, education, employment, previous KMC experience, frequency of NICU attendance, infant gestational age, birth weight, clinical stability, length of hospitalization, and attendance at the education sessions. Because no multivariable adjusted analysis was reported, these factors were considered when interpreting the findings and are acknowledged as possible sources of residual confounding.

Ethical Considerations

The study was approved by the Ethics Committee of Tabriz University of Medical Sciences (IR.TBZMED.REC.1397.808). Permission was obtained from hospital authorities. The study purpose, voluntary nature of participation, confidentiality, and right to withdraw were explained to all participants, and written informed consent was obtained before data collection.

Results

A total of 300 mothers participated in the study and completed the post-intervention assessment. Most infants had a gestational age of 28-32 weeks. Most mothers were homemakers, and 70.7% resided at home during the infant's admission. Selected participant and infant characteristics are presented in Table 1.

Table 1. Participant and infant characteristics (n=300)

Variable	Category	n	%
Birth weight (g)			
	<2500	140	46.7
	2500-3500	83	27.7
	>3500	68	22.7
	Not reported	9	3.0
Gestational age (weeks)			
	<28	55	18.3
	28-32	157	52.3
	>32	88	29.3
Maternal employment			
	Homemaker	188	62.7
	Employed	112	37.3
Maternal residence during admission			
	Home	212	70.7
	Hospital	88	29.3
Paternal education			
	Illiterate	52	17.3
	Diploma or below	88	29.3
	BSc	109	36.3
	MSc	36	12.0
	PhD	13	4.3
	Specialty	2	0.7
Parents' marital/living status			
	Divorced	5	1.7
	Living together	294	98.0
	Father deceased	1	0.3

Perceived Motivators and Barriers

The most frequently reported motivator was increased infant sleep duration. The most frequent overall barrier was the mother's inability to attend or remain in the NICU for all required hours. Infant clinical instability was the most frequently reported infant-related clinical barrier.(Table 2)

Table 2. Main motivators for KMC from the mothers' perspective

Motivator	n	%
Reduced infant crying	260	86.7
Improved feeding tolerance and reduced hospitalization duration	255	85.0
Improved feeding tolerance	251	83.7
Increased sleep duration	293	97.7

Knowledge and Attitude Outcomes

Paired analyses showed significant improvement in mothers' KMC-related knowledge and attitude scores after the complementary education program ($p=0.01$ and $p=0.03$, respectively). Overall, 70% of mothers were classified as having a favorable attitude toward

KMC, 20% as having an unfavorable attitude, and 10% as neutral (Table 3 , Table 4).

Table 3. Main barriers to KMC from the mothers' perspective

Barrier	n	%
Inability of the mother to attend or remain for all required hours	254	84.7
Low maternal interest or knowledge	206	68.7
Insufficient facilities	193	64.3
Infant clinical instability	147	49.0
Debilitating maternal illness	199	66.3

Table 4. Paired comparison of mothers' KMC-related knowledge and attitude scores

Outcome	Direction of change	p value
Knowledge	Improved after education	0.01
Attitude	Improved after education	0.03

Discussion

This single-group pretest-posttest study showed that a five-session complementary KMC education program was associated with short-term improvement in mothers' KMC-related knowledge and attitudes. This finding is consistent with a quasi-experimental maternal education program that improved mothers' knowledge, perceptions, and perceived barriers (7), as well as educational interventions among neonatal nurses that improved KMC knowledge, attitudes, or confidence [15,16]. Because the present study did not include a comparison group, the observed improvement should be interpreted as a within-group association rather than a definitive causal effect.

Increased infant sleep duration was the most commonly reported motivator. This perception is biologically and clinically plausible: a randomized study in Iran found that kangaroo care increased time spent in deep sleep and quiet alert states compared with in-arms holding (6). Mothers also identified reduced crying and improved feeding tolerance as important benefits, which aligns with the broader evidence supporting KMC for neonatal stability, feeding, growth, and family-centered care [1-5].

The most frequent overall barrier in the source table was difficulty remaining in the hospital for all required hours, not infant instability. This distinction resolves a major contradiction in the original abstract and discussion. Time, transportation, accommodation, unit access, space, maternal health, fear of harming the infant, and staff or family support are recurrent barriers in NICU studies [12-14]. Infant clinical instability remains an important clinical concern, but current practice increasingly supports carefully monitored KMC for many infants receiving intensive therapies when the neonatal team judges it safe (1,2). Education should therefore combine practical safety guidance with individualized clinical assessment rather than presenting instability as an absolute prohibition.

The findings have direct implications for neonatal nursing practice. A structured program should include simple explanations, visual demonstration, return-demonstration, and repeated opportunities for questions. Flexible scheduling across shifts, family participation, privacy, comfortable seating, and clear staff protocols may reduce barriers that education alone cannot solve. Nurses should document maternal readiness and competency, reinforce skills at the bedside, and coordinate with the medical team regarding infant eligibility. The Iranian implementation study by Mohammadi et al. similarly showed that institutionalization of continuous KMC requires attention to maternal, family, staff, and health-system barriers [14]. Interpretation should remain cautious. Without a control group, the study cannot distinguish the education effect from repeated testing, routine ward teaching, maturation, or changes in the infant's condition. Convenience sampling, immediate posttesting, self-report, incomplete psychometric reporting, and lack of adjusted analysis further limit causal inference and generalizability. Future studies should use randomized or controlled quasi-experimental designs, validated outcome measures, prespecified adjustment for confounders, longer follow-up, and direct observation of KMC practice.

Research Limitations

- The single-group design did not include a concurrent control group; observed changes may therefore reflect testing effects, maturation, routine ward education, or other time-varying factors. Potential confounders were not included in an adjusted analysis; therefore, causal interpretation is limited.
- Convenience sampling from one hospital limits generalizability and may introduce selection bias.
- The posttest was administered immediately after the program, so retention of knowledge and sustained attitude or practice change were not evaluated.
- Outcomes were self-reported and may be affected by social desirability and response bias.
- The researcher-developed questionnaire underwent expert review and showed acceptable overall internal consistency, but detailed subscale psychometric indices and criterion or construct validation were not available.

Conclusion

A five-session complementary KMC education program was associated with short-term improvement in mothers' knowledge and attitudes toward KMC in one NICU. Mothers most frequently identified improved infant sleep as a motivator, whereas limited ability to remain in the hospital was the most common barrier. Structured nurse-led education, practical bedside coaching, flexible access, and organizational support may facilitate KMC implementation. Because the study lacked a comparison group and outcomes were assessed immediately after education, the findings should be interpreted as preliminary within-group associations.

Authorship contribution statement

Ethical Consideration

Ethics approval was obtained from Tabriz University of Medical Sciences (IR.TBZMED.REC.1397.808).

Declaration of Competing Interest

The authors have no conflict of interests related to this article.

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Data Availability

data are available from the corresponding author on reasonable request, subject to ethical and institutional requirements.

Declaration of Generative AI

The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of tables, or their corresponding captions.

References

1. World Health Organization. WHO recommendations for care of the preterm or low-birth-weight infant. Geneva: World Health Organization; 2022. ISBN 978-92-4-005826-2.

2. WHO Immediate KMC Study Group. Immediate "Kangaroo Mother Care" and survival of infants with low birth weight. New England Journal of Medicine. 2021;384(21):2028-2038. https://doi.org/10.1056/NEJMoa2026486

3. Bhandari N, Mazumder S, Taneja S, et al. Effect of community-initiated kangaroo mother care on survival of infants with low birthweight: a randomised controlled trial. Lancet. 2019;394(10210):1724-1736. https://doi.org/10.1016/S0140-6736(19)32223-8

4. Boundy EO, Dastjerdi R, Spiegelman D, et al. Kangaroo mother care and neonatal outcomes: a meta-analysis. Pediatrics. 2016;137(1):e20152238. https://doi.org/10.1542/peds.2015-2238

5. Suman Rao PN, Udani R, Nanavati R. Kangaroo mother care for low birth weight infants: a randomized controlled trial. Indian Pediatr. 2008;45(1):17-23.

6. Bastani F, Rajai N, Farsi Z, Als H. The effects of kangaroo care on the sleep and wake states of preterm infants. Journal of Nursing Research. 2017;25(3):231-239. https://doi.org/10.1097/JNR.0000000000000194

7. Samsudin S, Chui PL, Ahmad Kamar AB, Abdullah KL. Maternal kangaroo care education program in the neonatal intensive care unit improved mothers' perceptions, knowledge, perceived barriers and stress related to premature infant. Nursing Open. 2023;10(1):349-357. https://doi.org/10.1002/nop2.1311

8. Olawuyi O, Ezenwa BN, Fajolu IB, Onwuama M, Ezeaka CV. Knowledge, attitude and practice of kangaroo mother care among mothers in the neonatal wards of a tertiary care centerPan African Medical Journal. 2021;38:364. https://doi.org/10.11604/pamj.2021.38.364.22833

9. Hendricks-Munoz KD, Li Y, Kim YS, Prendergast CC, Mayers R, Louie M. Maternal and neonatal nurse perceived value of kangaroo mother care and maternal care partnership in the neonatal intensive care unit. American Journal of Perinatology. 2013;30(10):875-880. https://doi.org/10.1055/s-0033-1333675

10. Zhang Y, Deng Q, Zhu B, et al. Neonatal intensive care nurses' knowledge and beliefs regarding kangaroo care in China: a national survey. BMJ Open. 2018;8:e021740. https://doi.org/10.1136/bmjopen-2018-021740.

11. Deng Q, Zhang Y, Li Q, et al. Factors that have an impact on knowledge, attitude and practice related to kangaroo care: national survey study among neonatal nurses. Journal of Clinical Nursing. 2018;27(21-22):4100-4111. https://doi.org/10.1111/jocn.14556

12. Saltzmann AM, Sigurdson K, Scala M. Barriers to kangaroo care in the NICU: a qualitative study analyzing parent survey responses. Advances in Neonatal Care. 2022;22(3):261-269. https://doi.org/10.1097/ANC.0000000000000907

13. Yue J, Liu J, Williams S, et al. Barriers and facilitators of kangaroo mother care adoption in five Chinese hospitals: a qualitative study. BMC Public Health. 2020;20:1234. https://doi.org/10.1186/s12889-020-09337-6

14. Mohammadi M, Bergh AM, Sattarzadeh Jahdi N, Valizadeh L, Hosseini M, Hakimi S. Launching continuous kangaroo mother care through participatory action research in Iran. BMC Health Service Research. 2023;23(1):436.

https://doi.org/10.1186/s12913-023-09372-0

15. Abuhammad S, Karimeh R, Mahadeen A. The impact of an educational intervention on neonatal intensive care unit nurses' knowledge, attitudes, and perceptions of parental participation in kangaroo mother care. PLoS One. 2024;19(8):e0306888 https://doi.org/10.1371/journal.pone.0306888

16. Almutairi WM, Ludington-Hoe SM. Kangaroo care education effects on nurses' knowledge and skills confidence. The Journal of Continuing Education in Nursing. 2016;47(11):518-524. https://doi.org/10.3928/00220124-20161017-11

17. Des Jarlais DC, Lyles C, Crepaz N; TREND Group. Improving the reporting quality of nonrandomized evaluations of behavioral and public health interventions: the TREND statement. American Journal of Public Health. 2004;94(3):361-366. https://doi.org/10.2105/AJPH.94.3.361