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KANGAROO MOTHER CARE IN LOW-RESOURCE SETTING: A STUDY OF HEALTHCARE PROFESSIONALS' KNOWLEDGE, ATTITUDES, PRACTICES AND IMPLEMENTATION BARRIERS IN PAKISTAN

Original Research

Sohail Nasir[1]*, Abbas Ali[2], Sawera Ayub[2], Tauqeer Ahmad[3]
[1]Assistant Professor, Foundation University Islamabad, Islamabad, Pakistan.
[2]BSN Student (Fourth Year), Foundation University Islamabad, Islamabad, Pakistan.
[3]Lecturer, Foundation University Islamabad, Islamabad, Pakistan.
Corresponding Author: Sohail Nasir, Assistant Professor, Foundation University Islamabad, Islamabad, Pakistan, sohail.nasir@fui.edu.pk
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ABSTRACT

Background: Kangaroo Mother Care (KMC) is a well-established, evidence-based intervention that improves survival, physiological stability, and maternal–infant bonding among preterm and low-birth-weight neonates. It is particularly valuable in low-resource healthcare settings, where access to advanced neonatal technology is limited. Despite global recommendations and proven effectiveness, the implementation of KMC remains inconsistent, largely due to gaps in healthcare workers' knowledge, practice patterns, and systemic support. Understanding these gaps is essential to strengthen neonatal care services and promote sustainable KMC integration.

Objective: To assess the knowledge, attitudes, practices, and perceived barriers related to Kangaroo Mother Care among healthcare workers working in neonatal and maternal care units of a tertiary care hospital in Rawalpindi, Pakistan.

Methods: An analytical cross-sectional study was conducted among 40 healthcare workers, including staff nurses, house officers, and postgraduate residents, working in the Neonatal Intensive Care Unit, Gynecology, and Labor departments. Participants were recruited using convenience sampling. Data were collected using a structured, self-administered questionnaire adapted from standardized KAP frameworks. The tool assessed demographic characteristics, knowledge, attitudes, practices, and barriers related to KMC. Internal consistency of the questionnaire was confirmed with a Cronbach's alpha of 0.80. Data were analyzed using SPSS software, employing descriptive statistics and chi-square tests.

Results: Among the participants, 85% (n = 34) were female and 67.5% (n = 27) were staff nurses. Moderate knowledge of KMC was observed in 90% (n = 36) of respondents, while 10% (n = 4) demonstrated low knowledge. A positive attitude toward KMC was reported by 67.5% (n = 27), whereas 30% (n = 12) showed neutral attitudes and 2.5% (n = 1) negative attitudes. In practice, 75% (n = 30) reported inconsistent KMC application, 15% (n = 6) practiced KMC regularly, and 10% (n = 4) reported minimal practice. High perceived barriers were identified by 60% (n = 24), primarily related to workload, resource limitations, and administrative constraints.

Conclusion: Although healthcare workers demonstrated moderate knowledge and largely positive attitudes toward KMC, its consistent implementation remained limited due to systemic and organizational barriers. Strengthening training programs, improving infrastructure, and enhancing institutional and policy-level support are essential to translate knowledge into sustained clinical practice.

Keywords: Attitude; Healthcare Professionals; Kangaroo-Mother Care; Neonatal Intensive Care Units; Premature Infant; Practice Patterns; Surveys and Questionnaires.

Kangaroo Mother Care Among Healthcare Workers in a Tertiary Care Hospital

Background

- KMC benefits preterm & low-birth weight infants
- Implementation remains inconsistent

Objective

Assess knowledge, attitudes, practices & barriers to KMC among healthcare workers

Methods

40 Healthcare Workers (Nurses, House Officers, Postgraduates)

Cross-Sectional Survey

Convenience Sampling

Results

- **90.0%** Moderate Knowledge
- **67.5%** Positive Attitude
- **75.0%** Inconsistent Practice
- **60.0%** High Barriers

Conclusion

Need for training, organizational support & policy interventions to improve KMC implementation.

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INTRODUCTION

Each year, an estimated 20 million low birth weight infants are born globally, placing a disproportionate burden on healthcare systems in low- and middle-income countries where resources are already constrained (1). The care of low-birth-weight and preterm infants is inherently complex, demanding specialized infrastructure, continuous monitoring, and highly trained personnel. In poorly resourced settings, premature newborns are frequently managed in overcrowded and understaffed neonatal units that lack essential equipment, paradoxically increasing the risk of morbidity and mortality rather than preventing it (2). These structural limitations have driven the search for safe, affordable, and context-appropriate alternatives to conventional incubator-based neonatal care. Against this backdrop, Kangaroo Mother Care (KMC) emerged as a transformative approach. In 1978, Colombian pediatrician Edgar Rey introduced KMC at the Instituto Materno Infantile in Bogotá as a response to incubator shortages and the detrimental effects of separating mothers from their newborns in neonatal care units (3). Subsequent randomized controlled trials demonstrated that KMC not only improved breastfeeding success but also reduced the severity of infections, with sustained benefits observed up to 12 months of corrected age (4). These findings repositioned maternal contact as a therapeutic intervention rather than a mere supportive practice. The World Health Organization recognizes KMC as one of the most cost-effective strategies for reducing preterm mortality worldwide (5). Continuous skin-to-skin contact functions as a natural incubator, effectively preventing hypothermia—a leading cause of neonatal morbidity and mortality—while simultaneously promoting physiological stability (6). Evidence shows that KMC improves thermoregulation, enhances breastfeeding outcomes, reduces infection risk, and strengthens mother–infant bonding (7). In addition to neonatal benefits, maternal outcomes are also positively influenced, with reduced rates of postpartum depression and increased maternal satisfaction reported among mothers practicing KMC (8). Measurable physiological improvements in infants include an average increase in body temperature of 0.4 °C, improved respiratory and heart rates, and a 5% rise in oxygen saturation, underscoring the biological plausibility and clinical relevance of KMC in neonatal intensive care settings (9,10).

Despite strong global evidence and endorsement, the implementation of KMC remains inconsistent, particularly in resource-limited countries such as Pakistan. National efforts began with the launch of a KMC project at Services Hospital Lahore in August 2016, where notable survival and recovery benefits were observed among preterm infants. Additional initiatives in districts such as Khairpur and Shikarpur in Sindh further demonstrated its feasibility and life-saving potential (11). Nevertheless, widespread and sustained adoption remains limited. Barriers including inadequate infrastructure, lack of privacy for mothers, insufficient training of healthcare providers, socio-cultural constraints, and the heavy workload of frontline health workers—particularly Lady Health Workers—continue to impede routine practice (12). Even in tertiary institutions where KMC has been introduced, consistent adherence is not uniformly achieved. Importantly, while programmatic experiences highlight the promise of KMC, there is a notable paucity of systematic research in Pakistan examining healthcare workers' knowledge, attitudes, and practices related to KMC, as well as the organizational and administrative barriers that influence its implementation. Understanding these human and institutional factors is critical, as healthcare workers play a central role in counseling families, initiating KMC, and sustaining its practice within neonatal units. Therefore, the objective of this study was to assess the knowledge, attitudes, and practices of healthcare workers regarding Kangaroo Mother Care and to identify and categorize the barriers—particularly administrative and organizational—that hinder its effective implementation in the local healthcare setting.

METHODS

This study employed an analytical cross-sectional design to assess the knowledge, attitudes, practices, and perceived barriers related to Kangaroo Mother Care (KMC) among healthcare workers in a tertiary care hospital in Rawalpindi. The study was conducted in the Neonatal Care Unit, Gynecology, and Labour departments, as these units are directly involved in the management of preterm and low birth weight infants and play a central role in the initiation and continuation of KMC. The study population comprised staff nurses, house officers, and postgraduate residents working in the selected departments. Healthcare workers who were actively posted in the selected units during the data collection period and willing to participate were included in the study, while those on leave, rotating through non-relevant departments, or unwilling to provide consent were excluded. A non-probability convenient sampling technique was used to recruit a total of forty participants. Although this approach facilitated feasibility within the clinical setting, it inherently limited the representativeness of the sample. Data were collected using a structured, self-administered questionnaire developed after an extensive review of published literature and adapted from the World Health Organization Knowledge, Attitudes, and Practices (KAP) survey framework originally designed for tuberculosis, which was modified to align with the objectives of this study (11,12). The use

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of questionnaires is consistent with standard methodological approaches in cross-sectional research designs (13). The final tool consisted of five sections: demographic characteristics (including gender, professional designation, and department of posting), knowledge, attitudes, practices, and perceived barriers related to KMC. The knowledge section included multiple-choice and true/false items assessing understanding of KMC concepts, benefits, and techniques, with correct responses scored to generate an overall knowledge score. The attitude section used a Likert scale to evaluate perceptions regarding the importance, feasibility, and effectiveness of KMC, while the practice section assessed the frequency of KMC-related clinical behaviors using a similar scale. The barriers section explored challenges to KMC implementation, including administrative constraints, workload, staffing issues, and resource limitations, with participants rating the severity of each barrier from minor to severe. Prior to formal data collection, the questionnaire was pilot tested, and internal consistency reliability was confirmed with a Cronbach's alpha of 0.80, indicating acceptable reliability.

Data collection was carried out by distributing printed questionnaires along with written consent forms to eligible participants during duty breaks within patient care units. The purpose and procedures of the study were clearly explained, and participants who provided verbal consent were subsequently asked to sign the written informed consent form before completing the questionnaire. The researchers remained available throughout the process to clarify queries and ensure completeness of responses. Completed questionnaires were checked for missing data prior to analysis. Collected data were entered into a statistical software package for analysis, where descriptive statistics were used to summarize demographic variables and KAP scores, and appropriate analytical methods were planned to explore associations between variables, in line with the analytical nature of the study. Ethical considerations were rigorously observed throughout the study. Ethical approval was obtained from the Ethical Review Committee for Health, Foundation University School of Health Sciences, Islamabad (Reference No. FF/FUMC/215-610 Phy/25). Participants were informed about the study objectives, potential risks, and benefits, and assured that participation was entirely voluntary, with the right to withdraw at any stage without any repercussions. Confidentiality and anonymity were maintained by assigning unique identification codes to participants, securely storing physical data, and protecting electronic data through password encryption.

RESULTS

A total of 40 healthcare workers participated in the study. The majority of respondents were female, comprising 85.0% (n = 34), while males accounted for 15.0% (n = 6). With respect to professional designation, staff nurses represented the largest group at 67.5% (n = 27), followed by house officers at 20.0% (n = 8) and postgraduate trainees at 12.5% (n = 5). More than half of the participants were working in the Neonatal Intensive Care Unit, accounting for 52.5% (n = 21), while 40.0% (n = 16) were posted in the Gynecology department and 7.5% (n = 3) in the Labor room. Assessment of knowledge regarding Kangaroo Mother Care revealed that the majority of healthcare workers demonstrated a moderate level of knowledge, reported by 90.0% (n = 36), whereas 10.0% (n = 4) exhibited a low level of knowledge. No participant achieved a categorization of high knowledge. In terms of attitudes, a predominantly favorable outlook toward KMC was observed, with 67.5% (n = 27) expressing a positive attitude. Neutral or moderately positive attitudes were reported by 30.0% (n = 12), while only 2.5% (n = 1) demonstrated a negative attitude toward KMC implementation. Analysis of clinical practice showed that consistent application of KMC was limited. A substantial proportion of healthcare workers, 75.0% (n = 30), reported practicing KMC inconsistently, while 15.0% (n = 6) actively practiced KMC on a regular basis. Occasional practice was reported by 10.0% (n = 4). Evaluation of perceived barriers indicated that 60.0% (n = 24) experienced high levels of barriers to KMC implementation, 37.5% (n = 15) reported moderate barriers, and only 2.5% (n = 1) perceived minimal obstacles. Department-wise analysis of barriers demonstrated that resource constraints were a major challenge across all clinical areas. High resource-related barriers were reported by 76.2% (n = 16) of NICU staff, 56.3% (n = 9) of Gynecology staff, and 66.7% (n = 2) of Labor room staff. Workload-related challenges were most pronounced in the NICU, where 71.4% (n = 15) reported high workload burden, compared with 31.3% (n = 5) in Gynecology and 66.7% (n = 2) in the Labor room. Administrative issues were also prominent, with 38.1% (n = 8) of NICU staff reporting high administrative barriers and 61.9% (n = 13) reporting moderate barriers. In the Gynecology department, 25.0% (n = 4) reported high administrative barriers, while 75.0% (n = 12) reported moderate challenges. Despite the smaller number of respondents from the Labor room, 66.7% (n = 2) identified high administrative barriers, indicating a consistent pattern across departments.

Inferential analysis using the Pearson Chi-square test demonstrated no statistically significant association between practice area and knowledge levels ($\chi^2 = 0.450$, $p = 0.799$), attitudes ($\chi^2 = 5.107$, $p = 0.277$), practices ($\chi^2 = 6.407$, $p = 0.171$), or perceived barriers to KMC ($\chi^2 = 6.353$, $p = 0.174$). These findings indicate that variations in knowledge, attitudes, practices, and perceived barriers were not significantly influenced by departmental placement. To further address the study objectives, composite scores for knowledge, attitude, and practice were generated by assigning ordinal numerical values to the respective categories for analytical purposes. Knowledge levels

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were coded as low = 1 and moderate = 2; attitude was coded as negative = 1, neutral/somewhat positive = 2, and positive = 3; practice was coded as occasional = 1, inconsistent = 2, and active = 3. Based on this scoring approach, the overall mean knowledge score was 1.90 ± 0.30, reflecting predominately moderate knowledge among participants. The mean attitude score was 2.65 ± 0.54, indicating an overall favorable perception toward Kangaroo Mother Care, while the mean practice score was comparatively lower at 2.05 ± 0.55, highlighting suboptimal translation of knowledge and attitudes into consistent clinical practice. Correlation analysis was performed to examine the relationship between knowledge, attitude, and practice scores. A weak positive correlation was observed between knowledge and practice ($r = 0.18$), suggesting that higher knowledge levels were associated with slightly improved KMC practice, although this relationship did not reach statistical significance ($p > 0.05$). Similarly, the correlation between attitude and practice was weak to moderate ($r = 0.29$), indicating that a more positive attitude tended to align with better practice patterns, but this association also remained statistically non-significant ($p > 0.05$). These findings suggest that while knowledge and attitudes toward KMC were generally favorable, they did not independently translate into consistent implementation, likely due to the presence of substantial systemic and organizational barriers.

Table 1: Demographic and Professional Characteristics of Participants (N=40)

S no.	Variable	Categories	n (%)
1	Gender	Male	6 (15%)
		Female	34 (85%)
2	Profession	Staff Nurse (S/N)	27 (67.5%)
		House officers (HO)	8 (20.3%)
		Postgraduate (PG)	5 (12.5%)
3	Current Department	NICU	21 (52.5%)
		Gynae	16 (40%)
		Labor	3 (7.5%)

Table 2: Knowledge, Attitude, Practice and Barriers to KMC (N=40)

Variable	Category	n (%)
Knowledge	Low Knowledge	4 (10.0%)
	Moderate Knowledge	36 (90.0%)
Attitude	Negative Attitude	1 (2.5%)
	Neutral or somewhat positive attitude	12 (30.0%)
	Positive Attitude	27 (67.5%)
Practice	KMC Practiced occasionally	4 (10.0%)
	KMC practiced but not consistently	30 (75.0%)
	KMC actively practiced	6 (15.0%)
Barriers	Low Barriers towards KMC	1 (2.5%)
	Moderate Barriers towards KMC	15 (37.5%)
	High Barriers towards KMC	**24 (60.0%)**

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Table 3: Departmental Barriers to Kangaroo Mother Care

Barrier Type	Department	Low n (%)	Moderate n (%)	High n (%)
Resources Constraints	NICU	0 (0%)	5 (23.8%)	16 (76.2%)
	Gynae	1 (6.3%)	6 (37.5%)	9 (56.3%)
	Labor	0 (0%)	1 (33.3%)	2 (66.7%)
Workload issues	NICU	0 (0%)	6 (37.5%)	15 (71.4%)
	Gynae	0 (0%)	11 (68.8%)	5 (31.3%)
	Labor	0 (0%)	1 (33.3%)	2 (66.7%)
Administrative issues	NICU	0 (0%)	13 (61.9%)	8 (38.1%)
	Gynae	0 (0%)	12 (75.0%)	4 (25.0%)
	Labor	**0 (0%)**	**1 (33.3%)**	**2 (66.7%)**

Table 4: Chi-square Test Results

Inferential Statistics: Chi-Square Test Results		
Comparison	Chi-square value	P-value
Knowledge levels × Practice Areas	0.450a	0.799
Attitude levels × Practice Areas	5.107a	0.277
Practice levels × Practice Areas	6.407a	0.171
Barriers to KMC × Practice Areas	**6.353a**	**0.174**

Table 5: Mean Scores and Correlation between Knowledge, Attitude, and Practice

Variable	**Mean ± SD**	
Knowledge Score	1.90 ± 0.30	
Attitude Score	2.65 ± 0.54	
Practice Score	2.05 ± 0.55	
Correlation Pair	Correlation Coefficient (r)	P-value
Knowledge × Practice	0.18	> 0.05
Attitude × Practice	0.29	> 0.05

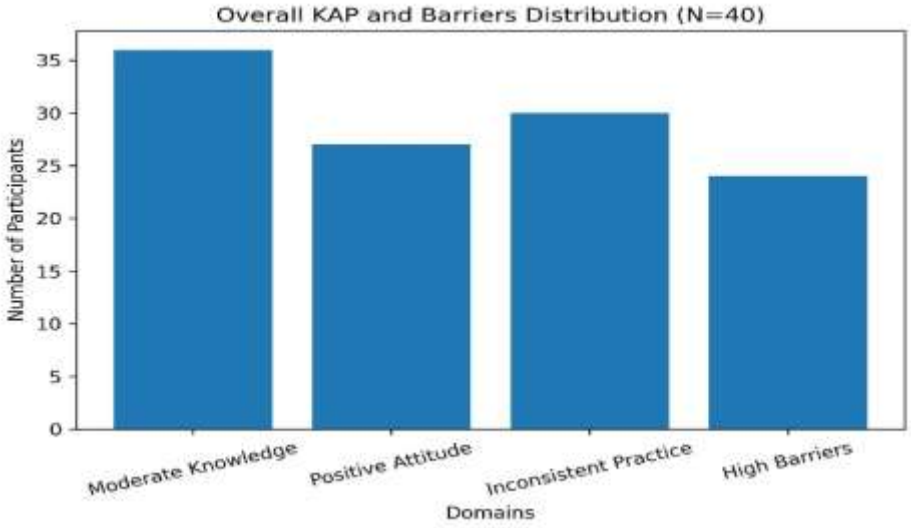

Figure 1 Overall KAP and Barriers Distribution (N=40)

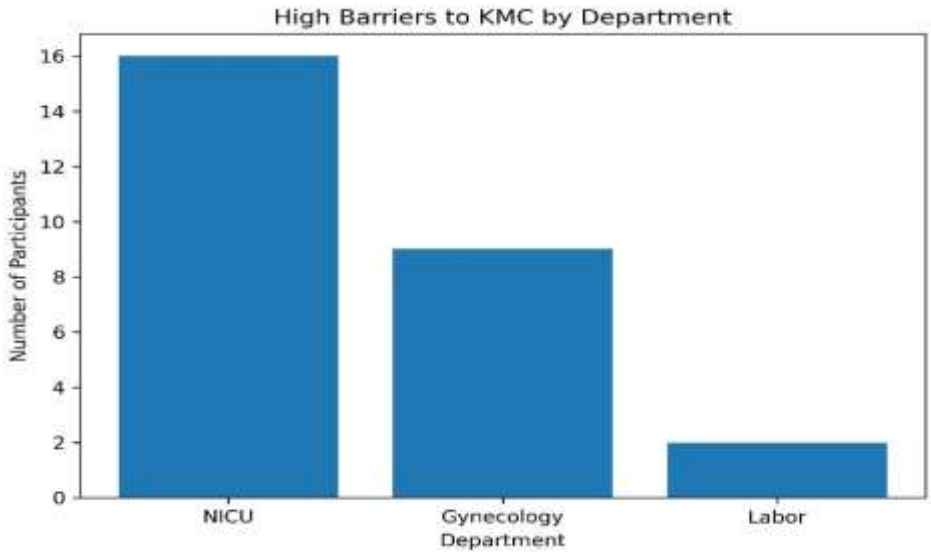

Figure 2 High Barriers to KMC by Department

DISCUSSION

The findings of this study indicated that healthcare workers demonstrated an overall moderate to high level of knowledge regarding Kangaroo Mother Care, reflecting a marked improvement compared with earlier reports from Pakistan. Previous evidence from Lahore in 2020 documented that only about one-third of healthcare workers were aware of KMC, suggesting limited dissemination of this intervention at that time (14). The substantially higher knowledge levels observed in the present study imply a gradual strengthening of awareness and exposure to KMC within neonatal services over recent years. This improvement may be attributed to increasing global advocacy, national-level initiatives, and the integration of KMC into neonatal care discussions, particularly in tertiary care settings. Despite this encouraging trend, the findings revealed important qualitative gaps in knowledge, particularly related to the technical aspects, indications, and long-term benefits of KMC. While healthcare workers were generally familiar with the concept and immediate advantages of KMC, incomplete understanding of procedural details may undermine effective counseling and consistent implementation. Evidence from previous studies indicates that maternal acceptance of KMC is strongly influenced by the clarity and confidence with which healthcare providers explain the process and its benefits, underscoring the clinical importance of comprehensive

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provider knowledge (15,16). In this context, partial or superficial understanding among healthcare workers may inadvertently limit maternal engagement and continuity of KMC practice. The study also demonstrated a largely positive attitude toward KMC among healthcare workers; however, this did not consistently translate into regular clinical practice. The observed discrepancy between favorable attitudes and inconsistent practice highlights the complex interaction between individual readiness and systemic constraints. Similar patterns have been reported in other settings, where positive perceptions alone were insufficient to sustain routine KMC without structural and organizational support. These findings reinforce the need for enabling environments that not only promote positive attitudes but also actively support implementation through training, leadership engagement, and reinforcement of evidence-based benefits. Incentivizing healthcare workers through structured educational programs, professional recognition, and institutional support has been proposed as a pragmatic strategy to improve adherence to KMC practices (17,18).

Barriers to KMC implementation emerged as a central theme in this study, with excessive workload identified as a major challenge. High patient volumes combined with staff shortages in the NICU and Gynecology departments restricted the time available for healthcare workers to initiate and supervise KMC, even when motivation and awareness were present. This observation aligns with findings from international studies, including research conducted in East Asia, where increased workload associated with KMC was reported as a significant impediment to its routine application (19). The findings suggest that without adequate staffing and workload redistribution, KMC may continue to be perceived as an additional burden rather than an integral component of neonatal care. Resource limitations constituted another critical barrier, encompassing inadequate infrastructure, limited availability of equipment, and financial constraints. The absence of dedicated KMC spaces, appropriate clothing or wraps, and standardized protocols impeded consistent practice across departments. Similar challenges have been documented in multiple low- and middle-income country settings, where insufficient funding, equipment shortages, and human resource limitations adversely affected KMC implementation (20,21). Administrative barriers further compounded these challenges, particularly the lack of institutional policies, structured protocols, and leadership-driven support. These issues were most pronounced in high-acuity areas such as the NICU and Gynecology departments, where formalized systems and clear governance are essential for sustaining practice. Existing literature consistently identifies deficiencies in infrastructure, equipment, trained personnel, and administrative commitment as dominant obstacles to KMC adoption (9,22).

The study's strengths include its focus on multiple cadres of healthcare workers directly involved in neonatal care and its comprehensive assessment of knowledge, attitudes, practices, and barriers within a real-world tertiary care setting. The use of a structured and internally reliable tool allowed for a multidimensional evaluation of KMC implementation. However, several limitations must be acknowledged. The cross-sectional design precluded causal inference, and the relatively small sample size limited generalizability beyond the study setting. The reliance on self-reported practices may have introduced social desirability bias, potentially overestimating positive behaviors. Additionally, the categorical nature of KAP measurement restricted more advanced statistical analyses, such as regression modeling, which could have provided deeper insight into predictors of KMC practice. Future research should consider longitudinal or interventional designs to assess the impact of targeted training programs, policy implementation, and resource enhancement on sustained KMC practice. Expanding the scope to include maternal perspectives and observational assessments of practice would further enrich understanding of implementation gaps. Addressing both individual-level competencies and systemic constraints through coordinated policy reforms, resource allocation, and administrative engagement appears essential for translating knowledge and positive attitudes into consistent, high-quality KMC practice across healthcare settings.

CONCLUSION

This study provided important insights into existing gaps in the knowledge, practice, and systemic support for Kangaroo Mother Care within the local healthcare context, underscoring its relevance for improving the quality of neonatal care in Pakistan. The findings emphasized the pivotal role of nurses and other healthcare providers in educating and counseling mothers on the correct and sustained practice of KMC, including guidance on appropriate continuation and discontinuation based on neonatal readiness. By highlighting the contribution of KMC to early neonatal discharge, enhanced maternal satisfaction, and improved physiological stability of newborns, the study reinforced its value as a practical, low-cost, and effective intervention. Overall, the research contributed evidence to support the integration of KMC into routine neonatal care and underscored the need for strengthened infrastructure, clearer practice regulations, and sustained institutional support to ensure its effective and consistent implementation.

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AUTHOR CONTRIBUTIONS

Author	Contribution
Sohail Nasir*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Abbas Ali	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Sawera Ayub	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Tauqeer Ahmad	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

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