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NURSE-DRIVEN PATHWAYS TO ENHANCING KANGAROO MOTHER CARE: A SYSTEMATIC REVIEW OF KNOWLEDGE, FACILITY DYNAMICS, CULTURAL BARRIERS, AND COMMUNITY INTEGRATION

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Abstract

Background: Kangaroo mother care (KMC) is a proven, low-cost intervention for improving outcomes in preterm and low-birth-weight (LBW) infants. It involves skin-to-skin contact, exclusive breastfeeding, and early discharge with follow-up. Despite global recommendations, KMC implementation remains inconsistent, particularly in resource-limited settings. This systematic review aimed to synthesize current evidence on the knowledge, practices, barriers, and facilitators affecting KMC delivery, with emphasis on the role of neonatal nurses and system-level factors. **Methods:** Following PRISMA guidelines, a comprehensive search of PubMed, Scopus, and Web of Science was conducted for studies published between 2002 and 2024. Inclusion criteria focused on original studies examining KMC-related knowledge, implementation strategies, outcomes, and nurse education. Ten studies were included in the review, encompassing cross-sectional surveys, randomized trials, and qualitative research. Findings were thematically synthesized and supported by additional evidence from seven key studies. **Results:** The review identified significant variability in nurses' knowledge and confidence regarding KMC. Barriers included insufficient staff training, lack of institutional policies, and maternal hesitation influenced by sociocultural norms. Educational interventions improved nurses' competencies and attitudes toward family-

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centered care. Community-initiated KMC models, as demonstrated in large-scale randomized trials, effectively reduced neonatal mortality but required structured follow-up and family support. Contextual challenges such as stigma, resource limitations, and communication gaps were also prevalent. Studies emphasized that provider encouragement and culturally adapted strategies enhance maternal engagement and continuity of care. **Conclusion:** KMC implementation is a multifactorial process influenced by provider preparedness, institutional readiness, and community dynamics. Strengthening nurse education, developing clear protocols, and fostering family involvement are critical for sustainable KMC adoption. A coordinated approach involving health systems and communities is essential to improving neonatal survival and bridging the gap between evidence and practice.

Keywords: Kangaroo Mother Care, Neonatal Nursing, Preterm Infants, Low Birth Weight, Education, Community Health, Implementation Barriers, Systematic Review.

INTRODUCTION

Fifteen million babies are born prematurely each year, and complications of prematurity are the leading cause of neonatal and under-five mortality (Bilal et al., 2021). Kangaroo mother care (KMC), involves skin-to-skin contact, exclusive breastfeeding, and early discharge with follow-up, has emerged as a cost-effective intervention to improve survival in low birth weight (LBW) and preterm infants (Kinshella et al., 2021). The World Health Organization recommends KMC for stable infants weighing 2000 grams or less, yet its uptake remains suboptimal in many low-resource settings (Bilal et al., 2021; Bayo et al., 2019).

Despite robust evidence supporting its clinical benefits, the implementation of KMC has encountered multiple barriers. Health system constraints such as inadequate staffing, poor infrastructure, and lack of consistent policies hinder the scale-up of KMC services in sub-Saharan Africa and beyond (Kinshella et al., 2021). Moreover, sociocultural norms, community-level misconceptions, and insufficient awareness among caregivers continue to impede KMC adherence, particularly in the home-based setting (Bilal et al., 2021).

Thermoregulation, a critical aspect of neonatal care, is a key goal of KMC. Quality improvement initiatives focused on maintaining normothermia at the time of neonatal admission have shown promise in reducing hypothermia and its associated risks (Donnellan et al., 2020). These efforts emphasize the importance of structured protocols and continuous staff training to optimize neonatal outcomes.

Nursing practices play a central role in the successful delivery of KMC. However, studies indicate that many neonatal nurses lack adequate training and emotional preparedness, especially when dealing with preterm infants in resource-limited settings (St Louis et al., 2023). Enhancing nursing education and institutional support could improve care quality and encourage parental participation. Maternal perceptions of KMC significantly affect uptake. In sub-Saharan Africa, some mothers report positive attitudes toward KMC but struggle with social stigma, fear of harming the infant, and a lack of confidence in their caregiving abilities (Bayo et al., 2019). Addressing these concerns through targeted counseling and culturally sensitive community engagement is vital for continuity of care. This systematic review aims to synthesize current evidence on KMC implementation,

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including the roles of healthcare providers, institutional frameworks, and community dynamics in improving neonatal outcomes.

METHODOLOGY

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines. The review aimed to synthesize evidence on the knowledge, attitudes, practices, and outcomes associated with kangaroo mother care (KMC) and related neonatal nursing interventions in preterm infants.

Eligibility Criteria

Studies were included if they met the following criteria: (1) original peer-reviewed research; (2) focused on KMC or closely related neonatal nursing practices such as hypothermia prevention, oral feeding in preterm infants, or parental participation in neonatal care; (3) involved neonatal nurses, preterm infants, or parents as key study populations; (4) reported on knowledge, implementation, barriers, or outcomes of KMC or related interventions; and (5) published in English. Exclusion criteria included review articles, editorials, conference abstracts, protocols, and studies that did not address neonatal nursing care or KMC.

Information Sources and Search Strategy

A literature search was conducted in PubMed, Scopus, and Web of Science databases to identify eligible studies published between 2022 and 2024. Search terms included combinations of the following: kangaroo mother care, KMC, neonatal nurse, NICU, preterm infant, skin-to-skin contact, oral feeding, and hypothermia prevention. Boolean operators (AND, OR) were used to refine search results. Additional studies were identified through manual reference screening of included articles.

Study Selection

Titles and abstracts were screened independently by two reviewers for relevance. Full-text articles were then assessed for eligibility based on the inclusion and exclusion criteria. Disagreements were resolved through discussion and consensus. A PRISMA flow diagram was used to document the selection process.

Data Extraction

A standardized data extraction form was developed to collect relevant information from each study. Extracted data included: author(s), year of publication, country of study, study design, sample size, population characteristics, intervention (if any), main findings, and reported outcomes. Methodological characteristics and risk of bias were also noted.

Data Synthesis

Given the heterogeneity in study designs and outcomes, a narrative synthesis was conducted. Studies were grouped and analyzed thematically based on focus areas such as knowledge and attitudes, implementation barriers, educational interventions, and

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clinical or developmental outcomes. Quantitative results were reported as described in the original studies, and qualitative findings were summarized thematically.

RESULTS

This systematic review included ten studies published between 2002 and 2024 that explored various aspects of kangaroo mother care (KMC) and related neonatal nursing practices. The selected studies were conducted in diverse settings, including China, India, Jordan, Turkey, Ethiopia, and the United States.

The study designs comprised descriptive cross-sectional surveys (n=5), quasi-experimental and randomized controlled trials (n=3), and one qualitative exploratory study, reflecting a mix of quantitative and qualitative approaches to understanding KMC implementation.

Sample sizes varied from 144 participants in the qualitative study in Ethiopia (Bilal et al. 2021) to over 8,400 infants in a large-scale randomized controlled trial in India (Mazumder et al. 2019). The study populations predominantly included neonatal intensive care unit (NICU) nurses, with some studies focusing on mothers and infants to assess clinical or developmental outcomes.

A recurring theme was the variability in nurses' knowledge and confidence regarding KMC. Studies from China (Zhang et al. 2018; Deng et al. 2018) and Jordan (Shattnawi et al. 2019) reported moderate to low baseline knowledge among NICU nurses. Experience with KMC was consistently associated with higher knowledge scores and fewer perceived barriers. Barriers frequently cited included lack of institutional support, limited training, reluctance from physicians, and concerns over infant safety during KMC.

Educational interventions demonstrated significant impact. In Jordan, Abuhammad et al. (2024) found that targeted education significantly improved NICU nurses' knowledge, attitudes, and perceptions of parental involvement in KMC. Similarly, in Turkey, Girgin and Gözen (2020) revealed gaps in oral feeding practices and called for increased training and protocol use to facilitate safe transitions to oral feeding in preterm infants. Community-based interventions were also explored.

Two randomized controlled trials (Mazumder et al. 2019; Taneja et al. 2020) assessed the effects of community-initiated KMC. While Mazumder et al. reported a 30% reduction in neonatal mortality among low birthweight infants, Taneja et al. found no significant impact on early neurodevelopmental outcomes, though KMC was deemed safe and feasible.

The qualitative study by Bilal et al. (2021) in Ethiopia identified cultural, socioeconomic, and health system barriers to KMC acceptance. It emphasized the importance of integrated, context-specific strategies to improve adherence, including community education and policy support. Overall, the evidence underscores that while KMC is widely supported in theory, its effective practice depends on nursing education, institutional policies, and community engagement.

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Table 1: Study Summary Table

Citation	Study Design	Sample Size	Study Population	Methodology	Study Aim
Engler et al. (2002)	Descriptive survey	537 (response rate 59%)	Nurse managers in U.S. hospitals with NICUs	National survey using Kangaroo Care Questionnaires sent to 1133 hospitals; descriptive statistics used.	To assess practice, knowledge, barriers, and perceptions regarding Kangaroo Care (KC).
Wang et al. (2023)	Descriptive cross-sectional	254	NICU nurses from 23 hospitals in Shandong, China	Evidence-based questionnaire on hypothermia prevention; data collected via Questionnaire Star platform.	To investigate knowledge and clinical practices on hypothermia prevention in preterm infants.
Mazumder et al. (2019)	Randomised controlled trial	8402	Infants with birthweight 1500–2250 g in Haryana, India	Randomised trial comparing community-initiated KMC vs routine care; mortality tracked over 28 and 180 days.	To assess effect of community-initiated KMC on neonatal and infant survival.
Abuhammad et al. (2024)	Quasi-experimental pretest/post test	160 (80 per group)	NICU nurses in 3 hospitals in Jordan	Education intervention to improve KMC knowledge, attitudes, and perceptions; assessed pre/post.	To evaluate effectiveness of educational intervention on KMC knowledge, attitudes, and perceptions.
Girgin & Gözen (2020)	Descriptive cross-sectional	275	NICU nurses from 9 hospitals in Istanbul, Turkey	Questionnaire assessing knowledge and practice on oral feeding in preterm infants.	To determine knowledge and clinical practices related to transitioning preterm infants to oral feeding.
Shattnawi et al. (2019)	Descriptive cross-sectional	229	NICU nurses in Jordan	Survey assessing knowledge and beliefs about KMC using structured questionnaire.	To assess neonatal nurses' knowledge and beliefs toward KMC in NICUs.
Bilal et al. (2021)	Qualitative exploratory	144 (24 IDIs, 14 FGDs)	Health workers and community members in Southern Ethiopia	Grounded theory with interviews and focus groups to explore KMC barriers and facilitators.	To identify barriers and devise a model to scale up KMC implementation.
Taneja et al. (2020)	Randomised controlled trial	552 (sub-sample	Stable LBW infants in India	Home-based KMC vs routine care; neurodevelopmental	To assess impact of community-initiated

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		of larger trial)		outcomes assessed at 6 and 12 months.	KMC on early child development.
Zhang et al. (2018)	Descriptive survey	861	NICU nurses across China	90-item Kangaroo Care Questionnaire assessing knowledge, practice, barriers, and perceptions.	To investigate knowledge, beliefs, and practices regarding KC among NICU nurses in China.
Deng et al. (2018)	Descriptive cross-sectional	830	NICU nurses in China	Online questionnaire assessing KMC-related knowledge, attitudes, barriers, and practices.	To explore factors affecting nurses' KMC knowledge, perception, and practice.

Table 2: Study Findings Table

Citation	Demographic Characteristics	Main Findings	Outcomes
Engler et al. (2002)	Nurse managers in 537 NICUs across U.S.	82% practiced KC; barriers included infant safety and staff/family reluctance.	KC positively perceived; need for education and policy development.
Wang et al. (2023)	254 NICU nurses from 23 hospitals in China	One-third unclear on mild hypothermia; education and experience affect knowledge level.	Need for evidence-based interventions and improved nurse training.
Mazumder et al. (2019)	8402 low birthweight infants (1500–2250 g) in India	Community-initiated KMC significantly reduced neonatal mortality.	Support for community-level KMC to improve survival.
Abuhammad et al. (2024)	160 NICU nurses in Jordan (80 per group)	Education improved knowledge, attitude, and perception on parental participation in KMC.	Educational programs enhance NICU care practices.
Girgin & Gözen (2020)	275 NICU nurses from 9 Istanbul hospitals	Knowledge gaps in cue-based feeding, infant positioning; protocols underused.	Call for practical training and protocol use in oral feeding.
Shattnawi et al. (2019)	229 NICU nurses in Jordan	Knowledge moderate; 47.2% believed KC not feasible for all preterm infants.	Need to address beliefs and provide education to improve KC practice.
Bilal et al. (2021)	144 participants (health providers, community) in Ethiopia	Barriers included cultural beliefs, resource gaps, and provider motivation.	Model proposed for community-to-facility KMC scaling.
Taneja et al. (2020)	552 LBW infants (India), mostly late preterm or SGA	No significant difference in neurodevelopmental outcomes at 12 months.	Community-initiated KMC safe; long-term effects unknown.
Zhang et al. (2018)	861 NICU nurses across China	KC knowledge better in those with experience; non-experienced perceived more barriers.	Supportive policies and staff education needed for KC adoption.
Deng et al. (2018)	830 NICU nurses in China	Experience with KC linked to higher knowledge and fewer perceived barriers.	Clinical training and leadership essential for successful KC practice.

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DISCUSSION

This systematic review synthesized evidence from ten studies examining neonatal nursing practices, knowledge, and the implementation of kangaroo mother care (KMC) and related interventions.

Knowledge and Educational Gaps

Many studies reported insufficient knowledge and practical experience among NICU nurses regarding KMC. Zhang et al. (2018) and Deng et al. (2018) found that nurses with hands-on experience were significantly more knowledgeable and perceived fewer barriers. Similarly, Girgin and Gözen (2020) reported limited awareness of cue-based oral feeding and underuse of protocols. These findings align with St Louis et al. (2024), who found that neonatal nurses frequently lacked adequate training in palliative and supportive care and expressed a strong desire for education in this area. The same educational deficiencies were noted by Maniago et al. (2019), who emphasized that ongoing training and institutional guidance can improve nurse confidence and practice.

Systemic Barriers and Institutional Support

Multiple studies, including Abuhammad et al. (2024) and Shattnawi et al. (2019), revealed that despite positive attitudes toward KMC, implementation was hindered by insufficient staffing, unclear protocols, and limited administrative support. These challenges are mirrored in the findings of Kinshella et al. (2021), who reported that health facilities across sub-Saharan Africa struggle with workforce shortages, lack of formal policies, and limited resources, all of which undermine the sustainability of KMC. Effective leadership, continuous supervision, and clear guidelines were identified as essential to overcoming these barriers.

Community-Based KMC and Continuity of Care

Community-initiated KMC, particularly in low-resource settings, demonstrated promising outcomes. Mazumder et al. (2019) reported a significant reduction in neonatal mortality following implementation of home-based KMC. These findings were supported by further analysis (Mazumder et al. 2021), which emphasized the feasibility and acceptability of community-level support systems. Taneja et al. (2020) confirmed the safety of this model, though neurodevelopmental benefits were not statistically significant. These findings underscore the need for integrated facility-to-home care transitions, especially in settings where early discharge is common.

Cultural Context and Stakeholder Engagement

Qualitative studies highlighted the role of social and cultural influences on KMC acceptance. Bilal et al. (2021) identified cultural beliefs, family dynamics, and perceptions of care as central to KMC adherence. These results align with observations from Kinshella et al. (2021), who emphasized that empowering mothers, families, and local communities was essential to sustaining KMC programs. Moreover, Maniago et al. (2019) stressed that provider encouragement and shared decision-making enhance maternal confidence and participation in care.

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CONCLUSION

This systematic review highlights the multifaceted nature of kangaroo mother care (KMC) implementation, emphasizing the central role of neonatal nurses, institutional frameworks, and community engagement in promoting effective care for preterm and low-birth-weight infants. While the clinical benefits of KMC are well-established, widespread adoption remains hindered by gaps in knowledge, limited training opportunities, systemic challenges, and sociocultural barriers.

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