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Research Article

Study Of Knowledge, Attitude, And Practice Of Kangaroo Mother Care Among Mothers In The Neonatal Wards

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ABSTRACT

Background: Preterm birth is a leading cause of neonatal mortality worldwide, with India contributing over 3.5 million preterm births annually. Kangaroo Mother Care (KMC), involving skin-to-skin contact and exclusive breastfeeding, is an evidence-based, low-cost intervention that improves neonatal outcomes. However, the uptake of KMC remains suboptimal due to maternal unawareness, cultural hesitations, and system-level barriers in public healthcare settings.
Objectives: To assess the knowledge, attitude, and practice (KAP) of Kangaroo Mother Care among postnatal mothers admitted in neonatal wards of Dr. Sushila Tiwari Hospital, and to evaluate the impact of structured counselling on maternal stress and KMC-related practices.
Methods: This was a descriptive observational study conducted over 18 months. A total of 234 eligible postnatal mothers of stable low-birth-weight infants were enrolled. Pretested structured questionnaires assessed baseline KAP. After structured KMC counselling and practice sessions, the same questionnaire was re-administered. Statistical analysis was conducted using SPSS v25.
Results: Post-counselling, maternal knowledge of KMC improved significantly across all domains ($p \leq 0.006$). Comfort, confidence, and perceived safety during KMC rose markedly, while maternal stress decreased from 64.6% to 2.5% ($p < 0.001$). Practical implementation improved, with mothers providing 12–18 hours of KMC rising from 4.3% to 32.5% ($p = 0.006$). Neonatal characteristics and feeding practices aligned with global KMC profiles.
Conclusion: Structured maternal counselling significantly improves KAP and reduces stress, reinforcing the need for integrated KMC education in neonatal care protocols to enhance maternal participation and infant outcomes.

Keywords*: Kangaroo-Mother-Care; Knowledge Attitude and Practice; Maternal stress.*

INTRODUCTION

Preterm birth, defined as delivery before 37 completed weeks of gestation, remains the leading cause of neonatal mortality worldwide, accounting for approximately one million deaths annually.[1] Globally, an estimated 15 million preterm infants are born each year, with South Asia, particularly India, contributing over 23% of this burden.[2,3] India records over 3.5 million preterm births annually, with significant risks of hypothermia, sepsis, and feeding difficulties.[4,5] To address these challenges, Kangaroo Mother Care (KMC) has been widely endorsed by the World Health Organization as a cost-effective and evidence-based neonatal care strategy, especially in low-resource settings.[2] KMC comprises early, continuous skin-to-skin contact, exclusive breastfeeding, and early discharge with structured follow-up, and has been shown to improve thermoregulation, promote weight gain, and reduce hospital-acquired infections and neonatal mortality by up to 40%.[6-8] Despite national implementation efforts under the India Newborn Action Plan, the uptake of KMC in many healthcare facilities remains inadequate due to lack of maternal knowledge, cultural barriers, overcrowded wards, and limited counselling by healthcare staff.[9,10] Studies report that the knowledge, attitude, and practice (KAP) of mothers are central to the success of KMC, as mothers are often primary caregivers in neonatal wards.[11,12] Maternal factors such as education

level, parity, antenatal counselling, and emotional readiness significantly affect the adoption and quality of KMC practices.[13,14] Institutional influences like trained healthcare providers, privacy for KMC, and ongoing support also determine maternal compliance.[15,16] This study assessed the knowledge, attitude, and practice of mothers with neonates admitted to the neonatal wards of Dr. Sushila Tiwari Hospital, aiming to identify gaps and challenges in Kangaroo Mother Care to inform strategies for improved maternal education and neonatal outcomes.

MATERIALS AND METHODS

This institutional-based descriptive observational study was conducted over a period of 18 months in the maternity wards and Special Newborn Care Unit (SNCU) of Dr. Sushila Tiwari Hospital, Haldwani, following ethical clearance from the Institutional Ethics Committee. The study targeted normal postnatal mothers whose neonates were either preterm or term but had low birth weight (less than 2000 grams) and were clinically stable, breathing spontaneously without life-threatening conditions or congenital malformations. Mothers who were themselves unwell or unwilling to provide Kangaroo Mother Care (KMC), or whose families were unable or refused to participate in KMC, were excluded from the study. Sample size was calculated using Epi Info™ software (CDC, Atlanta, USA), considering a 95% confidence level and a 5% margin of error. In the absence of prior regional data on maternal knowledge, attitude, and practice regarding KMC, an expected prevalence of 50% was assumed to obtain the maximum sample size. Applying the standard formula for population proportion studies, the minimum sample size calculated was 213. To accommodate a projected 10% non-response or loss to follow-up, the sample size was adjusted to a final total of 234 participants. After obtaining informed written consent, mothers who met the inclusion criteria were enrolled. Before any KMC sessions, participants were assessed using a pretested, structured questionnaire to evaluate their baseline knowledge, attitudes, and practices related to KMC. Sociodemographic information including age, education, parity, and socioeconomic status was also recorded. Mothers were also subjected IAP PARENT STRESS QUESTIONNAIRE(IAP-PSQ-4) before starting of KMC and were reassessed for PSQ after the study. Following this initial assessment, mothers were educated about KMC using verbal explanations and physical demonstrations by trained healthcare staff. Once mothers had completed several sessions of skin-to-skin contact with their babies, the same questionnaire was re-administered to evaluate any changes or improvements in their knowledge and practice levels. Data entry was performed using Microsoft Excel 2016. Statistical analysis was conducted using SPSS version 25 (SPSS Inc., Chicago, IL, USA). Chi-square or Fisher's exact test was used for comparing categorical variables, and Student's t-test was applied for continuous variables, with guidance from a qualified statistician.

RESULTS

We studied 234 post- natal mothers for Knowledge, Attitude and Practice of KMC. Demographic details of mothers are given as below:

Table 1: Demographic Details of Mother

Variable	Category	Frequency	Percentage (%)
Age (Mean ± SD)	25.92 ± 3.96		
Religion	Hindu	183	78.21%
	Others	51	21.79%
Socioeconomic Status	Lower Middle	79	33.76%
	Upper Class	17	7.27%
	Upper Lower	12	5.13%
	Upper Middle	126	53.85%
Educational Qualification	Graduate	33	14.10%
	High School	3	1.28%
	Illiterate	47	20.08%
	Primary	98	41.94%
	Secondary	53	22.65%
Mode of Delivery	Caesarean	74	31.62%
	Vaginal Delivery	160	68.38%
Occupation	Housewife	233	99.57%
	Pharmacist	1	0.43%
Parity	1	65	27.78%
	2	19	8.12%
	3	20	8.55%
	4	7	2.98%

In our study, the average maternal age was 25.92 ± 3.96 years, with most participants being Hindu (78.21%) and from the upper middle class (53.85%). A large proportion had only primary education (41.94%), and nearly all were housewives (99.57%). Vaginal delivery was more common (68.38%) and most mothers were primiparous (27.78%) (See Table 1)

A significant reduction in maternal stress was observed after KMC, with low stress levels rising from 35.5% to 97.9%. High stress (red zone) was completely eliminated post-KMC. The Chi-Square test showed a highly significant association ($p < 0.001$), demonstrating KMC's effectiveness in stress reduction (See Table 2).

Table 2: Mother Stress Level Before and After KMC

PSQ	Before KMC	Percent (%)	After KMC	Percent (%)
Green	83	35.5%	229	97.9%
Yellow	143	61.1%	6	2.5%
Red	8	3.4%	0	0.0%

Chi-square test used 202.29, p-value <0.001

Post-KMC counselling significantly enhanced maternal knowledge across all components of KMC, such as its definition, eligibility, timing, location, and posture. Correct response rates rose from <15% to over 85–95% in most areas, indicating the success of the educational intervention ($p < 0.006$ for all items) (See Figure 1).

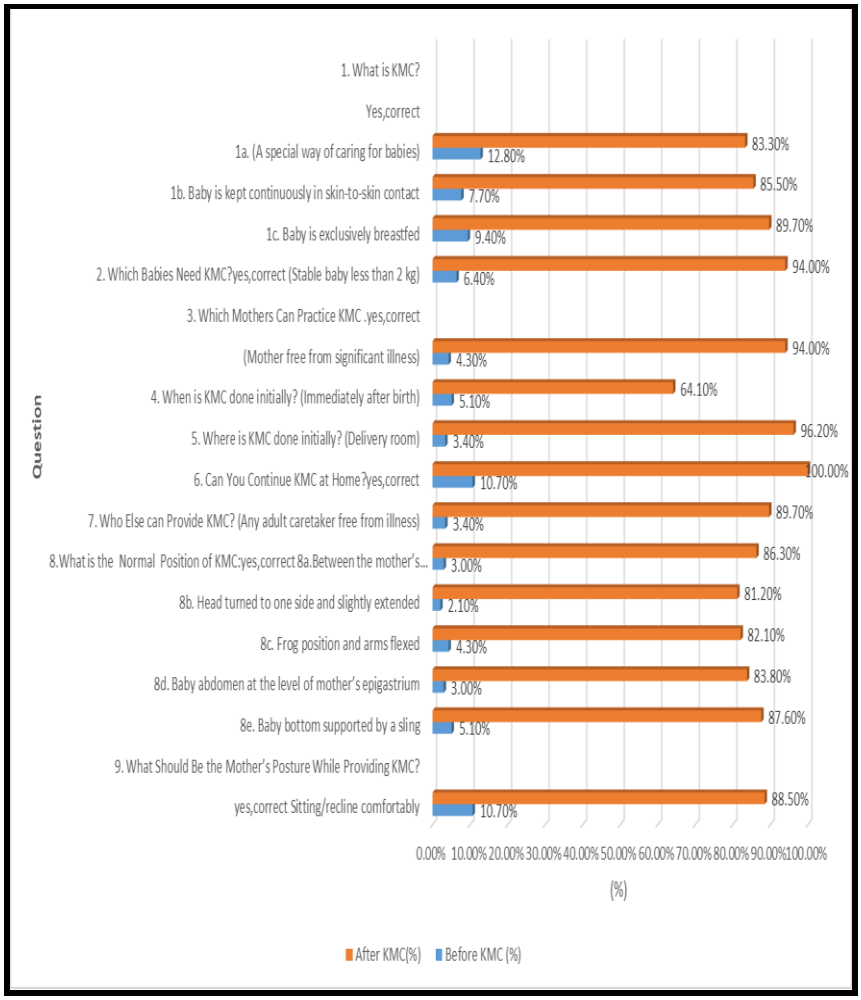

Figure 1: Distribution of Knowledge of KMC Among Mothers

Knowledge regarding duration, benefits, clothing, weight gain, and follow-up improved markedly after KMC, with most parameters showing an increase from less than 25% to above 85–95%. The observed improvements were statistically significant, indicating enhanced maternal understanding and preparedness ($p < 0.05$) (See Figure 2).

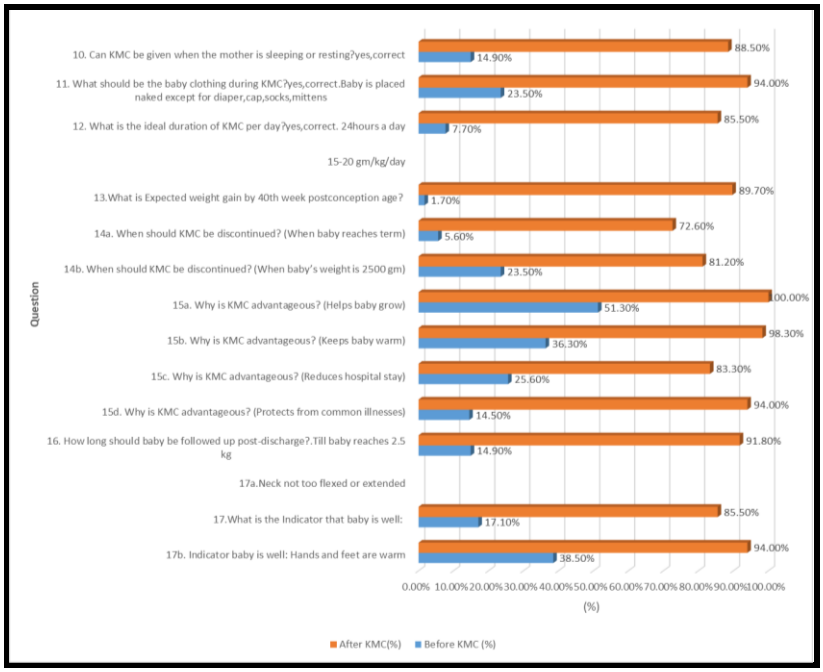

Figure 2: Distribution of Knowledge of KMC Among Mothers

Mothers' attitudes toward KMC improved substantially post-intervention, with significant increases in perceived comfort, confidence, bonding, and family support. Negative emotions such as anxiety or stress showed marked reductions, all with statistically significant p-values ($p < 0.05$), reflecting better emotional adaptation (See Figure 3).

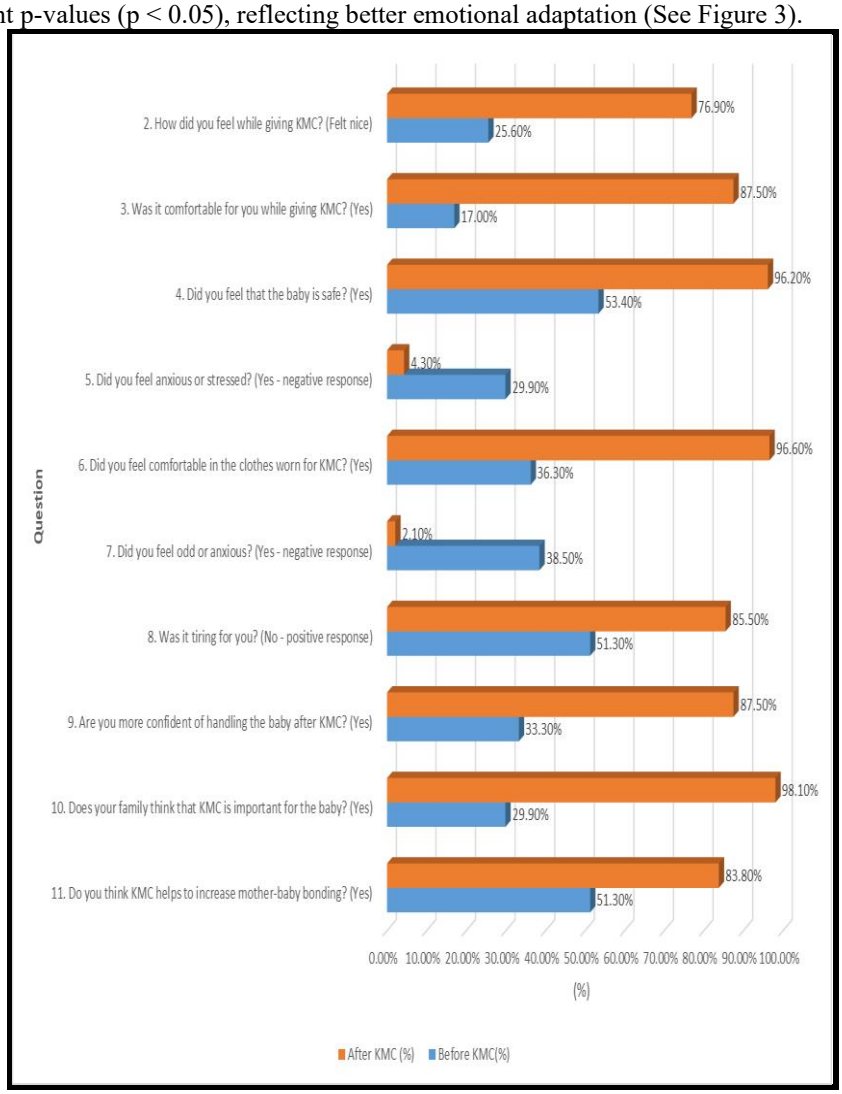

Figure 3: Distribution of attitude of KMC among mothers

KMC practice improved significantly after intervention, especially regarding daily duration, breastfeeding in KMC position, milk expression, and support from family. Mothers also showed increased ability to maintain KMC during sleep and chores, confirming effective practical application ($p < 0.05$ in most domains) (See Figure 4).

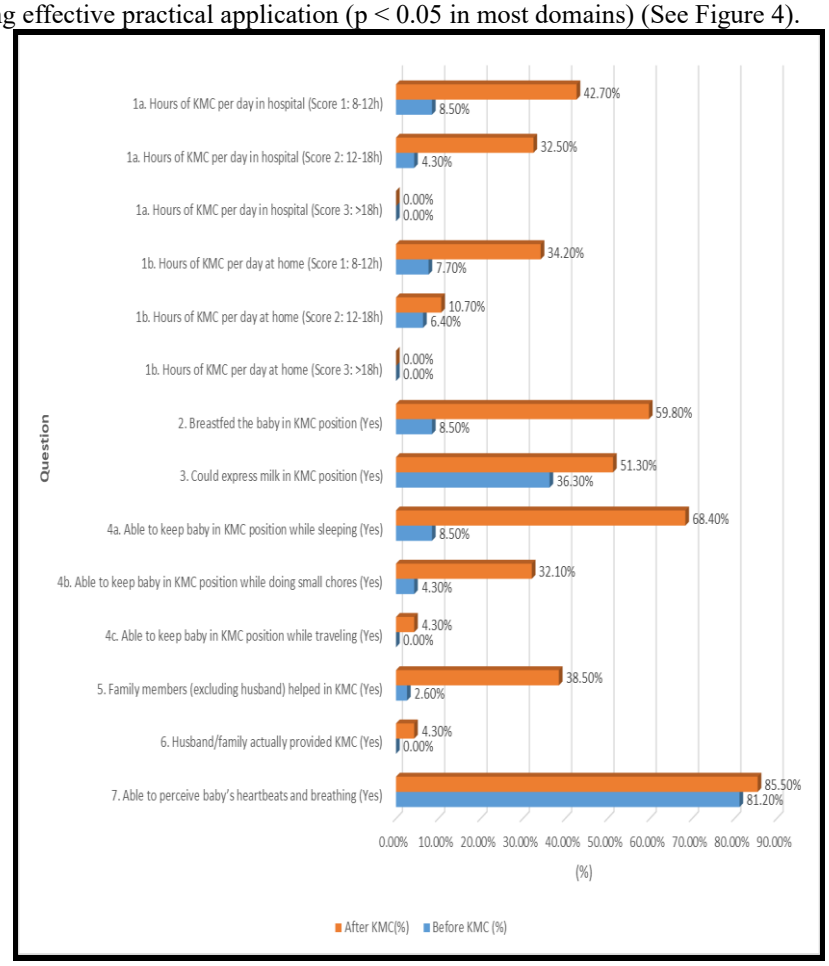

Figure 4: Distribution of Practice of KMC among mothers

Most neonates were AGA (58.1%) and >32 weeks gestational age, with respiratory distress being the most common comorbidity (21.4%). Feeding practices varied, with direct breastfeeding (38.9%) and OG feeding (31.6%) being common. These characteristics reflect a diverse neonatal population suitable for KMC (See Table 3).

Table 3: Characteristics of Neonates Subjected to KMC

Variable	Category	Frequency	Percentage (%)
AGA/IUGR	AGA (Appropriate for Gestational Age)	136	58.1%
	LGA (Large for Gestational Age)	1	0.4%
	SGA (Small for Gestational Age)	97	41.5%
Comorbidities	Early onset sepsis	1	0.4%
	Neonatal jaundice	15	6.4%
	Respiratory distress	50	21.4%
Mode of Feeding	Direct breast feed	91	38.9%
	Katori spoon	69	29.5%
	OG feed (Orogastric tube)	74	31.6%
Weight	<1 kg	4	1.7%
	1-1.5 kg	92	39.3%
	>1.5 kg	138	59.0%
Gestational Age	<28 weeks	3	1.3%
	28-32 weeks	95	40.6%
	>32 weeks	136	58.1%

The average neonatal weight was 1.58 kg, with corresponding mean length and head circumference of 41.57 cm and 29.17 cm, respectively. These baseline anthropometric values are indicative of low birth weight/preterm neonates and provide a reference for growth monitoring during KMC (See Table 4).

Table 4: Anthropometric Measures of Neonates Admitted for KMC

Anthropometric Measure	Mean ± SD
Weight (kg)	1.58 ± 0.27
Length (cm)	41.57 ± 3.24
Head Circumference (HC)	29.17 ± 2.0

DISCUSSION

This study demonstrated that structured counselling significantly improved maternal knowledge, attitude, and practice (KAP) regarding Kangaroo Mother Care (KMC). The mean maternal age in our cohort was 25.92 ± 3.96 years, aligning with Indian studies by Pradhan et al.[17], Jain and Goswami[18], and Urmila et al.[19], confirming that KMC predominantly involves young adult mothers. Socioeconomic status and education levels mirrored regional trends, while vaginal delivery remained the dominant mode, consistent with prior findings. A major highlight was the reduction in maternal stress: moderate-to-high stress dropped from 64.6% to 2.5% post-intervention ($p < 0.001$), consistent with Worku and Kassie[20] and Bergh et al.[21]. Maternal knowledge showed statistically significant gains across all domains—definition of KMC, skin-to-skin care, breastfeeding, and eligibility—with p-values ≤ 0.006, matching studies by Pradhan et al.[17], Urmila et al.[19], and Prasad et al.[22]. Knowledge of practical components, including timing, clothing, and positioning, also increased substantially. Attitudinal improvements were equally profound. Mothers reporting comfort with KMC rose from 17.0% to 87.5% ($p = 0.006$), while feelings of safety and bonding increased significantly, in line with Jain and Goswami[18] and Prasad et al.[22]. Anxiety levels decreased from 29.9% to 4.3%, and confidence in baby handling increased from 33.3% to 87.5%. Family support perception also rose from 29.9% to 98.1% ($p = 0.001$), underscoring the psychosocial impact of counselling. Practice-wise, hospital-based KMC duration improved remarkably, with mothers providing 12–18 hours daily increasing from 4.3% to 32.5% ($p = 0.006$). Home continuation, feeding in the KMC position, and ability to practice KMC during sleep and small tasks also improved significantly. These findings are consistent with the Cochrane review by Conde-Agudelo and Díaz-Rossello[7], Worku and Kassie[20], and Cattaneo et al.[23]. Neonatal characteristics, including gestational age, weight, and anthropometric parameters, closely matched other global KMC cohorts, validating the representativeness of our population. Importantly, this study also included extremely preterm neonates, demonstrating the feasibility of extending KMC beyond traditional eligibility criteria. In conclusion, structured maternal education significantly enhances KAP and reduces stress, promoting better implementation of KMC. These findings underscore the need to integrate formal KMC counselling into routine neonatal care to optimize maternal competence and neonatal outcomes.

Barriers identified were-
Because of non- availability of KMC binders , mothers were not able to keep baby in KMC position while doing small chores Because of lack of awareness, relatives were not helping mothers in KMC Significant gains were observed across knowledge and attitude but not in practice domain.

CONCLUSION

We concluded that structured, targeted counselling serves as a transformative tool in enhancing maternal knowledge, attitude, and practice toward Kangaroo Mother Care (KMC). The intervention not only improved awareness and behavioral adoption but also significantly reduced maternal stress and boosted confidence in neonatal handling. Our study shows the vital role of mother-centric education is in strengthening KMC implementation.

Antenatally, mothers did not have knowledge regarding KMC, acceptance was low. Introduce antenatal KMC education modules within routine prenatal classes—leveraging multimedia presentations/KMC videos—to establish early familiarity, enhance understanding and willingness among expectant mother. Raising awareness among relatives for KMC support so that they can help in KMC. Use of KMC binders so that KMC can be followed even at home/ while doing small chores. Integrating such evidence-based strategies into routine neonatal care protocols can drive meaningful improvements in both maternal engagement and infant survival outcomes.

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Ethical Approval: *Obtained.*
Consent: *Written consent secured.*

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