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Education and training in the implementation of kangaroo mother care

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In the past three decades, kangaroo mother care (KMC) has been established as a safe and effective method of infant care, with the potential for improving the survival of low-birth-weight newborns, especially in low- and middle-income countries. Despite many implementation, education and training efforts, some countries are finding it difficult to increase their coverage of KMC, and individual institutions still struggle to get KMC institutionalised in a sustainable way. In the past decade a better understanding has emerged on the health system pathways followed in the implementation of KMC.

The initiative reported in this paper started out with a review of education and training practices in the implementation of KMC across the world. This was discussed at an international workshop and further inputs were derived from individuals' experience, unpublished literature provided by colleagues, and published material. This report gives an overview of some of the key implementation and training issues identified by the group and recommendations emanating from the collaborative process.

A triangular change process that includes change agents and the choice of implementation and educational models is proposed. The different functions for change agents as drivers, trainers and implementers are discussed. The grassroots, policy and academic dimensions are presented as different pathways for initiating KMC. Educational models are developed locally and are determined by the context.

Education and training in KMC should be underpinned by the same basic understanding of the concept and should be accompanied by the creation of awareness, committed 'champions', multidisciplinary teamwork and continuous support from senior management. It should be based on the evidence produced by research, conducted according to current best practice in education, and locally appropriate and applicable.

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Kangaroo mother care (KMC) is a method of caring for newborns initiated in Bogotá, Colombia, in 1978.[1] It is underpinned by the theory that newborns, including premature and low-birth-weight (LBW) infants, should not be separated from their mothers and families.[2] The following is one of the most recent definitions of KMC: 'a standardized, protocol-based care system for preterm and/or LBW infants … based on skin-to-skin contact between the preterm baby and the mother'.[2] According to Charpak *et al.*, 'KMC is an example of both South-South and South-North knowledge transfer; an infrequent event in scientifically based medical care. It is a conceptually simple, elegant technique in which the role of kangaroo healthcare providers is basically to teach, coach, offer expert counselling, and closely monitor the mother infant dyad. It is not "alternative" medicine but a scientifically sound, multilevel intervention. Although more research on KMC is needed, there is already enough evidence for it to be used extensively for low birth weight infants.'[3]

A central component of KMC is the kangaroo position, which refers to securing the baby in an upright skin-to-skin position against the mother's chest. Secondly, exclusive breastfeeding is encouraged as the optimal choice of infant feeding whenever possible. The third component refers to ambulatory care, where the preterm infant is discharged from hospital in the kangaroo position earlier than in the case of conventional neonatal care, with the support of a reliable follow-up system.[4-6] Theoretically the infant should be kept in the skin-to-skin position for as long as possible. When skin-to-skin care is practised for more than 20 hours a day it is called continuous

KMC. Skin-to-skin care for a few hours a day is called intermittent KMC or kangaroo care (KC).[2-4]

There is a wealth of literature on the benefits of KMC, and these are summarised in different ways. Some sources refer to benefits for the mother, the baby and the hospital.[7] Ludington-Hoe *et al*.[8] divide the effects of skin-to-skin care into five main categories:

- **Physiological effects.** KMC improves the physiological stabilisation of the infant with regard to heart rate, respiratory rate, oxygenation and temperature control/thermoregulation.[3,5,8] Research evidence also demonstrated a reduction in nosocomial infections at discharge or 40 - 41 weeks postmenstrual age.[9]
- **Behavioural effects.** Infants receiving KMC have more mature and enhanced sleep patterns and cry less.[3,5,8] Moreover, an analgesic effect on the infant during painful procedures has been demonstrated.[10]
- **Breastfeeding.** With KMC breastfeeding is initiated sooner, milk production is better, exclusive breastfeeding is more prevalent and there is a longer duration of lactation.[3,5,8,9]
- **Psychosocial effects.** KMC facilitates maternal and infant interactions and attachment and helps reduce maternal anxiety and improve maternal satisfaction.[3,5,8]
- **Neurobehavioural effects.** Improved general development and mental and motor scores have been observed in infants receiving KMC.[3,5,8]

A recent updated Cochrane review compared mortality in LBW infants receiving KMC or conventional neonatal care and found a reduction in mortality at discharge or 40 - 41 weeks postmenstrual age and at latest follow-up.[9] This is an important public health advantage to consider in countries striving to achieve Millennium Development Goal 4. Some of the advantages mentioned above, such as improved breastfeeding and reduction in infection, also have public health cost benefits. For the hospital, cost benefits[7] may derive from the shorter stay of infants cared for in KMC than those receiving traditional neonatal care[9] and from a reduction in nosocomial infections. There is an indication of an improvement in staff morale,[7] and personal communications have also been received from staff regarding a reduction in workload. The personal involvement of the mother in the care of her LBW infant also has the potential to contribute to improved quality of care.

There have been several hypotheses as to why KMC is so beneficial. At first it was thought that the skin-to-skin touch stimulated the parasympathetic nervous system in stabilising the neonatal physiology, improving gastro-intestinal function and reducing stress responses. Currently it is thought that oxytocin is secreted by the skin-to-skin touch and that it acts as neurotransmitter on the parasympathetic nuclei, as well as having a sedation effect (enhanced sleep patterns) and an analgesic effect (reduced pain response when held skin-to-skin).[11-13]

The expansion of kangaroo mother care

Based on increased evidence of the positive effects and outcomes of KMC and the emerging understanding of the complexity of the physiology involved, KMC practice became rapidly accepted worldwide in both high- and low-resource countries. KMC was particularly attractive for low- and middle-income healthcare settings because the emphasis is on care by the mother under the supervision of healthcare providers rather than on the availability of high-tech resources. KMC has also been introduced in mostly teaching hospitals in African countries in the past two decades, and a number of studies to demonstrate the safety, feasibility, acceptability and cost-effectiveness of KMC have been conducted in countries such as Ethiopia,[14,15] Ghana,[16] Madagascar,[17] Malawi,[18,19] Mozambique,[20] Nigeria,[21] South Africa[22,23] and Zimbabwe.[24,25]

Despite the positive results of most of these studies, implementation was patchy in many countries and KMC did not expand beyond the teaching hospital where the initial study had been done.[26] All over the world interest groups also started promoting KMC, by means ranging from informal communications to formal education and training programmes. These programmes are presented in diverse formats, supported by a wide variety of educational materials and training opportunities. However, despite these efforts, some countries are finding it difficult to increase their coverage of KMC implementation[27] and individual institutions still struggle to get KMC institutionalised in a sustainable way.

An initiative for gaining a better understanding of existing KMC education and training programmes and materials in contexts where KMC has been successfully implemented started as a Working Group for Education and Training at the Seventh International Workshop on Kangaroo Mother Care, held in Uppsala, Sweden, from 8 to 11 October 2008. At this workshop educational issues in the implementation of KMC and quality improvement were reviewed for the first time, with the focus primarily on healthcare workers 'in practice' and 'in training'. The workshop was followed by a period of correspondence between participants and other key informants, as well as collection of further materials and viewpoints to expand on the initial picture of how successful KMC education, training and implementation took shape in different parts of the world. Thirty-one delegates from 18 countries participated in the activities of the working group and another 16 individuals from 11 countries provided comments on and inputs into the process. This report gives an overview of some of the key implementation and training issues identified by the group and provides recommendations for local and regional implementation emanating from the collaborative process.

A model for change

A triangular model was constructed to describe three essential components in the relationship between education and training on the one hand and the implementation of a healthcare intervention on the other, with KMC being the example (Fig. 1). The first component comprises the role-players or 'change agents' undertaking one or more of the roles of drivers, trainers and implementers at various stages of the change or implementation process. These change agents are needed at different levels in the health system, from the individual to the institution to the broader district, regional or national health system. The second component relates to three possible implementation pathways, ranging from a grassroots to an academic to a policy dimension. The third component relates to education and training needs that are determined by the context, together with the development of locally relevant educational models that also incorporate the universal aspects of KMC.

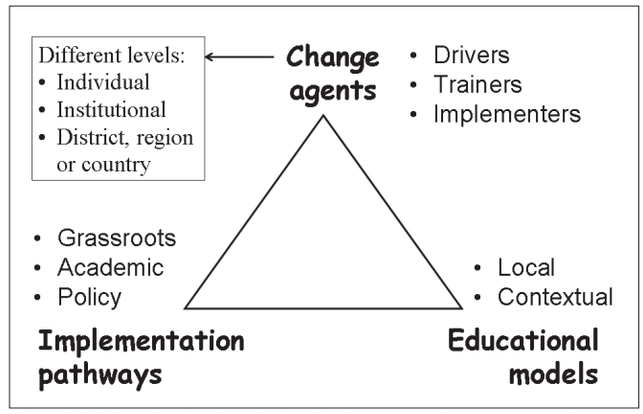

Fig. 1. Model explaining the relationship between implementation and education and training.

Implementation pathways

Three pathways were identified via which the practice of KMC could be initiated (Fig. 2). Each of these has unique implications for education and training.

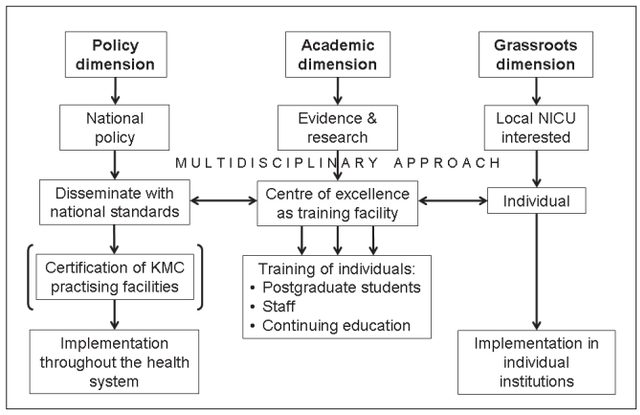

Fig. 2. Three pathways of KMC initiation.

When KMC was still relatively unknown, the most common approach was the grassroots pathway. Individual institutions or individuals with an interest in starting KMC would initiate some form of KMC practice, either in the neonatal intensive unit or the high-care unit. This was by way of intermittent or continuous KMC and depended on the level of care, the setting and the resources available.[3,5,22,24,28] Initially professional teams were sent to Colombia for training; later on other training centres were established. Some individuals also learned solely by means of reading or videotapes. The Maricopa Medical Center in Phoenix, Arizona, produced one of the first reports on implementing KMC in a grassroots fashion.[29]

As evidence of the benefits of KMC for the preterm and LBW newborn became available, a more systematic approach to the possibilities of a health system level implementation process became evident. This gave rise to the **policy** pathway, in which education and training are planned at a national or regional level and systematic efforts are made to bring KMC training to health workers from all or a selection of facilities in a particular country, region or geographical area. The first step with a policy approach to implementation is the decision by a health authority whether KMC is worth the investment in time, money and human resources initially needed to train a sufficient number of healthcare workers. Highly decentralised service delivery by different health agencies sometimes hampers such decision making.

The **academic** pathway straddles the grassroots and policy dimensions, in that the teaching hospital becomes a centre of excellence for education and training, which is accessed by both individual institutions and health authorities. The academic programme is often linked to research. Results of the research are then incorporated into pre- and in-service training, as well as into continuing education programmes. The centre of excellence could also play an important role in establishing the KMC network in a country or region and in the development of locally relevant and appropriate treatment protocols.

All three pathways are underpinned by a multidisciplinary approach. Participants viewed a step-by-step progression from the grassroots or academic dimension to the policy dimension as a useful approach to follow for achieving the inclusion of KMC as a routine practice in the continuum of neonatal care in a country. Quality improvement in the clinical setting as a result of training and education in KMC implementation and advances in research in an academic setting are important arguments in favour of establishing a national KMC policy.

Educational models

As is the case with KMC implementation, there is also no education model of the 'one-size-fits-all' kind. Participants recognised that implementation depended on context, that training was required to be flexible and individualised, and that the choice of educational and implementation modalities should match the technology and resources available in a particular setting. The following pointers were suggested for consideration by curriculum planners, trainers and educators in making decisions on approaches, formats and options to follow in the development and execution of education and training programmes:

- Who is the audience?
- How long should the training be?
- What should the structure and scope of the curriculum be?
- What curriculum principles should be followed in the development of programmes?
- What content should be included?
- Who should act as educators, trainers and facilitators?
- What training materials and aids should be used?
- How should education and training be assessed and evaluated?

Table 1 gives more details of factors to consider in this regard.

In discussions with participants, reference was also made to the ideal that the content of any educational programme should reflect the desired outcomes of the programme and that outcomes and objectives

Table 1. Aspects to consider in the development of educational models for kangaroo mother care

Aspect	Options
Audiences	• Multidisciplinary institutional team – healthcare staff, managers/directors (especially nursing service managers/'matrons'), administrators and health support staff (e.g. quality assurance) • Obstetric and neonatal staff – shorter courses and refresher courses in various settings • Healthcare workers in preventive, social and public medicine, including emergency service and community health workers • Professional bodies and their members • Graduate or postgraduate training of nurses and midwives and residents/registrars in paediatrics, neonatology, obstetrics and family medicine • Pre-service or undergraduate training of all groups of health professionals (doctors, nurses, midwives, occupational therapists, physiotherapists, dieticians/nutritionists, speech-language practitioners, psychologists, social workers) • Mothers for mother-to-mother support
Time	• Longer and shorter periods of training, depending on the objectives to be reached • Range: from 1 month for comprehensive training to 2 weeks if some aspects related to KMC are already in place (e.g. good breastfeeding practices) to 1 hour for demonstration of the skin-to-skin position
Cost	• Lower-cost versus more expensive programmes, depending on the scope to be covered • Consideration of spending money on what has been demonstrated to be effective

Table 1. Aspects to consider in the development of educational models for kangaroo mother care (continued)

Aspect	Options
Curriculum:	
(a) Structure and scope	• Defined according to the level of expertise • KMC integrated in other programmes (e.g. neonatology, essential newborn care, caring for LBW infants, the Integrated Management of Newborn and Childhood Illnesses, lactation management) • Stand-alone KMC modules or courses (although KMC should be included in all teaching on newborn care and not be an add-on, it is sometimes taught on its own where no KMC is practised and where it still needs to be integrated into the continuum of neonatal care. In such cases, planning should be in place to integrate it into newborn care as soon as possible) • Integration in other types of training according to country, health system or facility need (e.g. family planning, immunisation)
(b) Principles	• According to current best educational practice • Educational approach: · Content selected according to outcomes set · Participatory and interactive approaches – avoidance of training by rote[37] and stand-alone lectures · Taking individual learning styles into account · 'See one, do one, teach one' – observe demonstration, practise, demonstrate to others · Where applicable, a period of monitoring new trainers in a co-teaching model • Selection of content – examples: · Include relevant principles of developmental care in handling of infant · Infant feeding: to be done according to the principles of the Baby-friendly Hospital Initiative[43] and in accordance with the · International Code for the Marketing of Breast Milk Substitutes[44]
(c) Content	• Different combinations of KMC theory and practice – these are often defined by the target audience, with some health-care workers receiving more practical training, whereas others may be required to be au fait with the theory as well • Management of the implementation of KMC, especially where it is not practised • Basic message: KMC should take place, as soon as possible, as long as possible each time and as often as possible[2,45-47]
Modes of delivery (for scale-up programmes)	• Distance[48,49] and e-learning versus face-to-face learning[38,42] • Training the trainer (cascade model) • On-site facilitation[38,42] versus training at a centre of excellence (off-site facilitation)[38] • Learning from the neighbour (also for benchmarking) • Incremental training, with or without continuous facilitation and support over a period of time (between 6 months and 2 years) • Mass media campaigns for awareness-making and sensitisation (e.g. newspapers and other print media, radio, TV, Internet)
Trainers, educators, facilitators	• Qualified and experienced trainers • Master trainers experienced in KMC • Local and international experts visiting a site or a country or giving support at a distance (e.g. through e-mail, phone calls or videoconferencing)
Training aids and materials	• Very basic or comprehensive • Manuals on newborn and perinatal care with KMC modules included • Generic KMC guides, e.g. the World Health Organization's practical guide,[50] the community KMC manual,[37] the mother- and baby-friendly care manual[49] • Country-specific guides, training modules and workshops, also in local languages (e.g. in Bangladesh, Colombia, India, Madagascar, Malawi, Tanzania, Mali, Indonesia, South Africa, Nigeria) • Manuals for trainers/facilitators and/or for trainees (e.g. Tanzania, Mali) • Monitoring tools with KMC quality of care indicators • Web-based materials for download (e.g. training manuals, narratives and anecdotes, photos, success stories, discussions of problems, case studies) • Videos/DVDs (especially those adapted to local circumstances and in local languages) • Parents sharing their experiences with healthcare workers • Advocacy tools for government and ministries, decision-makers, managers, parents, insurance agencies, donors • Brochures, leaflets, picture cards, and books for parents and the general public,[29,51,52] in different local languages where applicable and with pictures for community health workers to use with the parents
Evaluation of education and training	• Achievement of predetermined and described outcomes or objectives • Participant competency: · Written and oral tests and examinations (including multiple-choice questions) · Pre- and post-tests · Practical skills demonstrations · Observation of practices (could include indicators for the quality of KMC application) • Checklists (either for facilitators to check on the planned outcomes or used in a participatory way to gauge satisfaction of participant expectations) • Participant attitudes · Questionnaires • Participant satisfaction · Questionnaires · Focus groups · Group drawings

should inform the choice of modules and content, educational approaches, teaching techniques, facilitation methods, assessment of participant proficiency, efficacy of the learning methods, need for follow-up sessions, and plans for educator feedback. In some cases tailor-made messages and modules for different target groups might be needed, drawing on existing evidence from medical and nursing science and insights from anthropology, sociology and psychology and depending on the knowledge and skill of the participants when entering the KMC learning experience. In some settings the principal need might be for evidence-based information; in others there may have to be more emphasis on counselling techniques.

Details of the universal aspects of KMC that should form part of the content of all educational programmes are provided in the Committee Report on the First European Conference and Seventh International Workshop on Kangaroo Mother Care.[2] These include general information; requirements for health/medical care facilities and healthcare professionals; information to be provided to mothers and families; the initiation and duration of KMC; responsibilities of KMC providers; the kangaroo position; breastfeeding; creating a family-friendly neonatal unit environment; and psychosocial concerns. Participants felt that misperceptions such as that the incubator is the only standard of care and that KMC is the panacea for the care of preterms should also be dealt with. Table 2 gives an overview of teaching opportunities and 'teachable moments' that have been used in KMC implementation initiatives at the individual and institutional level. They include clinical teaching opportunities at the bedside and in the ward, in regular meetings and journal clubs, and in more 'fun' types of activities.

KMC implementation entails a change process. Any education and training activities in KMC should therefore also prepare participants to understand the process of change and the management of change using appropriate change models. One model that has been observed in KMC training[30] is the 'Stages of Change' theory developed by Prochaska, DiClemente and others.[31-33] The model was originally designed to address addictive behaviour and has subsequently also been applied to organisational change. The stages identified are pre-contemplation (ignorance); contemplation (learning); preparation (planning); action (doing); maintenance (habit); relapse ('implementation dip'[34]); and termination of implementation drive (success, sustainable practice reached[34]).

Change agents

Three different types of functions were identified for role-players in the implementation process – there are drivers, trainers and implementers. Ideally, continuous interactions between these groups of people should be visible for external observers. Drivers take the initial initiative, support training and give guidance on implementation processes. Educators and trainers support the efforts of the drivers in 'spreading the message' in different ways to different target audiences. The implementers are all the health workers on the ground who, as part of their daily activities and job descriptions, have to ensure that KMC is maintained and remains practised over time.

The drivers – individuals leading multidisciplinary teams

Regardless of which implementation pathway is the point of departure in a country or in an individual institution, participants considered the presence of committed individuals, the 'champions' acting as agents of change, as a prerequisite for successful implementation. These change agents should ideally include expert professional local trainers. Apart from becoming knowledgeable about the benefits, practice and requirements of KMC, the following guidelines for actions by change leaders were identified:

- Immersion in the evidence on the practice of KMC
- Gaining expertise on possible economic benefits specific to their area (e.g. cost per day in the neonatal intensive care unit v. shorter-stay savings brought about by KMC)
- Conceptualisation of the centrality of the infant: providing humanised care and ensuring that the baby is not an 'object' of care but becomes 'real' to adults, including the mother, father, nurses and other hospital staff
- Recognition of the need for other 'champions' or supportive change agents to help create awareness, sensitise role-players and counter resistance and negative attitudes among healthcare workers
- Assessment of national and local rules and practices
- Consideration of the UN Declaration of the Rights of the Child[35] (including premature infants) and the Millennium Development Goals.[36]

In cases of successful implementation of KMC, individual drivers have been assisted by multidisciplinary teams – in other words, programmes did not collapse when an enthusiastic individual left. One way recommended for the development of such a team was to train a multidisciplinary core team from a country, region, area or institution. In some countries paediatricians, nurses and psychologists form the core team; in others an important role is played by allied professionals, such as nutritionists or dieticians responsible for the Baby-friendly Hospital Initiative (BFHI), occupational therapists, physiotherapists, speech-language therapists and social workers.

A universal problem with in-service training organised within public health systems is to identify the 'right' people, able to act as drivers, to be sent for training, and not just the next person in line for attending a workshop. In the case of KMC the right people for initial training are individuals convinced of the importance of KMC, who are in a position to take the lead in decision making and who could together act as a team.

Educators, trainers and facilitators

In addition to sending the right people for KMC orientation and training, having the 'right' educators and trainers was also considered

Table 2. KMC teaching opportunities at institutional level

Scheduled meetings	Simulations
Journal clubs	Demonstrations
Exhibitions	Examples and explanations
Ward rounds	Assignments (e.g. reading, worksheets)
Small pointers at nurses' and doctors' handovers (change of shifts)	Assessment and feedback (e.g. discussion of monthly statistics, morbidity and mortality meetings)
Mentoring of clinical practice through demonstrations and practical hands-on and skills-based training[37]	Repetition of key messages
Bedside teaching	Newsletters summarising the latest evidence[29]
One-on-one teaching	Educational bulletin boards[29]
Small-group discussions	PowerPoint presentations
Short half- to 1-hour teaching sessions	DVDs
Supervised community-based follow-up[37]	Aprons or printed cloth bearing KMC messages
Case studies[53]	

important for success in KMC implementation. According to participants, there is a need to *'speak the same language'* with regard to KMC in order to understand how to approach education and training, regardless of the setting or the language.[5] While KMC appears to be a simplistic method, it is far more intricate than it appears at first and may require a mindset change for which planning, training and follow-through are needed.

Apart from having the same frame of reference, educators and trainers should have hands-on experience in KMC and be able to relate to facility- and community-based KMC issues. Participants indicated that initial trainers should be *experienced* international or local trainers. According to one community KMC manual, inexperienced or unqualified trainers should never be used. Trainers should be 'doctors, nurses or midwives who have spent many years teaching KMC to mothers' and 'formally educated, experienced trainers who have been taught KMC by such experts and who correctly and completely understand the method'.[37]

Theoretically, in kangaroo mother care the infant should be kept in the skin-to-skin position for as long as possible.

Implementers – 'champions' and resisters

Implementers are not only those healthcare workers sent for training in KMC, but all health workers active in the neonatal healthcare environment. Orientation of all staff – similar to the requirements of the BFHI – assists with getting KMC institutionalised. Staff turnover and rotations were also mentioned as factors that affect the continuity of KMC practice and education and training. The importance of the continuing availability of KMC-trained personnel[38] could also be addressed as part of all education and training plans at the various levels of the health system.

The ideal world and the real world seldom correspond, and there is almost always resistance[4] to change when new practices are introduced. Some of the more common forms of resistance mentioned by participants are scepticism of healthcare providers regarding the benefits of KMC; reluctance to change existing arrangements related to space; staff allocations; family visits and other entrenched newborn care policies; misperceptions about additional work for staff and additional costs; and fear about the safety of the infant if more care responsibilities are given to the mother and other family members.

According to participants, medical practitioners are often sceptical about introducing KMC, as it is perceived as a lower level of technology. It was also considered important to reflect on the hierarchical power relations that may exist among different health professions, which could hamper KMC implementation and education and training efforts. Furthermore, institutional cultures vary and implementation plans often have to be adapted to local circumstances. Some training programmes sensitise trainees on prevailing misperceptions and possible arguments they may hear about issues related to KMC and reasons why it should not be implemented.

A positive implementation environment could be promoted by using 'champion' implementers, for example by deploying enthusiastic people, sharing experiences as part of in-service training, and using parents who have successfully practised KMC. Because attitudes may be slow to change, the repetition of important messages was deemed essential. The collection of good-quality data that show the results of KMC practice[39] was considered an indispensable part of the change process as well. Participants also referred to piloting and evaluating the initiation of KMC so that practices could be modified and improved before institutionalisation or scaling up occurs. A gradual process of this nature could facilitate the acceptance of the new practice and the reduction of resistance.

Scaling up KMC – the policy pathway and education and training

When a country opts for a policy approach to KMC implementation, several additional aspects require consideration. Implementation could evolve from the bottom up, from the top down, or as a combination of the two approaches. In some countries implementation starts in an individual healthcare facility that also serves as an education and training centre, possibly with the gradual spread of KMC to other facilities (e.g. Botswana, Cameroon, Ecuador, Ethiopia, Malawi, Mali, Rwanda, Uganda, Vietnam); in other countries implementation is scaled up under the direction of a national, provincial or regional health authority (e.g. Brazil, Colombia, Ghana, Indonesia, Madagascar, Nigeria, South Africa, Tanzania). Education and training play an important role in all implementation processes. The gradual introduction of KMC, supported by appropriate educational strategies, may lead to broader acceptance, less resistance and better results in the long term.

Some countries have no guidelines to support the implementation of KMC. When KMC is not recognised by policy makers as a beneficial and cost-effective intervention, implementation efforts are observed to be fragmented and lacking co-ordination. On the other hand, a strong, committed national team of dedicated persons, working in unison with professional trainers, facilitates the scaling up of KMC. It was recommended that a multidisciplinary team of important key players, representing different professions, and the administration and management functions should be set up to develop implementation/education/training committees or task forces at different levels. Countries where such committees or task teams have been active in the implementation of KMC include Finland, Ghana, India, Indonesia, Madagascar, South Africa, Sweden and Tanzania. Colombia was one of the first countries to create a multidisciplinary team of paediatricians, epidemiologists, nurses, auxiliary nurses, psychologists and lawyers when the Kangaroo Foundation was established in 1994.

As teaching hospitals are often central in nationwide implementation processes in countries or regions where KMC is not yet practised, some participants considered a first possible step to be the establishment of a centre of excellence in KMC that would take responsibility for further education and training (Fig. 2). Suggestions regarding such centres included certification of neonatal intensive care units according to uniform criteria and certification of individuals working in neonatal units. The sustainability of centres of excellence as training facilities is largely dependent on the continuation of funding,[38,40] and ideally funding should be included in the government budget. It was also perceived that with this approach the availability of sufficient resources would boost the education and training needed to implement KMC on a large scale and address lack of resources as an obstacle.

The following minimum questions to be covered in long-term education and training plans within the policy model were reconstructed from participants' inputs:

- What kind of publicity or large-scale information campaigns could be useful?
- Who should be consulted or included in the development of the KMC education and training programme?
- What should be done centrally and what should be done via transfer-training and/or on-site facilitation?
- What training materials should be obtained or developed? What is valued as the optimal type of training material for each particular setting?

- What budgetary provisions should be made for education and training?
- How and where would people be trained?
- What professional mix of trainee participants would be required from each institution?
- What would be expected of the people who were trained initially with regard to measurable training and implementation outputs (e.g. development of protocols or standard operating procedures, a record-keeping system, a reporting system for relevant meetings, and a training programme at their own institutions)?
- What kind of monitoring and evaluation and quality assurance activities would be expected from institutions?
- How could education and training activities feed into a national policy process for KMC?
- How should KMC be incorporated into the undergraduate and postgraduate curricula of health workers?

Further recommendations

Education and training on their own are unlikely to lead to the successful implementation of KMC. They should be accompanied by sufficient sensitisation and creation of awareness of the importance of KMC;[34] champions driving the process; multidisciplinary teamwork;[38,40] the right paradigm;[30,40] continuous support from leadership and management;[34,38,40,41] and appropriate national and/or institutional policies and guidelines.

In order to make a contribution to change, educators need to ensure that their activities include a thorough understanding of the following: management of change; the theory behind KMC; good practical application and counselling techniques; and acquisition of persuasive language and skill in the implementation of KMC. The combination that seems to produce benefits is one that involves changing attitudes while at the same time providing hands-on experience supported by policy.

Although there are universal aspects of KMC, and countries and institutions could learn from one another with regard to the ways education and training in KMC are conducted, pedagogy and materials should be locally applicable and appropriate. Education and training should be based on the evidence produced by research and conducted according to current best practice in education. In the past the focus was on clinical care and hospital organisation, and a need has been identified for the development of 'companion tools on education and planning, such as those developed and used in South Africa'.[2] Evidence from the South African trials suggests that the implementation of a new healthcare intervention can be scaled up by using a carefully designed educational package, combined with face-to-face facilitation by respected resource persons, on site or at a centre of excellence.[38,42]

Finally, two further major challenges for KMC education and training for the future are the following:

- Developing an international virtual network of KMC hospitals with space for theoretical and practical exchanges and for strengthening the KMC method.
- Designing innovative educational strategies for strengthening poor or token KMC practices that resulted from the precipitous implementation of KMC in the rush to move forward.

Conflict of interest. None declared.

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