PERSPECTIVE

Implementation of Kangaroo Mother Care – Challenges and Solutions

SOMASHEKHAR NIMBALKAR AND NITESH SADHWANI

From Department of Pediatrics, Shri Krishna Hospital and Pramukhswami Medical College, Karamsad, Anand, Gujarat, India. Correspondence to: Prof Somashekhar Nimbalkar, Professor and Head of Pediatrics, Department of Pediatrics, Pramukhswami Medical College, Karamsad-Anand-Gujarat, India. somu_somu@yahoo.com

Kangaroo Mother Care (KMC) is an efficient intervention that provides warmth, sensory stimulation, safety, protection against infections, breastfeeding, and bonding between infant and mother. The issues faced in implementing of KMC are highlighted herein, along with a suggestive plan for policy making for better implementation. With this plan, it will be easier to extend the approach to the community, where KMC has the potential to reach numerous LBW babies. Therefore, well-functioning facility-based services should be available before introducing KMC in the community, as community KMC must link with facility-based services for successful implementation. Community health workers and staff in facilities without KMC units should also be trained on KMC benefits and positioning. Each health facility implementing KMC services should have a written policy and guidelines that are based on national documents, and adapted to its specific level of health care.

Keywords: *Guidelines, Implementation, Neonatal mortality, Primary care.*

Kangaroo Mother Care (KMC) is widely recognized as an excellent intervention for improving the health and survival chances of premature and low-birthweight infants. KMC consists of early, continuous and prolonged skin-to-skin contact between the caregiver and the baby, exclusive breastfeeding or breastmilk, and context-appropriate discharge and follow-up provided to the baby and his or her family [1].

The last 20 years were passed generating and presenting evidence for utility of KMC in the scientific literature [2]. Globally, 15.5% of all births are LBW babies – with higher proportion in low- and middle-income countries [3]. Survival chances are less beyond first year and the survived have significantly high risk to develop long-term health problems including sensory deficit and neurodevelopmental disabilities [4,5]. Not only it has shown reduced neonatal mortality, good school performances have been observed in preterm who has received KMC [6]. Early initiation and prolonged skin-to-skin contact has shown tremendous benefits.

Almost 25 years ago, following their visit to Colombia, a few pediatricians from India initiated KMC practice in handful units across India [7]. In the past few years, KMC has attracted even more attention, with an International Kangaroo Mother Care conference held at Ahmedabad in 2012, a Kangaroo Mother Care Foundation being set up in India, and greater attention by the government of India and UNICEF towards promoting KMC across neonatal units [8].

Two studies have shown neonates receiving only a measly number of hours of KMC. In a paper published in 2015, a KMC-friendly unit had about four hours of KMC on an average [9], while in another paper, it was noted that private pediatricians abandoned KMC on the introduction of EMBRACE [10].

REQUIREMENTS FOR KMC IMPLEMENTATION [11,12]

A hospital should allow 24×7 access to the parents to the neonatal unit at all times. A room near to or at the neonatal unit, furnished with comfortable seats for the mothers should also be ensured. Reclining chairs in the nursery and postnatal wards, and beds with adjustable backrest should be arranged. Mothers can provide KMC sitting on an ordinary chair or in a semi-reclining posture on the bed with help of pillows. Appropriate supporting staff and a nurse trained in assisting mothers in KMC should be available round the clock. All nursing staff should receive adequate training on KMC, including nutrition of LBW infants, expression and storage of breast milk, using alternate methods of feeding and daily growth monitoring of LBW infants. Educational material such as information sheet, posters, and video films on KMC in local language should be available to the mothers, families and the community.

While we have evidence on the beneficial effects of KMC, along with its incorporation in training content, and a Government of India policy document related to KMC; we still lag in the adequate utilization of KMC as a tool for reduction of neonatal mortality rate.

PROBLEMS RELATED TO LACK OF IMPLEMENTATION

Despite available literature on KMC from India, there is still a lack of a well-conducted study that describes reasons for not implementing KMC for neonates that are eligible. Literature from other parts of the world suggests that it may be due to a host of causes **(*Box* 1)** [13-15].

There is enough evidence available now to show the steps that can increase the implementation of KMC. Most of this evidence is available from investigators outside India. From the evidence that is available, one can draw the conclusion that the Indian effort towards KMC care is not focused, and disorganized at best. Instead of training a large number of people resulting in the expenditure of man-hours and money; it might be more efficient and useful to train key opinion leaders and interested faculty in areas where care is needed most.

MODELS OF IMPLEMENTATION ACROSS THE WORLD

The first qualitative study on the implementation of KMC was conducted in South Africa in two hospitals in 1999-2000 to identify important issues by interviews and direct observations [11,16]. Since 2000, regular KMC training workshops were held at the Kalafong Hospital in Pretoria, which were evaluated by means of a questionnaire asking about participants' experiences of enabling factors and barriers in currently practicing KMC or in implementing KMC in future [17].

Between 1994 and 2004, 44 teams in 25 developing countries were trained in KMC in Bogota, Colombia; however, not all the teams were successful in initiating their own programs and not all replicated the validated model. A study was conducted in which open-ended questionnaires were sent by e-mail to the coordinators of functioning KMC programs in 15 countries, and 15 site visits were made to institutes that reported problems in starting programs. They concluded that active surveillance for an appropriate identification of obstacles usually indicated the appropriate solution [18].

In a similar study conducted in India [19], the barriers of KMC were categorized into six categories (knowledge, mother-related, environmental, family-related, positional, and infant-related barriers). One of the most important barriers of KMC was lack of family members' cooperation leading to inadequate time left for the mother to stay by her infant constantly, as she does other household activities and, consequently, spend the time to rest [19].

PROPOSED MODEL

Any regions, such as state or district or even a healthcare organization, that wants to implement or propagate KMC can structure its implementation plan as given below (***Fig.* 1**). It is derived from successful published experiences of implementation.

Box 1 PROBLEMS FACED DURING IMPLEMENTATION OF KANGAROO MOTHER CARE (KMC)

- *Process of skin-to-skin care*: Considered culturally inappropriate as skin-to-skin contact is involved between mother/father and child. Personal space is not available for mother.
- *Misconception amongst healthcare professionals*: May not be convinced of efficacy and benefits of KMC.
- *Role of father and other relatives*: Generally there is a misconception that giving skin-to-skin care is the role of mother as she is the one breastfeeding. Fathers and relatives are reluctant to provide Kangaroo care, which puts the burden on the mother. Mother is given duty of household chores preventing her from practising KMC.
- *Considered as burden over staff*: Involves obtaining parents' consent, feeding, teaching correct method and follow-up. It is considered extra work for staff which devoid of benefit for them
- *Dilemma of policymakers*: In a majority of healthcare facilities, KMC is taken for granted as part of routine care and no policies are available for its implementation. Adequate space and basic facilities, which are helpful for kangaroo position, are not provided or maintained well.

Our model for implementation of KMC is based on the model developed from the studies conducted in South Africa. The steps are, (*i*) Pre-implementation phase, (*ii*) Implementation and (*iii*) Follow-up. This model for implementation is applicable for institutes willing to adopt the concept of KMC for the benefit of newborn babies.

First Phase: Pre-implementation

Leadership or KMC Champion: This is an important concept that needs to be present in an effort to ensure KMC implementation. For effective implementation of KMC on large scale, team work is required and for that champions are allotted. The champions will ensure that the effort is on track and should be able to address obstacles in its implementation. The champions will have a leader for keeping check over activities who will be able to convince the hierarchy to allocate resources (personnel and budgetary allocation) for the KMC program. It would be beneficial if the champions and leaders are experts in KMC but it is not essential.

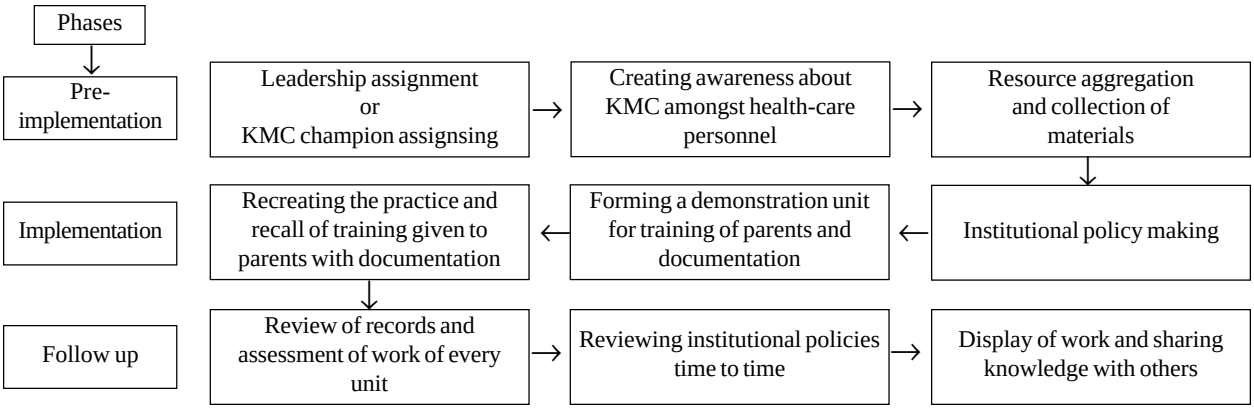

FIG. 1 *Stepwise approach for implementation of Kangaroo mother care.*

Creating Awareness about KMC: Healthcare personnel need to be trained in both the need and the method of kangaroo care. Multiple trainings to be carried out to ensure that challenges towards the implementation of KMC that may arise can be dealt with. A shoot and scoot kind of training approach will not help create awareness.

Resource aggregation: This is the next part of the program. This includes health personnel and educational material such as videos, posters, papers, magazines, lectures, etc for purpose of demonstration. In addition, materials required for implementation of KMC (binders, caps etc.) need to be available and the administrative processes with respect to the same needs to be in effect well in advance.

Second Phase: Implementation

Policymaking: The center or institute should formulate a policy regarding the implementation of KMC, taking the team into confidence. The written policy with documents should be user-friendly to health care workers involved and should be easily applicable and accessible. Posters and magazines summarizing policy of the institute should be displayed in the center, such that people are aware of KMC, along with its benefits and implementation method.

Demonstration unit: This is the core of this program. Preferably, a video recording along with good narration in vernacular language and in English. Steps starting from room temperature, to preparing of parents *via* counseling about KMC by physician and/or nurse should be included. Mother preparation with required clothes and other instructions should be clearly addressed. Neonate preparation in terms of positioning, simultaneous monitoring of vitals and all other required steps also need to be clearly demonstrated. To enhance learning among healthcare providers, the demonstration by the providers on parents (with prior consent), to acclimatize them and revise all that's learned should be done. Separate workbooks can be given to all healthcare workers containing literature and details about KMC showing benefits and pictorial representations of KMC. Parents should be able to visit it, replicate what they have learned on return and teach other parents. The first National conference on Kangaroo Mother Care in India held in 2017 February had a demonstration visit to Nalgonda SNCU for the excellent Kangaroo care provided, which is a template that can be replicated across.

Recreating the Practice: After 2-4 weeks of demonstration, health care providers who participated are gathered and asked to demonstrate what they had learned and demonstrate it live on babies. Accordingly, the score is provided. The practical demonstration should be assessed frequently and amendments have done if required.

Third Phase: Follow-up

Review of records: the In-charge sister and champions should make sure duration of KMC and other details should be included in nursing records. Clinical review should be carried out every monthly to track the usage of KMC. This essentially tracks the improvement in KMC indicators over a period of time and discussion as to what may have contributed to the change. The KMC champion leads the review, but it may be a better idea if it is carried out by different team members every time. Clinical review forms cornerstone for successful implementation of KMC program as it helps to change viewpoint of health care providers towards KMC implementation [20].

Assessment by unit in-charge: Designated person to conduct timely assessment meets and makes sure assigned work is completed and reviewed and a result if prepared. In-charge also keeps quality of work by staff in check, and keeps correcting and assessing them.

Reviewing policy: After audit information gathered is applied to the current functioning of the system and based on those; policies are reformed to improve the implementation of KMC. Policies need to be updated from time to time to address issues that may be the impeding duration of KMC.

Display of work and sharing knowledge: This can be done by dissemination of program results, whether helpful or not. This may be in the form of scientific articles or conference presentations, as well by informing KMC champions in other institutions. Active participation by other family members will help overcome the hindrance created by maternal issues such as lack of proper maternal surroundings and availability of her time [21]. Active participation of mothers and their family members in the KMC process should be appreciated in the form of certification and recognition in front of other parents to motivate and boost their confidence in the process

The approach of training healthcare workers *via* a teach the trainer model and expecting the healthcare system to change will not work at all and needs to be abandoned in favor of an implementation based program with a feedback to the implementing team.

THE ROAD AHEAD

While we delineate the model for implementation of KMC, it needs to be studied during implementation and it may or may not work in different settings. Any organization, planning to ramp up KMC practices needs to audit and publish its practices. At this point of time, three funded studies that are ongoing with the aim of increasing the implementation of KMC in Haryana, Lucknow and Bengaluru [21-23]. Their results may not be replicable at all places. While the benefits of KMC are proven for stable preterm, there is increasing evidence that it may be even more useful for unstable preterm [24]. We also await the results of an ongoing clinical trial in India that looks at KMC beginning at birth [25]. The authors do feel that there is a need to develop local strategies to enhance usage of KMC.

Though benefits of KMC are evident in reducing the neonatal mortality rate, it alone is not sufficient for improving mortality rate in low birth weight babies. A multidisciplinary approach including good KMC, proper breastfeeding practices, handwashing and hygiene maintenance, timely intervention for complications and regular follow up in high risk clinic are needed by a competent team and co-operative parents to improve overall neonatal mortality rate.

Contributors: SMN: conceived the idea and decided the framework of the manuscript; SMN, NS: wrote manuscripts and then they were synthesized by SMN. All authors approved the final manuscript.
Funding: None; *Competing Interest*: None stated.

REFERENCES

1. Conde Agudelo A, DíazRossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. Cochrane Database Syst Rev. 2016;20:5-36.
2. Lawn JE, Mwansa-Kambafwile J, Horta BL, Barros FC, Cousens S. 'Kangaroo mother care' to prevent neonatal deaths due to preterm birth complications. Int J Epidemiol. 2010;39:144-54.
3. Beck S, Wojdyla D, Say L, Betran AP, Merialdi M, Requejo JH, *et al*. The worldwide incidence of preterm birth: A systematic review of maternal mortality and morbidity. Bull World Health Organ. 2010;88:31-8.
4. Lawn JE, Blencowe H, Oza S, You D, Lee AC, Waiswa P, *et al*. Every newborn: Progress, priorities, and potential beyond survival. Lancet. 2014;384:189-205.
5. Doddabasappa PN, Mahantshetti NS, Kamate M, Adarsh E. Effect of Kangaroo mother care on neurodevelopmental outcome of low birth weight babies: A one-year randomized control trial. Int J Contemp Pediatr. 2018;5:508.
6. Charpak N, Tessier R, Ruiz JG, Hernandez JT, Uriza F, Villegas J, *et al*. Twenty-year follow-up of Kangaroo mother care versus traditional care. Pediatrics. 2017;139:e20162063.
7. Deorari A. Kangaroo Mother Care Initiative (KMCI). Kangaroo Mother Care Initiative - Past Events. 2004. Available from: *http://www.kmcindia.org/healthcare/past_events.html*. Accessed February 26, 2019.
8. Vani S. About Us – Kangaroo Mother Care Foundation. KMC foundation and KMC India conference. Available from: *https://kmcfoundationindia.org/index.php/about-us*. Accessed February 17, 2019.
9. Soni A, Amin A, Patel DV, Fahey N, Shah N, Phatak AG, *et al*. The presence of physician champions improved Kangaroo mother care in rural Western India. Acta Paediatr. 2016;105:e390-395.
10. Nimbalkar S, Patel H, Dongara A, Patel DV, Bansal S. Usage of EMBRACE^{TM} in Gujarat, India: Survey of pediatricians. Adv Prev Med. 2014;415301.
11. Bergh A-M. Implementation-workbook-for-KMC. Implementation workbook for Kangaroo mother care. Pretoria: Medical Research Council Research Unit for Maternal and Infant Health Care Strategies. 2002. p. 6-7.
12. Beiranvand S, Valizadeh F, Hosseinabadi R, Pournia Y. The effects of skin-to-skin contact on temperature and breastfeeding successfulness in full-term newborns after cesarean delivery. Int J Pediatr. 2014;846486.
13. Cattaneo A, Amani A, Charpak N, De Leon-Mendoza S, Moxon S, Nimbalkar S, *et al*. Report on an international workshop on Kangaroo mother care: lessons learned and a vision for the future. BMC Pregnancy Childbirth. 2018;18:170.
14. Seidman G, Unnikrishnan S, Kenny E, Myslinski S, Cairns-Smith S, Mulligan B, *et al*. Barriers and enablers of

kangaroo mother care practice: a systematic review. PLoS One. 2015;10:e0125643.
15. Chan GJ, Labar AS, Wall S, Atun R. Kangaroo mother care: A systematic review of barriers and enablers. Bull World Health Organ. 2016;94:130-41J.
16. Bergh AM, Pattinson RC. Development of a conceptual tool for the implementation of kangaroo mother care. Acta Paediatr. 2003;92:709-14.
17. Bergh A-M, Arsalo I, Malan AF, Patrick M, Pattinson RC, Phillips N. Measuring implementation progress in Kangaroo mother care. Acta Paediatr. 2005;94:1102-8.
18. Pattinson RC, Arsalo I, Bergh A-M, Malan AF, Patrick M, Phillips N. Implementation of Kangaroo mother care: a randomized trial of two outreach strategies. Acta Paediatr. 2005;94:924-7.
19. Parikh S, Banker D, Shah U, Bala D. Barriers in implementing community based kangaroo mother care in low income community. Available from: *http://paper.researchbib.com/view/paper/3564.* Accessed February 16, 2019
20. Joshi M, Sahoo T, Thukral A, Joshi P, Sethi A, Agarwal R. Improving duration of Kangaroo mother care in a tertiary-care neonatal unit: A quality improvement initiative. Indian Pediatr. 2018;55:744-7.
21. Clinical Trial Registry of India. Implementation research in India (Karnataka state) towards accelerating scale-up of Kangaroo Mother Care (KMC). 2017. Available from: *http://www.ctri.nic.in/Clinicaltrials/pdf_generate.php*. Accessed February 16, 2019.
22. ICH GCP - Clinical Trials Registry. Kangaroo Mother Care Implementation Research for Accelerating Scale-up. Available from: *https://ichgcp.net/clinical-trials-registry/NCT03098069*. Accessed February 16, 2019.
23. Kumar A, Kumar V. ISRCTN - ISRCTN12286667: Kangaroo Mother Care implementation research for accelerating scale-up in Uttar Pradesh, India. Available from: *https://www.isrctn.com/ISRCTN12286667*. Accessed February 16, 2019.
24. Chi Luong K, Long Nguyen T, Huynh Thi DH, Carrara HP, Bergman NJ. Newly born low birthweight infants stabilise better in skin-to-skin contact than when separated from their mothers: A randomised controlled trial. Acta Paediatr. 2016;105:381-90.
25. Clinical Trials Registry of India. A multi-country randomized clinical trial to evaluate the impact of continuous KMC initiated immediately after birth compared to KMC initiated after stabilization in newborns with birth weight 1.0 to less than 1.8 kg on their survival in low-resource settings. Available from: *http://www.ctri.nic.in/Clinicaltrials/pmaindet2.php?trialid=21832*. Accessed February 26, 2019.