# PROBLEMS AND SOLUTIONS FOR THE IMPLEMENTATION OF KANGAROO MOTHER CARE ( KMC) ACCORDING TO THE LEVEL OF CARE AND COUNTRY´S DEVELOPMENT

N. Charpak* , Zita Figueroa de Calume* and J.G. Ruiz* on behalf of the participants of the II International Workshop on Kangaroo Mother Care**
*Fundación Canguro, Transv 39ª Nº 46-29, Santafé de Bogotá, Colombia. herchar5@colomsat.net.co
** II International Workshop on Kangaroo Mother Care, Bogotá, 30/11/98 to 4/12/98, Colombia (participants list in appendix).

Kangaroo Mother Care (KMC) is a care technique for Low Birth weight Infants (LBWI) created and first developed by a team of Colombian pediatricians at the "Instituto Materno Infantil" in Bogotá (Dr E. Rey (creator, 1978) , H. Martínez (1979-93), L. Navarrete (1982-94)) [1]. The Kangaroo Foundation and its research team began the scientific evaluation of the original technique in 1989, adding the concept of different modalities of application of KMC according to the level of care[2] and beginning a training program for developing countries in 1994.

Original components of the intervention (24 hours skin-to-skin contact – kangaroo position - breast milk based nutrition and early discharge in kangaroo position) have been scientifically tested in observational and experimental studies [3-19] and its has been shawn, when used together as in the original KMC, to be an effective and safe alternative for caring for LBWI in minimal care units after stabilization of infant´ conditions. [20] It offers additional advantages, such as mother's empowerment and family bonding with the LBWI [21].

Components of the complete intervention are:

1) Early discharge (instead of minimal care in a neonatal unit)
2) Skin-to-skin contact 24 hours per day
3) Exclusive breastfeeding whenever possible
4) Strict ambulatory follow-up

It is worth emphasizing that during the provision of ambulatory KMC, the quality of health care should meet the standards of a neonatal minimal care unit. It is also important to remark that separation of mother and infant should be avoided whenever possible; skin-to-skin contact should be started as early and as prolonged as possible, even at the Neonatal Intensive Care Unit (NICU).

If correctly applied, KMC, can be safely used instead of expensive equipment such as incubators to provide good quality care to stable LBWI at any level of care. KMC represents a step towards humanizing neonatal health care, and it promotes bonding and breastfeeding, two essential elements for the survival of LBWI.
In l996, the first International Meeting of Kangaroo Mother Care took place in Trieste (Italy), producing recommendations for the implementation of KMC for LBWI at all levels of care which were summarized in an article published in this journal last year [22].
A second International Workshop was held in Bogota in December 1998 to define and analyze the difficulties encountered and their solutions for the implementation of this

technique at all levels of care, according to the recommendations of the first workshop. Thirty participants from 15 countries were present in Trieste and more than 100 participants from 30 countries, mostly developing countries, were present in Bogota. KMC is attractive not only because it humanizes the technological aspects of the neonatology, as well as making a better use of the human and technological resources available in developing countries. For these reasons we expect an even greater interest in the III workshop to be held in Yojakarta in 2000.

At the Bogota meeting during 3 days we listened to KMC implementation problems from participants and on the fourth day we met to reflect on these presentations dividing problems and solutions into 5 key themes: Policies, Implementation, Feeding, Communications and Research Problems. The last day was dedicated to presentation of relevant current investigations results on KMC.

We would like to share these valuable insights about difficulties and barriers to KMC implementation in many different settings contributed by pthe articipants of this meeting with all health professionals that are using KMC or are thinking of using it in the future. Both, the list of the 2nd International Workshop on KMC participants (Bogotá, 1998) and the Bogotá Kangaroo Declaration can be found in the appendix.

Workshop participants split into 5 groups:

The first 3 groups worked on problems and solutions according to the level of care and the level of their country's development:

**GROUP I** In setting without appropriate neonatal care facilities which is a common situation in a lot of developing countries, KMC is proposed as the only alternative to the lack of incubators.
**GROUP II** In setting where technical and human resources are of good standards but insufficient to cope with demand for example, in nearly all public health obstetric facilities in big cities of developing countries, KMC is an alternative for a Neonatal Minimal Care Unit once infants have overcome major extrauterine life adaptation problems.
**GROUP III** In setting with easy access to all levels of neonatal care as is the case for most developed countries and in private and wealthy facilities in developing countries, early mother-infant skin-to-skin contact, is employed looking for benefits including an enhancement of the quality of the mother-to-infant bonding and successful breast feeding.

The two others groups worked on: One on the implementation of the KMC network (INK), the access to information, the links between internet home pages (the Kangaroo Foundation home page URL is kangaroo.javeriana.edu.co; and offers the possibility to subscribe for free to the KMC mailing list interest group), and the conduction of multicentric studies and the other one worked on KMC management guidelines at all levels of care for the Colombian Ministry of Health. These guidelines were sent to the WHO so thet they may be included in the document WHO is preparing on KMC guidelines.

Table 1 : COMMENTARIES ON PROBLEMS AND SOLUTIONS RELEVANT TO KMC IMPLEMENTATION

| | GROUP I | GROUP II | GROUP III |
|---|---|---|---|
| PROBLEMS | 1. Lack of Policy LBWI/KMC<br>2. Isolated Program<br>3. Ethical Issues | 1-Lack of policies for KMC implementation.<br>2-Lack of academic integration<br>3-Lack of national and international documentation and information. | No established KMC Guidelines |
| SOLUTIONS | 1. To design the Policy (when , how, how long, etc)<br><br>2. Integration of KMC in the existing Programs(I.M.C.I. B.F., PNC, etc)<br><br>3. Possibility of a Local Ethics committee. Provide adequate information to parents. | 1- There are 5 steps to be accomplished:<br>-Legalization of KMC<br>-Legislation on KMC<br>-KMC inclusion in the Health Ministry policies.<br>-Institutional KMC rules.<br>-National and International management Guidelines on KMC (WHO)<br><br>2- Include KMC in the curriculum at the medical universities .<br>- Communication to the scientific and medical associations of the country<br>- National reference and training centers.<br><br>3-International Declaration of the Kangaroo Infant Rights<br>-National Kangaroo documentation centers internationally supported and updated | • Involve professional health care associations in the recommendation to implement KMC<br>• Talk about the rights of the child<br>• Introduce KMC into the University curriculum of all health professionals that work with mothers and new borns ( MD, Nurses, PT, OT, Psychologist, etc...)<br>• Link with national/international programs related to infant (child) health such as the Baby Friendly Initiative.<br>• Develop an International Board on KMC (part of INK?), not to duplicate, but perhaps to become a working group within another organization<br>• Demonstrate cost effectiveness<br>• Develop laws that discourage the separation of mother and infant<br>• Sensitise insurance providers<br>• Mothers participation must be optional, not a requirement |

As you can see in this table a common point for all participants was the lack of international and local management guidelines. Due to this we support the initiative from the OMS of writing KMC guidelines that can be adapted to each country according to local conditions and needs. These KMC Guidelines could be used as a way a pressure in front of governmental statements that decide the health system rules in each country.

Another common point for all working groups was the desire to introduce the KMC education in the medical university curriculum.

It is very important the creation of center of documentation in KMC, regularly updated and of easy access for each country, which is difficult, becoming an obstacle for the diffusion of knowledge and therefore of the local research development.
The ethical problems are considered more in countries with very limited resources or in countries without limited resources , while the intermediary countries show as if they have integrated the KMC in their practice, which is not a surprise, taking into account that it is in these places that KMC fully applied was demonstrated to be scientifically efficace and safe. They consider of major importance the creation of pilot centers for national references in order to train with quality the peripherical centers. We consider elemental at any level to give to the women the possibility to choose the use of the KMC previous risks and benefits information.

Table 2 COMMENTARIES ON PROBLEMS AND THEIR SOLUTIONS RELATED TO THE TECHNICAL AND HUMAN REQUIREMENTS FOR THE KMC IMPLEMENTATION

**MAIN POLICY STATEMENT: Infant and Mother must not be separated**

| PROBLEMS | GROUP I | GROUP II | GROUP III |
|---|---|---|---|
| Administrative Level | | Administrative staff resistance | |
| Staff Level | 1. Lack of information and Knowledge on KMC.<br>2. Reluctance / time / workload | Lack of acceptance and education | No clear guidelines<br>No information on:<br>-Cost/Benefit<br>-Quality of Life<br>-Safety<br>Resistance to changes |
| Physical and Human Resources | -Need of appropriate environment | 1-Inadequate Installations<br>2-Staff (not enough).<br>3-Material (electronic scale pulsoximeter) | Environmental Constraints<br>Limitation in space<br>Limitation in staff<br>Limitation in time<br>Limitation in visitor policy |
| Cultural and Society Level | -Difficult to change beliefs and practices | | Family constraints: cultural and social |
| Monitoring, Evaluation | -Difficulty to collect Data | 1-Lack of eligibility criteria for KMC<br>2-Lack of early discharge criteria | |

| SOLUTIONS | GROUP I | GROUP II | GROUP III |
|---|---|---|---|
| Administrative Level | | Costs and benefits study and training in KMC | Facilitate the access of KMC information including cost to hospital managers |
| Staff Level | 1. -Policy, guidelines, protocols, flow charts.<br>-Training<br>2. -Work organization<br>-Involvement of the family/community. | Assign a responsible person for KMC implementation. | Training of all interdisciplinary personnel<br>-Continuing education<br>-Technical skills<br>-Mothers prenatally:<br>mass media and prenatal classes<br>-Train professionals to communicate with mothers<br>Develop and implement hospital guidelines<br>Flexible step-by-step process for staff ( larger stable premies to smallest premies) |
| Physical and Human Resources | Define minimal appropriate conditions | 1- Kangaroo mother and child hospitalization Unit<br>- Space at ICU /incubator<br>2-Organization of a multidisciplinary team.<br>3-Education of administrative hospital staff | Allocate money to reconfigure the environment |
| Cultural and Society Level | Information, group discussion, community participation | | Elicit philanthropic and community assistance for mothers while they are hospitalized with their infant. |
| Monitoring, Evaluation | Monitoring System, | 1- Local criteria written and respected<br>2- Follow up clinic in order to establish safe early discharge criteria | Monitoring existing programs to see if they are really implemented |

We could sum up the common solution to the problem of resistance and lack of knowledge about KMC with three words: communication, awareness and training.
To obtain this goal, it is necessary that:

- The staff that works with KMC or that wishes to implement it, must have a KMC protocol adapted to his center.
- The staff that works in KMC or that wishes to implement it, must dedicate some time to raising the level of awareness of the whole center's health personnel, in a progressive way, and also of the family and the community.
- The staff must have all the investigation's data readily available in order to convince the professionals of the center and to have their support.

Inadequate health care space and the need in adequate human and technical resources represent a common problem to all groups. Long-range solutions to these problems will require an inicial financial investment that will depend on the successful and rigorous demonstration of the benefits of KMC

In the literature, there is a lack of real studies about the costs and benefits of the KMC, applied in its totality which take into account not only the economic benefits in terms of days in the incubator, a decline in the neonatal and infantil morbimortality, better growth but also variables such as parental satisfaction and child's wellbeing. Uncompleted studies about costs have already been published, but they don't consider the ambulatory component [23]

All working groups solicited the creation of an evaluation system or regular monitoring of the existent KMC programs, at all levels of care. This shows us the important role that monitoring and evaluation could play in the International Network about KMC, the INK, created in Trieste in 1996.

Table 3: COMMENTARIES ON FEEDING PROBLEMS AND SOLUTIONS FOR THE KMC IMPLEMENTATION

| PROBLEMS | GROUP I | GROUP II<br>**Key phrase :We are looking not only for survival but for quality of life.** | GROUP III |
|---|---|---|---|
| Definition of growth's quality | | Lack of standardization of the premature growing curves. | |
| Breastfeeding of kangaroo infant in the hospital | | 1-<u>Late Starting</u><br>-Ignorance of the mother<br>-Ignorance of health staff<br>-Inadequate intrahospitalary routines<br>-Lack of personnel<br>-Overcrowded facilities<br>2-N<u>ICU</u><br>-Ignorance in production and sucking techniques.<br>-False beliefs ( mother as germs carrier )<br>3-<u>Minimal Care</u><br>-Lack of space<br>-Lack of personnel<br>-Lack of motivation<br>-Lack of Growth monitoring<br>( weight, height and HC) | - Separation of mother and baby<br>- Lack of milk storage and expression facilities<br>- Formula vs. breastmilk cultures<br>- Lack of knowledge<br>- Free formula in hospitals |
| • Breastfeeding of Kangaroo infant at home<br><br>1- Age: Below 40 weeks post conceptional.<br><br>2- Age: Above 40 weeks post conceptional. | | - If the child doesn´t have an adequate somatic growth.<br><br>-Introduction to complementary feeding<br>-Returning to work | |
| Micronutrients (Vitamins A,D,E and K, oligoelements Calcium and phosphorus) | | -Difficult attainment. | |

| | | | |
|---|---|---|---|
| Kind of milk | 1. Difficult to change cultural beliefs<br>2. Lack of training<br>3. Lack of mother support<br>4. Working mother<br>5. Lack of mother motivation | | |
| Maternal nutrition | Malnourished mothers | | |
| Way of feeding . | 1. Loss of energy (baby)<br>2. Cup feeding, dependence,<br>3. Nipple confusion<br>4. Difficulty in nasogastric tube feeding | | |
| Special situations | 1. Hypogalactia,<br>2. HIV, hepatitis B, etc.<br>3. Orphan infants, severely ill mothers | 1-Hypogalactia<br>2-Mother with HIV or Hepatitis B, C.<br>3-Orphan children<br>4-Acutely ill mothers<br>5-Breast feeding rejection<br>6-Inadequate growth | |

| SOLUTIONS | GROUP I | GROUP II | GROUP III |
|---|---|---|---|
| Definition of growth´s quality | | -Unique vision of the premature baby:<br>Setting point :40 weeks of postconceptional age<br>-Intrauterine growth curves plus national growth curves. | |
| Breastfeeding of Kangaroo infant in the hospital | | 1- <u>Late Starting</u><br>-Communication and training of the mother, and health staff including obstetricians and midwives.<br>-Mother and child hospitalization Unit.<br>**<u>Note: The mother is and always will be the best caregiver for her child</u>**.<br>2-<u>NIUC</u><br>-Open visits<br>-Chairs close to the incubator<br>-Oro-facial stimulation<br>-No nutritious sucking<br>-Kangaroo Position<br>-Support with other countries researches.<br>-Hands washing<br><u>3-Minimal Care</u><br>-Create an intrahospitalary adaptation Kangaroo Unit (Nurse , Social Worker, Psychologist)<br>-or create a Mother and Child hospitalary Kangaroo unit. | -Breast feeding is a strong component of KMC and must be supported<br>-Mothers should express breast milk for their own baby until the baby is able to breast feed. There must be an adequate transport and storage of this milk<br>-Bottle feeding is not an obligatory step between tube feeding and breast feeding. It is possible and perhaps preferable to move directly from tube feeding to breast feeding. Fortification of these early feeds is not necessary<br>-When formula is needed the formula should be acquired by the hospital in a way that avoids conflict of interest ( buy it!!!) |
| •Breastfeeding of Kangaroo infant at home<br><br>1-Age: below 40 weeks post conceptional. | | -Requires a strict monitoring of weight, height and HC .<br>-Support to breastfeeding<br>-Final milk technique ( If <35 weeks)<br>-Liquid formula for premature (cup, dropper...) to avoid wrong manipulations ( infections).<br>-Rehospitalization for diagnosis to avoid malnutrition<br>**<u>Note:The formula is prescribed as a drug</u>** | |

| | | | |
|---|---|---|---|
| 2-Age: Above 40 weeks post conceptional. | | Between 4 and 6 months according to the growing curves (Weight, Height and HC)<br>-Educational training to the mother about complementary feeding.<br>-Support to breastfeeding working mother.<br>-Kangaroo Law: Starting of maternity license at 37 weeks of posconceptional age. | |
| Micronutrients (Vit lipo Solubles, oligoelements Calcium and phosphor) | | -Awareness of local pharmacy universities and pharmacy of hospital in order to adapt drugs to premature´s needs. | |
| Kind of milk | -More research on the KMC different components.<br>-Training in breast feeding: theory and practice (health staff)<br>-Support to mothers | | |
| Maternal nutrition | -To recognize the reality and to find solutions with mothers or community | | |
| Way of feeding. | -Depending on the setting: express mother milk, high frequency of feeding, nasogastric tube for few days | | |
| Special situations | -Relactation of the mother or surrogates. | 1- Relactation and drugs.<br>2,3,4,5 and 6- Use of pasteurized human milk from milk bank ( Costs!! )<br>- Fortifiers of LM (Costs!)<br>- Special Formula for premature infant<br>- Lyophilized human milk ( the future? Costs? ) | |

This discussion on nutritional problems and solutions for the Kangaroo infant was the most controversial during the meeting, taking into account that the quality of life of the kangaroo premature depends on good nutritional feeding and its consequences, such as brain growth. Some countries use the KMC as a mechanism for survival of their prematures, while for the majority of countries the KMC is not only for survival but for quality of life too . The problem becomes acute when a supplement to breastfeeding must be considered in special cases, such as with HIV positive mother. We think that a special liquid milk for premature bebies is the only possible solution ( to avoid contamination). Unfortunately many of these countries countries struggling for the life of prematures also have the highest percentages of mothers with HIV and the economic situation in these countries do not allow them to provide this milk. We consider that this type of economic and public health problem should receive world attention, in the same way that expensive triconjugate therapy could have halt the current expansion of HIV epidemic in Africa.

We saw during the meeting that countries with intermediate economies were the only ones that propose to always support and promote breastfeeding using supplements only when necessary, in order to guarantee the adequate growth of the premature baby..

We want to mention that for developed countries the KMC is used to promote breastfeeding, which had been lost in these centers, going back to the rational use of the maternal milk with the beneficial and psychological consequences not only for the child but for the mother as well.

We experience a great pleasure in the fact that almost all the countries are beginning to have a unique vision of the premature baby: before reaching 40 weeks of post conceptional age and after this date especially on everything concerning the somatic growth and that is the way to guarantee the best quality of life.

The possibility of creating a mother milk pasteurized bank, which has shown good results, should be considered whenever the cost does not pass the economic capacity of the centre concerned.

We think that a modification, when ever necessary, of the maternity leave for the kangaroo mothers, could guarantee a more successful maternal breast feeding.

Table 4: COMMENTARIES ON COMUNICATION´S PROBLEMS AND SOLUTIONS FOR THE KMC IMPLEMENTATION

| PROBLEMS | GROUP I | GROUP II. | GROUP III |
|---|---|---|---|
| Community and Health Center | | Ignorance of KMC rules and ambulatory follow up. | Lack of dissemination of information on KMC |
| Mother and family | 1. Lack of consensus definition<br>2. Lack of guidelines<br>3. Poor access to information<br>4. Ignorance of KMC and needs of LBW infant<br>5. No support from men | Ignorance of KMC rules. | Lack of dissemination of information on KMC |
| Nurses | 1. Ignorance of KMC and needs of LBW infant<br>2. Workload | -Ignorance of the KMC rules.<br>-Ignorance of maternal breast feeding and early skin to skin contact benefits for the new born infant. | Lack of dissemination of information on KMC |
| Doctors and other professionals. | 1. Skepticism<br>2. Ignorance | 1-Scepticism<br>2-Ignorance | Lack of dissemination of information on KMC |
| Managers | Ignorance | Ignorance of the economic benefits of KMC and user satisfaction . | Lack of dissemination of information on KMC |
| Public, key persons (mayors, religious leaders) | | Ignorance of the KMC | Lack of dissemination of information on KMC |
| Politicians , policy makers | 1. Ignorance<br>2. No priority | -Ignorance of KMC benefits<br>-Ignorance of LWBI needs in their own country | Lack of dissemination of information on KMC |
| International Organization | | Ignorance of the KMC impact on the neonatal morbimortality and the humanization of the neonatology | Lack of dissemination of information on KMC |

| SOLUTIONS | GROUP I | GROUP II. | GROUP III |
|---|---|---|---|
| Community and Health center | | -KMC program must train , inform and produce educative brochures | Posters in obstetrician's offices, prenatal clinics and on maternity wards |
| Mother and family | -Information appropriate, accessible, interesting.<br>-Radio, posters, drama, | -KMC program must educate, inform in a direct way about KMC , and the need to establish rules. | • Hot line for KMC mothers experiencing problems<br>• Photos contest of KMC pictures. Winners allowed to develop posters |
| Nurses | -Focus group, nurses Antenatal clinic.<br>-Add to Curriculum | -Training and awareness about the benefits of the KMC and the breastfeeding<br>-Information about unincrease of the work load.<br>-Awareness about the need to humanize the newborn management. | • WABA features on KMC during breastfeeding week<br>• Scientific articles and editorials ( editorials stimulate discussion)<br>• Newsletter (INK)<br>• Research summaries on the Internet |
| Doctors and other professionals. | -Training / Workshops | -Lectures and presentation of results<br>-Training | • WABA features on KMC during breast feeding week<br>• Scientific articles and editorials ( editorials stimulate discussion)<br>• Newsletter (INK)<br>• Research summaries on the Internet |
| Managers | -Information on benefits (short and long term, work, budget) | -Information about the reduction of the hospital stay<br>-Support to breastfeeding<br>-Humanization of the care<br>**Note: the KMC program is responsible for the training of the community, the mother, and the family. the health professionals and the hospital managers** *l* | |
| Public, key persons (Majors, religious leaders) | -Advocacy, pressure groups. | Awareness from the community and from the KMC team with the aid of testimonies, radio,T.V. and journals. | |
| Politicians, policy makers | | Awareness from KMC experts and national associations, with workshop and communication media. | |
| International Organizations | | Negotiation from the Health Ministry in order to have the necessary support. | Utilize mass media to promote child rights/maternal rights<br>Unicef calendar and Christmas cards feature KMC pictures or drawings |

This key point mixes almost all major problems treated before: Lack of national and international guidelines, lack of access to all information about KMC at all levels of care. Furthermore the solutions have the same three key words**: awareness, communication and education.** The professionals who are working in KMC and the kangaroo parents are responsible for a better communication, education and awareness, using all the disposable means, from the scientific reviews and associations to radio/television diffusion to a large public.

Table 5 : COMMENTARIES ON RESEARCH PROBLEMS AND SOLUTIONS FOR THE KMC IMPLEMENTATION

| PROBLEMS | GROUP I | GROUP II. **"Science is a tool for a country's development"** | GROUP III |
|---|---|---|---|
| General problems | a) Lack of Interest in these settings<br>b) Lack of recognition ¨Newborn¨= problem<br>c) Lack of recognition KMC=solution | -Lack of training in research methodology<br>-Studies with no comparable results<br>-Lack of funds | Staff working with KMC has no time, and often limited knowledge on conducting research |
| Operational problems in poor Countries | a) Lack of funds.<br>b) Lack of skilled people<br>c) Lack of time, not priority<br>d) Difficulty in publishing results<br>e) Difficulty in disseminating results<br>f) Difficult to have baseline data | | |
| Operational problems in rich countries | a) Difficulty in finding funds<br>b) Difficulty for motivation in developing countries<br>c) Difficulty to collaborate in a local setting<br>d) Logistical difficulties | | |
| Specific problems for KMC | a) Methodology<br>b) Study group/ethical reasons<br>c) RCT: difficult, expensive | Too often the subject of the research doesn't correspond to the local requirement | Need of basic fundamental research in biological, physiological and neurobiological fields |

| SOLUTIONS | GROUP I | GROUP II. | GROUP III |
|---|---|---|---|
| General problems | -Awareness by information data on KMC, research evidence<br>-To identify proposals, projects.<br>-To identify Key persons | -Training and collaboration from the International Kangaroo Network.(INK)<br>-Use of the same database<br>-Education of politicians, private and public foundations, about the necessity of local research for development | Always consider ethical issues<br>Allow time for research and collaboration with other researchers<br>Information about ongoing studies<br>Need of multicentric studies |
| Operational problems in poor countries | -To join efforts by creating working groups at Nat. and Intern. Level<br>-Training local staff<br>-To use experts<br>-To use simple protocols. | | |
| Operational problems in rich countries | -To create an official group in<br><br>charge of these problems.<br>*Plan research training in account logistic.<br>*Look for grants | | |
| Specific problems for KMC | *To reassess concept of research in developing countries<br>*To do descriptive studies<br>*To do qualitative research<br>*To design R.C.T. | -Create an international support and network for KMC investigators consulting.<br><br>Research proposals to be explored :<br>-Evaluation of the economic impact of KMC (including variables such as the mother satisfaction)<br>-KMC and children with acute pathologies (DBP,Down, Colostomia.....)<br>-Evaluations of Kangaroo feeding policies<br>-Cultural aspects of KMC implementation in different countries.<br>- Comparison between different neuromotor tests in the detection of development´alterations in the premature infant | Research needed on KMC and:<br>VVLBW<1000g<br>Mild RDS, transient tachypnea<br>Mild metabolic problems<br>Growth of the baby<br>Basic issues different of mild RDS<br><br>After WHO guidelines on KMC are published, they could form the rationale for grant applications |

To achieve these changes, it is indispensable to train researcher teams in each country, as they are the ones who know their needs and feasible solutions. It is not enough to collect data from a country and to have them analyzed by experts detached from the national problems, in order to establish norms of implementation of the KMC technique, Rather we need to train professionals from each country to carry out their own investigations ("the question is not to give fish, but to teach one to fish").

These commentaries were very well reflected in the working groups of the developing countries and we hope that each country, through a kangaroo network, may achieve this goal thanks to multicentric studies.

All the commentaries emphasize the difficulty to obtain funds for research at all levels of care, due to the economical crisis in the world. We beleive that the developing countries should give the example of providing funds for research, not only on KMC, but also in other areas, as a part of the national effort for their development.

We feel very proud that a technique such as the KMC, born in a South Country, could serve as a basis for fundamental research in neonatology, in developed nations.

## CONCLUSION

For the implementation of a KMC program, the coordinated action of health authorities at the national and provincial level is needed to assess local and regional needs, health facilities at different care levels and to initiate the training of health care personnel.

Initiating a KMC program in very precarious conditions might be counter-productive. It is necessary to make an initial effort to provide the program with the minimum facilities for a safe management. Unfortunately, there are not enough good quality data regarding the cost-effectiveness of KMC, particularly for the ambulatory modality. We just have data on the reduced hospital stay with the original KMC, a reduction which is higher for Kangaroo infants with birth weights <1500g, as compared to control infants under a traditional technique in a maternity similar to our hospital or in the in-hospital modality in low income countries [24] or in developed countries [25]

We recommend offering to all premature newborns and term infants with birth weight ≤ 2.000 gr. who satisfy eligibility criteria, to be given the opportunity of receiving all the Kangaroo Mother Care method components, or at least part of them. In addition, this technique can be used as an emergency measure to prevent and correct hypothermia (skin-to-skin contact) and hypoglycemia (breast feeding) at all levels of care. It can also be employed as a means of efficient and safe neonatal transportation to a higher level of care.

## REFERENCES


1. Rey ES, Martinez HG. Manejo racional del niño prematuro. In: Curso de Medicina Fetal, Universidad Nacional, Bogotà, Colombia, 1983
2. Charpak N, Ruiz-Pelaez JG, Figueroa de Calume Z. Current knowledge of kangaroo mother intervention. Curr Opin Pediatr 1996;8:108-12
3. Fardig JA. A comparison of skin-to-skin contact and radiant heaters in promoting neonatal thermoregulation. J Nurse Midwifery 1980;25:19-27
4. Ludington-Hoe SM, Hadeed AJ, Anderson GC. Physiologic responses to skin-to-skin contact in hospitalized premature infants. J Perinatol 1991;11:19-24
5. Bosque EM, Brady JP, Affonso D, Wahlberg V. Physiologic measures of kangaroo versus incubator care in a tertiary level nursery. J Obstet Gynecol Neonatal Nurse 1995;24:219-28
6. Bauer K, Uhrig C, Sperling P, Pasel K, Wieland C, Versmold HT. Body temperatures and oxygen consumption during skin-to-skin (kangaroo) care in stable preterm infants weighing less than 1500 grams. J Pediatr 1997;130:240-4
7. Whitelaw A, Heisterkamp G, Sleath K, Acolet D, Richards M. Skin-to-skin contact for very low birth weight infants and their mothers. Arch Dis Child 1988;63:1377-81
8. Wahlberg V, Affonso D, Persson B. A retrospective, comparative study using the kangaroo method as a complement to the standard incubator care. Eur J Public Health 1992;2:34-7
9. Bergman NJ, Jürisoo LA. The “kangaroo-method” for treating low birth weight babies in a developing country. Tropical Doctor 1994;24:57-60
10. Sloan NL, Leon Camacho LW, Pinto Rojas E, Stern C, and Maternidad Isidro Ayora Study Team. Kangaroo mother method: randomised controlled trial of an alternative method of care for stabilised low-birthweight infants. Lancet 1994;344:782-5
11. Leew R, et al. Physiological effects of kangaroo care in very small preterm infants. Biology of the Neonate 1991.59(3):149-155
12. Ludington AM. Energy Conservation during skin to skin contact between Premature infants and their mothers. Heart and Lung 1990. 19(5):445-451
13. Hadeed AJ, Ludington S,Siegel Sh. Skin to skin contact between mother and infants reduces idiopathic apnea of prematurity
14. Ludington-Hoe SM, Hashemi MS, Argote LA, Medellin G, Rey H. Selected physiologic measures and behavior during paternal skin contact with Colombian preterm infants. J Dev Physiol 1992;18:223-32
15. Christensson K. Fathers can effectively achieve heat conservation in healthy newborn infants. Acta Paediatr 1996;85:1354-60
16. de Leeuw R, Colin EM, Dunnebier EA, Mirmiran M. Physiologic effects of kangaroo care in very small preterm infants. Biol Neonate 1991;59:149-55
17. Affonso D, Wahlberg V, Persson B. Exploration of mother’s reactions to the kangaroo method of prematurity care. Neonatal Network 1989;7:43-51
18. Gale G, Franck L, Lund C. Skin-to-skin (kangaroo) holding of the intubated premature infant. Neonatal Network 1993;12:49-57
19. Charpak N, Ruiz-Pelaez JG, Charpak Y. Rey-Martinez kangaroo-mother programme: an alternative way of caring for low birth weight infants? One year mortality in a two-cohort study. Pediatrics 1994;94:804-10

20. Charpak N, Ruiz-Pelaez JG, Figueroa de Calume Z, Charpak Y. Kangaroo mother versus traditional care for newborn infants ≤ 2000 grams: a randomized controlled trial. Pediatrics 1997;100:682-8
21. Tessier R, Cristo M, Velez S, Girón M, Figueroa de Calume Z, Ruiz-Peláez JG, Charpak Y, Charpak N. Kangaroo mother care and the bonding hypothesis. Pediatrics 1998;102:e17
22. Cattaneo A, Davanzo R, Uxa F, Tamburlini G (for the International Network on Kangaroo Mother Care). Recommendations for the implementation of kangaroo mother care for low birthweight infants. Acta Paediatr 1998;87:440-5
23. Cattaneo A, Davanzo R, Worku B, Surjono A, Echeverria M, Bedri A, Haksari E, Osorno L, Gudetta B, Setyowireni D, Quintero S, Tamburlini G. Kangaroo mother care for low birth weight infants: a randomised controlled trial in different settings. Acta Paediatr 1998;87:976-85
24. Cattaneo A, Davanzo R, Bergman N, Charpak N. Kangaroo Mother Care in Low-Income Countries. Journal of Tropical Pediatrics, 1998;44:279-282