ORIGINAL ARTICLE

Awareness and Experience of Kangaroo Mother Care for full term newborns: An interventional study at a rural maternity hospital in south Karnataka

Avita Rose Johnson[1], Cicy Varghese[2], Andrea Daniella Johnson[3], Maria Vimala P[4], Rose Mary J Vadassary[5], Ashel Daphne D'Souza[6], Merlyn Joseph[7]

[1]Assistant Professor, Department of Community Health, St. John's Medical College, Bangalore; [2]Post Graduate, Department of Community Health, St. John's Medical College, Bangalore; [3]Intern, Department of Community Health, St. John's Medical College, Bangalore; [4]Intern, Department of Community Health, St. John's Medical College, Bangalore; [5]Intern, Department of Community Health, St. John's Medical College, Bangalore; [6]Intern, Department of Community Health, St. John's Medical College, Bangalore; [7]Tutor, Department of Community Health, St. John's Medical College, Bangalore

Corresponding Author

Dr. Cicy Varghese, Department of Community Health, St. John's Medical College, Sarjapur Road, John Nagar, Bangalore – 560034.
E Mail ID: cicyvarghese84@gmail.com

Citation

Johnson AR, Varghese C, Johnson AD, Vimala MP, Vadassary RMJ, Dsouza AD, Joseph M. Awareness and Experience of Kangaroo Mother Care for full term newborns: An interventional study at a rural maternity hospital in south Karnataka. Indian J Comm Health. 2020;32(3):518-526.

Source of Funding: Nil **Conflict of Interest:** None declared

Article Cycle

Received: 14/08/2020; **Revision:** 27/08/2020; **Accepted:** 05/09/2020; **Published:** 30/09/2020

Abstract

Background: Kangaroo Mother Care (KMC) is early, continuous and prolonged skin-to-skin contact between mother and baby, with exclusive breastfeeding. Besides preterm and low birth weight babies, even full-term healthy newborns benefit from KMC. **Objective**: to assess awareness and experience of KMC for full-term newborns among newly delivered mothers in a rural maternity hospital. **Methods**: Interventional study with interview schedule to capture awareness of KMC (25 scored items). After one hour of practicing KMC, post-intervention assessment of KMC experience (23 scored items) was done. Bivariate analysis performed to associate awareness and experience of KMC with socio-demographic and obstetric variables. **Results**: The 100 mothers in our study had low median KMC awareness score of 4(IQR=2,8) and were unaware of benefits of KMC. Median KMC experience score was 21(IQR=19,22), indicating highly positive experience. Mothers reported feeling happy or relaxed, found it easier to breastfeed, easy to practice KMC, and wanted to continue KMC at home. Mothers with caesarean section were more likely to experience abdominal or back pain during KMC (P=0.037) and mothers with previous abortion/stillbirth were more likely to have fear of suffocating the baby during KMC (P=0.005). **Conclusion**: Though awareness of KMC was found to be low, overall experience of KMC was very positive. Mothers should be educated about benefits of KMC and given an opportunity to practice KMC in hospital. Full-term healthy newborns and their mothers should not be denied the numerous advantages of KMC. There is need to create KMC-friendly hospital culture and promote KMC for all newborns.

Keywords

Kangaroo Mother Care; Skin to Skin Contact, Full Term Newborns

Introduction

Kangaroo Mother Care (KMC) is the early, continuous and prolonged skin-to-skin contact between mother and baby, along with exclusive breastfeeding.(1) It was first presented as an alternative to incubator care for low birth weight

(LBW) newborns in resource poor settings.(2) Many hospitals have now implemented skin-to-skin contact for full-term newborns immediately following birth,(3) as this intervention improves breastfeeding outcomes and cardio-respiratory stability while providing thermoregulation.(4)

KMC has proven benefits of keeping babies warm, reducing infection, increasing mother-baby bonding, promoting breastfeeding, accelerating weight gain, improving neurodevelopment and reducing the duration of hospital stay.(1,3,5) KMC improves vital physiological parameters in low birth-weight newborns.(6) KMC also benefits mothers by reducing postpartum depression and postpartum bleeding, improving breast-milk production and general maternal well-being.(1,5) No negative short-term or long-term effects of KMC have been documented in medical literature.(4) KMC is advocated for at least one hour at a time, but can be performed as long as both mother and baby are comfortable.(7) Though KMC is strongly advocated for LBW infants, all newborns irrespective of prematurity, birth weight and socio-economic status have been found to benefit from the practice.(8,9) Yet, KMC is currently not actively encouraged for full-term healthy newborns, aside from the initial skin to skin contact immediately following birth.

National Health Mission (NHM), Government of India, initiated India Newborn Action Plan (INAP), 2014 with KMC as one of the strategies to achieve 'single digit neonatal mortality rate' by 2030.(10) Awareness among stakeholders is important for effective uptake of any public health practice,(11) and World Health Organization has recognised that a woman's experience of care is also key to improving maternal and child health services.(12) However, there is paucity of literature documenting awareness and experiences of mothers with regards to KMC, especially in resource-challenged rural areas, the setting that would benefit the most from KMC. There is also lack of research regarding KMC for full-term healthy newborns in India.

Aims & Objectives

This study was conducted with the objective to assess the awareness and experience of KMC for full-term newborns among newly delivered mothers in a rural area and the associated factors, with the ultimate aim of helping health care providers and institutions in better implementation of KMC as a newborn survival strategy.

Material & Methods

Study setting: An interventional study conducted in a rural secondary-level, maternity hospital located 60 kms from Bangalore city, Ramanagara district, south Karnataka, from April to June 2020. Study population: Mothers who delivered at the hospital and their newborns. Sample size: Based on a previous study in an urban tertiary care setting in Kerala,(13) where 5% of postnatal mothers were aware of KMC, with 95% confidence limits, absolute precision of 5%, and 30% non-response rate, the sample size was estimated as 95 and rounded off to 100. Sampling Technique: The study participants were consecutively sampled as soon as they completed the second post-natal day. Inclusion criteria: All newly delivered mothers, on the third postnatal day along with their full-term newborns either singleton or twins. Full term was defined as gestational age of 37 completed weeks or more. Exclusion criteria: Mothers whose pregnancy had ended in stillbirth, mothers with pre-term delivery at <37 completed weeks, seriously ill mothers or mothers with seriously ill newborns.

Study tool: Based on an extensive review of available literature, a structured interview schedule was prepared and face-validated by two experts in Neonatology and Community Medicine. The finalised interview schedule after pilot-testing, had three parts: Part 1: Socio-demographic and obstetric details: Information on maternal age, education, occupation, income, parity and past obstetric history. Complications during pregnancy and delivery, birth details like birth weight, gestational age at birth and mode of delivery were obtained from in-patient records. Socio-economic status was determined using Modified BG Prasad Classification (14) Part 2: Awareness of KMC: 25 questions to assess whether mother heard of KMC, how to give KMC and benefits of KMC. Each correct response was awarded a score of one, with a maximum possible KMC awareness score of 25. Part 3: Experience of KMC: 23 questions to capture feelings and emotions of mother after one hour of practising KMC, along with fears, difficulties and discomforts of KMC. The responses were on a Likert scale: Agree, Neutral, Disagree. Responses which agreed with positively worded statements were awarded score of one, responses which disagreed to negatively worded statements were also awarded score of one, with a maximum possible KMC experience score of 23.

Data Collection: After Part 1 and 2 of the interview-schedule was administered, KMC technique was demonstrated using a video from Ministry of Health and Family Welfare, Government of India. (15) Contents of the video were explained to the mother in the local language. Intervention: Mother performed KMC with her newborn, with assistance from the researchers. Privacy to provide KMC was ensured with curtains or mobile screens. Newborn was dressed in cap, mittens, booties and diaper and placed on the bare chest of mother, who was in semi-reclining position in bed, as per KMC Operational Guidelines, 2014.(1) A shawl or saree was used to wrap the baby in place, over which mother wore her nightgown. Mother provided KMC for one hour. She was free to stop KMC at any point of time, if she was uncomfortable. After intervention, Part 3 of the study tool (Experience of KMC) was administered, after which mothers received a health education session on benefits of KMC.

Ethical Considerations: Institutional Ethics Committee approval was obtained. Written informed consent was obtained from participants, after explaining purpose and procedure of the study.

Statistical Analysis: Data analysis was performed using IBM Statistical Package for Social Sciences (SPSS) v20. Data was described by mean and standard deviation, median and inter-quartile range for continuous variables and frequency and proportions for categorical variables. The outcome variables (total KMC awareness score and total KMC experience score) were tested for normality using Normality Probability Plots. Since KMC awareness score was not normally distributed, Mann Whitney U test was used to look for difference between median KMC awareness scores among various independent co-variates (socio-demographic and obstetric factors). Correlation between KMC awareness score and continuous independent variables was done with Spearman's Rank Correlation test. KMC experience score was normally distributed, therefore Independent t-test was used to look for difference between mean KMC experience scores among the independent co-variates. Correlation between KMC experience score and continuous independent variables was done with Pearson's Correlation Co-efficient test. Chi-square test was performed for association between select negative experiences and various independent variables. P value of <0.05 was considered statistically significant for all analyses.

Results

A total of 100 postnatal women and their full term newborns participated in our study.

Socio-demographic details: Mean age of the women were 24.3±3.5 years, with 4% of subjects in the adolescent age group [Table 1]. Participants had a mean of 12.66±2.75 years of formal education, with more than three-quarters being educated till pre-university (PUC) or beyond. Most of them belonged to Hindu religion (98%) and were home makers (88%). Mothers had been married for a median of 2 years (IQR=1,5). Median monthly per capita income was Rs. 2500 (IQR=1969, 3617).

Obstetric History: Over 60% of the women were primiparous [Table 2]. Mean gestational age at delivery was 38.8 ±1.0 weeks. All newborns were singleton. Complications in pregnancy noted were: anaemia (8%), pregnancy induced hypertension (6%), oligohydramnios (6%), hypothyroid (2%), hyperemesis (2%). Complications during delivery were : foetal distress (9%), first degree perineal tear (7%), malpresentation (7%), non-progress of labour(4%) and premature rupture of membranes (2%). Only 1% of the newborns had any complications.

Mother's awareness of KMC: The participants' KMC awareness scores ranged from 0 to 17. The mean KMC awareness score was 4.73±3.87 and the median KMC awareness score 4 ((IQR=2,8). Bivariate statistical analysis revealed no significant association between median KMC awareness scores and socio-demographic factors like occupation, type of family or various obstetric variables [Table 5]. There was also no correlation between KMC awareness score and continuous variables like age, education and income [Table 4]. Gaps in awareness of KMC: Only 17% of mothers had heard of the term "Kangaroo Mother Care", while 60% had heard of the term "skin to skin contact" [Table 3]. Less than a third of mothers were aware that KMC was recommended for sick, preterm, LBW babies or twins. Only one-fifth of mothers were aware that KMC could be given to normal healthy newborns. While some mothers were aware that baby should be placed on mother's chest during KMC (52%) and mother sits in semi-reclining position during KMC (40%), awareness of benefits of KMC, how the baby should be dressed and who else can give KMC was found to be very low.

Mother's experience of KMC: The participants' KMC experience scores ranged from 16 to 23. Mean KMC

experience score was 20.3± 2.42 and median experience score 21(IQR=19,22). There was no significant association between mean KMC experience scores and various socio-demographic and obstetric variables [Table 5]. There was also no correlation between KMC experience score and continuous variables [Table 4]. Positive Experiences of KMC: Nearly all the mothers reported positive experiences after practising KMC. Mothers wanted to continue giving KMC; they felt happy and relaxed, found it easy to practice KMC, felt confident they can practice KMC at home and found it easier to breastfeed during KMC [Figure 1]. Negative Experiences of KMC: Some mothers experienced more back pain/abdominal pain than usual (28%), many felt they needed assistance to arrange the baby for KMC and would be difficult to do this alone (54%), some felt they may not receive support at home to give KMC (12%). Feeling embarrassed to give KMC in front of family members (30%) or in front of visitors (44%) were commonly experienced. A few feared suffocating the baby while giving KMC (10%)[Figure 2].

Mothers who had undergone caesarean section (LSCS) were significantly more likely to experience abdominal or back pain while giving KMC than those with vaginal delivery (p=0.037). Those mothers who had previous abortion or stillbirth were significantly more likely to have fear of suffocating the baby during KMC (p=0.005) [Table 6].

Discussion

Our study explored awareness and experience of KMC among rural women. We assessed 'awareness' rather than 'knowledge', as in the knowledge domain, awareness is considered more general and sits at the lower end of the continuum, while knowledge which is considered detailed and specific sits at the higher end.(16) Awareness of KMC in our study was found to be low, only 17% having heard of KMC before. This was similarly reported by a tertiary care hospital in Kannur, where majority of mothers were unaware of KMC.(13) The lack of awareness could be attributed to the fact that KMC has thus far been advocated for preterm and LBW babies and has not been discussed in the public domain unlike breastfeeding and immunization.

One of the major gaps in awareness of KMC, was regarding benefits of KMC. Mothers were unaware that KMC can provide warmth, reduce infection, promote breastfeeding and enhance mother-baby bonding. This is important as studies have shown that maternal practice of healthful behaviours and utilisation of health services is strongly linked to their awareness of the benefits to their children.(17) Improved awareness of newborn care has also been shown to be significantly associated with adequate newborn care practice, in rural north India.(18) Therefore, it is vital that newly delivered mothers should receive health education regarding KMC in order to improve practice of KMC among mothers.

Keeping the baby warm is an integral part of essential newborn care, as hypothermia can cause neonatal mortality irrespective of gestational age or birth weight.(19) Mothers should be made aware that KMC is a cost-effective way of keeping babies warm, while providing numerous other benefits.(3) A review of mothers' experiences at a hospital in Malawi revealed that mothers preferred KMC over incubator care and had a positive attitude towards KMC, once they were fully aware of its benefits.(20) None of the mothers in our study were aware that KMC can help the baby gain weight. It has been found that KMC promotes mothers to breastfeed exclusively and for longer periods, reducing stress hormones like cortisol and somatostatin in the newborn which allows for better absorption and digestion of nutrients.(3) Previous research in our same study setting had revealed that out of 1017 live births in one year, 21.1% were LBW (<2500g) and 92% of LBW were full term births.(21) This indicates that intrauterine growth retardation is still a problem in the rural area. Considering that babies lose around 10% of body weight in the first week of life, KMC would be a value addition to the strategies to help such babies gain weight during neonatal period.

After performing KMC for their babies, most mothers in our study had positive experiences like feeling relaxed, happy, confident and close to their baby. A cross sectional study done among mothers of preterm babies in a tertiary hospital in Warangal, Andhra Pradesh found that positive feelings arose in mothers even with one hour of KMC, and most mothers reported feeling happy (97.8%) and close to their baby (93.5%).(22) Positive experiences similar to our study were also reported from a qualitative study in Kenya where mothers reported that KMC enabled them to get closer and more connected to their baby, they felt more confident to handle their baby and felt de-stressed and less anxious during KMC.(23) KMC has been found to play an important role in reducing risk for postpartum depression. Skin-

to-skin contact during KMC triggers release of oxytocin, which is hypothesized to minimize depressive symptoms, reduce postpartum bleeding, decrease maternal stress and reduce maternal blood pressure. (3,5,24)

A study done on the feasibility and acceptability of KMC among mothers of LBW infants in a neonatal care unit in Chandigarh, showed that 80% mothers reported ease of lactation during KMC, (25) as was similarly reported by mothers with full-term newborns in our study. There is evidence from a systematic review of skin to skin contact for normal healthy newborns, which included 34 randomised controlled trials and 2177 participants, which found that skin to skin contact soon after birth improves breastfeeding outcomes.(4) Mother's prolactin level is known to rise during skin to skin contact along with oxytocin levels. KMC is therefore an important strategy to help establish and sustain lactation. This highlights the importance of KMC, not only for preterm but even among full term newborns.

There were few negative experiences among the study subjects; feeling tired, feeling KMC is cumbersome, perceiving need for assistance, lack of support and embarrassment while giving KMC in front of others, as was also found among mothers in the Malawi and Kenya studies.(20,23) The International Network on KMC, an experience-sharing conference by 92 countries world-wide, lists several barriers to KMC.(26) Besides resource-barriers due to lack of knowledge regarding KMC on the part of various stakeholders, there are experiential barriers to KMC like pain during KMC and fear of hurting the baby, which were also found in our study. We found that pain while giving KMC was experienced significantly more among those who underwent caesarean section, while fear of suffocating the baby was significantly more among those who had suffered a previous pregnancy loss. This implies that mothers with such fears should be counselled about benefits and safety of KMC, with the assurance that KMC has no negative effects on mothers and babies, either short term or long term. (4) It should be emphasised that KMC stimulates all five senses of the newborn. The baby feels the mother's warmth through skin-to-skin contact (touch), listens to her voice and heartbeat (hearing), sucks breastmilk (taste), has eye contact with mother (vision) and becomes familiar with her odour (smell). (1)

Mothers in our study had positive experiences when giving KMC to full-term newborns and were willing to continue KMC at home. Therefore, mothers should be educated about the benefits of KMC and should not miss out on the opportunity to practice KMC in hospital. There is a need to promote KMC as a newborn survival strategy for all newborns irrespective of the gestational age or birth weight. This will not only keep the baby warm and prevent infection, but also sustain breastfeeding, increase weight gain in the newborn, prevent postpartum depression and promote mother-baby bonding.

Conclusion

The awareness of KMC among rural newly delivered mothers was found to be low with most mothers completely unaware of the benefits of KMC. Yet, after performing KMC for an hour for their full-term newborns, nearly all mothers reported positive experiences. Mothers should be educated about the benefits of KMC and given an opportunity to practice KMC in hospital. Full-term healthy newborns and their mothers should not be denied the numerous advantages of KMC. There is a need to create a KMC-friendly hospital culture and promote KMC for all newborns.

Recommendation

It is hoped that the findings from this research study will help give direction for further research into identifying and addressing the barriers to KMC, with the aim of scaling-up KMC for all newborns and creating a KMC-friendly hospital culture. Our study used a video to train mothers in KMC, followed by training in the local language Kannada. Since the video was in Hindi, the language barrier needs to be overcome by having videos in the local language for better understanding for mothers, their families and community. To ensure continuation of KMC at home, family members should be counselled by health care providers regarding benefits of KMC and supporting the mother for KMC.

Limitation of the study

This was a hospital-based study and therefore we could not explore the experiences of mothers continuing KMC in the home setting. Our findings were based on a one hour, one-time KMC intervention and we were not able to capture maternal experience of longer duration of KMC, as mothers were discharged from hospital on the third postnatal day.

Relevance of the study

Our study has highlighted the positive experiences of rural mothers giving KMC to full-term newborns, pointing out to a need to offer the option of KMC to mothers with full-term newborns, and not denying the mother-baby dyad all the numerous benefits of KMC.

Authors Contribution

ARJ conceived and designed the study. CV and MJ analysed and interpreted data. ADJ, MVP, RMJV and ADD extensively reviewed literature and collected data. All authors were involved in preparing, editing and reviewing the manuscript.

References

1. Kangaroo Mother Care and optimal feeding of low birth weight infants. Operational Guidelines for programme managers and service providers. National Health Mission, Child Health Division, Ministry of Health and Family Welfare, Government of India, 2014. Available from: https://nhm.gov.in/images/pdf/programmes/child-health/guidelines/Operational_Guidelines-KMC_&_Optimal_feeding_of_Low_Birth_Weight_Infants.pdf
2. Kangaroo Mother Care. Editorial. Journal of Tropical Paediatrics 1999;45:192-4. Available from: https://academic.oup.com/tropej/article/45/4/192/1694982
3. Skin-to-skin contact. The Baby Friendly Initiative. UNICEF, 2019. Available from: https://www.unicef.org.uk/babyfriendly/baby-friendly-resources/implementing-standards-resources/skin-to-skin-contact/
4. Moore ER, Anderson GC, Bergman N, Dowswell T. Early skin-to-skin contact formothers and their healthy newborn infants. Cochrane Database Syst Rev. 2012 May16;5(5):CD003519. doi: 10.1002/14651858.CD003519.pub3. Update in: CochraneDatabase Syst Rev. 2016 Nov 25;11:CD003519. PMID: 22592691; PMCID: PMC3979156.[PubMed].
5. Safari K, Saeed AA, Hasan SS, Moghaddam-Banaem L. The effect of mother andnewborn early skin-to-skin contact on initiation of breastfeeding, newborntemperature and duration of third stage of labor. Int Breastfeed J. 2018 Jul16;13:32. doi: 10.1186/s13006-018-0174-9. PMID: 30026787; PMCID: PMC6048813.[PubMed]
6. Bera A, Ghosh J, Singh AK, Hazra A, Som T, Munian D. Effect of kangaroomother care on vital physiological parameters of the low birth weight newborn.Indian J Community Med. 2014 Oct;39(4):245-9. doi: 10.4103/0970-0218.143030.PMID: 25364150; PMCID: PMC4215507.[PubMed]
7. Kangaroo Mother Care. Module-3. World Health Organization Collaborating Centre for Training and Research in Newborn Care. All India Institute of Medical Sciences, New Delhi, 2014. Available from: https://www.newbornwhocc.org/Dec2014_pdf/Kangaroo-mother-care-2014.pdf
8. Souza AK, Tavares AC, Carvalho DG, Araujo VC. Weight gain in newborns submitted to skin-to-skin contact. Rev. CEFAC 2018;20:53-60. doi: 10.1590/1982-021620182018317 .
9. Boundy EO, Dastjerdi R, Spiegelman D, Fawzi WW, Missmer SA, Lieberman E,Kajeepeta S, Wall S, Chan GJ. Kangaroo Mother Care and Neonatal Outcomes: AMeta-analysis. Pediatrics. 2016 Jan;137(1):e20152238. doi:10.1542/peds.2015-2238. Epub 2015 Dec 23. PMID: 26702029; PMCID: PMC4702019.[PubMed]
10. India Newborn Action Plan. National Health Mission, Ministry of Health and Family Welfare, Government of India, 2014. Available from: https://nhm.gov.in/images/pdf/programmes/inap-final.pdf
11. Frieden TR. Six components necessary for effective public health programimplementation. Am J Public Health. 2014 Jan;104(1):17-22. doi:10.2105/AJPH.2013.301608. Epub 2013 Nov 14. PMID: 24228653; PMCID: PMC3910052.[PubMed]
12. Tunçalp Ö, Pena-Rosas JP, Lawrie T, Bucagu M, Oladapo OT, Portela A, MetinGülmezoglu A. WHO recommendations on antenatal care for a positive pregnancyexperience-going beyond survival. BJOG. 2017 May;124(6):860-862. doi:10.1111/1471-0528.14599. Epub 2017 Mar 9. PMID: 28190290.[PubMed]
13. Urmila KV, Ravikumar, Karunakaran U. Study to assess the knowledge, attitude and practice of Kangaroo mother care among post-natal mothers in a tertiary care centre of North Kerala, India. Int J Contemp Pediatr 2018;5:992-6.
14. Debnath DJ. Kakkar R. Modified BG Prasad Socio-economic Classification, Updated – 2020. Indian J Comm Health 2020;32:124-5.
15. Importance of Kangaroo Mother Care. Ministry of Women and Child Development. Government of India. Available from: https://www.youtube.com/watch?v=-xrfUiMel1Y
16. Trevethan R. Deconstructing and Assessing Knowledge and Awareness in PublicHealth Research. Front Public Health. 2017 Aug 7;5:194. doi:10.3389/fpubh.2017.00194. PMID: 28824900; PMCID: PMC5545880.[PubMed]..
17. Mathew G, Johnson AR, Sulekha T, Kumari R, Varghese A. Barriers to Childhood immunisation among women in an urban underprivileged area of Bangalore City, Karnataka, India: A qualitative study. Int J Community Med Public Health 2016;3:1525-30. doi: http://dx.doi.org/10.18203/2394-6040.ijcmph20161622
18. Singh DR, Harvey CM, Bohara P, Nath D, Singh S, Szabo S, Karki K. Factorsassociated with newborn care knowledge and practices in the upper Himalayas.PLoS One. 2019 Sep 16;14(9):e0222582. doi: 10.1371/journal.pone.0222582. PMID:31525242; PMCID: PMC6746396.[PubMed]
19. Vilinsky A, Sheridan A. Hypothermia in the newborn – an exploration of its cause, effect and prevention. British J of Midwifery 2014;22:395-400.
20. Chisenga JZ, Chalanda M, Ngwale M. Kangaroo Mother Care: A review ofmothers'experiences at Bwaila hospital and Zomba Central hospital (Malawi).Midwifery. 2015 Feb;31(2):305-15. doi: 10.1016/j.midw.2014.04.008. Epub 2014 May2. PMID: 24908188.[PubMed]
21. Johnson AR, Nisha C, Navya CJ, Treesa S, Lija S, Rodrigues RJ. Low birth weight and associated factors in a rural maternity hospital, Bangalore. Natl J Res Community Med 2014;3:260-265.

22. Muddu GK, Boju SL, Chodavarapu R. Knowledge and awareness about benefits ofKangaroo Mother Care. Indian J Pediatr. 2013 Oct;80(10):799-803. doi:10.1007/s12098-013-1073-0. Epub 2013 Jun 8. PMID: 23749416.[PubMed]
23. Gakuna MN, Maina D, Ongeso A. Experiences of Parents on Kangaroo Mother Care in the Neonatal Clinic at Kenyatta National Hospital. International Journal of Recent Innovations in Medicine and Clinical Research 2019;1:21–30. Available from: https://ijrimcr.com/docs/2019/volume1/issue2/IJRIMCR-04.pdf
24. Badr HA, Zauszniewski JA. Kangaroo care and postpartum depression: The roleof oxytocin. Int J Nurs Sci. 2017 Jan 5;4(2):179-183. doi:10.1016/j.ijnss.2017.01.001. PMID: 31406740; PMCID: PMC6626107.[PubMed]
25. Parmar VR, Kumar A, Kaur R, Parmar S, Kaur D, Basu S, Jain S, Narula S.Experience with Kangaroo mother care in a neonatal intensive care unit (NICU) inChandigarh, India. Indian J Pediatr. 2009 Jan;76(1):25-8. doi:10.1007/s12098-009-0024-2. Epub 2009 Apr 18. PMID: 19390999.[PubMed]
26. Cattaneo A, Amani A, Charpak N, De Leon-Mendoza S, Moxon S, Nimbalkar S,Tamburlini G, Villegas J, Bergh AM. Report on an international workshop onkangaroo mother care: lessons learned and a vision for the future. BMC PregnancyChildbirth. 2018 May 16;18(1):170. doi: 10.1186/s12884-018-1819-9. PMID:29769056; PMCID: PMC5956892.[PubMed]

Tables

TABLE 1 SOCIO-DEMOGRAPHIC DETAILS OF THE STUDY PARTICIPANTS N=100

Variable	Category	N (%)
Age in years	≤ 19	4 (4%)
	20-24	57 (57%)
	25-29	31 (31%)
	≥ 30	8 (8%)
Education	Illiterate	0 (0%)
	Up to High school	22 (22%)
	PUC/Diploma	39 (39%)
	Graduate/Post graduate	39 (39%)
Occupation	Homemaker	88 (88%)
	Gainfully employed	12 (12%)
Type of family	Nuclear	24 (24%)
	Joint family	76 (76%)
Socio-economic Class	Upper	4 (4%)
	Upper-middle	17 (17%)
	Middle	38 (38%)
	Lower-middle	34 (34%)
	Lower	7 (7%)

TABLE 2 OBSTETRIC DETAILS OF THE STUDY PARTICIPANTS N=100

Variable	Category	N (%)
Parity	Primiparous	61 (61%)
	Multiparous	39 (39%)
History of previous abortion / still birth	No	82 (82%)
	Yes	18 (18%)
Sex of the baby	Male	48 (48%)
	Female	52 (52%)
Birthweight of the baby	<2500 g	16 (16%)
	>= 2500 g	84 (84%)
Mode of delivery	Vaginal	69 (69%)
	LSCS	31 (31%)
Complications during pregnancy	No	78 (78%)
	Yes	22(22%)
Complications during delivery	No	69 (69%)
	Yes	31 (31%)
Complications in the newborn	No	99 (99%)
	Yes	1 (1%)
Mother admitted in	General ward	80 (80%)
	Pvt room	20 (20%)

TABLE 3 MATERNAL AWARENESS OF KMC N=100

Awareness of KMC	N (%)
Heard of Kangaroo Mother Care	17 (17%)
Heard of Skin to Skin Contact for newborns	60 (60%)
KMC Procedure	
Baby is placed on mother's chest during KMC	52 (52%)
Baby should be dressed in cap, mittens, socks and diaper only	1 (1%)
Mother should be in semi-reclining position when giving KMC	40 (40%)
KMC can also be given by father or family member	6 (6%)
KMC should be given for a minimum of one hour at a time	37 (37%)
KMC can be continued as long as the mother and baby are both comfortable	33 (33%)
KMC can be given for	
Twins	23 (23%)
Sick baby	37 (37%)
After caesarean section	26 (26%)
Low birth weight baby	34 (34%)
Preterm baby	35 (35%)
Normal healthy newborn	20 (20%)
Benefits of KMC	
Provides warmth to baby	3 (3%)
Improves survival of baby	2 (2%)
Reduces infection in baby	2 (2%)
Reduces stay in hospital	1 (1%)
Better health/well-being of baby	7 (7%)
Acts like an incubator for baby	1 (1%)
Improves baby's weight gain	1 (1%)
Helps mother to breastfeed	7 (7%)
Increases mother-baby bonding	7 (7%)
Reduces postpartum depression	0 (0%)
Reduces maternal stress	0 (0%)

TABLE 4 CORRELATION OF KMC AWARENESS SCORE AND KMC EXPERIENCE SCORE WITH CONTINUOUS VARIABLES

Variable	KMC Awareness Score		KMC Experience Score	
	Spearman's rank Correlation Coefficient*	*P* Value	Pearson's Correlation Coefficient**	*P* Value
Age of mother	0.005	0.959	-0.013	0.893
Years of marriage	-0.024	0.816	-0.069	0.496
Years of formal education	0.041	0.685	-0.063	0.535
Per capita monthly income	-0.016	0.873	0.147	0.146
KMC Awareness Score	-	-	0.112	0.266

TABLE 5 ASSOCIATION OF KMC AWARENESS SCORE AND KMC EXPERIENCE SCORE WITH CATEGORICAL VARIABLES

Variable	Category	Awareness of KMC		Experience of KMC	
		Median score (IQR)*	*P* Value	Mean score ± SD**	*P* Value
		4 (2, 8)		**20.3 ± 2.4**	
Occupation	Homemaker	5(2,8)	0.661	20.4 ±2.3	0.858
	Gainfully employed	4(1,9)		21.0 ±1.4	
Type of family	Nuclear	6(2,9)	0.404	20.6 ±1.6	0.974
	Joint family	4(2,8)		20.4 ±2.4	
Parity	1	5(2,9)	0.738	20.5 ±1.6	0.181
	≥2	4(2,8)		20.5 ±2.9	
Gender of the baby	Male	4(2,8)	0.631	20.1 ±2.7	0.301

	Female	5(2,9)		20.8 ±1.6	
Birth weight	< 2500 g	3(1,7)	0.828	20.6 ±2.0	0.666
	≥ 2500 g	5(2,9)		20.4 ±2.2	
Mode of delivery	Vaginal /Assisted	6(3,9)	0.056	20.6 ±1.7	0.191
	LSCS	3(0,8)		20.1 ±3.1	
Complications in pregnancy	Yes	3(2,7)	0.251	20.7 ±1.6	0.113
	No	5(2,9)		19.9 ±3.4	
Complications in delivery	Yes	3(0,8)	0.053	20.6 ±1.7	0.239
	No	6(2,9)		20.0 ±3.2	
Bad Obstetric History	Yes	6(2,8)	0.829	19.6 ±3.8	0.054
	No	4(2,9)		20.7 ±1.6	
Mother admitted in	General ward	5(2,8)	0.744	20.5 ±2.4	0.2
	Private room	4(0,9)		20.4 ±1.6	
*Mann Whitney U test, **Independent-t-test					

TABLE 6 ASSOCIATION OF SELECTED NEGATIVE EXPERIENCES OF KMC WITH SOCIO-DEMOGRAPHIC AND OBSTETRIC VARIABLES N=100

Variable	Category	Experienced abdominal or back pain during KMC		*P* value
		Yes 28 (28.0)	No 72 (72.0)	
Mode of delivery	Vaginal	15 (21.7)	54 (78.3)	0.037
	LSCS	13 (41.9)	18 (58.1)	
Parity	1	19 (30.6)	43 (69.7)	0.45
	≥ 2	9 (23.7)	29 (76.3)	
Birth weight	< 2500 g	5 (35.7)	9 (64.3)	0.52
	≥ 2500 g	23 (26.7)	63 (73.3)	
		Fear of suffocating baby		
		Yes 10 (10.0)	No 90 (90.0)	
Education	Up to High School	2 (10.0)	18 (90.0)	1
	≥ Pre-university	8 (10.0)	72 (90.0)	
Parity	1	5 (8.1)	57 (91.9)	0.409
	≥ 2	5 (15.2)	33 (84.8)	
Previous Abortion/Stillbirth	Yes	5 (28.6)	13 (71.4)	0.005
	No	5 (7.9)	77 (92.1)	

Figures

FIGURE 1 POSITIVE MATERNAL EXPERIENCES OF KMC N=100

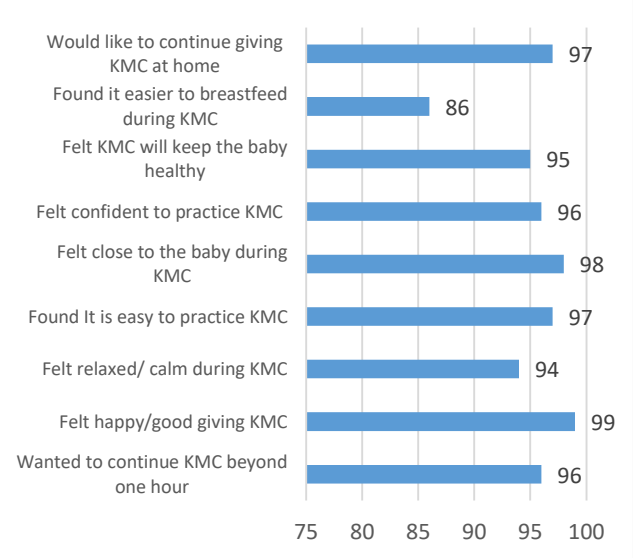

FIGURE 2 NEGATIVE MATERNAL EXPERIENCES OF KMC N=100