



**KMC**  
Québec 2010

# Programme & Abstract Book

8th International Conference on Kangaroo Mother Care (KMC)  
June 19-22, 2010 Quebec City, Canada





# EXPO PHOTO

## DES BÉBÉS KANGOUROUS AU VIETNAM *KANGAROO BABIES IN VIETNAM*

La méthode KMC à l'Hôpital Tu-Du,  
Ho Chi Minh Ville.

...

*The KMC method in Tu-Du Hospital,  
Ho Chi Minh.*

*Château Laurier, Québec / 18-22 juin  
Photographe: Ulysse L. B. / yulphoto.ca*





## Welcome

On behalf of the Organizing Committee of the 8th International Conference on Kangaroo Mother Care, I am delighted to welcome all of you to Quebec City. The focus of this biennial conference is Developmental Issues in Prematurity and the Effects of KMC. Although originally developed in settings with limited medical and healthcare resources, the KMC method has recently attracted considerable interest in developed countries due to the evidence of its numerous health benefits for infants and families. More than 200 representatives from developed and developing countries will be present, and we are pleased to offer the opportunity to discuss different aspects of developmental care in newborn settings as well as various modalities of implementation.



### Invited leaders

Presentations will be made by invited outstanding scientific leaders, Dr Michael Kramer (McGill University), Dr Rodolfo Llinas (New York University), Dr Saroj Saigal (McMaster University) and Dr Joy Browne (University of Colorado) as well as leading figures in Kangaroo Mother Care from over 30 countries, namely, Afghanistan, Argentina, Belgium, Brazil, Cameroon, Canada, Colombia, Finland, France, Germany, Ghana, Haiti, India, Indonesia, Iran, Italy, Japan, Kenya, Madagascar, Mali, Uganda, Portugal, Rwanda, Senegal, Sierra Leone, South Africa, Spain, Sweden, Switzerland, Ukraine, the United Kingdom, the United States, and Vietnam.

### Topic areas

Topics areas are centered on KMC as a new philosophy of care, on infant brain development as induced by KMC, on the breastfeeding impact on infant development, on the necessity of short- and long-term follow-up of infants and families, and on evaluating the economic impact of KMC. In addition, nationwide and worldwide modalities of implementation will be exemplified and rules of implementation discussed.

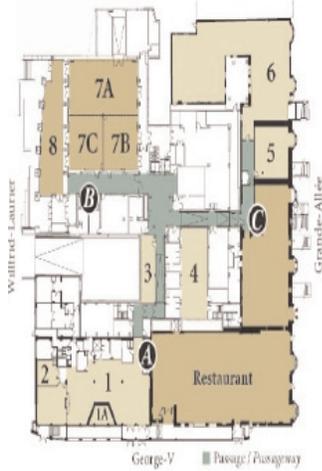
We hope you will appreciate the Conference as well as your stay in Quebec City, a place devoted to culture and friendship.

With best wishes from the Organizing Committee: Leila Azzaria, Line Nadeau, Cyril Schneider, Sylvie Bélanger and Nathalie Charpak

Réjean Tessier, PhD, Conference Chair



**Rez-de-chaussée / Ground Floor**



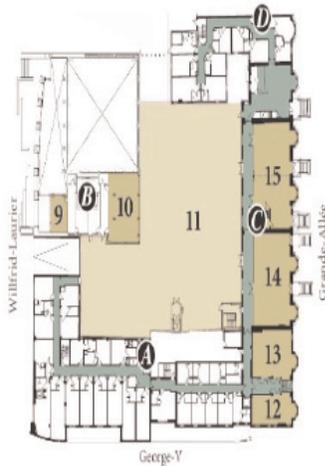
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- 3 Salle d'exercice / Fitness centre
- 4 Piscine, sauna / Pool, sauna
- 5 Tabagie / Convenience store
- 6 Centre de santé Vivaldi spa  
Health and Beauty centre

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- 7A, 7B, 7C Salle des Plaines / Ballroom
- 8 Foyer des Plaines

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**Lobby Elevator**  
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Rooms ending by 16 à /to 50
- B** Ascenseurs des Plaines  
**Elevator**  
Chambres se terminant par /  
Rooms ending by 00 à /to 15
- C** Ascenseur  
**Grande Allée Elevator**  
Chambres se terminant par /  
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- D** Ascenseurs  
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accessible on the 1<sup>st</sup> floor)  
Chambres / Rooms: 581 à /to 595

**1<sup>er</sup> étage / 1<sup>st</sup> Floor**



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- 10 Salle du Jardin Meeting room
- 11 Cour intérieure / Inner courtyard
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- 12 Salle George-V Meeting room
- 13 Salle de la Colline Meeting room
- 14 Salle Abraham-Martin Meeting room
- 15 Salle Grande Allée Meeting room

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## Table of contents

Programme .....	8 – 13
Abstracts for the oral presentation	
Saturday.....	14 – 33
Sunday.....	34 – 46
Monday.....	47 – 66
Abstracts for the poster session	
Sunday.....	67 – 99
Monday.....	100 – 121
Authors and presentation numbers .....	122 – 128
List of participants .....	129 – 132

## Organization and Coordination

Leïla Azzaria  
Nathalie Charpak  
Line Nadeau  
Réjean Tessier

Sylvie Bélanger  
Annie Fraser  
Cyril Schneider

## Saturday, June 19, 2010

- 8:00 am Welcome
- 8:15 am **Topic 1. A Philosophy of Care for a Neonatal Intensive Care Unit a Swedish Example of Family-Centered Care**  
**Guest lecturer:** Kerstin Hedberg Nyqvist, University Hospital, Uppsala  
**Chairman:** Réjean Tessier
- 9:00 am **Aino Ezeonodo**  
The Effect Of Systematic Education and Evaluation of Kangaroo Care -Implementing Kangaroo Care Chart. An Intervention Used At Level 3 NICU
- 9:15 am **Gontijo Tarcísio Laerte** (Presenter: Vivian Azevedo)  
Implementation of Kangaroo Mother Care Method in Brazil
- 9:30 am **Marlene Burkholder**  
Hop into Evidence-Based Practice to Promote KMC
- 9:45 am **Rachel Musoké**  
Impact of Partial Kangaroo Mother Care on Growth Rates and Duration of Hospital Stay of Low Birth Weight Infant
- 10.00 am **Coffee Break**
- 10.30 am **Topic 2. Long-Term Child Health Effects of Prolonged and Exclusive Breastfeeding**  
**Guest lecturer:** Michael Kramer, McGill University, Montreal  
**Chairman:** Réjean Tessier
- 11:15 am **Salahuddin Ahmed** (Presenter: Nancy Sloan)  
Community KMC and Predominant Breastfeeding : Associations with Infant Growth, Health and Survival by Birthweight
- 11:30 am **Deepa Banker**  
The Impact of Kangaroo Mother Care on lactation, breastfeeding and weight gain in Low Birth Weight Babies in Western India
- 11:45 am **Rekha Udani**  
Kangaroo Mother Care & Breastfeeding
- 12:15 am **Lunch**



13:30 pm	<p><b>Topic 3. The Kangaroo Mother Care from a Neuroscience Perspective</b>  <b>Guest lecturer:</b> Rodolfo Llinas, New York University  <b>Chairman:</b> Nathalie Charpak</p>
14:15 pm	<p><b>Nils Bergman</b>  KMC is the bridge between modern neuroscience and better public health outcomes</p>
14:30 pm	<p><b>Barbara Morrison</b>  Neuro-endocrine processes during KC: A review</p>
14:45 pm	<p><b>Jackie Martin</b>  Preterm Infant Cerebral Oxygenation During Kangaroo Care</p>
15:00 pm	<p><b>Cyril Schneider</b>  Brain Functioning and KMC influence in adolescents born prematurely: a Quebec-Bogota multi-facetted approach using magnetic stimulation and imaging of brain</p>
15:15 pm	<p><b>Coffee break</b></p>
15:45 pm	<p><b>Topic 4. The NIDCAP and contribution of KMC as a partner of its evolution</b>  <b>Guest lecturer:</b> Joy V. Browne, University of Colorado  <b>Chairman:</b> Nathalie Charpak</p>
16:30 pm	<p><b>Nina Vieira</b>  Does KC really promote the development of the preterm infant? A literature review</p>
16:40 pm	<p><b>Ylva Thernström Blomqvist</b>  Kangaroo mother care at two swedish nicus - an ongoing study</p>
16:55 pm	<p><b>Laura N. Haiek</b>  Compliance with WHO/UNICEF skin-to-skin recommendations in Québec</p>
17:10 pm	<p><b>Zeni Lamy</b>  Kangaroo Mother Care: Influences in the environment on Neonatal Unit</p>
17:25 pm	<p><b>Discussion:</b> Developmental Care and KMC</p>
18:30 pm	<p><b>Welcome Cocktail</b></p>



## Sunday, June 20, 2010

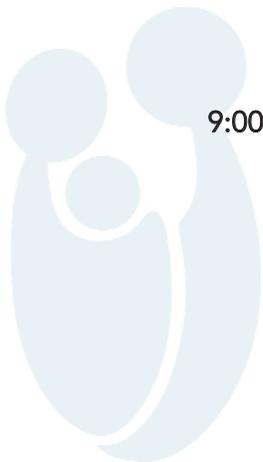
- 8:00 am **Topic 5. A. Design and methodological issues in the evaluation of developmental interventions in the perinatal period**  
**Guest Lecturer:** Saroj Saigal, McMaster University, Hamilton
- 8:45 am **Guest Lecturer:** Nathalie Charpak, Kangaroo Foundation, Bogotá, Quebec and Bogota teams
- B. 15-year follow-up at Bogota**  
**Guest Lecturer:** Nathalie Charpak, Kangaroo Foundation, Quebec & Bogota teams  
**Chairman:** Réjean Tessier, Université Laval, Québec, Canada
- 9:30 am **Coffee break**
- 10:00 am **Busingye Annet**  
KMC and follow-up - the best alternative to enhance preterm care in developing countries
- 10:15 am **Shuko Nagai**  
Long Term Follow-up of Earlier Continuous Kangaroo Mother Care (KMC) for Low Birth Weight (LBW) infants in Madagascar
- 10:30 am **Joy Lawn** (Presenter: Kate Kerber)  
KMC to prevent neonatal deaths due to preterm complications
- 10:45 am **Mantoa Mokhachane**  
Kangaroo Mother Care (KMC) follow-up at Chris Hani Baragwanath Hospital
- 11:00 am **Poster Session 1**
- 12:15 pm **Lunch**
- 13:30 pm **Topic 6. A. Physiological stability and B. Massage**  
**Chairman:** Cyril Schneider, Université Laval, Quebec
- Abuelfettoh Amel** (Presenter: Susan Ludington)  
Effect of Kangaroo Care on Preterm Infants Skin Barrier Function and Hospital Acquired Infection  
*To be confirmed*
- 13:45 pm **Somashekhar Nimbalkar**  
Kangaroo Mother Care in Reducing Pain in Preterm Neonates on Heel Prick: A Randomized Controlled Double Blinded Cross-over Trial



14:00 pm	<b>Gene Anderson</b> Early Skin-to-Skin (Kangaroo) Care (KMC) and Toe Temperature (TT) in Preterm Infants
14:15 pm	<b>Xiaomei Cong</b> Effects of Skin-to-Skin (Kangaroo) Care on Heart Rate Variability in Preterm Infants Undergoing Heel Stick Pain: Pilot Study
14:30 pm	<b>Réjean Tessier</b> Massage the premature baby: some evidences from a literature review
14:45 pm	<b>Kim Chi Luong</b> Massage treatment in the NICU: A confirmatory study
15:00 pm	<b>Discussion:</b> Massage and Neurological Development
15:15 pm	<b>Poster Session 2</b>
17:30 pm	<b>Cocktail</b>
19:30 pm	<b>Banquet</b>

**Monday, June 21, 2010**

8:00 am	<i>Topic 7. Kmc and lasting impact on infant development and family relationships</i> <b>Guest lecturer:</b> Rejean Tessier, Université Laval, Quebec <b>Chairman:</b> Kerstin Hedberg Nyqvist
8:30 am	<b>Ann Bigelow</b> Mother-Infant Skin-to-Skin Contact: Effect on Breastfeeding and Maternal Sensitivity
8:45 am	<b>Maria Anna Tallandini</b> Influence of Kangaroo Care During the First 6 Months of Life. Analysis of Mother-Child Attachment, Psychomotor Development and Family Environment
9:00 am	<b>Madalynn Neu</b> Kangaroo Holding and Home Visiting for 8 Weeks After Birth and Mother-Infant Interaction at 6 Months



- 9:15 am Pablo Muñoz**  
Comparative Study Of Q-Sort Scores On The Care Sensitivity That Parents Provide To Their Premature Children In The Kangaroo Mother Programs In Vietnam
- 9:25 am Natalia Varela**  
Impact Of The Skin To Skin Contact On The Sensitivity In Parental Care Of Premature Child In India
- 9:35 am Poster Session 3**
- 11:00 am** *Topic 8. Economic Impact of KMC*  
**Guest Lecturer:** Juan Gabriel Ruiz-Paelaez, Javeriana University, Bogotá. An initial approach to the challenges of performing an economic evaluation of a Kangaroo Mother Care Program
- 11:30 am Discussant 1:** Uwe Ewald, University Hospital, Uppsala  
From a conventional (western style) NICU to a modern KMC-family-centered NICU. Change processes and impact
- 11:45 am Discussant 2:** Bruce Shaerer, Université Laval, Quebec
- 12:00 pm Discussion**
- 12:15 pm Lunch**
- 13:30 pm** *Topic 9. Planning KMC nationwide*  
**Guest lecturer:** Nathalie Charpak, Kangaroo Foundation, Bogotá  
**Chairman:** Rekha Udani
- 14:00 pm Anne-Marie Bergh**  
Progress in The Scale-Up of Kangaroo Mother Care In Ghana
- 14:15 pm Patrick Aliganyira (to be confirmed)**  
Setting up Kangaroo Mother Care (KMC); Linking Health Facilities to Communities – Experiences from central Uganda
- 14:30 pm Rulina Suradi**  
Adopting National Program For Kangaroo Mother Care (KMC) in Indonesia
- 14:45 pm Evelyn Zimba**  
Planning and Scaling up KMC in Malawi
- 15:00 pm Kante Modibo**  
KMC in Mali: getting to scale in a severely resource-limited setting



15:15 pm      **Rekha Udani**  
Implementation of Kangaroo Mother Care - KEM Experience in India

15:30 pm      **Coffee break**

16:00 pm      *Topic 10. KMC and worldwide implementation: the WHO perspective*  
Guest Lecturer: Jelka Zupan, OMS, Geneva

16:45 pm      **Discussion**

## Tuesday, June 22, 2010

8:00 am      **Workshops**

10:00 am      **Coffee Break**

10:30 am      Guidelines and recommendations for KMC implementation

12:00 pm      Concluding remarks on the 8th International Conference on KMC  
**Lunch**



# ABSTRACTS FOR THE ORAL PRESENTATIONS

Saturday, June 19, 2010

#O1

8:15

## Topic 1. A PHILOSOPHY OF CARE FOR A NEONATAL INTENSIVE CARE UNIT A SWEDISH EXAMPLE OF FAMILY-CENTERED CARE



**Guest lecturer:** Kerstin Hedberg Nyqvist, University Hospital, Uppsala

### Parents' and infants' needs

After birth, the mother, father and newborn infant need immediate, unrestricted physical contact. Parents need to establish bonding to the infant, and the infant needs to develop attachment to the parents. However, research has demonstrated that NICU care often acts as a barrier to family roles. Transfer to parents of infants' care typically occurs shortly before discharge.

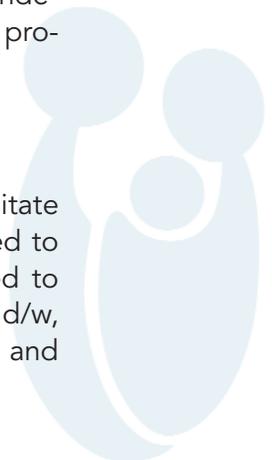
Discrepancy between parents' and infants' human rights in neonatal intensive care. Although the UN Convention of the Rights of the Child emphasizes infants' and parents' right to be together, separation has become the norm in NICUs, with numerous negative effects on parents and infants. This gap is obvious in that nurses normally act as primary caregivers, with parents as visitors and helpers. Parents experience loss of their role and uncertainty of what is expected from them by the staff.

### Philosophy of care

The Uppsala NICU philosophy of care is based on Roy's Adaptation model, and serves as a tool for constant improvement of care. It addresses all infant physiological needs including circadian rhythm, protection from stress, and modified stimulation of all senses. Adaptation of the NICU to infants and parents/families includes privacy, a quiet, calm environment, and infants' protection from direct light. Ideally, infants and parents are together 24 hours; parents' self-confidence and normal role functions are supported. The goal is infants' and parents' independence of professional assistance. An important consideration is that all professionals share the same knowledge and attitudes.

### Parental role, independence, modified environment

The Uppsala NICU guidelines for parent support were formulated to facilitate parents' transition to the role of primary caregivers. They are actively offered to take over care, without feeling compelled. Nurses' role has partly changed to educator, guide and substitute for parents. KMC is implemented, 24 h/d, 7 d/w, as soon as possible, from 28 weeks when appropriate. KMC may commence and





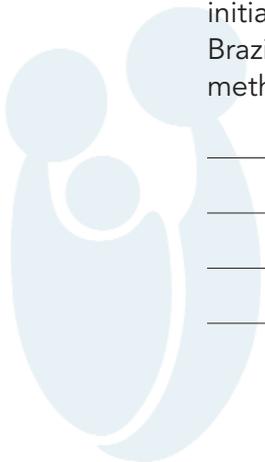


**Gontijo Tarcísio Laerte** (Presenter: Vivian Azevedo), Universidade Federal de Sao Joao Del Rei, Brasil

**IMPLEMENTATION OF KANGAROO MOTHER CARE METHOD IN BRAZIL**

*Meireles AL, Azevedo V, Maltam DC, Proietti FA, Xavier, CC*

The Kangaroo Mother Care Method, introduced into Brazil by a few maternity hospitals on their own initiative, became a national health policy as of the year 2000, when the Ministry of Health issued the Guidelines for Humanized Care of Low-Birthweight Infants - Kangaroo Mother Care Method. These KMC method guidelines state that it should be put into effect in three steps: Step 1 – Identification of premature labor, newborn infant with birthweight <2500 grams, particularly the very-low-birthweight <1500g infants who, unable to withstand removal to general care units, need to remain in an Intensive Care Unit. During this period both mother and family should receive information and orientation regarding the child’s condition, with an emphasis on the importance of KMC. Step 2 – Transferral of the medically stable baby to the kangaroo ward where the mother holds it continuously in the skin-to-skin kangaroo position for as long as possible, stimulating it to rest against her in that position around the clock. Step 3 – Consists of ambulatory follow-up care till the baby reaches 2500 grams with posterior referral to a Primary Healthcare Center for conventional follow-up care. On publication of these guidelines, the Ministry of Health organized and conducted training courses for healthcare workers from maternity hospitals that provide care for high-risk Neonatology patients. These courses were delivered at Benchmark Teaching Hospitals where 293 maternity hospitals from around the country qualified to adopt the method. Against this backdrop, this study purported to evaluate KMC method implementation in Ministry of Health-KMC-certified maternity hospitals. It is a transversal study and consisted of a Ministry of Health questionnaire sent to the 293 training-certified hospitals by mail, fax, or e-mail. The questionnaire followed the normative evaluation approach: structure, processes and results. Out of the 176 (60.1%) maternity hospitals that responded, 141 (84.9%) of them had implemented Step 1 of the kangaroo method, however, only 79 (47.3%) had implemented the three steps in compliance with national guideline requirements. 366 neonatal beds were identified, only 21% of which belonged to kangaroo wards. This rendered it clear that training was important in initiating the implementation process of the kangaroo mother care method in Brazil, but did not suffice to foster implementation of all three steps of the method.



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Marlene Burkholder, Riverside Methodist Hospital Columbus, Ohio, USA

### HOP INTO EVIDENCE-BASED PRACTICE TO PROMOTE KANGAROO MOTHER CARE IN THE HEALTHY NEWBORN

Lamp, J

**Purpose:** The purpose of this project is to describe the application of an Evidence-Based Practice model to create Clinical Change promoting Kangaroo Mother Care. **Search and Review methodology:** An Evidence-Based Practice team was formed of key stakeholders. The team followed the “Iowa Model of Evidence-Based Practice to Promote Quality Care” developed by Marita Titler et al. in 2001. This model provided the structure for moving from a clinical question to changing nursing practice. A systematic literature review and analysis ensued. Staff nurses designed the following clinical question: Is Kangaroo Care a safe and effective alternative to the overhead warmer for healthy newborn infants? **Analysis:** The group was fortunate to find thirty plus years of abundant research and over 400 articles which supported Kangaroo Care (KC). The body of evidence was of Meta-analyses and Randomized Controlled Trials. Nursing research journal club sessions were offered to critique the Kangaroo Care Cochrane review. Team members collaborated with leading experts in KC with questions regarding research findings. Ultimately, the team determined that research findings supported a change in practice. **Summary of Key Findings:** Outcomes of the project were designed by combining the Iowa Model of EBP with the hospital organization’s balanced scorecard quadrants for Quality of Care, Customer Service, Quality of Worklife, and Finance. Success was measured through newborn physiologic balance and safety during KC, mothers’ recommendation of KC, and nurse satisfaction in quality of worklife related to KC. There was minimal effect on the budget. **Conclusions:** This innovative approach to pairing a clinical issue with an EBP model has sparked enthusiasm for the movement toward transforming the quality of nursing care through research. Staff nurses comprehend how research findings are applicable to their practice. The Kangaroo Care project is the benchmark for other hospital evidence-based practice initiatives.

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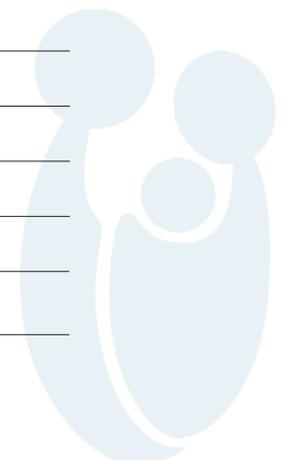
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## Topic 2. LONG-TERM CHILD HEALTH EFFECTS OF PROLONGED AND EXCLUSIVE BREASTFEEDING



**Guest lecturer:** Michael Kramer, McGill University, Montreal

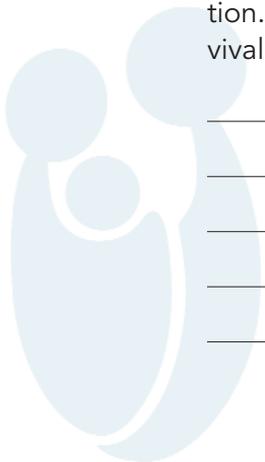
The reported beneficial effects of breastfeeding in protecting against obesity, atopic disease, and a variety of chronic diseases and for accelerated neurocognitive development are based nearly entirely on observational (nonexperimental) studies, with potential for bias due to confounding, selection, and reverse causality. To overcome these sources of bias, we carried out the Promotion of Breastfeeding Intervention Trial (PROBIT), a cluster-randomized trial of a breastfeeding promotion intervention based on the WHO/UNICEF Baby-Friendly Hospital Initiative. 17,046 healthy, breastfeeding mother-infant pairs were enrolled from 31 Belarussian maternity hospitals and affiliated polyclinics, of whom 13,889 (81.5%) were followed up at 6.5 years. At follow-up, polyclinic pediatricians performed duplicate measurements of anthropometry and blood pressure and administered the Wechsler Abbreviated Scales of Intelligence (WASI), the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire, and skin-prick tests of 5 antigens (birch pollen, mixed northern grasses, *Alternaria* mold, house dust mite, and cat epithelium), as well as histamine (positive) and saline (negative) controls. The children's teachers evaluated their academic performance on a 5-point Likert scale for reading, writing, mathematics, and other subjects. Analysis was based on intention to treat, with a multilevel statistical model that accounts for clustering within hospitals/clinics and controls for region, urban vs rural status, birth weight, age at follow-up, and maternal and paternal education and BMI. The experimental intervention led to a large increase in exclusive BF at 3 months (43.3 vs 6.4%,  $P < .001$ ) and a significantly higher prevalence of any BF at all ages up to and including 12 months. The experimental group had higher means on all WASI measures, with adjusted mean differences (and 95% CIs) of +7.6 (+0.9 to +14.3) for verbal IQ, +3.1 (-3.1 to +9.2) for performance IQ, and +6.1 (-0.8 to +12.9) points for full-scale IQ, respectively. Teacher's academic ratings were also significantly higher for both reading and writing. No significant intervention effects were observed for height, BMI, triceps or subscapular skinfold thicknesses, or systolic or diastolic blood pressure; symptoms of asthma, hay fever, or atopic eczema; or allergen skin-prick test results. Prolonged and exclusive breastfeeding improves neurocognitive function through age 6.5 years but has no demonstrable effects on growth, adiposity, or atopic disease. Previous reports of reduced risks of obesity and beneficial effects on stature and blood pressure are probably due to uncontrolled bias due to confounding and selection inherent in observational studies.

**Salahuddin Ahmed** (Presenter: Nancy Sloan), Johns Hopkins University, USA

**COMMUNITY KMC AND PREDOMINANT BREASTFEEDING : ASSOCIATIONS WITH INFANT GROWTH, HEALTH AND SURVIVAL BY BIRTHWEIGHT**

Sloan NL, Mitra SN, Chowdhury M, Winikoff B.

Background: Community-based KMC (CKMC) in rural Bangladesh had significant impact on immediate breastfeeding. Aim: We assess the association of skin-to-skin (STS) on infant breastfeeding patterns, and of predominant breastfeeding on infant growth, morbidity and mortality by birthweight less than or equal to (LE) and over 2K. Materials and methods. Community workers taught expectant and postpartum women to hold newborns STS immediately after birth in the 21 of 42 villages randomly assigned to CKMC. 3,861 babies were followed at 1 month and quarterly through 365 days. Results: STS greater than or equal to (GE) 7 hours/day in the first two days of life was significantly associated with predominant breastfeeding at 2 to 5 months of age; breastfeeding within an hour of birth was not. Fewer babies 330-440 days old who were predominant breastfeed through 3 months of age had arm circumference (OR = 0.509, 95% CI 0.452 - 0.799,  $p < 0.001$ ), head circumference (HC OR = 0.675, 95% CI 0.544 - 0.836,  $p < 0.001$ ) and weight (OR = 0.753, 95% CI 0.617 - 0.918,  $p = 0.005$ ) below the 5th percentile for age and gender, all statistically significant when adjusted for birthweight LE 2K. Predominant breastfeeding through 3 months of age was significantly associated with less fever (OR = 0.819, 95% CI 0.763 - 0.880) and with less ARI (OR = 0.735, 95% CI 0.614 - 0.881,  $p < 0.001$ ), even when adjusted for birthweight LE 2K. Predominant breastfeeding in the first month of life but not afterwards was associated with significantly lower infant mortality (OR = 0.103, 95% CI 0.031 - 0.339,  $p < 0.001$ ) but not when adjusted for birthweight LE 2K. Birthweight LE 2K was associated with higher IMR (OR = 13.4, 95% CI 3.5 - 50.6,  $p < 0.001$ ). Conclusions: Predominant breastfeeding was associated with better growth, respiratory status and infant survival. In general, the benefits of predominant breastfeeding are greatest in those with birthweight LE 2K. Predominant breastfeeding was influenced by STS GE 7 hours/day in the first two days of life, but not by less STS. Community-based KMC training must achieve sufficient STS to increase predominant breastfeeding and influence growth, health and survival, consistent with results indicating that sufficient STS is required to provide thermal regulation. Keywords: Community KMC, STS, predominant breastfeeding, infant survival.



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Rekha Udani, KEM Hospital & Seth GS Medical College, Mumbai, India

### KANGAROO MOTHER CARE & BREASTFEEDING

Nanavati R

Rationale- Nearly 4 million newborns die each year; 75% of these deaths occur in South Asia and sub Saharan Africa. Approximately 2.5 million newborn deaths could be prevented annually by improving access to low-tech interventions. Indian Scenario - Approximately 27 million babies are born every year in India and 9 million (30%) are low birth weight (LBW) and are responsible for 75% neonatal mortality. Kangaroo Mother Care (KMC) – is an effective means of meeting babies’ need for warmth, nutrition, protection from infection, safety and love. Global research and Randomized Controlled Trials have proved KMC as cost effective intervention for better survival and better quality of life for benefit of baby, mother, family, community and nation. Kangaroo Mother Care & Breastfeeding- Kangaroo Mother Care (KMC) is an ideal prerequisite to early Breastfeeding of Preterm babies. Human milk is not only species specific but also baby specific. Scientific evidences prove the beneficial effects of KMC on breast-feeding. KMC increases prevalence, duration, breast milk production & exclusive breastfeeding rate. It also increases the competence of mother and allowed the mother to respond to early feeding cues to breastfeed. Benefits of preterm milk- i) Nutritional ii) Decrease infection and NEC iii) Improved neurodevelopment and Greater intellectual performance score at 8yrs iv) Decrease in rate of ROP v) Gastrointestinal- rapid gastric emptying, increases intestinal lactases, decrease in intestinal permeability. Gastrointestinal growth. Preterm Hind milk has higher energy density (82 cal/100ml) and fat content (4.8g/100 ml), higher concentration of protein up to 2.0g/100 ml, higher concentration of sodium and chloride. KMC and exclusive Breastfeeding – RCT mentions KMC promotes exclusive breast-feeding rate at discharge, at CDOB, and at 1, 2 and 6 months of age (1988-2005). Experience of KMC at KEM Hospital KMC Center - ‘Shishughar’ was very encouraging and Exclusive Breastfeeding up to 6 months & continuation of breastfeeding with complimentary feeds (BF + CF) from 7 to 12 months. Overall breastfeed- ing rate in all 225 KMC babies in the study, 95% babies were exclusively breast- fed up to 6 months and 5% babies received Breastfeeding & top milk feeding. How to feed a preterm baby in what quantity? The importance of Non nutritive sucking (NNS) and Oro-motor stimulation will be discussed.



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Nils Bergman, University of Cape Town, South Africa

**KMC IS THE BRIDGE BETWEEN MODERN NEUROSCIENCE AND BETTER PUBLIC HEALTH OUTCOMES**

The latest neuroscience is “revolutionary” in terms of the understanding newborn brain development. The key is the sensory environment, which the brain perceives, absorbs, and then learns to respond to. The quality of this environment determines the quality of subsequent development. If the fetus and the newborn perceive the environment to be unsafe, or harsh, adaptations take place where optimal development is traded for survival fitness. We now know that the modern technological environment is perceived as unsafe by the premature newborn, whose sensory capacities are much greater than we believed when we designed our technology. We also know that the long term outcomes, even of late pre-term infants in developed countries, is not good. Finally, morbidity and mortality is very real in developed countries, and increases exponentially in developing countries. The greatest burden of disease is in developmental disabilities that persist for life. Kangaroo Mother Care is the perfect application of modern neuroscience. Kangaroo Position provides the sensory environment the baby perceives as safe, and wires the brain optimally. Kangaroo Nutrition is evidence based, and for premature infants mother’s milk is recognized as essential. Kangaroo Support should encompass all the technology available, but needs adapting and modifying to allow for continuous “presence of buffering adult support”, and then earlier Kangaroo Discharge. In terms of “Implementing KMC Worldwide”, I will suggest three radical approaches, justified by the neuroscience. First, the developed world should take the lead, and make mothers’ (and fathers’) chests the routine and normal place of care to all newborns, and to all premature infants, regardless of gestation and weight. The problem with implementing is not in the science, it is in our mindsets and skills. Second, following the first, as hands-on skills develop, the neuroscience predicts that sick prematures will recover better in Kangaroo Position. And then thirdly, the developing world can with confidence use Kangaroo Position for all newborns, as the optimal mechanism for stabilizing newborn prematures. Implemented worldwide, this will have profound implications.

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**Jackie Martin**, Carillion Medical Center, Roanoke, Virginia, USA

### PRETERM INFANT CEREBRAL OXYGENATION DURING KANGAROO CARE

Ludington S, Dowling D.

**Purpose:** Because premature infants are highly susceptible to cerebral lesions due to cerebrovascular immaturity, knowing the effects of maternal-infant separation (while the infant is in an incubator) and non-separation (while the infant is in Kangaroo Care) on cerebral hemodynamics is important. Cerebral hemodynamics are reflected in cerebral oxygenation (rSO<sub>2</sub>) values. The purposes were to describe and compare cerebral oxygenation as measured by near-infrared spectroscopy during Incubator and Kangaroo Care periods. **Subjects:** Ten premature infants, five male and five female, who had mean birth weight of 1487.5 grams (range 1076-2218), mean gestational age of 30 and 4/7 weeks (range 27 5/7 to 33 1/7), mean entry weight of 1764.9 grams (range 1380 to 2341), and mean post-conceptual age of 33 and 4/7 weeks (range 31 1/7 to 34 6/7) participated once stable and not needing oxygen support. **Design:** A within-subject controlled descriptive comparative study of infants randomly assigned to a cross-over from Incubator Care first to Kangaroo Care second or vice versa was conducted. **Methods:** Randomization was by the Zellen Sealed-Envelope Technique. After vital signs and feeding, the near infrared spectroscopy sensor (Somanetics, Inc.) was placed on the left forehead and a pulse oximeter (MassimoSet) on the left foot. The infant was either put into KC or placed prone in the incubator for the first data collection episode of 90 minutes duration. Infants remained in KC or Incubator until the next vital signs and feeding were completed 90 minutes later. Then the infant was placed in the opposite condition. After 90 minutes of data collection, monitoring equipment was removed. **Outcome Measures:** Heart rate, respiratory rate, oxygen saturation, regional cerebral oxygenation, infant behavioral state (Brazelton NBAS scale –predominant state over 30 seconds) and presence/absence of environmental noise data were collected each minute throughout both 90 minute periods in a multi-bed NICU in which only a fabric screen separated the infant from the NICU by one researcher. **Results:** During KC, as compared to Incubator Care, respiratory rate decreased, regional cerebral oxygenation decreased, % time in Quiet Sleep decreased, and % time in Agitation increased as did the number of times loud noises were present. No changes were noted in heart rate nor oxygen saturation between sequences and periods. No residual nor cross-over effects of KC on rSO<sub>2</sub> were present and rSO<sub>2</sub> remained within clinically acceptable range at all times. **Conclusion:** Lower regional cerebral oxygenation (rSO<sub>2</sub>) during KC indicates a calming brain deactivation effect, even in the presence of increased behavioral agitation that was most likely due to extreme environmental noise frequency. When KC ended, the increase in rSO<sub>2</sub> signaled an increase in sympathetic control of cerebral hemodynamics.

Cyril Schneider, Université Laval, Québec, Canada

**BRAIN FUNCTIONING AND KMC INFLUENCE IN ADOLESCENTS BORN VERY PREMATURELY: A QUEBEC-BOGOTA MULTI-FACETTED APPROACH USING MAGNETIC STIMULATION AND IMAGING OF BRAIN.**

Tessier R, Charpak N, Nadeau L.

Brain functioning in 15-yr adolescents born very prematurely and having experienced the Kangaroo Mother Care: a Québec-Bogotá multi-faceted. A premature birth under 32 weeks of gestation jeopardizes the maturation of brain via the interruption of axonal growth and myelination. The subsequent white matter disorders (decrease of myelinated fibers volume) may lead to dysfunction of the neural networks usually involved in communication between brain structures intra- and interhemispherically. Our team focusing on brain functioning in prematurity effectively measured differences in cortical motor control of hand function in 8-yr children born very preterm. For example, the intracortical processes of normal motor programming were missing in parallel to a faulty visuomanual coordination (see poster from Flamand, Nadeau, Schneider). A further question was twofold: (1) can these problems still be detected in adolescents born very preterm, i.e. when myelination of fibers ought to be completed thus when networks are supposed to be mature compared to 8-yr children we had already tested; (2) how can we test whether the Kangaroo Mother Care approach (KMC) contributed to improve brain functioning in such adolescents. To this end, our Québec-Bogotá collaboration enabled to test the brain functioning of adolescents born very preterm in Bogotá and having experienced KMC 15 years ago. Transcranial magnetic stimulation of brain (painless, non invasive) were applied to test how brain worked for the control of hand function (intra- and interhemispheric functioning) and anatomical (tractography included) and functional magnetic resonance imaging enabled to get structural measurements (volume, fiber counting) and cerebral activation patterns during hand tasks, respectively. Data will be presented as raw neurophysiological traces of brain activity and as a comparison (ANOVA) of 3 groups of 15-yr participants, the KMC preterms, the non-KMC preterms and the fullterms.

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**Topic 4. THE NIDCAP AND THE CONTRIBUTION OF KMC AS A PARTNER OF ITS EVOLUTION**



**Guest lecturer:** Joy V. Browne, University of Colorado

The Newborn Individualized Developmental Care and Assessment Program (NIDCAP) provides training and consultation for health professionals in hospitals and encourages its use nationally and internationally to support the growth and development of premature infants and to improve the quality of their care and the support for their families. Through direct observation of the infant’s behavioral repertoire and development of implied goals of the baby in the context of his or her parents, a comprehensive plan for support towards those goals is established for infants in the NICU. NIDCAP approaches guide and support professionals in enhancing the infant-parent relationship. Its neurobehavioral and relationship based foundations incorporate KMC as an essential component for enhancing the ongoing organization of the dyad. NIDCAP individualized approaches are designed to encourage the ongoing regulatory support for both the infant and his or her parents. Empirical support for enhanced medical, neurobehavioral and developmental outcomes for infants using the NIDCAP approach is increasing. Structural and behavioral brain changes in favor of more optimal outcomes for infants receiving NIDCAP provide a foundation for our understanding of how best to nurture the early born infant. Both short and long-term physiological adverse outcomes are decreased in those premature infants who receive the NIDCAP approach, as is developmental disorganization. KMC is an essential component of the NIDCAP approach and therefore the two are seen to provide synergistic, neuroprotective mechanisms for the developing neonatal brain. This presentation will review the theoretical and empirical foundations for NIDCAP, and describe how KMC is a key component of the approach. Outcome data will be provided in the context of contributing to our understanding of the importance of early regulatory processes that are complimented by the integration of NIDCAP and KMC.



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Ylva Thernström Blomqvist, Uppsala University and University Children's Hospital, Sweden

**KANGAROO MOTHER CARE AT TWO SWEDISH NICUS - AN ONGOING STUDY**

Kerstin Hedberg Nyqvist, Christine Rubertsson, Uwe Ewald

Aims To study kangaroo mother care (KMC) with respect to the time infants are cared for skin to skin by their parents. To explore effects of the time of skin to skin contact on parents' depression and anxiety symptoms, sleep, perception of parenting-related stress, interaction with and bonding to their children, and parents' experiences of providing their infants with KMC. To identify possibilities and barriers to KMC. Methods. Data collection is carried out in two Swedish NICUs with a consecutive sample of infants born at a gestational age between 28 + 0 and 33 +6 weeks. The infant's time skin to skin is recorded by parents or staff. A questionnaire will be completed by both mother and father during the infant's hospital stay, after discharge and at the corrected ages (CA) of 2, 6 and 12 months. Survey questions address parent-infant bonding and interaction, the child's and parents' sleep, parental symptoms of depression and anxiety, and parental stress during the first year of life. Individual interviews have been conducted with 20 mothers and fathers when their child was at the CA of 4 months. Data are also obtained through chart review of infants' medical records. Results A first study, in preparation of the project, showed that Swedish mothers (n = 17) are willing and able to provide their preterm and/or ill newborns with continuous (24 hours/day, 7 days/week) KMC, provided that they receive the assistance and support they desire from nurses. No mother would have preferred not provide her infant with KMC or would have preferred to discontinue KMC earlier than she did. In a second study of reliability of nurses' versus parents' record keeping, we compared parents' (n = 20) documentation of KMC time with nurses' records of infants' time skin-to-skin. Results showed that parents provided more complete records than the staff, whereas the nurses only gave information for 31/41 of the KMC sessions. Differences in duration of KMC sessions were marginal, but nurses omitted records for four sessions documented by parents, giving a total of 41 vs. 45 sessions. In the third study in the project, 20 parents, both mothers and fathers, whose infants have been cared for in the study NICUs, were interviewed about their experiences of caring for their preterm infants with KMC. These data are currently being analyzed. Conclusion. The results obtained so far show that Swedish mothers are able and willing to provide continuous KMC during the infant's whole hospital stay. Parents were more precise in their documentation of the time they cared for their infant skin to skin.



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Laura N. Haiek, Ministère de la Santé et des Services Sociaux, Québec, Canada

## COMPLIANCE WITH WHO/UNICEF SKIN-TO-SKIN RECOMMENDATIONS IN QUÉBEC

Background: Since their introduction by WHO/UNICEF in 2006, countries are faced with challenges in implementing the more rigorous Baby-Friendly Hospital Initiative revised standards, particularly in regards to mother-baby contact after delivery: skin-to-skin, immediately after birth for at least an hour unless justified, for both vaginal and caesarean deliveries without general anesthesia. In order to support health care facilities in implementing these new recommendations and create conditions favorable to breastfeeding, Québec's ministry of health and social services assessed skin-to-skin contact (SSC) practices in 54 hospitals and 6 birthing centers. Methods: A 2007 assessment examined SCC implementation level in vaginal and cesarean deliveries with respect to its timing after birth, duration, quality and reasons for delay or interruption, using as data sources mothers (N=1375) and professionals (N=535). Results: Regarding staff, 95% report placing babies in SSC immediately after birth in vaginal deliveries and 62% report leaving babies in SSC for at least one hour. According to mothers 1087 delivering vaginally, 97% state having had their baby in SSC immediately after birth and 56% for at least one hour, or an acceptable reason for either delaying or interrupting contact. The most common reasons given by 70 mothers for not having experienced SSC contact immediately after vaginal birth were consider acceptable: complications needing urgent or specialized care for mother or baby (55%). Only 1% of mothers did not want immediate contact and in 3% it was initiated by the father. Conversely, the most common NON acceptable reasons for delaying SSC were related to non-urgent care given to baby such as administering vitamin K and eye ointment, wiping the baby, routine suctioning of secretions, measuring vital signs/APGAR/medical exam (19%), warming up the baby with a heat source (3%) and transferring mother or baby between units (9%). With regards to SCC interruption before one hour in a vaginal birth, the most common reasons reported by 609 mothers were NON acceptable: non-urgent care given to baby as stated above (62%), weighing (16%) or warming up (3%) the baby, and transferring between units (4%). "True" SSC contact after vaginal birth (i.e., naked baby on his mother's naked body) was reported by 93% of staff and 69% of mothers. When compared with vaginal delivery, results for cesareans show considerably lower compliance with SSC timing and quality but higher compliance with SSC duration. Conclusions: Assessment results showed that several SSC-related standards for vaginal births are well implemented in Québec. Personalized dissemination of findings to participating facilities aimed at helping them revise practices to improve compliance with the updated SCC recommendations for both vaginal and cesarean deliveries.

Zeni Lamy, Universidade Federal do Maranhao, Brasil

### KANGAROO MOTHER CARE: INFLUENCES IN THE ENVIRONMENT ON NEONATAL UNIT

Gomes R, Fernandes RT, Lamy Filho F, Bastos AA, Costa Campelo CM

Introduction: Traditionally the Neonatal Unit is an area dominated by rules established by the health staff, where the mother did not have autonomy and needed permission to have the right to visit her hospitalized child. The Kangaroo Methodology introducing the mother in this environment, during all day, generates changes. Objective: To analyze the changes occurred in the environment of the Neonatal Unit from the effective participation of the mother made possible by the Kangaroo Mother Care (KMC). The interactions between newborns, parents and health professionals were analyzed; recognizing the aspects that facilitate or hinder the mother's participation and identifying the impact of this participation within the Unit. Methods: Qualitative research like study of case, contemplating the principle of triangulation. It was realized in the University Hospital of the Federal University of the state of Maranhão, a Brazilian Hospital of reference to the KMC. It was made 101 hours of participant observation and 14 semi-structured interviews distributed as follows: 14 mothers, nine doctors, two residents, four nurses and eight nurse technicians. Data were analyzed by Hermeneutic-Dialectic. Results: Although the staff recognizes the mother's presence as important and this comes, gradually, reaching autonomy and modifying the environment, conflicts occur and need to be negotiated. The mother, intentionally or not, exerts effective supervision over the professionals' actions which goes beyond that desired by them. When the staff receives the mother, it hopes that the mother incorporates the institutional rules, what often does not happen. The mother gives baby a new meaning to the professionals and amplifies the care universe. Conclusion: The implementation of KMC has provided a change in the paradigms of the neonatal attention resizing the care of the newborn and improving the environment of Neonate Intensive Care Unit through a better communication between family and health professionals.

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## A COLLABORATIVE AND MULTI-FACETED QUÉBEC-BOGOTÁ FOLLOW-UP OF 15 YEAR-OLD PRETERM CHILDREN HAVING EXPERIENCED THE KANGAROO MOTHER CARE IN COLOMBIA



**Guest Lecturer:** Nathalie Charpak, Kangaroo Foundation, Bogotá and Quebec and Bogota team

Participant institutions: Kangaroo research team (Fundación Madre Canguro, Bogota), Psychology and Neuroscience Units (Laval University – Quebec City), Imagine Grupo de Informática Grafica & Procesamiento de Imágenes (Universidad de los Andes), Departamento de Imágenes Diagnósticas (Hospital Universitario - Fundación Santa Fe de Bogotá), Unidad de Epidemiología Clínica & Bioestadística (Javeriana University, Bogota).



**Background.** An excess of behavioral problems among preterm and very LBW infants when they reach the school level has been clearly documented. The Kangaroo Mother Care method (KMC) is a form of care for premature infants where the mother holds the infant in kangaroo position (continuous and prolonged skin-to-skin contact) becoming the main provider of heat stimulation, and nutrition and has shown a protective neurodevelopment effect during the first year of corrected age. Long-term effects are largely unknown. **Objective** To explore cognitive, behavioural neuroimaging and neurophysiological variables and school performance in a sample of subjects who participated in a RCT comparing KMC and “traditional” care in incubators early in life together with normal term (control) subjects were evaluated when reaching 14-15 years of age. **Design:** Cross sectional study (observational) for generating and refining hypotheses. **Sample:** Forty subjects: 30 preterm infants less than 33 weeks of gestational age at birth who participated in a RCT on KMC conducted between 1994 and 1997 (15 kangaroo –KG- and 15 non-kangaroo preterm subjects –NKG-) and 15 years old at time of the present study; and 10 normal term controls –CG- (13 years old) coming from a cohort study on healthy newborn infants with similar socio economic status conducted in 1996 at the same institution. **Outcomes:** Cerebral activity (fMRI), Total volume of the corpus callosum and white matter according to MRI and ITD, Cerebral plasticity (TMS), Neuro and psychomotor development (WISC4), Somatic growth and Quality of life evaluated from parents, teachers and patients point of view **Results:** Neuroimaging and neurophysiological results are reported elsewhere. There are no differences between the 2 groups of premature infants (KG and NKG) in weight and gestational age at birth, gender, number of infants who stayed in ICU and education level of their parents. At 15 years 50% of the infants are presenting any degree of neurosensorial or orthopedic or behavioral problems attributable to prematurity. As compared to the CG kanga-



Busingye Annet, Uganda

**KMC AND FOLLOW-UP - THE BEST ALTERNATIVE TO ENHANCE PRETERM CARE IN DEVELOPING COUNTRIES**

Background: Kangaroo Mother Care is a method which involves caring for Low Birth Weight newborn infants where the baby is kept between mother's breasts in direct skin to skin contact. The approach is useful and can be integrated in poor and developing countries; it has numerous advantages compared to the conventional care that has been always used for along period of time. Doctors, nurses and paramedics have been educated and trained in KMC and its benefits. However, the issue of follow-ups has not been largely conducted in order to assess its effectiveness. According to Kangaroo Mother Care Initiative, Kangaroo Mother Care (KMC) holds different definitions which include; skin-to-skin contact (SSC), and breastfeeding (BF). The biological perspective holds that skin-to-skin contact represents the correct "habitat", and breastfeeding represents the "niche" or pre-programmed behaviour designed for that habitat In Bogota, Colombia, where KMC started, "early discharge" is regarded as the third part of the definition. This is also a form of support where hospitals are overcrowded, but it also requires a good community support system. Objective 1. To assess the extent of Kangaroo Mother Care follow-ups in the resource limited settings of Uganda, East Africa. 2. To generate evidence about feasibility of KMC Follow-up and conduct research in the community. Methods The study will consist of all live born infants who weighed 2000g and were qualified for KMC, and the KMC group infants who underwent intrahospital Kangaroo adaptation and received continuous Kangaroo mother care every day, during hospital stay, and at home were also included in the study. A pre designed pretested questionnaire will be administered to the participants in the study which will incorporate discharge criterion and follow-up of KMC babies. The parents whose children will be enrolled in the study will therefore be counseled and the methods that will be used explained, parents and caretakers will be asked about the benefits of KMC and follow-up. Records regarding Follow-up will be taken. Conclusions KMC and follow-up has been recognized as the best alternative to enhance preterm care in developing countries and that there development would be important for the success of KMC during the stay at the hospital and at home.



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Joy Lawn (Presenter: Kate Kerber), Save the Children, USA

### NEW EVIDENCE OF MORTALITY EFFECT OF KMC: WHAT DOES THIS MEAN FOR PROGRAMMES?

Lawn JE, Mwansa-Kambafwile J, Horta BL, Barros FC, and Cousens S, Kate Kerber

**Background** ‘Kangaroo mother care’ (KMC) includes thermal care through continuous skin-to-skin contact, support for exclusive breastfeeding or other appropriate feeding, and early recognition/response to illness. Whilst increasingly accepted in both high- and low-income countries, previous reviews have not shown a significant mortality benefit, and included studies where the intervention started after one week of age (survival bias) and have combined varying mortality outcomes (predischarge, neonatal, six months and infant mortality). In addition several new studies have been published. **Methods** We conducted systematic reviews. Standardized abstraction tables were used and study quality assessed by adapted GRADE methodology. Meta-analyses were undertaken. **Results** We identified 15 studies reporting mortality and/or morbidity outcomes including nine randomized controlled trials (RCTs) and six observational studies all from low- or middle-income settings. Except one, all were hospital-based and included only babies of birth-weight <2000 g (assumed preterm). The one community-based trial had missing birthweight data, as well as other limitations and was excluded. Neonatal-specific data were supplied by two authors. Meta-analysis of three RCTs commencing KMC in the first week of life showed a significant reduction in neonatal mortality [relative risk (RR) 0.49, 95% confidence interval (CI) 0.29–0.82] compared with standard care. A meta-analysis of three observational studies also suggested significant mortality benefit (RR 0.68, 95% CI 0.58–0.79). Five RCTs suggested significant reductions in serious morbidity for babies <2000 g (RR 0.34, 95% CI 0.17–0.65). **Conclusion** This is the first published meta-analysis showing that KMC substantially reduces neonatal mortality amongst preterm babies (birth weight <2000 g) in hospital, and is highly effective in reducing severe morbidity, particularly from infection. This evidence is sufficient to recommend the routine use of KMC for all babies <2000 g as soon as they are stable. Up to half a million neonatal deaths due to preterm birth complications could be prevented each year through KMC. However, KMC remains unavailable at-scale in most low-income countries. Priority research gaps include studies of community level initiation of KMC as well as follow up of facility KMC initiation with early discharge in low income countries.



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Mantoa Mokhachane, Neonatal Unit, Chris Hani Baragwaanath Hospital, Soweto (CHBH), University of Witwatersrand, Johannesburg

**KANGAROO MOTHER CARE (KMC) FOLLOW-UP AT CHRIS HANI BARAGWANATH HOSPITAL**

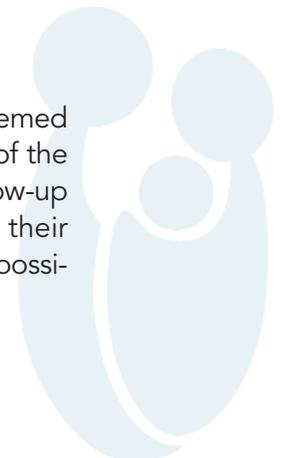
Pulane Mokgosi L.

Introduction:KMC was started in 2002 in response to overcrowding and shortage of staff. All infants were followed up at a general neonatal follow-up. There were too many babies at the clinic and it became impossible to manage. It was realised that the unit does not have adequate information on the LBW babies that have been discharged. In response to this a KMC follow-up was initiated. Aims: Document the outcomes of infants admitted to this unit; growth, feeding practices, mortality morbidity and loss to follow-up Methods: The neonatal unit at CHBH has 4 levels of care; the intensive care unit, high care, low medium care ward and kangaroo mother care unit. The KMC unit has 20 beds and is run by professional nurses, auxiliary nurses and nursing assistants, ward attendants. At the kangaroo mother care follow-up, infants are followed up weekly if discharged below 40 weeks corrected age until term corrected age, then at 3 months, 6 months, 9 months and 12 months corrected age. Those that have major problems were followed up for longer than the prescribed period. At follow-up, infants' growth parameters are measured, a feeding history is taken, enquiries about previous history of outpatients/clinic visits or admissions is made. A full clinical examination of the infant is performed and appropriate referrals are made where indicated.Results: More than 600 infants have been followed up until a year corrected age. For this abstract only 408 records were looked at.

**Infants' demographics**

Gender . . . . .	Male 173 (42%)	
	Female 225 (55%)	
Mean gestation . . . . .	31 (±2)	
Mean birth weight . . . . .	1298g (±218)	
Discharge weight . . . . .	1676 (±62)	
Length of stay in days . . . . .	11 (±5)	
HIV exposed . . . . .	110	Only 67 received NVP at birth
	HIV PCR at 6 weeks	73 negative
		9 positive

Mortality: Nineteen of the infants died where sudden infant death syndrome seemed to be the commonest cause of death. Loss to follow-up: Twenty two percent of the infants were lost to follow-up. Less than a quarter of those never attended follow-up at all. The majority of those lost to follow-up had gone back to their provinces.Conclusion: Follow-up of LBW babies up to a year corrected age is possible even in a very unstable community.



**Topic 6. A. PHYSIOLOGICAL STABILITY AND B. MASSAGE****Chairman:** Cyril Schneider**#O27****Abuelfettoh Amel** (presenter: Susan Ludington), KSA University for health sciences**EFFECT OF KANGAROO CARE ON PRETERM INFANTS SKIN BARRIER FUNCTION AND HOSPITAL ACQUIRED INFECTION**

Ludington S

Introduction: 32% of the 5 million annual neonatal deaths are due to infection. Neonatal infection is due in part to immature immune functions, such as skin barrier function. Kangaroo Care (KC) (skin-to-skin, chest-to-chest placement of preterm infant and mother) may improve skin barrier function by increasing skin hydration (SH) and decreasing transepidermal water loss (TEWL). Purpose: To determine effect of 5 daily KC sessions on infant SH, TEWL, and presence of infection (# of positive blood cultures during hospitalization and maternal report of signs of infection at 4 weeks post-discharge). Design: A one-group pretest-test-posttest design with 10 preterm infants (28-30 wks GA, 30- 32 wks postmenstrual age, no active infection at entry) was conducted. Test period = 90 minutes of KC; pre-test and post-test periods = 30 minutes each of prone positioning in an incubator. SH and TEWL were taken on Days 1 and 5 at 10 (beginning), 20 (middle), and 30 (end) minutes into the pre- test and post-test periods, and at 30 (beginning), 60 (middle), and 90 (end) minutes of the test period using Multi-Probe Adaptor (MPA) with Tewameter (TEWL) and Corneometer probe (SH). TEWL and SH probes were consecutively placed 2 cm. below the infant's left nipple at midline. Second-by-second recordings of TEWL (120 seconds) and SH (6 seconds) were downloaded to MPA software in a laptop. Data Analysis: Repeated Measures ANOVA determined the difference in SH and TEWL between the pretest-test-posttest periods. Descriptive statistics described number of positive blood cultures during hospitalization and presence of infections four weeks post-discharge. Results: 88% of the infants were African American, 75 % were male with mean GA  $28.75 \pm 1.28$  weeks and were  $16.25 \pm 7.36$  days old at entry. Significant increases in SH between the pre-test and test periods on Day 1 ( $F= 6.28, p= 0.04$ ) and on Day 5 ( $F= 39.67, P= 0.001$ ) were found. TEWL was significantly higher during test than pre-and post-test periods on Day 5 ( $F=6.29, P=0.046$ ). One infant had a + blood culture during hospitalization; no infants had signs of infection by 4 weeks post-discharge. Conclusion: Increased SH is an encouraging finding however, increased TEWL probably reflects maternal contributions to the available water on the infant's skin at the KC intercept. Findings of increased SH and TEWL during KC mandate study with larger sample size (TEWL Effect Size = 0.63, power = 0.77; SH Effect size= 0.51, power = 0.55) to learn KC's effects.



Gene Anderson, Case Western Reserve University, USA

### EARLY SKIN-TO-SKIN (KANGAROO) CARE (KMC) AND TOE TEMPERATURE (TT) IN PRETERM INFANTS

Sheau-Huey Chiu, PhD, RN, University of Akron, schiu@uakron.edu

Objective: Skin-to-skin (SS) KMC has documented vagal effects. Optimal functioning postbirth for preterm infants depends on generalized vascular perfusion. This research was done to investigate the effect of KMC on preterm infant TT as a possible index of vascular perfusion. Design: NIH-funded randomized controlled trial with Institutional Review Board approval registered with ClinicalTrials.gov (NCT00917085). Randomization was done using minimization after eligibility was confirmed. Sample: Non-ventilated preterm infants, 32-36 completed weeks (N=100). We studied all infants who were held during the first 6 hours postbirth (9 KMC and 9 Control infants). Groups were similar. Intervention: Mothers held their diaper-clad infants upright, chest-to-chest, and SS between their breasts. Outcome Variable: TT was measured with a skin probe that was placed on the ventral surface at the base of the right toe and connected to an electronic monitor (SpaceLabs). Methods: Informed consent was obtained during early labor. KMC began as soon as possible postbirth and occurred as often and as long as possible each time Days 0-5. Control infants were wrapped and held at parents' request (standard care). TT was measured continuously by monitor. During the first 6 hours postbirth TT was recorded from the monitor every 15 minutes; type of contact was recorded concurrently using the Index of Mother-Infant Separation (I-MIS). Recording times were objectively determined by preset electronic timer. Pretest-Posttest Analyses: An event that qualified for analysis included 1 or 2-6 consecutive 15-minute periods of KMC or holding that were preceded by 3 consecutive 15-minute periods alone and also followed by 3 consecutive 15-minute periods alone. Eleven KMC and 14 Control events were identified. Monitor strip data were not suitable for analysis. Results: For pretest, test/control, posttest periods, mean TT was 32.5, 32.8, and 33.0 °C (90.5, 91.0, and 91.4 °F) for KMC infants and 32.1, 31.8, and 32.0 °C (89.8, 89.2, and 89.6 °F) for controls. Longer periods of KMC led to greater increases in TT; longer periods of wrapped holding led to greater decreases. Conclusions: Mean TT increased during and after KMC and decreased during wrapped holding suggesting KMC is safe for similar infants. Conclusions are tentative due to small sample size, but suggest hypotheses for future testing. We speculate that TT and vascular perfusion of internal organs are positively correlated, and higher TT posttest for KMC infants reflects stimulation of thermoregulatory processes by KMC. Alternatively, warmer TT in KC group only reflects heat from the mother's current or recent presence. These thoughts suggest hypotheses for future testing in RCTs that focus on definitive measurement of toe and core temperatures.



Réjean Tessier, Université Laval, Québec, Canada

### THE EFFECTS OF MASSAGE ON PRETERM CHILDREN: A LITERATURE REVIEW

The negative consequences of preterm birth or insufficient birthweight on children's and adolescents' health and social and academic adjustment are currently the subject of a broad consensus in the scientific literature. Efforts are increasingly focusing on studying the inherent mechanisms and identifying effective interventions. These studies, along with the latest knowledge on fetal brain development in the third trimester of pregnancy, have gradually led to the adoption of a new approach to preterm care generally termed "Developmental Care."

Massage is part of this new intervention tradition. Over the past twenty years or so, different effects of massage on preterm infants have been observed, including a recurrent effect on daily weight gain and thermoregulation. These effects are thought to be due to changes in vagal activity which may lead to increased gastric motility and thereby weight gain. The hypothesis put forward to account for these results is that the stimulation of mechanoreceptors and baroreceptors in the skin (main afferent fibres of the vagus nerve) leads to increased vagal activity which further stimulates its efferent fibres which are responsible for parasympathetic functions of the gastrointestinal system, such as gastric motility.

The benefits of massage are not only physiological. Preterm infants who receive massages exhibit fewer irritable behaviours, fewer movements, less crying and a lower increase in stress behaviours. In the longer term, at three months of age, massaged preterms show better mother-infant interaction than the non-massaged group. This result can be observed both for the group where the mother provided the massage and for the group where a professional provided the massage. Massaged infants display more reciprocal interaction with their mothers, in addition to being more socially engaged compared with the control group.

In conclusion, preterm infant massage is a method that has cost-effectiveness advantages. Fifteen minutes of daily massage over 2 weeks resulted in a 5-day decrease in length of stay both on the intensive care unit and in hospital. Furthermore, studies that solicited mothers' participation to provide massages for their preterm infant show that mothers (when given training) achieve benefits comparable to those observed with more experienced staff, thus reducing the cost of the intervention even further.



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Monday, June 20, 2010

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8:00

## Topic 7. KMC AND LASTING IMPACT ON INFANT DEVELOPMENT AND FAMILY RELATIONSHIPS



**Guest lecturer:** Rejean Tessier, Université Laval, Quebec, Canada

**Objective:** To examine the long term effects of KMC on the establishment of a durable high quality parent infant relationship.

**Rationale:** **Preterm birth is one of the most common complications of pregnancy and is responsible for 28% of all infant deaths within the first 7 days of life.** Results from meta-analyses of observational studies concluded that premature or low birth weight subjects have cognitive deficits, poorer academic performance, attention problems and are less socially competent than their full-term peers. Two main causal hypotheses brought to our attention are based on the infant's neurological deficits at birth and, secondly, the maladjustment in infant-to-parent interactions.

**Research question:** **Could an intervention such as Kangaroo Mother Care reverse the short- and long-term negative effects of preterm birth?**

Among the negative sequelae of premature birth is the disruption in the attachment process, resulting in part from maternal-infant separation caused by standard incubator care. What to conclude from a literature review?

Effects on the mother

The studies showed that early mother-infant skin-to-skin contact has a more positive effect on the mother's feelings of bonding than the traditional standard care method. It creates a subjective bonding state that can be attributed to the feeling of empowerment afforded by the Kangaroo Mother Care method. These results are more significant if skin-to-skin contact was started within the first days of life.

On the father

Families where mothers reported their partner as being more helpful were described by an observer as more stimulating and more open to their proximal environment. It can therefore be expected that improvements in maternal sensitivity and intrusiveness following KMC may also be observed between father and child in the same domains. KMC may positively influence the family-level process.





Ann Bigelow, St. Francis Xavier University, Canada

**MOTHER-INFANT SKIN-TO-SKIN CONTACT: EFFECT ON BREASTFEEDING AND MATERNAL SENSITIVITY**

Power M, McDonald, C.

The effect of early mother-infant skin-to-skin contact (SSC) on mothers' decision to maintain exclusive breastfeeding and on maternal sensitivity during feeding was investigated in 89 mother-infant dyads over the infants' first three months of life. Mothers in the SSC group were requested to provide 6 hours of daily SSC to their infants in the first week and then 2 hours per day until the infants were one month. No request for SSC was made to mothers in the control group. All mothers recorded the SSC they daily provided to their infants. SSC group mothers provided a mean of 4.9 hours/day in the infants' first week and a mean of 2.8 hours/day in weeks two to four. Control group mothers provided little or no SSC (week 1: M = .4 hours/day; weeks 2 to 4: M = .2 hours/day). On home visits when infants were one week, one month, two months, and three months, mothers' method of feeding their infants was recorded and a feeding session was observed and scored on the NCAST. At one week, the percentage of mothers who exclusively breastfed their infants was not significantly different in the SSC and control groups. However, the percentage of mothers in the control group who were exclusively breastfeeding significantly declined over the infants' first three months of life, whereas the percentage of mothers in the SSC group who were exclusively breastfeeding did not significantly change over this period. Thus early mother-infant SSC helps mothers maintain their decision to exclusively breastfeed their infants. On the Maternal Behavior Subscale of the NCAST, mothers in the SSC group had significantly higher scores, indicating more maternal sensitivity, than mothers in the control group when infants were one week, but not at older ages. At one week, scores on the Maternal Behavior Subscale were examined for mothers who breastfed and bottle-fed in both groups. Mothers who breastfed their infants had significantly higher scores than mothers who bottle-fed their infants. Mothers with the highest scores were mothers in the SSC group who breastfed their infants. Kangaroo Mother Care (KMC) involves SSC and breastfeeding. Thus KMC optimally enhanced maternal sensitivity in the first week.



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Maria Anna Tallandini, Universita di Trieste, Italy

**INFLUENCE OF KANGAROO CARE DURING THE FIRST 6 MONTHS OF LIFE. ANALYSIS OF MOTHER-CHILD ATTACHMENT, PSYCHOMOTOR DEVELOPMENT AND FAMILY ENVIRONMENT**

Huertas-Ceballos A, Genesoni L,

Preterm Infants: Influence of Kangaroo Care During the First 6 Months of Life. Analysis of Mother-Child Attachment, Psychomotor Development and Family Environment Aim. The aim was to verify the efficacy of Kangaroo Care (KC) in developed country across the first 6 months of the preterm infants' life on: 1) mother- infant attachment, 2) maternal psychological distress, 3) infant's family environment, and 4) infant's development. Research has documented the long-term beneficial effects of KC within a westernized culture on infant development and parenting outcomes (Feldman et al., 2004), however controversial data have emerged in UK (Miles et al., 2005).Methods. Participants: 56 mother-child dyads in KC and 34 in Traditional Care (TC) were examined. KC mothers were divided in 33 Intervention KC (I-KC) (at least 60 min a day for 14 days) and 23 Limited KC group (L-KC) (less than 14 days). Procedure: Data were collected after birth (time 1), after hospital discharge (time 2), at 3 months (time 3) and 6 months infants' corrected age (time 4). Possible maternal personal characteristic bias was controlled by Gordon-Personal Profile Inventory (GPP-I). Measures used: Parental Stress Index-SF (PSI-SF), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Neonatal Perception Inventory (NPI) (times 1, 2, 3), Maternal Postnatal Attachment Questionnaire (MPAQ) (times 2, 4), Parenting Alliance Inventory, ENRICH Marital Satisfaction Scale (times 1, 2, 3), HOME Observation (time 3), and BAYLEY-III (time 4).Results. Mother-preterm infant attachment: At time 4, I-KC had a better attachment (MPAQ) ( $p < .05$ ) toward their child than TC. Maternal psychological stress: I-KC mothers shown less parental stress (PSI-SF) at time 2 ( $p < .01$ ) and time 4 ( $p < .05$ ) than TC. Family Environment: I-KC mothers offered a better environment (HOME) in terms of learning materials ( $p < .05$ ). Infant's development. Total motor score was better in L-KC ( $p < .05$ ) than TC. I-KC infants had higher total adaptive behaviors score ( $p < .01$ ) than L-KC and TC, also on self-car ( $p < .01$ ), social ( $p < .05$ ) and motor ( $p < .01$ ) sub-scales (BAYLET-III).Conclusion. KC has a lasting beneficial effect on mother-child, home environment and motor and adaptive behaviours development.

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Madalynn Neu, University of Colorado, Denver, USA

**KANGAROO HOLDING AND HOME VISITING FOR 8 WEEKS AFTER BIRTH AND MOTHER-INFANT INTERACTION AT 6 MONTHS**

Purpose: A follow-up study was conducted to compare interactive responses during a Still Face observation of mother infant dyads who had experienced one hour of kangaroo holding daily for 8 weeks to dyads who experienced traditional blanket holding and a control group. Sample: Mother-infant dyads (n = 66) who participated in an 8-week home intervention encouraging holding were assessed when infants were 6 months of age. Infants were born at 32 to 35 weeks gestational age. Dyads were recruited when infants were 2 to 4 weeks of age and randomly assigned to 3 groups: a) kangaroo holding: mothers held infants at least 1 hour a day in kangaroo fashion; b) blanket holding: mothers held infants wrapped in a blanket in their arms at least 1 hour a day; and c) control: no restrictions on holding time or style. Kangaroo and blanket holding groups received 60-minute weekly visits from an RN who encouraged holding and discussed infant development and cues. The control group received 15 minute social visits. Methods: During the Still Face observation at 6 months, infants were seated in an infant seat directly across from the mother. Each segment of the observation lasted 2 minutes: a) Mother and infant played; b) mother assumed a neutral expression; c) mother and infant played. The neutral face period is typically stressful for the infant and they become less available to the mother afterward. The percentage of time spent in coordinated interaction between mother and infant during free play was calculated. Observations were videotaped and scored by three coders blind to group assignment of the dyads and inter-rater reliability > 90 obtained. The Fogel scoring method was used to assess the quality of the dyad interaction. Symmetrical interaction, when both mother and infant are contributing, is the most optimal. Results: MANOVA analysis indicated no difference in coordinated interaction during play before the neutral face period. A difference was found between groups in interaction after the stress of the still face period (p = .022). Dyads who experienced kangaroo holding were more symmetrical and less asymmetrical in their interaction than dyads who experienced blanket holding and the control group. Conclusion: Kangaroo holding positively influenced mother-infant interaction after stress when the effect of teaching and amount of attention to the mother was controlled.



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Pablo Muñoz, Kangaroo Foundation, Bogota, Colombia

### COMPARATIVE STUDY OF Q-SORT SCORES ON THE CARE SENSITIVITY THAT PARENTS PROVIDE TO THEIR PREMATURE CHILDREN IN THE KANGAROO MOTHER PROGRAMS IN VIETNAM

Varela N, Plata S, Moreno S.

Objective: India and Vietnam are very different countries: the religion, the cast system, the social and cultural dynamics particularly from the Hindu Muslim culture with the limitations on the women's socioeconomic field and the parenthood traditional model contrast with the Vietnamese cultural context, influenced by the Chinese culture, the Buddhist religion, and the western world through a long history of occupations that have created a hybrid socio cultural system open to the western model but deeply rooted to Asian roots where the parenthood concept has been getting gradually more flexible. Based on this cultural particularities and the marked difference between the parenthood concepts in each one of the cultures it was established the importance of measuring the impact of the skin to skin contact (kangaroo position-KP) on the level of sensitivity in parental care of the premature child in Vietnam and India, evaluating the care sensitivity quality and comparing between parents that did the KP contact and the ones who didn't, in each one of the countries. Likewise establish similarities and differences of the most characteristic behavior domains of the parents in Vietnam and India. Design: descriptive – exploratory study Setting: India: Kangaroo Mother Care Programs (KMCP) at the: KEM Mumbai, PGIMER Chandigarh, NHL Medical College- Ahmedabad, Amma Hospital IOG Chennai Vietnam: KMCP at the TU-DU Hospital- Ho Chi Minh City. Subjects: 53 parent-premature baby pairs India: 14 pairs of parents that had their son in KP for at least one hour per the day for more than three weeks and 23 pairs of parents that didn't have the child in KP. Vietnam: 8 pairs of parents that had their child in KP for at least one hour per day during more than three weeks and 8 pairs of parents that didn't have their child in KP. Measurement: Q-sort methodology (care sensitivity), socio demographic survey and adhesion to the KP survey. Results: India: The group of parents that had their baby in KP didn't obtain negative scores in the Q-sort test of care sensibility having 0.87 as the highest score and 0.20 the lowest score for an average of 0.75. While in the group of parents that didn't have their baby in KP the highest score was 0.85 and the lowest score was -0.45 for an average of 0.36 Vietnam: The group of parents that had their baby in KP didn't obtain negative scores in the Q-sort test of care sensibility having 0.87 as the highest score and 0.65 the lowest score for an average of 0.78. While in the group of parents that didn't have their baby in KP the highest score was 0.76 and the lowest score was 0.35 for an average of 0.57. Discussion: It was showed that the KP had a positive effect in the sensitivity care of the Indian and Vietnamese parents, nevertheless it was identified that apparently there is a bigger effect of the KP over the sensitivity care in the Indian parents than in the Vietnamese parents.

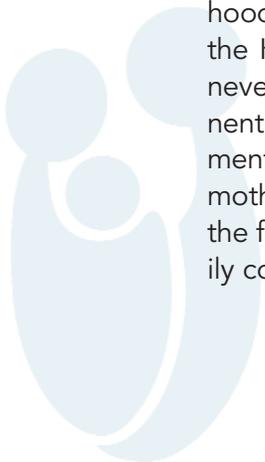


Natalia Varela, Kangaroo Foundation, Bogota, Colombia

### IMPACT OF THE SKIN TO SKIN CONTACT ON THE SENSITIVITY IN PARENTAL CARE OF PREMATURE CHILD IN INDIA

Muñoz P, Plata S, Moreno S.

Objective: India is a diverse sociocultural and heterogenic country; its closed caste system, religions and particular ways of social integration generate big queries for the western culture. Practices like settled marriage, dowries in order to get married, integration between castes and separation between father and son during his first month of life, are examples of how different Indian cultural context can be. Having in mind these cultural particularities and the reduced number of researches that have been done about the influence of the skin to skin contact (kangaroo position-KP) on the sensitivity in paternal care, it was determined that in this research it will be measured the impact of KP on the level of sensitivity of the father in five Kangaroo Programs (KMCP) in India through: 1) Characterization of the perceptions of the paternal role with his son, 2) The evaluation of the impact of the sensitivity in parental care, and 3) Establishing similarities and differences about perceptions and behaviors on the level of paternal care between the ones who provided KP and the ones who did not. Design: Descriptive – exploratory study Setting: KMCP at the: KEM Mumbai, PGIMER Chandigarh, NHL Medical College- Ahmedabad, Amma Hospital IOG Chennai. Subjects: 37 dyads father-infant, divided into two groups: 14 dyads that had their son in KP at least one hour/day for three weeks and 23 dyads that didn't have their child in KP. Measurement: Q-sort Methodology (care sensitivity), semi-structured interview, socio demographic survey and adherence to the KP. Results: The group of fathers that had their baby in KP didn't obtain negative scores in the Q-sort test of care sensitivity having 0.87 as highest score and 0.20 as lowest score for an average of 0.75. In the group of fathers that didn't carry their baby in KP highest score was 0.85 and lowest score was -0.45 for an average of 0.36. Inside the analysis categories that the interviews showed we can observe that the KP and prematurity are variables that have influence on the perception of the paternal role, in the same way that the cultural and religious aspects are emerging categories that tend to determine the gender expectations and the number of expected children. Discussion: It was possible to show that the KP had a positive effect over the sensitivity care in Indian parents as well it was found that the parenthood perceptions have been enriched by the experience of having their son in the KP due to the interaction, early involvement and a bigger care responsibility nevertheless religious, cultural, and prematurity factors are determinant components for the paternal role. This results that were found in this investigation complement and go according to along with results found in the research: "Kangaroo mother care, a family perspective" (Tessier, R) about the impact of KMC Method in the family, where it is concluded that there exist a favorable influence over the family context.



## Topic 8. ECONOMIC IMPACT OF KMC



**Guest lecturer:** Juan Gabriel Ruiz-Paelaez, Pontificia Universidad Javeriana, Bogotá

### AN INITIAL APPROACH TO THE CHALLENGES OF PERFORMING AN ECONOMIC EVALUATION OF A KANGAROO MOTHER CARE PROGRAM

**Rationale:** A complete economic evaluation should enumerate and value all the health effects attributable to an intervention. It also enumerates and value all the resources used or saved when delivering the health care intervention. Then it tries to compare both costs and outcomes in a meaningful way and offers an estimation of whether the benefits are worth the resources invested and the risk incurred. The merits and costs are always estimated by comparison with a standard or control intervention. Incremental benefits and costs are compared, i.e. differences in costs and effects between competing interventions. There are 4 approaches to conducting these evaluations: 1) cost-minimization (assuming effects to be equivalent), 2) cost-effectiveness (incremental cost/incremental health effect), 3) cost-utility (incremental cost/ incremental utility –quality adjusted life years) and cost-benefit analysis (both cost and effects are valued as currency). **Objectives:** Cost-utility evaluations are the most favored approach to assess efficiency of health care programs, but specifically for KMC the problems related with measuring health related quality of life in preterm infants have not been properly addressed and solved. As a preliminary approach to the economic evaluation of a KMC program developed by Fundación Canguro in Bogotá a cost-minimization analysis was conducted. **Methods:** Basic assumptions were: 1) setting Bogotá, Colombia 2009, 2) Perspective: Social Security System (SSS) which a) Pays for hospital bills b) Pays for ambulatory care and c) Pays for maternity leave. 3) Time horizon: from eligibility to KMC to term 4) Subjects: preterm infants under 1500 g at birth. 5) Direct medical costs in Colombian pesos of 2009 (“typical” exchange rate col\$2000 per US\$) and no discount rate applied 6) Modeling as if: a) All mothers are workers and b) All make a minimum legal wage 7) Effects estimated from RCT results (Pediatrics 2001;108:1072-9.) : a) No differences in mortality b) No differences in morbidity c) Average savings in hospital stay from eligibility to term: 10 days (in under 1500 g). 10) Sources for costs were average charges per hospital day at Hospital San Ignacio and direct cost structure of the KMC program at San Ignacio Hospital. **Results:** 1) KMC: Total average direct costs for the SSS per infant (assuming 100 infants per month) Col\$1’520.000 2) Control group Col\$7’500.000 (range 4’5-10 M) 3) Net cost difference (Control – KMC) Col\$ 5’980.000 (range 2’98 M - 8’48 M) **Interpretation:** This is a very simplified exercise. Several direct medical costs in control group were not included. Despite the bias against KMC, cost savings for kangaroo infants are large, allowing to pay for the program up to term and to subsidize the cost of the maternal leave. This exercise offers an idea of the likely direction of economic consequences of using KMC. Currently a formal economic analysis is being designed.





## Topic 9. PLANNING KMC NATIONWIDE

**Guest lecturer:** Nathalie Charpak, MD., Pediatra, Programa Madre Canguro Integral, Hospital Universitario San Ignacio, Directora « Fundacion Canguro », Bogota, Colombia.

Introduction. Low birth weight (LBW) affects some 20 millions infants each year, mostly from less developed countries and is associated with more than 30% of neonatal mortality and morbidity worldwide. Kangaroo Mother Care (KMC) is an evidence-based technology developed in Bogotá that is able to ameliorate LBW deleterious effects on infants' health, nutrition and early development. This strategy is particularly well suited for resource-restricted settings: KMC is an effective way to meet infants' needs for warmth, breastfeeding, stimulation, safety and love. Because of the way research has been conducted and translated into health care policies, KMC has also promoted the use of scientifically sound interventions in the actual delivery of neonatal care in developing countries. The role of the Kangaroo Foundation in Colombia: The Kangaroo Foundation has been working with more than 10 large health care facilities in different regions in Colombia. The goal is that each center develops a KMC program, together with quality assurance and monitoring tools, including clinical and managerial databases and performance indicators. The Kangaroo Foundation coaches each institution during training, implementation and consolidation of their KMC programs. The dissemination model is summarized as "see, do and teach", meaning that in order to translate KMC to another geographical location a health care team visit and receive training in a reference KMC program in Bogotá (see one); then go back and implement a KMC program in their home institutions (do one) and afterwards, they train teams from other centers in their region and coach them during implementation (teach one). Colombian health policy and the KMC method: KMC is well known and accepted by health professionals in Colombia. In 2000, the Ministry of Health issued recommendations for delivering kangaroo mother care to LBWI in Colombia, but very few institutions were able to implement KMC. Recommendations by themselves are not enough to develop a good quality program. Training and exposure to successful practice in a reference KMC centre in our experience has been key to successful dissemination. In 2009 the Colombian health authorities decided that KMC had to be implemented in all health facilities taking care of LBW infants and their families. The Kangaroo Foundation was commissioned to provide a set of practice guidelines to implement and deliver KMC. Tools for assessing and monitoring successful implementation and criteria for KMC programs quality assurance and accreditation were also developed. Conclusion: There has been a continuous effort to translate knowledge about KMC into effective and efficient health practices in Colombia. The uptake of KMC in Colombia, the performance of KMC programs and their impact on health and quality of life of LBW infants in Colombia should be monitored and enhanced.

Anne-Marie Bergh, MRC Unit for Maternal and Infant Health Care and Strategy and University of Pretoria, South Africa

**PROGRESS IN THE SCALE-UP OF KANGAROO MOTHER CARE IN GHANA**

Davy K, van Rooyen E, Manu R, Ghana Health Service, Koku A, Baffoe P.

Background Kangaroo mother care (KMC) was introduced to all hospitals in 4 of the 10 regions in Ghana. The programme consisted of the establishment of regional, district and institutional KMC steering committees, combined with continuous support and training over a period of one year (2008-2009). The first phase was a joint partnership between Ghana Health Service, UNICEF Ghana, the MRC Unit for Maternal and Infant Health Care Strategies and the University of Pretoria, South Africa. Aim To describe the results of the monitoring of the progress with implementation of KMC in Ghana after one year. Method Implementation progress was measured with a standardised progress-monitoring tool. Each region nominated assessors for a 2-day training workshop (n = 24). All 38 hospitals were visited in May 2009 by a team of 3-4 monitors, initially accompanied by a facilitator familiar with the monitoring tool. A progress-monitoring visit typically included a presentation by the district, hospital and health centres on achievements, interviews with staff and a walk-through visit to relevant wards. Results Scores ranged from 1.55 to 20.69 out of a possible 30 points. The mean score was 12.07 and the median 12.42. 26 hospitals (68%) scored more than 10 points, which placed them at the level of having reached at least "evidence of practice". 7 of these hospitals (18%) achieved the higher level of "evidence of routine and institutionalised practice". 12 hospitals (32%) did not achieve "evidence of practice". Hospitals that had obtained baby-friendly status or had been re-accredited within the previous 5 years (n = 16) had a significantly higher mean score of 14.60 (p <0.0005). Conclusion • It was possible to scale up KMC in Ghana. More than two thirds of hospitals were able to demonstrate evidence of practice. • Appropriate support is needed to keep the momentum with a view to sustainable practice. • Hospitals excelling in implementation have been identified for further development as training and reference centres. • Community KMC will be addressed in future. There are plans for the further scale-up of KMC in Ghana.

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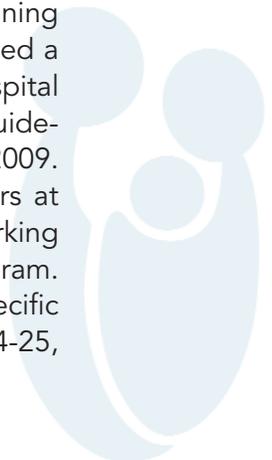


Rulina Suradi, University of Indonesia

## ADOPTING NATIONAL PROGRAM FOR KANGAROO MOTHER CARE (KMC) IN INDONESIA

Pratono H, Wahyuningsh A, Arbain E, Suginarti

Indonesia is the fourth biggest populated country in the world with a population of 220 millions. The Neonatal Mortality Rate (NMR) is still high. Based on the recent Demographic Health Survey (DHS) of 2007 the NMR was 34/1000 live births. Around 47% of the infants' death occurred during the neonatal period, and about 29% were caused by Low Birth Weight Babies (LBWB). The incidence of LBWB was estimated about 17%. The main cause of neonatal death varied, but most of them were partly due to lack of optimum health services and facilities in neonatal emergency as well as the failure in getting proper information and optimum newborn health care for the family. The KMC as an evidence-based intervention to reduce death due to prematurity and LBWB has been introduced in the country. In 1994/1995, the Indonesian Society for Perinatology (Perinasia) with the support of the Ministry of Health (MOH) conducted a study in the rural areas for the acceptance of KMC by the rural women. In 1997 Perinasia held its 5th National Congress in Manado (North Sulawesi) in which the KMC was discussed among the professionals including a resource person from Italy. In 2003, a team consisting of a pediatrician and a midwife from Mataram hospital were sent to the Kangaroo Foundation (Bogota) to join a 3 week hands on training in KMC. This hospital besides Sardjito hospital (Yogyakarta) implemented KMC. Since then Perinasia has run its own 2 day training of KMC, the training used a baby doll instead of using a real case. Since 2009, the training was enhanced with another half day for practice with real patients. Up to 2009 about 1436 health personnel have joined the KMC training by Perinasia, consisted of 772 midwives, 363 nurses, 182 general practitioners or obstetrical-gynecologist and pediatric residents, 53 pediatricians, 3 gynecologist, and 61 college's lecturers. Intermittent KMC has been practiced in several hospitals, however, continuous KMC is still not being properly practiced in the Indonesian teaching hospitals. In 2008 Perinasia in cooperation with MOH (supported by HSP/USAID) sent a team consisting of a program manager at MOH and 3 teams from teaching hospitals (Dr Cipto Mangunkusumo General Hospital, Jakarta; Dr Sutomo General Hospital, Surabaya and Dr Wahidin Sudirohusodo General Hospital, Makassar) to join a three week hands on training on KMC in South Africa. After returning these teams and the MOH developed a policy on guidelines for caring LBWB with KMC, Mother Baby Friendly Hospital in which KMC and early initiation of breastfeeding was integrated in the guideline. A decree on a National Working Group on KMC was issued on May 16, 2009. This national working group of KMC consists of different main stakeholders at MOH, and professional organizations. The main task of this national working group is assisting the MOH in preparing a national plan for the KMC program. This national working group on KMC was attached to the Director of Specific Medical Services (sub-directorate of hospital accreditation). On February 24-25,





Evelyn Zimba, Save the Children-Saving Newborn Lives, Malawi

### PLANNING AND SCALING UP KMC IN MALAWI

Abwao S.

In Malawi the under-five mortality rate has declined substantially from 133/1000 to 118/1,000 live births with neonatal mortality rate at 33 per 1,000 live births. Progress towards the MDG4 is complicated by a high number of low birth weight babies forming an estimated 20% of all newborns in Malawi every year. LBW/preterm babies are especially at risk of infections and hypothermia. This is made worse by poor access to health services and lack of related specialized care and equipments. Many preterms born at home inevitably die of hypothermia or untreated infections. Kangaroo mother care (KMC) is a feasible, low cost intervention that has been used to care for LBW babies in Malawi. Few options for specialized care were available for small babies at most health facilities with inadequate staff; no incubators and lack of other related equipments and supplies. This necessitated a need for greater access to and availability of KMC services. To promote KMC service scale up, wider partnerships, beyond a single program’s intervention and directed government leadership were required. KMC in Malawi was initiated in 1999 at one central hospital with 8 KMC beds. In 2002, Save the Children-Saving Newborn Lives (SC-SNL) program in collaboration with the Malawi Ministry of Health-Reproductive Health Unit (MOH-RHU) by learning from this central hospital, initiated the scale-up of KMC services. By 2005, six more KMC sites were established, though still inadequate for the whole country. In 2007, a KMC retrospective assessment was undertaken to inform KMC expansion and the report recommended KMC scale up was possible with few additional resources. During national dissemination of this report, scaling up to all district hospitals was envisioned and 10 districts requested technical assistance to establish KMC units. At present, 30 hospitals and 6 health centres have KMC, 300+ health staff trained and 2000 babies received KMC, and community KMC introduced in a few districts. This abstract paper will also detail process/steps in planning and rationale for nationwide KMC scale up, challenges and actions, partnerships/role of government, advocacy, resource mobilization, training, service quality, BCC, M&E, and national KMC policy/service guidelines. Related challenges are highlighted that need specific attention for planning and implementing nationwide scale up.

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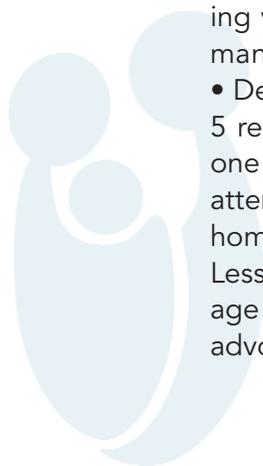


**Kante Modibo**, Saving Newborn Lives/Save the Children, USA, Sahel Office

## **KMC IN MALI: GETTING TO SCALE IN A SEVERELY RESOURCE-LIMITED SETTING**

Diarra H, Kerber K

Context and justification: The neonatal mortality rate in Mali is very high at 46 deaths per 1,000 live births (DHS IV, 2006), resulting in an estimated 28,000 deaths per year. This represents one quarter of all deaths among children under age five. Each year around the world approximately 20 million babies are born with low birth weight. The WHO estimates that 17% of newborns in low-income countries are born with low birth weight compared to 6% in high-income countries. In Mali, 14% of newborns are low birth weight, and approximately half of all births in Mali take place in a health facility, but many facilities provide very little in the way of newborn care. It is well known that KMC is a cost-effective approach that can address many needs of the preterm/low birth weight babies but yet it is not widely implemented, especially in low-resource settings. Unfortunately other practices are used which are not as effective and also separate the mother and baby. In light of this situation, in 2006 the Saving Newborn Lives programme of Save the Children together with the Division of Health and Reproduction of the Ministry of Health and partners including UNICEF, CHU/GT, CREDOS, Groupe Pivot/Sante population, have implemented a programme to manage low birth weight babies through KMC. General objective: to determine the feasibility and acceptability of KMC in the Malian context and to identify strategies to scale up the method across the country. Specific objectives include: Reinforce competencies of the health care workers in caring for low birth weight babies • Undertake a systematic costing exercise to determine the cost of KMC implementation in Bougouni district. Disseminate results with the view of expanding KMC widely Strategies: • Set up a learning centre for KMC • Develop communication and counseling materials. Undertake a systematic advocacy and communications strategy for KMC at various levels • Train health workers and management staff Activities completed: • Trained trainers from Centre Hospitalier Universitaire Gabriel Toure (CHU/GT) Renovation and equipment supplied to the learning centre based at CHU/GT • Advocacy days with local political authorities, local councilors, development partners, chief medical staff in 8 regions • Conducted a learning visit to Rwanda with Ministry of Health delegates • Adapted a KMC training manual also used in Malawi, Tanzania, Rwanda for the Malian context • Developed communication materials and job aids for KMC • Trained trainers in 5 regional hospitals nation-wide • Supported the establishment of KMC unit at one district hospital • Oriented community health workers and traditional birth attendants to KMC so they could refer low birth weight babies who were born at home • Oriented radio announcers and other media personalities on KMC Lessons learned • If health workers receive training in KMC they are able to manage low birth weight babies, even without a background in newborn care. • While advocacy efforts with administration and local officials has been successful, poli-





Rekha Udani, KEM Hospital & Seth Gs Medical College, Mumbai, India

**IMPLEMENTATION OF KANGAROO MOTHER CARE - KEM EXPERIENCE IN INDIA**

Nanavati R.

Rationale - Out of 5million global newborn deaths 1.2million in India. Every year 27 million neonates are born; approximately 30% (highest in world) are Low birth weight (LBW) babies and 75 % of them die either direct or indirect causes of low birth weight. Kangaroo Mother Care is a cost effective intervention and is the need of the hour for better survival & better quality of life and for the benefit of the baby, family, community and the nation. In 2000 after learning through literature, KMC was initiated at KEM Hospital Mumbai, having level III NICU; for securing a baby for KMC, KMC bag was made. Kangaroo Mother Care was implemented in Labor room, postnatal care ward, Neonatal intensive care unit and Transitional Intermediate care unit. Randomized Controlled Trial was planned. In 2002 International KMC sensitization conference at Delhi was organized and Pediatricians from private and government medical colleges were invited to attend. In 2003 one nurse & HOD Neonatology received training at Bogotá. KMC committee was formed. SNL approved 2years KMC Project in 2004 with objectives of having implementation of KMC to HRLBW, Ambulatory KMC and KMC Dissemination in country. Challenges of implementing the KMC components and Establishment of Ambulatory KMC centre were faced and resolved. Dissemination of knowledge was carried out by developing the training material and conducting workshops and training programs in western India by targeting pediatricians, obstetricians, community health care and nursing personnel from medical colleges.To establish KMC in India, Central coordinator with the help of zonal , regional coordinators & National Professional Bodies should implement KMC all over India by i) organizing In-service training workshops at the Demonstration centre (KEM-KMC Center) having devoted & trained personnel ii) developing networking & coordination with International & national, Government & NGO donor agencies. lii) carrying awareness through learning material in local languages, posters, and video demonstrations and media coverage on WAR-FOOT basis to develop KMC culture in the country for better quality survival of LBW babies for achieving Millennium Development Goals.



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# ABSTRACTS FOR THE POSTER PRESENTATIONS

## POSTER SESSION 1

Sunday, June 20, 2010

11:00 AM

### #P1 SKIN-TO-SKIN CARE AND FUTURE BREASTFEEDING: THE VALUE OF MATERNAL ODORS AND NEONATAL OLFACTION IN THE FIRST 90 MINUTES OF LIFE

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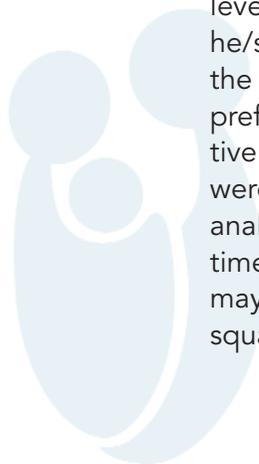
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Background: Skin-to-skin contact (SSC) at birth has been previously shown to facilitate the latching-on process, maternal-infant bonding and eventually, the success of breastfeeding. Various mechanisms and theories have been hypothesized to explain this phenomenon but the value of maternal odors and the newborn's prenatally-developed olfactory system has rarely been explored as a contributing factor to this process. Objectives. 1) To observe the newborn babies' preference for the mother's unwashed breast during skin-to-skin contact in the first 90 minutes of life 2) To determine if this preference for the unwashed breast impacts on the success of subsequent breastfeeding. 3) To determine if the time of the last maternal bath prior to delivery has an effect the baby's choice of nipple. Methodology: This is an observational cohort study of full term, healthy newborns delivered vaginally to healthy mothers at a tertiary private hospital in Pasay City, Metro Manila Philippines. After appropriate consent was obtained from the mother, the newborn is immediately dried on the mother's abdomen while one of the mother's nipples is washed with cotton balls soaked in sterile water. The newborn is subsequently placed prone, skin-to-skin in between the breasts at the level of the nipple. The infant's behavior was observed and videotaped until he/she found the nipple without assistance and began to suck vigorously within the first 90 minutes of life. For the next 24 hours, the frequency of breastfeeding, preference for mixed or bottle feeding were documented. Description of qualitative data was done using a simple frequency distribution table. Quantitative data were summarized using the mean, standard deviation and the range. Data was analyzed using a binomial test, with the null hypothesis being set at 50% of the time, babies will either choose the unwashed breast or not. Other factors that may be related to choosing the unwashed breast were determined using chi-square test. Level of significance was set at  $\alpha = 0.05$ . Results. A total of 26 full



term healthy babies were enrolled in the study. Of these babies, 19 (73%) chose the unwashed breast while of the seven (27%) who did not, six just stayed in the middle and only one chose the washed breast. ( $p=0.029$ ). Of the 19 who chose the unwashed breast, 12 (63.2%) exclusively breastfed, 7 (36.8%) mixed fed and no baby bottle fed. On the other hand, in the 7 babies who did not choose unwashed breast 3 babies (42.9%) were purely breastfed, 1 baby (14.3%) was mixed fed, 3 babies (42.9%) were bottle fed ( $p=0.009$ ). The time of last bath prior to delivery did not significantly affect the choice of the nipple. ( $p$  value= $0.495$ ).

**Discussion.** The nipple and areola are rich sources of substances that could serve as olfactory signals, not only colostrums and milk, but also secretions of densely concentrated sebaceous and apocrine glands. Olfactory cues are of biological relevance at initiation of breastfeeding. When newborn babies are placed in a prone (skin-to-skin) position between their mother's breasts immediately after delivery, they display a consistent sequence of activity, i.e, crawling movements, which bring the babies into contact with one of the nipples, and eventually active sucking occurs within about one hour after the delivery. Unnecessary routine cleaning may interfere with the establishment of successful early breastfeeding by elimination of the infants' access to biologically relevant chemical signals. Newborn babies are physiologically prepared to recognize the olfactory signature of the mother during their interactions within the first postnatal hours. This observational cohort study supports the theory that prenatal olfactory experiences in-utero assists the newborn baby in "nipple-tracking" during the first 90 minutes of life. Likewise, the smell of unwashed breast, which has a similar lipid compound to the amniotic fluid, leads the baby to the nipple, enabling a successful latching-on process and continued breast feeding in the first 24 hours of life.

**Conclusion.** Successful initiation of breastfeeding in the first 90 minutes of life can be facilitated not only by skin-to-skin care but also by preserving maternal odors and allowing the newborn's prenatally-developed and adapted olfactory sense to track his/her own mother's nipple odors. Babies who chose the unwashed breast will be more likely to be purely breastfed in the first 24 hours of life compared to those who were unable to track their own mother's nipple due to washing and removal of maternal odors.



## #P2 IDENTIFYING FACTORS ASSOCIATED WITH HIGHER BREASTFEEDING RATE IN IRAN COMPARE TO AUSTRALIA

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Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants. However, despite the well documented health benefits of breastfeeding, most Australian women discontinue breastfeeding before the recommended time. Based on UNICEF statistics in 2007, in Australia 87% of mothers initiated breastfeeding, no infants were fully breastfed at age six months and no mothers have continued breastfeeding up to 23 months. However, in Iran 98% of mothers initiated breastfeeding, the exclusive breastfeeding rates at six months of age were 23% and 58% of mothers have continued breastfeeding up to 23 months. This study attempts to identify variables influencing breastfeeding practices in Australia by comparing Australia with Iran, which enjoys a comparatively high breastfeeding rate. A search of the literature relevant to breastfeeding in Australia and Iran from 1980–2007 was conducted. Those variables which appear to be associated with longer breastfeeding duration in Iran were identified as: 1- More uptake of the Baby Friendly Hospital Initiative. The BFHI mandated ten steps to successful breastfeeding are followed in Iran, whereas in Australia there are apparent differences in relation to at least 7 of the ten BFHI steps. Among these steps mother-infant skin-to-skin contact, early and exclusive breastfeeding and rooming-in practice were the most important factors. The early initiation of breastfeeding (Kangaroo Nutrition) and skin-to-skin contact (Kangaroo Position) is associated with longer duration of breastfeeding in Iran. In addition, 24-hour rooming-in (Kangaroo Support) is practiced in all Iranian hospitals whereas this value is only 37% for Australia. 2- National program for the promotion of breastfeeding 3- More supported return to paid work 4- Cultural issues. Strategies successfully employed by Iran to increase breastfeeding duration may also be of benefit in Australia and other countries. While many of these strategies involve financial cost, increasing the length of breastfeeding in Australia has the potential not only to improve the health status of Australia's population, but also to make significant savings in Government health expenditure. The cost of weaning prematurely is around \$60–120 million annually in Australia whereas a relatively small portion of this money may make a difference to breastfeeding duration in Australia.

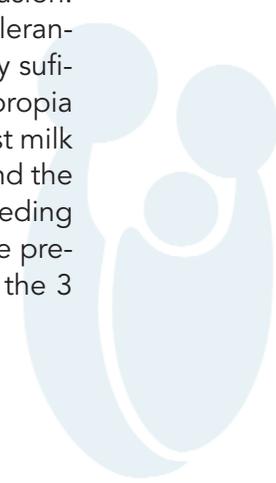


### #P3 KMC AND BREASTFEEDING THE LOW BIRTH WEIGHT INFANT (LBWI): EXPERIENCE AND RESULTS AT ONE YEAR OF CORRECTED AGE IN A COHORT OF 6889 INFANTS DISCHARGED HOME

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Objective: To evaluate rate of breastfeeding and growth results at one year of corrected age in a cohort of 6889 LBW infants cared in a ambulatory KMC program between 2002 and 2009. Patients and design: Prospective cohort of LBWI infants (GA  $\geq$  37 weeks at birth or birthweight  $<$  2000g) discharged home in kangaroo position-KP with periodical follow-up until 12 months of corrected age. Promotion of breastfeeding is part of the KMC intervention. Intervention: KMC intervention: 1) Continuous KP (skin-to-skin contact 24 hours), 2) Exclusive breastfeeding whenever possible and 3) Early discharge in KP with close monitoring and follow-up. Breastfeeding intervention: The kangaroo nutrition strategy is designed for babies in the steady growth period which is divided in 2 during KMC, one in the hospital and the second one at home in Kangaroo position during the KMC follow up. Breastfeeding is the main nutritional source for the baby, and should be used whenever possible. The growth objective is a weight gain at least as significant as that of the intrauterine growth (15 g/Kg/day until term). When this goal is not attained, the first option should be using hind milk from the same mother to provide supplementary caloric intake before considering breast milk supplementation. Only when hind milk has failed, breastfeeding supplementation or fortification will be considered apart from a deep psychological support. Results: 6889 eligible infants were admitted to the ambulatory KMC program. 15.1% of them were less than 30 weeks of GA at birth, 16.4% between 31 to 32, 31.0% between 33 to 34, 28.2% between 35 to 36, and 9.3% more than 37 weeks. 3333 of these infants had a intrauterine growth retardation at birth, 48.4% reached 40 weeks of gestational age with exclusive breastfeeding (EBF) and 38.8% with mixt feeding. At three month, 16.7% were still with EBF, 30.4% with mixt feeding and 52.9% with only artificial feeding. Anthrometric data at 40 weeks were in average: 2813 gr for weight, 46,4 cm for height and 34.3 cm for head perimeter (HP). At one year average weight was 8621 gr, height 71,4 cm and HC 45,5 cm. Overall mortality in the cohort was 1.5% up to one year of corrected age. Conclusion: Conociendo los efectos beneficiosos de la leche materna sobre la tolerancia digestiva, la calidad nutricional y la protección contra las infecciones hay suficientes argumentos válidos para estimular la lactancia materna de su propia madre en el niño prematuro. Considering the beneficial effects of breast milk on digestive tolerance, nutritional quality and protection against infection and the anthropometric results of these cohorte the arguments to stimulate feeding preterm babies with milk from their own mother are valid. Breastfeeding the premature y/o LBWI in the cornerstone of the KMC nutrition strategy, one of the 3 components of the KMC method.



#### #P4 EFFECT OF EARLY SKIN-TO-SKIN MOTHER-INFANT CONTACT DURING THE FIRST 3 HOURS FOLLOWING BIRTH ON EXCLUSIVE BREASTFEEDING DURING THE MATERNITY HOSPITAL STAY

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This was a nurse-driven hospital-based prospective cohort study of data collected in 19 hospitals in San Bernardino and Riverside counties in California by California Perinatal Services Network of Loma Linda University Medical Center/Children's Hospital on all mothers (n = 21 842) who delivered a singleton infant (37-40 weeks gestation) between July 2005 through June 2006. Multivariate ordinal logistic regression showed that maternal infant-feeding method intention (measured prior to birth), sociodemographic characteristics, intrapartum variables, and early skin-to-skin mother-infant contact during the first 3 hours following birth (controlling for delivery hospital) were correlated with exclusive breastfeeding during the maternity hospitalization. Compared with mothers with no early skin-to-skin contact, exclusive breastfeeding was higher in mothers who experienced skin-to-skin contact for 1 to 15 minutes (odds ratio [OR] 1.376; 95% confidence interval [CI], 1.189-1.593), 16 to 30 minutes (OR 1.665; 95% CI, 1.468-1.888), 31 to 59 minutes (OR 2.357; 95% CI, 2.061-2.695), and more than 1 hour (OR 3.145; 95% CI, 2.905-3.405). The results demonstrate a dose-response relationship between early skin-to-skin contact and breastfeeding exclusivity.



## #P5 CEREBRAL EXCITABILITY AND VISUOMOTOR COORDINATION IN 8 YEAR-OLD CHILDREN BORN VERY PRETERM

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**INTRODUCTION.** Children born very preterm (PT < 32 weeks of gestational age) and living without any major disorder remain at a high risk for developmental impairments at school age. Most of these children present a high prevalence for minor motor and functional impairments, especially difficulties in visuomotor coordination skills. Preterm birth may alter corpus callosum maturation, which modifies cerebral excitability and motor programming mechanisms. The present study aimed at addressing, in 8 year-old PT children compared to term peers (T), whether visuomanual coordination difficulties were accompanied by an alteration in primary motor cortex (M1) functioning, as tested by transcranial magnetic stimulation (TMS) outcomes. We hypothesized that a different brain development in PT may interfere with the establishment of functional cortico-cortical motor connections, thus leading to differences in M1 excitability and to motor coordination deficits.

**METHODS.** Seventeen children aged 8 years old were enrolled in this study. Ten PT children were recruited (six males; mean age = 8 years 6 months 3 days, SD = 3 months 15 days; range 8y 0mo 20d to 8y 11mo 5d; mean birthweight = 1157g, SD = 305g). Seven T children were recruited (five males; mean age = 8 years 4 months 13 days, SD = 4 months 8 days; range 8y 0mo 9d to 8y 10mo 29d). These groups were compared in terms of clinical performance (three standardized clinical assessments) and cerebral excitability (TMS single- and paired-pulse paradigms).

**RESULTS.** Preterm children presented lower scores on the Developmental Test of Visual-Motor Integration (VMI; for visual-motor integration full format section ( $p=0.0018$ ) and for motor coordination subtest ( $p=0.018$ )) as well as on the Movement Assessment Battery for Children (M-ABC;  $p=0.038$ ). In parallel, in the dominant hemisphere, term children presented a higher level of intracortical motor inhibition (ICI) compared to PT children, where no ICI was observed ( $p=0.009$ ).

**CONCLUSION.** This study provides new evidence of differences in brain functioning and visuomotor impairments associated with a preterm birth. We showed further the significant difficulties of very preterm children in visuomotor integration and fine motor coordination tasks as compared to fullterm children. The total absence of ICI in M1 of very preterm children, as compared to the ICI detected in their term peers for the dominant hemisphere, may reveal that the intracortical inhibitory mechanisms required for motor planning and programming are lacking and may explain visuomotor coordination deficits.



## #P6 BIRTH KANGAROO CARE FOR LATE PRETERM BABY AND ADAPTATION TO EXTRA UTERINE LIFE

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Background : We decided to implement coupled care in our NICU. Since 2007, the premature baby and mother are hospitalized together at some point of the baby's stay at the hospital, but rarely from the first hours, as the neonate is initially observed and cared in the neonatal department. Retrospective results: In 2008 and 2009, we evaluated the population of premature babies of 34 and 35 weeks of gestational age, staying or not with their mother. The results showed a statistically significant relationship between a stay even partial in a mother premature baby's room and the success of exclusive breastfeeding at discharge : 67 out of 86 (77,9%) premature babies who stayed with their mother received exclusive breastfeeding at discharge, versus 23 out of 55 (41,8%) among those who stayed only in the NICU ( $p < 0.0001$ ). The robustness of these observations could be criticised due to their retrospective nature and due to the fact that the premature babies didn't stay with their mother during the total length of hospitalization,. Prospective study :To assess physiological stability in babies of 34-35 weeks of gestation that receive coupled care, i.e. skin to skin contact, starting in the delivery room and continuing to the mother - premature baby room. Neonates will be randomly allocated to 2 groups: Study population: premature babies of 34-35 weeks of gestational age maintained with their mother during the first 6 hours in skin to skin (birth kangaroo care for late preterm baby). Control population: standard care in the neonatal department. Physiological stability (cardiac, respiration, temperature and glycaemia) the first 6 hours, the impact on success of exclusive breastfeeding at discharge and on post-partum depression (Edinburgh Post Partum Depression Scale) will be evaluated. This prospective study is currently in progress. Conclusion: KMC and (partial) coupled care for late preterm babies seem to have an impact on successful breastfeeding at discharge. The next step is studying birth kangaroo care and coupled care immediately after birth for these babies. The impact on the physiological stability, on exclusive breastfeeding at discharge and on post-partum depression will be evaluated.



## #P7 BREASTFEEDING IN SMALL FOR GESTATIONAL AGE INFANTS ON KANGAROO MOTHER CARE

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Breastfeeding in small for gestational age infants on Kangaroo Mother Care Ekawaty L Haksari, Setyowandito, Tanjung Wibowo Most article showed comparison growth and breast feeding of low birth weight (LBW) infants under Kangaroo Mother Care (KMC) and conventional care. Our study investigate the different outcomes of small for gestational age (SGA) and appropriate gestational age (AGA) infants on kangaroo care Method. A retrospective study based on medical records, all low birth weight infants < 2000 grams who met the inclusion criteria were collected from January 1, 2008 to July 31, 2009 in Sardjito general hospital. LBW infants with major congenital anomaly, severe illness and disturbance hemodynamic condition were excluded. The LBW infants included in our study were divided into 2 groups were AGA and SGA groups. Physicians decided the LBW infants undergo KMC and nurses initiated KMC to mothers, according to the protocol of start adaptation, implementation and follow up during KMC. Recording included previous diagnosis before enrollment into the study, the time of KMC enrollment, hospitalization and follow up until reach 40 weeks of gestational age or more than 2500 gram in the lactation clinic. Body temperature, feeding, respiration, daily weight, and episodes of disease during hospitalization were measured. The outcome of the LBW included discharge, death, return to conventional care and discharge against medical advice. The information on LBW after discharge was based on the out patient records and mothers records. Breastfeeding and way of feeding were recorded before enrollment, during the stay and after discharge Results There were 92 SGA and 93 AGA infants in our study. We found 2 infants SGA infants and 3 AGA infants with KMC returned back to conventional care. There was no difference of episode of apnea in the two groups. Breast milk and breastfeeding was found to be higher in the SGA group than AGA group. Increased weight was observe to be higher in the SGA group more than AGA group. Episodes of mucocutaneous infection was similar in two groups. In addition, episode of hypothermia was known to be higher in the AGA group than in the SGA group. Conclusion. Breastfeeding and increased weight of SGA group were higher than those in AGA group Keyword: Breastfeeding, KMC, SGA.



## #P8 AT BIRTH KANGAROO MOTHER CARE (BREAST CRAWL) AND FIRST HOUR BREAST FEEDING – ACCEPTABILITY STUDY

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Breast crawl (At birth Kangaroo mother) is the natural instinctive behavior of the human newborn. Initiation of breastfeeding by the Breast Crawl is one of fundamentals of 'Ten Steps to Successful Breastfeeding' which also form the basis of 'Baby Friendly Hospital Initiative'. The benefits accrued from the practice of breastfeeding are innumerable, the most important being a significant reduction in mortality, morbidity and malnutrition among the children. Method We designed a randomized controlled trial to compare routine care (short term skin to skin contact) and breast crawl (at least one hour skin to skin contact or at birth kangaroo mother care) as described by UNICEF. Cases were selected from the patients admitting in Alzahra hospital of Tabriz. Inclusion criteria was gestational age  $\geq 37$  weeks, absence of any congenital disease in fetus, absence of psychological problem in mother, non-twin delivery, absence of breast herpes or anatomic malformation. Exclusion criteria was presence of meconium stain amniotic fluid, low apgar score, mother hemodynamic instability during delivery, using any sedative drug during delivery. Results One thousand mothers going to deliver in Tabriz Alzahra hospital entered the study, 448 cases excluded the study because of either of not having eligibility criteria or met one of the exclusion criteria. Out of 552 remaining cases 269 cases randomized into breast crawl intervention group and 283 in control group. Mean (SD) mother age was 26.2 (5.8) years. Mean gravidity index was 1.96 (1.16) and in 263 case it was their first delivery. Mean (DS) newborn gestational age and birth weight were 38.86 (0.9) w and 3268.52 (413) gr. In control group 236 newborns (87.7%) had a successful breast crawl and also had a full breastfeed before 60th minute of life. Duration of first phase of BC (resting on mother's chest) was 10.8 (8.4) minutes, the second phase (breast crawl) was 18.79 (10.38) minutes and the third phase (breast feeding) was 17.44 (11.46) minutes. There was a significant difference (P-Value  $< 0.0001$ ) between control and BC groups in first hour breast feeding. In BC group 95.4% (250 cases) had a successful breast feeding in first hour of life whereas this was in control group 76.5% (212 cases). Conclusion: This study showed the acceptability of breast crawl both for mothers and hospital staff. Breast crawl is a good intervention for improving first hour breast feeding and mother and baby bonding and attachment. In the next phases of this study we are going to compare the long-term benefits of breast crawl on length of breast feeding and future child growth.



## #P9 THE EVOLUTION OF EXCITATORY AMINO ACIDS LEVELS IN PRETERM NEWBORNS AFTER TRADITIONAL AND KANGAROO CARE

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Inability of effective energetic supply in preterm infants assist to increasing of common catabolism including degradation of proteins and amino acids that favor for ammonium toxicosis, synthesis of false neurotransmitters and neurodevelopment and behavioral disorders in future. Excitatory amino acids (glutamate,  $\alpha$ -ketoglutarat) exert influence on nmda-receptors activity, which result in deficiency of sensor, motor and mental functions. Clinical and laboratory investigations of glutamate activity and  $\alpha$ -ketoglutarat levels (sigma-kit, "bio iriens sq", france) performed in two representative group of preterm infants < 32 weeks after traditional and kangaroo care. In 2nd group of babies cared in kangaroo 24-hours amino acids levels were measured after 3 days adaptation. After traditional care on 15-20 day of life the level of  $\alpha$ -ketoglutarat is twice more than after kangaroo ( $1,77 \pm 0,18$  mmol/l) that could be possible reason of neuron activation via  $\gamma$ -ABA shunt with irritation syndrome progression ( $r = +0,68$ ). The activity of glutamate decrease up to  $2,6 \pm 0,3$  mmol/l/h-1. Reevaluation these indices on 40 days of life detected the gain of glutamate activity ( $7,44 \pm 0,8$  mmol/l/h-1), reduction of  $\alpha$ -ketoglutarat concentration ( $0,49 \pm 0,05$  mmol/l) and depression syndrome ( $r = +0,82$ ). Revealed changes indicate the block of oxygen transformation of the carbohydrate in Crebs cycle, activation of additional shunt with subsequent lesion of specific NMDA-receptors, injury of neuron polarization and neurodegeneration. On the beginning kangaroo care indices were similar to those after traditional care. However on 40 days (more than 2 weeks of KMC) we detected reduce of glutamate activity and stabilization of the  $\alpha$ -ketoglutarat concentration. In summary, asphyxia triggers a cascade of pathological biological process which may be support by hypothermia with increasing oxygen consumption. Stabilization of indices in addition to stable weight gain indicatives about positive effect of KMC on catabolism reduction and state of energetic metabolism. The modulation of transneuronal connection due to accumulation or inhibition of utilization of excitatory amino acids in thermo unstable conditions during separate care in NICU may be the reason of the neurological pathology formation in preterm infants.



## #P10 DOCOSAHEXAENOIC ACID IN PLASMA OF VERY PRETERM INFANTS: IMPACT OF AN EARLY SUPPLEMENTATION OF THE MOTHER DURING LACTATION

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Background: Very preterm infants are vulnerable to deficiency in docosahexaenoic acid (DHA), with potential negative consequences on their neurodevelopment. Objective: In DHA supplemented mothers, evaluate extend of the increase in DHA intake and DHA status in very preterm infants receiving their breast milk. Procedure: Ten mothers who delivered prematurely (? 29 week gestation) and planning to breastfeed received a DHA supplement (1.2g/d) until 36 weeks after conception. DHA intakes were assessed in their 12 preterm infants from birth to Day 49. Fatty acid profiles were measured weekly in breast-milk and in the plasma of mothers and premature infants at baseline, Day 14, and Day 49. Fatty acid profiles of the milk and plasma at Day 49 of a reference group of 22 mothers and their 24 babies, whose mother did not receive DHA supplements during lactation was use for comparison. Results: Plasma DHA concentrations in babies receiving the DHA-enriched was significantly and positively increased over the study period ( $p=0.0143$ ). At Day 49, DHA in mothers' milk was 12 times higher in the DHA group compared to the reference group. There was also a significant linear increase ( $p<0.0001$ ) in the amount of DHA provided to the very preterm infants in the supplemented DHA group over time. Although the infants from both groups had similar enteral intake at Day 49, the supplemented DHA group received  $55.2 \pm 37.6$  mg/kg/day of DHA compared with  $7.2 \pm 11.1$  mg/kg/day in the reference group ( $p=0.0017$ ). Conclusion: Early supplementation with DHA to lactating mothers with low dietary DHA was successful in increasing DHA status in very preterm infants.



## #P11 KANGAROO CARE AND BREASTFEEDING FOR ALL NEWBORNS IN THE UNITED STATES

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With the revised the interpretation of step 4 of the 10 Steps to Successful Breastfeeding (BF) to read "Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour. Encourage mothers to recognize when their babies are ready to breastfeed and offer help if needed." (BFHI, Section 1, 2009, p. 34) and recommendations from international, national and professional organizations to "place all newborns in skin-to-skin contact (Birth Kangaroo Care [BKC]) starting immediately after birth and to leave them there until after the first breastfeeding is completed," hospital birthing centers and birthing units are beginning to recognize the need to change immediate post-birth care practices. The purpose was to evaluate the progress toward implementation of BKC with BF in the US through case studies and evaluation studies. In many hospitals introduction of and education about KC and BF has only been with nursing staff. Implementation has then been started by nurses who are passionate about the practice. However, within 1-2 years of initiating BKC the number of mothers doing some BKC has increased 5-fold and mothers express great satisfaction. Unfortunately, periods of BKC remain short, not through the first BF as recommended though mothers do have more time with their newborns than before implementation of BKC. Fathers are providing BKC during cesarean sections until mothers are able to do BKC themselves. Nurses continue to separate mothers and newborns to do initial assessments and give medications in the warmer. Length of time mothers and newborns remain in the birthing center or birthing unit is not significantly different clinically than before the change of practice. Influence on breastfeeding duration and exclusivity is still being evaluated. While KC is understood to be a nursing practice and strong evidence for the multiple benefits of BKC with BF exists, there remains much skepticism and resistance to change among the nurses. Additionally, stronger support from nursing managers and administrators is needed.



## #P12 KMC: a mother's perspective

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This presentation introduces the author's personal experience and lessons learned about KMC, as well as the experiences and reactions of the people she has been able to help throughout the years. Some of the history important to this presentation: Zachary Jackson was born prematurely to the speaker in 2001 weighing less than 2 lbs. Three weeks later he survived the deluge of Tropical Storm Allison that shut down the power to the generators and all equipment of his hospital in Houston, Texas — he was kept alive “by hand” for 9 hours until he was evacuated. Yamile held her premature son Zachary skin-to-skin during this disaster and her husband and nurses “bagged” him while the doctors found hospitals to evacuate all 79 NICU babies. Zachary was hospitalized for over 5 months and survived against incredible odds. He is now a healthy 8-year-old and the speaker is paying the promise she made to help other babies because her son Zachary survived. His story of survival has been featured in the Reader's Digest, ABC, CBS, NBC, FOX, Univision, BBC, The Washington Post, and many others. The author has won 11 awards for the work she does, and is currently nominated for the “2010 Texas Business Woman of the Year Award.”



## POSTER SESSION 2

Sunday, June 20, 2010

15:15 PM

### #P13 KANGAROO CARE REDUCING BIO-BEHAVIORAL PAIN RESPONSES IN PRETERM INFANTS: PILOT STUDY

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The purpose of this cross-over pilot was to test mother Kangaroo Care (KC) effects on bio-behavioral responses to heel stick pain in preterm infants with 30-32 weeks gestational age and 2-9 days old. Theoretical framework: KC is a promising method to blunt pain responses because some of its components including maternal touch, warmth, respiratory movement, heart beat, and odor have been found to reduce the severity of responses to stress and pain. Method: Mother-infant dyads were randomly assigned to KC heel stick (KCH) first or incubator heel stick (IH) first in a two-day test. Study 1 (80-min study, N=18) tested the effect of 80 minutes of KC before and throughout heel stick procedure vs. undisturbed incubator care. Study 2 (30-min study, N=10) tested 30 minutes of KC before and throughout heel stick vs. incubator care. KCH and IH began during a pre-measurement and continued through four data collection phases: Baseline, Heel Warming, Heel Stick, and Recovery. Infants' facial actions, heart rate, oxygen saturation responses were measured every 30 seconds during data collection; salivary cortisol was measured at the end of Baseline and Recovery; serum cortisol was measured during Heel Stick. Results: The 80-min study showed no differences between KCH and IH. The 30-min study resulted in higher oxygen saturation during Heel Stick (KCH:  $96.83 \pm 2.13$ , IH:  $93.71 \pm 3.54$ ,  $p < 0.05$ ), lower salivary cortisol at the end of Recovery when adjusted for baseline values (KCH:  $0.21 \pm 0.12$  ug/dL, IH:  $0.57 \pm 0.61$  ug/dL,  $p < 0.01$ ), and lower serum cortisol during Heel Stick (KCH:  $5.63 \pm 2.31$  ug/dL, IH:  $9.15 \pm 6.59$  ug/dL,  $p < 0.05$ ), in favor of the KCH condition. Conclusions and implications: Results support that the use of KC, a nonpharmacological intervention, reduces bio-behavioral pain responses in preterm infants undergoing procedural pain but need to be confirmed by definitive studies.



## #P14 MASSAGE THERAPY DURING THE NICU PERIOD : A PILOT STUDY

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Knowing that infants born prematurely are physiologically vulnerable to their immediate environment, many studies have experimented the efficiency of massage therapy to improve regulation of body temperature and vagal activity and to help babies gaining weight, being more relaxed, less active and less aroused. Objectives: The purpose of the following pilot study was to observe the effects of a 15-minute massage per day on babies born prematurely. Method: Forty very premature babies (mean 30 wga) were randomized at birth and 20 of them received a 13-day massage therapy from the second day of life while 20 others made up the control group (without massage). Variables such as weight gain, hospitalization length, body temperature, height, oxygen saturation and head circumference were measured all along the treatment. Results: The massage group of infants had significant gains in head circumference, O<sub>2</sub> saturation and body temperature, and showed less retinopathy and were discharged 5,6 days earlier from hospital as compared to the control group of infants. These results reveal that massage therapy is a valuable intervention to increase preterm babies' health in the NICU.



## #P15 INFANT STABILITY DURING KANGAROO CARE – EVALUATED BY REGISTERED NURSES AT LEVEL 3 NICU USING KANGAROO CARE CHART AS A TOOL

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Background: Kangaroo Care (KC) Chart was established in 2007 to develop means to promote actions that facilitate the provision of KC in the NICU of Hospital for Children and Adolescents in Helsinki, Finland, and to systematically evaluate the conduct of KC and its effects to patients and their family. Patient stability during KC is one of the evaluated measures by registered nurses (RN). Aim: To systematically evaluate the patient stability during KC and to give tools to fortify patient safety. Materials and methods: Systematic evaluation. Written reports of Kangaroo Care Charts (KCC) was assessed between 1.7.2007 and 31.12.2009, giving total of 2.5 years of patient documentation. During this time patients had KC 2448 times at the NICU. Results: KC is safe and well tolerated with all types of patients. Patients were stable during KC 98.7% (2415) of the times. Instability was reported 33 times (1.3%). Due to instability KC was discontinued 5 times (15.1%, 5/33). Main reason for instability was the need for suction in intubated patients diagnosed with BPD (33.3%, 11/33). Other major reasons corresponded to the need for more effective breathing aid on patients in transition to spontaneous breathing (30.3%, 10/33). Conclusions: KC is well tolerated and safe. More attention need to be given for the availability of fast endotracheal suction for intubated patients (eg. closed suction system must be attached to the intubation tube at all times). Key words: Kangaroo Care, Patient Safety, Systematic Evaluation, Neonatal Intensive Care Unit.



**#P16 CLINICAL COURSE AND PROGNOSIS AT ONE YEAR OF CORRECTED AGE OF A 2800 COLOMBIAN LOW BIRTH WEIGHT (LBW) INFANTS COHORT DISCHARGED HOME IN KANGAROO POSITION**

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Objective: To evaluate clinical course and prognosis at one year of corrected age of a cohort of 2800 oxygendependent preterm infants cared in our ambulatory KMC program between 2002 and 2009. Patients and design: Prospective cohort of 2800 oxygendependent (OD) preterm infants discharged home in kangaroo position (KP) with periodical follow-up until 12 months of corrected age to determine survival, growth, development and morbidity. Intervention: 1) Continuous KP (skin-to-skin contact 24 hours), 2) Exclusive breastfeeding whenever possible and 3) Early discharge in KP with close monitoring and follow-up (dynamic oxymetry each week up the weaning) Results: 6889 eligible infants (?37 weeks of gestational age or weight ? 2000 at birth) were admitted in the ambulatory KMC program during this period. 2800 were discharged home with supplementary use of oxygen. Weight at birth for 45% of infants was under 1500g. and for 12,2% was under 1000g, 20,1% weighted more than 2000g. 32% of patients were less than 30 weeks of GA, 56% were less than 32 and even 3% were more than 37 weeks of GA. Post-natal age at entry was between 1-15 days for 48,4%, 15-30 days for 41,1% and more than 1 month for 10,5% of them. Weight at entry was less than 1500g. for 45% of patients. 63% were NICU graduates and 51,3% of them have been ventilated. 51% were diagnosed with BPD at entry and 16,3% had intraventricular hemorrhage. 44,5% had history of nosocomial infection at entry. 2396 infants (85,6%) had completed follow up from entry into KMC to one year of corrected age. Overall mortality in the cohort was 1,6% up to one year, with 1,2% of deaths occurring between discharge and 3 months. 41,8% of infants were readmitted at least once. Main causes of readmission before 40 weeks GA were anemia (47,2%) and pneumonia (34,1%); main cause of readmission before 3 months was acute respiratory infection (91.4%). In average, oxygen was discontinued at 3431g. of weight. 41,2% received exclusive breastfeeding up to term, 24% up to three months, and 14% up to 6 months. Average weight, length and head circumference were 2818g, 46,3cm, 34.3cm at term and 8557g, 71,4 and 45,4cm at one year of corrected age; Retinopathy was detected in 17,6% and blindness in 0,4%. Diagnosis of cerebral palsy at one year was 3%. Mean developmental coefficient at 6 months was 95,8 and at 12 months (Griffiths + Bailey test). Conclusion: Our experience shows that weight, over age, is a major indicator of oxygen discontinuation. Weaning in our cohort reached its peak at 3431g. There is an unacceptable rate of OD in infants > 32 weeks GA that may be explained by inappropriate ventilation practices in NICUs, suboptimal oxygen delivery and factors that need to be further explored in prospective studies.

## #P17 EVALUATION OF ANALGESIC EFFECT OF SKIN-TO-SKIN CONTACT COMPARED TO ORAL GLUCOSE IN PRETERM NEONATES

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**INTRODUCTION:** Preterm neonates have been found to be more sensitive to pain than full-term neonates and much more sensitive than adults because of their full capacity of pain perception and little ability of pain inhibition. Even extreme preterm neonates are known for their functional and anatomical capacity of painful perception. Nonpharmacological interventions are important alternatives for pain relief during minor procedures in preterm neonates. Skin-to-skin contact or Kangaroo Mother Care is a human and efficient way of caring for low-weight preterm neonates. **OBJECTIVE:** The aim of the present study was to assess the analgesic effect of Kangaroo Care compared to oral glucose on the response of healthy preterm neonates to a low-intensity acute painful stimulus. **METHODS:** Ninety five preterm neonates of both genders with a postmenstrual age of 28-36 weeks were randomly assigned to three groups in a single-blind manner. The size of the sample was calculated to permit an odds ratio of 7.36. In group 1 (isolette, n=33), the neonate was in the prone position in the isolette during heel lancing and did not receive analgesia. In group 2 (kangaroo method, n=31) the neonate was held in skin-to-skin contact for 10 minutes before and during the heel-lancing procedure. In group 3 (glucose, n=31) the neonate was in the prone position in the isolette and received oral glucose (1ml, 25%) 2 minutes before heel lancing. Excluded from the study were the neonates receiving invasive or noninvasive ventilation, a chest drain, oxygen therapy or a tracheotomy, hemodynamically unstable neonates, neonates who had received analgesia or sedative medications during 48hours prior to the study, neonates with congenital anomalies, chromosomal syndrome, ventricular hemorrhage or periventricular leukomalacia, and neonates of mothers taking illicit drugs. **RESULTS:** A smaller variation in heart rate ( $p=0,0001$ ) and oxygen saturation ( $p=0,0012$ ), a shorter duration of facial activity (brow bulge, eye squeeze and nasolabial furrowing) ( $p=0,0001$ ), and a lower PIPP (Premature Infant Pain Profile) score ( $p=0,0001$ ) were observed in group 2. **CONCLUSION:** In conclusion, skin-to-skin contact produced an analgesic effect in preterm newborns during heel lancing.



## #P18 INFLUENCE OF KANGAROO CARE INTERVENTION ON PSYCHOMOTOR DEVELOPMENT OF PRETERM INFANTS AND MOTHER-INFANT RELATIONSHIP

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Influence of Kangaroo Care Intervention on Psychomotor Development of Preterm Infants and Mother-Infant Relationship. Aim: The psychological stress associated to a preterm birth and the neonatal care necessary for the survival of the infant adversely affects the infants' neuropsychological development later in life (Saigal & Doyle, 2008) and maternal attachment (Kennel & Klaus, 1998). The aim of this study is to examine the long term effect (six months corrected age (CA)) of Kangaroo Care (KC) on: 1) infant's psychomotor, socio-emotional and adaptive behavior development and 2) mother-infant relationship. Methods: Participants: 56 mother-child dyads in KC and 34 in Traditional Care (TC) were examined. KC mothers were subdivided in 33 Intervention KC (I-KC) (at least 60 min a day for 14 days) and 23 Limited KC group (L-KC) (at least 60 min a day for less than 14 days). Procedure: At 6 months CA the following measures were administered: Parental Stress Index Short Form (PSI-SF), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI) and Maternal Postnatal Attachment Questionnaire (MPAQ). Infant development was measured with BAYLEY-III. Results: 1) Preterm-infants: L-KC infants presented a better global motor development than TC infants ( $p < .05$ ). I-KC infant showed better global adaptive behaviors than L-KC and TC ( $p < .01$ ), on self-care ( $p < .01$ ) social ( $p < .05$ ) and motor skills ( $p < .01$ ) (BAYLEY III). 2) Mothers: I-KC mothers had a better attachment (MPAQ) towards their child ( $p < .05$ ) than TC mothers. Mothers in the I-KC also presented less parental stress (PSI-SF) ( $p < .01$ ) than TC, L-KC mothers' parental stress was midway between I-KC and TC mothers, but not significantly different. I-KC mothers perceived their interaction with the child less dysfunctional (PSI-SF Dysfunctional Interaction Sub-scale) ( $p < .001$ ) than TC.

Conclusion: KC infants at six months present better development in terms of motor and adaptive behaviours skills. KC mothers, who followed the full intervention, have better attachment to the preterm infant and less parental stress. Therefore KC is a valid procedure on mother and infant development when preterm infant are considered.



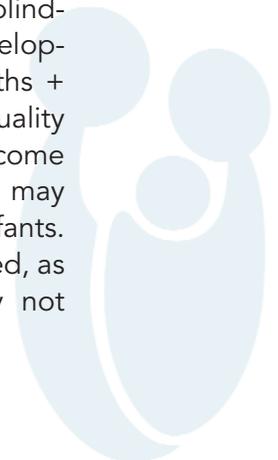
## #P19 CLINICAL COURSE AND PROGNOSIS AT ONE YEAR OF 1043 COLOMBIAN INFANTS BORN BEFORE 31 WEEKS AND DISCHARGED HOME IN KANGAROO POSITION.

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**Objective:** To evaluate clinical course and prognosis at one year of a cohort of 1043 preterm infants  $\geq 30$  weeks of gestational age at birth (GA), cared in our ambulatory KMC program between 2002 and 2009. **Patients and design:** Prospective cohort of 1043 preterm infants (GA  $\geq 30$  weeks at birth) discharged home in kangaroo position KP with periodical follow-up until 12 months corrected age to determine survival, growth, development and morbidity. **Intervention:** 1) Continuous KP (skin-to-skin contact 24 hours), 2) Exclusive breastfeeding whenever possible and 3) Early discharge in KP with close monitoring and follow-up. **Results:** 6889 eligible infants ( $\geq 37$  weeks of gestational age or weight  $\geq 2000$  at birth) were admitted to the ambulatory KMC program. 1043 of them were less than 31 weeks of GA at birth. Birthweight were  $\leq 1500$ g in 90.7% of the infants and for 32,4% was under

1000g. Post-natal age at entry was between 1-15 days for 11.9%, 15-30 days for 69,4% and more than 1 month for 18,7% of infants. Weight at entry was more than 1500g. for 91,6% of patients. 73,1% were NICU graduates and 71,3% of them had been ventilated. 85,9% were oxygen-dependent at entry, 70,7% were diagnosed with BPD and 28,5% had intraventricular hemorrhage. 68,5% had history of nosocomial infection at entry. 868 infants (83%) had completed follow up from entry into KMC to one year of corrected age. Overall mortality in the cohort was 2,3% up to one year of corrected age, with 1,6% of deaths occurring between discharge and 3 months. Nearly half of infants (47%) were readmitted at least once. Main causes of readmission before 40 weeks GA were anemia (56,6%) and pneumonia (36,3%); main cause of readmission before 3 months was acute respiratory infection (95,8%). 23,6% received exclusive breastfeeding up to term, 13,5% up to three months, and 9% up to 6 months. Average weight, length and head circumference were 2805g, 45cm, 34.2cm at term and 8.285g, 70.9 and 45cm at one year of corrected age. Retinopathy was detected in 23,7% and blindness in 0,4%. Diagnosis of cerebral palsy at one year was 5,5%. Mean developmental coefficient at 6 months was 94,6 and at 12 months was 97 (Griffiths + Bailey test). **Conclusion:** These results highlight the importance of a high quality follow-up program as KMCP to decrease morbidity, mortality and to overcome minor disabilities and mild to moderate neurological impairments that may respond to early intervention during their first year of life of premature infants. Follow up beyond one year of corrected age and monitoring is recommended, as long-term complications of prematurity cannot be predicted, and may not become evident until school age.



## #P20 EARLY SKIN-TO-SKIN CARE IN EXTREMELY PRETERM INFANTS: BODY TEMPERATURE AND TRANSEPIDERMAL WATER LOSS

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Background Incubator care separates extremely preterm infants from their parents for weeks and delays parent-infant bonding and infant-parent attachment. Objective To examine the reactions of extreme preterm infants in body temperature and transepidermal water loss during skin-to-skin care according to Kangaroo Mother Care (KMC) during the infant's first week of life. Methodology This was a descriptive quantitatively designed study, which was a pilot study within the framework of a larger project. Nine infants born at a Swedish university hospital, with a median (range) gestational age of 24 (22-26) weeks were included. They were examined at a postnatal age of 4 (2-7) days, when they had a current weight of 648 (447-844 g), by measurement of body temperature (axillary and skin temperature) as well as trans-epidermal water loss before, during and after KMC. During KMC, the infants were held in the kangaroo position with head and body adequately covered with a blanket specially designed to prevent heat and water loss. Results The skin temperature tended to rise during KMC, especially for those infants who were cared for skin-to-skin for longer than 60 minutes. Eight out of nine infants had a normal axillary temperature after a KMC session. As expected, transepidermal water loss was high both when measured both pre and post test, median 58 g/m<sup>2</sup> per hour pre test and 59 g/m<sup>2</sup> post test. Despite this, the infants maintained normal body temperature. Conclusion The results support the capacity of KMC to create a micro-climate that, for at least one hour, makes it possible even for extremely preterm infants to maintain a body temperature within the normal range during their first week of life. Keywords Attachment, body temperature, bonding, extremely preterm infant, kangaroo mother care, transepidermal water loss.



**#P21 SKIN-TO-SKIN CONTACT BY MOTHERS COMPARED TO FATHERS FOR PROCEDURAL PAIN IN PRETERM NEONATES 32-36 WEEKS GESTATIONAL AGE.**

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Background. Skin-to-skin contact, often referred to as Kangaroo Care (KC), by mothers has been reported to reduce pain response and more rapid recovery in preterm neonates undergoing heel lance for clinical purposes. Studies to date have exclusively examined mothers as the provider of SSC for painful procedures. Although fathers have participated in non-pain related studies of SSC, there are reports that paternal skin-to-skin promotes physiological stability and quiet state. Objective. To measure the efficacy of skin-to-skin contact by fathers compared to mothers on pain reduction for heel lance. Methods. Using a cross-over design, preterm neonates 32-36 weeks gestational age (n=65) underwent heel lance during skin-to-skin contact under two conditions: skin-to-skin contact with 1) father and 2) mother. The Premature Infant Pain Profile (PIPP) was the primary outcome, calculated by physiological recording of heart rate and oxygen saturation and video recordings of facial actions. Results. There were no differences in heart rate or oxygen saturation in the incubator before being placed in SSC in either condition. Heart rate was 4bpm lower with mother during SSC prior to heel lance ( $p < .05$ ). At 30 seconds post heel lance, the PIPP scores were lower with mothers (6.9 vs 8.5,  $p < .01$ ) and as well at 60 seconds (7.0 vs 8.7,  $p < .01$ ) but at 90 seconds (6.5 vs 7.6 ) and 120 seconds (6.0 vs 6.2) were not significant. Recovery time to incubator heart rate was not significantly different. PIPP scores in both conditions were generally lower than in previous studies with incubator controls. Conclusions. Mothers providing skin-to-skin care for pain reduction during heel lance procedure in preterm neonates appear to be more efficacious than fathers. It could be that the infant recognizes his mother through olfactory or auditory in utero memory or that infants are more comforted by females. More research is required to understand the mechanisms. Nevertheless, PIPP scores with fathers providing SSC were lower than scores from earlier reports with no intervention and became similar to mothers after the first minute of heel lance.



## #P22 EVALUATION OF THE NEONATAL OUTCOMES OF THE KANGAROO MOTHER METHOD IN BRAZIL

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Introduction: Since 1999, the Brazilian Health Ministry has implemented the Kangaroo Mother Care Method in the country. The Brazilian method was defined as a humanization strategy for the low birth weight infants care. It includes the full-time care to the baby together with his mother during all the hospitalization time, especially in the Special Care Unit (the second phase of the Brazilian kangaroo mother method). However, it was necessary to evaluate this experience since there were no scientific evidences on literature about the impact of this kind of care on the clinical outcomes in these children. Objective: To evaluate the results of the kangaroo mother method in Brazil. Methods: A prospective cohort study comparing 16 units with and without the second phase of the kangaroo mother method was implemented. Eight of them were national centers of excellence for the kangaroo mother method (study group) and eight were part of the Brazilian Neonatal Research Network (control group). A total of 985 newborn infants with birth weights from 500 to 1,749g were enrolled. Multivariate analyses (multiple linear regression and Poisson regression) were employed to confounding adjustment. Results: The adjusted analysis (controlled for birth weight, gestational age, Score for Neonatal Acute Physiology Perinatal Extension II, Neonatal Therapeutic Intervention Scoring System, and maternal age and educational level) demonstrated that mean length of hospital stay ( $p = 0.14$ ) and clinical complications in the special care unit were equal for both groups. Weight ( $p = 0.012$ ), length ( $p = 0.039$ ) and head circumference ( $p = 0.006$ ) at 36 weeks' corrected gestational age were all lower at the kangaroo units. The kangaroo units exhibited superior performance in exclusive breastfeeding at discharge (69.2 vs. 23.8 percent,  $p = 0.022$ ). Conclusions: The evidence suggests that the humanization strategy adopted by the Brazilian Ministry of Health is a safe alternative to conventional treatment and a good strategy for promoting breastfeeding. Others Authors: Kangaroo Method Evaluation Group; Neonatal Research Brazilian Network.



## #P23 KANGAROO POSITION FOR BACTERIAL DECOLONIZATION OF NEONATES HOSPITALIZED IN NEONATAL INTENSIVE CARE UNIT

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Introduction: Hospital infection increased in the last years mainly in the Neonatal Intensive Care Unit. The colonization process precedes and always brings the possibility of a bacterial infection. Some methods of bacterial decolonization can modify the bacterial colonizer flora of skin and may trigger bacterial resistance. Skin-to-skin contact care could promote competition for the biological space of the neonates, allowing recolonization with the mother's skin bacteria flora. Objective: To study the behavior of bacterial colonizer flora in neonates submitted to the skin-to-skin contact care of their mothers. Methodology: Randomized clinical trial realized in three NICU in public maternity hospitals in São Luís, Brazil. The sample was constituted of 64 patients (32 in each group). The inclusion criteria were: birth weight between 1300g and 1800g; time of hospitalization longer or equal to four days; colonization by *Staphylococcus aureus* and Coagulase-Negative *Staphylococcus* resistant to oxacillin plus mothers non-colonized by these bacterias. The exclusion criteria were: clinical instability; neonates with ostomy or catheter; mothers or neonates with skin infections. Patients were randomly allocated. The studied intervention was skin-to-skin contact care of the neonates by their mothers, twice a day, for 60 minutes each time. Results: We studied 128 neonates with average gestational age of  $35,2 \pm 2,59$  and average birth weight of  $1528g \pm 161,44g$ . The first set of nasal cultures of the neonates showed multi-resistant *Staphylococcus* on 78,1% (62,5% MRSA); only 23,4% of the mothers had multi-resistant *Staphylococcus*. The nasal colonizer flora of the mothers was predominantly constituted of oxacillin sensitive *Staphylococcus*, whereas the flora of the neonates showed higher prevalence of MRSA *Staphylococcus aureus* and multi-resistant CoNS. Recolonization with non-multi-resistant bacteria was observed on 44% of the neonates that received the intervention and 16,6% in the control group ( $p= 0,227$ ). It wasn't found any significant association between the proposed intervention and the positive outcome. It is possible that a larger sample could have demonstrated significant difference between the groups. Conclusion: The skin-to-skin contact does not show major risk of contamination and it suggests the possibility of a protector effect against baby's contamination in the NICU.



## #P24 KANGAROO CARE IN INFANTS WITH CONGENITAL HEART DISEASE: IS KC SAFE?

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Each year approximately 32,000 infants are born with congenital heart disease (CHD), of those, 2.3 of every 1000 live births will require hospitalization to undergo a procedure before the age of one. With improved intensive care, surgical techniques, and technologies it is now possible to perform cardiac surgery on smaller, less than 2 kilograms, and younger, less than 30 weeks, infants. Parenting an infant in the intensive care unit is challenging, particularly following cardiac surgery, as infants may exhibit cardiorespiratory and hemodynamic instability. More than 1000 infants and children are admitted each year to the Cardiac Intensive Care Unit (CICU) at the Children's Hospital of Philadelphia (CHOP). Approximately one half of the admissions are infants born with complex heart disease and many require surgery within the first month of life. To foster an environment of developmental care in the CICU with medically fragile cardiac infants a developmental care team was formed. Kangaroo Care (KC) was included as one element in the "developmental care" program. A scarcity of literature exists investigating the effects and safety of KC in infants with CHD, however, the literature is replete with investigations on KC's effect on HR, RR, and SaO<sub>2</sub> that report slight increases, or stability in all outcomes but all remaining within clinically normal limits. To successfully embrace KC in the CICU and engage staff, it was necessary to begin investigating if KC effects were as safe as lying in an incubator or being held on the mother's lap. Kangaroo Care was implemented in two infants. One infant was a prenatally diagnosed male with Hypoplastic Left Heart Syndrome (HLHS) on prostaglandins infusing through an umbilical venous catheter and an arterial umbilical line in place for arterial blood pressure monitoring. He was placed in KC prior to undergoing Stage One repair. The second infant was a prenatally diagnosed female with complete heart block and IUGR delivered via C-section at 30 weeks gestation due to a low in-utero HR. Immediately after birth, she underwent a median sternotomy for the placement of temporary pacing wires. During one-hour of KC, HR, RR, and SaO<sub>2</sub> were continuously monitored; all variables remained stable and within clinically normal limits in both infants. The effects of KC in premature infants are profound but, little research has been conducted in premature or full term infants with CHD. The findings of the two case studies presented are the first step in building the science of KC's effects in infants with CHD demonstrating that KC in complex cardiac infants may be as safe as standard care. Further investigations are warranted to determine the safety of KC in infants with complex heart disease.

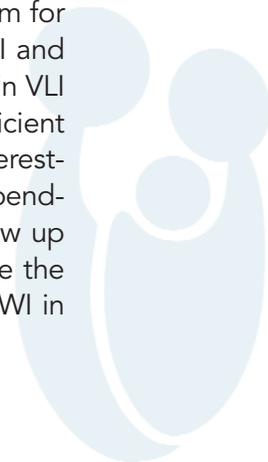


## #25 CLINICAL COURSE AND PROGNOSIS AT ONE YEAR OF A COHORT OF LOW BIRTH WEIGHT INFANTS (LBWI) DISCHARGED HOME IN KANGAROO POSITION, ACCORDING TO HEALTH CARE I

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Objective: clinical course and prognosis at one year of corrected age of a cohort of LBWI cared in an ambulatory KMC program between 2002 and 2009, according to 3 types of health care insurances in Colombia: Private prepaid plan (high income-HI) Contributive plan (middle and low income-MLI) and subsidized plan (very low income-VLI). Patients and design: Prospective cohort of 6889 LBWI discharged home in kangaroo position (KP) with periodical follow-up until 12 months of corrected age to determine survival, growth, development and morbidity. Intervention: 1) Continuous KP (skin-to-skin contact 24 hours), 2) Exclusive breastfeeding whenever possible and 3) Early discharge in KP with close monitoring and follow-up. Same KMC guidelines were implemented independently of the health care insurance Results: 6889 eligible infants (>37 weeks of gestational age or weight > 2000 at birth) were admitted in the ambulatory KMC program, 4% from HI, 90% from MLI and 6% from VLI plans. Birthweight >1000g was 7.3%-5.2%-9% according to health plans (LI-MLI-VLI) and gestational age > 32 weeks 16.7% -16.1% -19.9%. Post-natal age at entry was an average between 8-30 days for the three groups.. NICU graduates were 50.5%-40.3-38.6% and 39.6%- 27.4%-30.4% have been ventilated. History of nosocomial infection at entry was higher in VLI group with 10.5%-15.3%-20.2 as malnutrition at entry 13.8%-20%-34.2%. In average, mortality during the follow up was 1.6% for the three groups, mainly between discharge and 3 months. While 100% of deaths for HI infants occur during hospitalization, 24% and 45.5% of deaths in MLI and VLI groups were at home. Main causes of readmission before 40 weeks GA were anemia and pneumonia, but frequency of infectious diseases is markedly increase in VLI plan (For anemia 45.2% in HI vs. 15.8% in VLI and for pneumonia 25.8% in HI vs. 50% in VLI). While nearly half of patients in MLI (56.1%) and VLI (49.4%) received exclusive breastfeeding up to term, in HI only 4.6% did. Weight, length and head circumference at birth didn't show great variation between groups neither at one year of corrected age: 8708g, 71.5cm and 45.6cm for HI, 8633g, 71.5cm and 45.5cm for MLI and 8431g, 70cm and 40cm for VLI infants. Retinopathy was detected in 24.9% of infants in HI, 15.8% in MLI and 30.5% in VLI. Diagnosis of cerebral palsy at one year was markedly increased in VLI group with 3.5% vs. 1.8% in HI and 1.3% in MLI. Mean developmental coefficient at 12 months didn't show great variation between groups. Conclusion: It is interesting to see that results in the implementation of KMC are nearly identical independently of the health care insurance; mortality rate during the first year of follow up was the same at expense of more morbidity but anthropometric indices were the same. KMC rules rigorously applied can give the same benefits to all the LBWI in Colombia independently of the socio economic level.



## #26 EFFECTS OF KANGAROO POSITION ON THE PHYSIOLOGIC AND BEHAVIORAL RESPONSES OF MECHANICALLY VENTILATED VERY LOW BIRTH WEIGHT NEWBORN INFANTS

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Background: Kangaroo mother care as soon as possible in critically ill intubated newborn preterm infants seems safe and is potentially beneficial to parents and infants. Nevertheless, evidence on safety and effectiveness of this practice is scarce, what acts as a barrier to its implementation in Neonatal Intensive Care Units (NICU), particularly in very low birth weight (VLBW) infants. Objectives: To evaluate the effects of kangaroo position (KP) on vital physiologic parameters and on sleep-wake behavioral states of mechanically ventilated VLBW newborn infants. Design: Quasi-experimental one-group pretest-test-posttest study. Subjects: A convenience sample of 26 mechanically ventilated VLBW newborn infants admitted in a NICU in two hospitals, who were intubated for at least 24 hours, respiratory and hemodynamically stable (power = 90% to detect a effect size = 0.4 between 4 repeated measures with F test and  $\alpha = 0.05$ ). Methods: For each infant, the variables heart rate, oxygen saturation, axillary temperature (every 1 minute), mean blood pressure (every 15 minutes) and sleep-wake behavioral states (every 3 minute) were measured for four 30 minutes periods: 1) pre-KP; 2) KP - first 30 minutes; 3) KP - second 30 minutes; 4) post-KP. In the pre-KP and post-KP periods, the infant was in incubator in prone position. Physiological variables were monitored and recorded by a modular multiparametric monitor; sleep-wake states were assessed by Brazelton's criteria. Study protocol included safety procedures and criterions. For each outcome variable, possible differences were evaluated between the means (repeated measures analysis of variance) and between the trends (visual graphic analysis) in the 4 periods. Results: All infants ( $103.7 \pm 292.7$  grams at study;  $28.4 \pm 1.9$  weeks gestational age;  $7.1 \pm 5.7$  days) tolerated KP for 1 hour without any adverse events or reactions, although a few of them experienced light physiologic and/or behavioral stress associated with the transfers from and to incubator. KP did not significantly affect heart rate, oxygen saturation or mean blood pressure. Axillary temperature significantly reduced in the post-KP period compared to the KP - second 30 minutes period ( $p < 0.008$ ), but within clinically acceptable range. The infants exhibited a increased time in quiet sleep and a decreased time in active sleep during the KP - second 30 minutes period, compared to the pre-KP and post-KP periods ( $p < 0.008$ ). Sleep time or time in the other states did not differ significantly. Conclusion: This study suggests that KP can be a safe practice to mechanically ventilated VLBW newborn infants as long as the baby is monitored, and that this intervention may be effective in promote quiet sleep in its second half an hour.



**#P27 OUTCOME OF NEWBORN WITH BIRTH WEIGHT <1500 G AND GESTATIONAL AGE < 32 WEEKS, DURING THE 2 FIRST YEARS OF CORRECTED AGE: COMPARISON OF TWO PERIODS OF TIME.**

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Jesús Rodríguez López. Servicio de Neonatología. Hospital 12 de Octubre.

**OBJECTIVE:** To evaluate the impact of changes in perinatal practice in the evolution of newborn with birth weight < 1500g and gestational age < 32 weeks, comparing the differences in survival and disability rates at 2 years corrected age (EC), in 2 periods of time. **METHODOLOGY:** Study of follow-up that included 963 children were born in the hospital between 1991 and 2004 that gathered the criteria of study. It has been evaluated the neonatal morbidity, mortality and disability to the 2 years of corrected age in 2 periods of time 1991-1998 (period I) and 1999-2004 (period II) and analysed by subgroups of weight (weight < 1000g and 1000-1500g). **RESULTS:** The mortality decreased significantly in the second period, both in children with birth weight < 1000 g ( 32% vs 44%) and in birth weight between 1000 -1500 g ( 3,6% vs 9%). Analysing all children > 1500g, there was an increase of non-disabled survivors in the second period (69% vs 60%,  $p=0,003$ ); but by subgroups this increase only was significant in children with birth weight 1000 - 1500g (67% vs 82%). **CONCLUSIONS:**1.In our study, the survival of newborn with birth weight > 1500 g has increased significantly during the second period.2. Analysing by subgroups of weight, the survival has increased in both groups, and however the disability has decreased only in the birth weight 1000-1500 g subgroup. 3. Changes in the administration of pre / postnatal corticosteroids and in the respiratory management are among others, the factors involved in the best evolution of very low and extremely low birth weight newborns, during the second period.

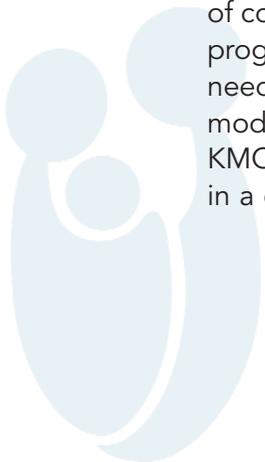


**#P28 CLINICAL COURSE AND PROGNOSIS AT ONE YEAR OF CORRECTED AGE OF A 379 COLOMBIAN INFANTS COHORT BORN WEIGHING LESS THAN 1001g AND DISCHARGED HOME IN KANGAR**

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Objective: Clinical course and prognosis at one year of corrected age of a cohort of 379 preterm infants <1000g at birth, cared in our KMC program between 2002 and 2009. Patients and design: Prospective cohort of 379 preterm infants (weight at birth  $\leq$ 1000g.) discharged home in kangaroo position (KP) with periodical follow-up until 12 months corrected age to determine survival, growth, development and morbidity. Intervention: 1) Continuous KP (skin-to-skin contact 24 hours), 2) Exclusive breastfeeding whenever possible and 3) Early discharge in KP with close monitoring and follow-up Results: 379 eligible infants (<1001g. at birth) of 6889 LBWI were admitted in our ambulatory KMC program, 89,2%  $\pm$  30 weeks of GA. Post-natal age at entry was between 1-15 days for 1,9%, 15-30 days for 81,5% and more than 1 month for 16,6% of infants. 73,6% were NICU graduates and 74,9% of them had been ventilated. 90,2% of infants were oxygen-dependent at entry, 81,6% were diagnosed with BPD and 35,4% had intraventricular hemorrhage. 80% had history of nosocomial infection at entry. 322 infants (85%) had completed follow up from entry into KMC to one year of corrected age. Overall mortality in the cohort was 3,4% up to one year, 2,4% of deaths occurring between discharge and 3 months. Half of infants (49,4%) were readmitted at least once. Main causes of readmission before term were anemia (50%) and pneumonia (48,6%); main cause of readmission before 3 months was acute respiratory infection (93,5%). 14,6% received exclusive breastfeeding up to term, 12,8% up to three months, and 6,3% up to 6 months. Average weight, length and head circumference were 2496g, 44cm, 33cm at term and 7611g, 69cm and 44cm at one year of corrected age. Retinopathy was detected in 34,6% and blindness in 1,2%. Diagnosis of cerebral palsy at one year was 5,8%. Mean developmental coefficient at 6 months was 91,4 and at 12 months was 97 (Griffiths + Bailey test). Conclusion: Although improved medical care and interventions at the NICUs have increase the survival of extremely low birth weight infants, high rate of complications and disabilities are still a serious concern. High quality follow-up program, with close expert surveillance during first year and beyond as KMCP, is needed to decrease morbidity, and to overcome minor disabilities and mild to moderate neurological impairments that may respond to early intervention. The KMC program is an opportunity for a high risk follow up for these fragile infants in a country like Colombia.



## #P29 TEN YEARS OF KANGAROO MOTHER CARE AT KALAFONG HOSPITAL

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Background A Kangaroo Mother Care (KMC) unit was established in July 1999 to improve overcrowding in the neonatal unit. Aim To describe the lessons learnt in running a KMC unit during the past ten years and to present the results of a 10 year audit. Method Data was collected and captured on computer on a yearly basis. Each year the data was processed and updated. Results The KMC unit admitted 3902 premature or low birth weight (LBW) infants from 1 August 1999 to 31 July 2009. During this time period only 37 (0.95%) infants died in the unit. Eight of the deaths were expected. Infants admitted were a high risk population, 48% had a birth weight less than 1500g, 15% were oxygen dependent, 25% were HIV exposed in Year 1 and in 2009 32% were HIV exposed. In spite of this high risk population only 268 (6.9%) infants had to be transferred back to the high care unit. Of the infants that were discharged home 133 (3.4%) had to be readmitted because the infants were not thriving at home. Most often the reason was that KMC was not practised or the baby was not breastfed often enough. On discharge babies followed up at a clinic that is held in the KMC unit. The first year only 67% returned, but after a concerted effort in convincing mothers that it is important to attend the clinic, the attendance has been consistently high (82%). The greatest number of infants received exclusive breastfeeding but with the escalation of the AIDS epidemic more and more infants received formula milk until 2002 when Pretoria pasteurisation was introduced and most babies received breast milk. In 2008 evidence showed that HIV-free survival is better with exclusive breast feeding and audit data reflects the increase in exclusive breastfeeding (89%). Conclusion The implementation of KMC at Kalafong hospital had a big impact on neonatal care. In spite of increasing numbers of preterm and LBW infants the neonatal unit has been able to provide excellent care because the KMC unit is available to accept stable infants. By doing an audit and processing the data on a regular basis it was possible to use the results to assess clinical practice and make improvements where necessary. KMC has improved the neonatal care that is offered to patients and parents at Kalafong hospital.



**#P30 BRONCHOPULMONARY DYSPLASIA IN PATIENTS KANGAROO MOTHER CARE PROGRAM: 10 YEARS EXPERIENCE IN THE CIVIL HOSPITAL OF GUADALAJARA, MÉXICO.**

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Bronchopulmonary Dysplasia in Patients Kangaroo Mother Care Program: 10 years experience in the Civil Hospital of Guadalajara. AUTHORS: Laura Lopez-Vargas MD, Veronica Reyes-Aguirre MD, Leticia Serra-Ruiz MD, Ricardo Martinez-Veronica MD, Eusebio Angulo- Castellanos MD. INSTITUTION AND TOWN: Neonatology, OPD Hospital Civil "Fray Antonio Alcalde, Universidad de Guadalajara. Guadalajara, Jalisco, Mexico. INTRODUCTION: In the Old Civil Hospital of Guadalajara was implemented Kangaroo Mother Care for 10 years, ambulatory monitoring of patients premature and low birth weight included in this program has given us the experience in one of these patients develop complications to survive after being ventilated: bronchopulmonary dysplasia of prematurity. MATERIAL AND METHODS: We performed a retrospective, descriptive evaluation of the clinical records of all patients included in the Kangaroo Mother Care in the period 1998-2008 with a diagnosis of bronchopulmonary dysplasia. The variables evaluated were: birth weight, gestational age, sex, skin contact (maternal bonding), weight, hospitalization, medical treatment at discharge, growth and neurodevelopment, frequency of rehospitalizations, causes of rehospitalization and babies mortality. All babies discharged had telephone counseling 24 hours. To analyze the results use descriptive statistics, percentages, mean and standard deviation. RESULTS: A total of 1 321 patients were admitted to the Kangaroo Mother Care program of which 102 (7%) had a diagnosis of bronchopulmonary dysplasia, 50% were male and 50% female. In relation to birth weight 13 patients (12.7%) were between 1100 and 1400 g, 12 (11.7%) 1200g, 11 (10.7%) 1300g, 10 (9.8%) 1700 g, 9 (8.8%) 1600g, 7 ( 6.8%) 1000g, 6 (5.8%) 1500g, 5 (4.9%) 1800g and 1900g, 2 (1.9%) 2100g, 2000g and 900g, 1 (.98%) with 625g, 2400g, 2300g and 2200g. Gestational age in infants: 2 (1.9%) of 37 weeks, 3 (2.9%) of 36 weeks, 4 (3.9%) 35 weeks 19 (18.6%) of 34 weeks, 18 (17.6%) 33 weeks , 9 (8.8%) 32 weeks 15 (14.7%) 31 weeks 12 (11.7%) 30 weeks 8 (7.8%) 28 weeks 4 (3.9%) 27 weeks 1 (.98%) 26 and 25 weeks . Weight at hospital discharge 53 patients (51.9%) with 2000 or more grams, 13 (12.7%) 1900 g, 13 (12.7%) 1700 g, 9 (8.8%) 1800 g, 7 (6.8%) 1600 g, 3 (2.9%) 1500 1 (.98%) and 1400 g, 1 (.98%) 1300 g. Skin to skin contact had 43 babies (42.1%), average days on attachment for males was 10.3 days, standard deviation of  $\pm$  19 days and in females 14.7 days with standard deviation of  $\pm$  29 día. Average weight gain was 23 g / kg / day, 89 (87%) babies had optimal growth and neurodevelopment. Medical treatment at discharge, 53 patients (52%): (30 males and 23 females) required more outpatient diuretic O2, with a mean of 34.5 days for the O2 and a standard deviation of  $\pm$

62.7 days, 30 patients (30%) only diuretic and 19 (18%) patients without O<sub>2</sub> or diuretic. The diuretics used were hydrochlorothiazide (mean 68.5 ± standard deviation 66.2 days) and spironolactone (mean 77.5 ± standard deviation 67.4 days). Theophylline as a bronchodilator was used on average 56.6 days with standard deviation of ± 42.5 days. Patients rehospitalizations during the first year of life were 29 (28.4%), the leading causes of highest to lowest frequency: lower respiratorytract infection, apnea, surgical procedures (retinopathy, hernia, etc.), febrile seizures, anemia, liver disease and encephalitis. Mortality was 4.9%. CONCLUSIONS: According to literature, the outflow of dysplastic babies in Kangaroo Technical shortens hospital stay and oxygen, decreases risk of recurrent respiratory infections. The therapeutic, well guarded, does not limit fluid intake, parents receive medical advice and emotional support to enhance bonding and home care of babies, mothers resolved faster their emotional crisis, and are very optimistic. Improve survival, growth and neurodevelopment quality of life by following up with humanization. Should be monitored motor coordination, visual disturbances and global intelligence, also improve the case continues under weight. Avoiding overweight and obesity.



## #P30A THE IMPACT OF TOTAL BODY MASSAGE AND KANGAROO CARE ON PREVENTION OF OSTEOPENIA OF PREMATURITY IN VLBW INFANTS IN THE NORTHWEST IRAN

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Background: Recent developments in the field of perinatology and neonatology have led to survival of more premature infants. The survival, however, might be followed by some serious disorders such as osteopenia pertinent to prematurity. Research findings have revealed that in infants weighing less than 1'500 g, which is a very low birth weigh, the frequency of osteopenia of prematurity amounts to 30%. No research has been conducted to investigate osteopenia caused by prematurity in the northwest of Iran. Hence, this descriptive, cross-sectional, and hospital-based study was carried out at Alzahra Medical Centre, which is a referral hospital, to scrutinize the instances of osteopenia in the northwestern Iran. Methods. Participants in the present study included ninety seven very low birthweight neonates, weighing under 1500 g at birth, with no congenital anomaly or other disorder related to skeletal system from May 2007 to January 2009. All infants received the same total parental nutrition and feeding protocol. Massaging total body and kangaroo care started as soon as possible by infants' parents in neonatal intensive care units. Serum alkaline phosphatase activity, calcium, phosphor, and magnesium were regularly measured every six weeks using a Vita lab Selectra E 6002-160 Analyzer. At the same time, radiographs were taken from neonates' left wrist to assess bone density and detect signs of rickets. Demographic and corresponding data were recorded and subjected to independent samples t-tests, Chi squarer, or Fisher s exact test for categorical variables. The Data are expressed as Mean  $\pm$  SD. A p value of  $< 0.05$  was considered statically significant. SPSS15 software was used to conduct all statistical analyses. Results Postnatal age of infants was 40-66 (48/3 $\pm$ 4/2) days, birthweight 1132/9  $\pm$ 209/8 grams (620-1500). Ninety infants (19.6 %) weighed less than 1000 grams at birth. Sixty one of them (62/9 %) were boys and 36 (37/1%) girls. Mean gestational age of the infants was 28/6 $\pm$ 1/7(26- 34) weeks. Using a combination of the criteria "serum total alkaline phosphatase activity $> 900$  lu/l and "serum phosphor concentrations  $<4/5$ mg/dl as screening method for low bone mineral density in preterm infants revealed that there were 9 VLBW infants (9/3% ) suffering from osteopenia (with the sensitivity of 100% and a specificity of 70% according to previous data). The single most striking risk factor of osteopenia was Gestational age  $<30$  wk (  $p<0/001$ ). No correlation was found between feeding type of VLBW infants with osteopenia of prematurity ( $p>0/05$ ). Conclusions. The findings emerging from the present inquiry has indicated that incidence of osteopenia of prematurity in VLBW infants is relatively low in the northwest IRAN. The findings highlight the probable impact of total body massage or kangaroo care on prevention of osteopenia. Further research on total body massage and kangaroo care is required to substantiate the findings from this study.

## POSTER SESSION 3

Monday, June 21, 2010

9:35 AM

### #P31 MOTHERS' EXPERIENCES IN KMC

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Eduardo Duro MD MPH

Mothers' experiences in KMC. Duro EA, Goicoechea S. Hospital Magdalena V de Martínez. Buenos Aires, Republica Argentina. To describe the maternal experience in KMC on the neonatal intensive care unit (NICU) for their very low birth weight preterm infants a qualitative research approach was followed. The methods included on-site observations and informal conversational interviews, as well as semistructured records, in-depth interviews follow triangulation analysis. All mothers who kangaroo held their premature infants were included in a 6-month period of time. The mothers were interviewed following a kangaroo holding session in the NICU. KMC mothers reported feelings of "being needed" and "feeling comfortable" with the holding experience regardless of the infant's physical health status. KMC should begin as soon as possible after birth, facilitates bonding and enhances maternal-infant acquaintance, even in the NICU environment and calmed them and their newborn babies.



## #P32 LA NOTION DE SÉCURITÉ AFFECTIVE DANS LE CONTACT ET LE PORTAGE DU BÉBÉ

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La réflexion psychanalytique, à travers notamment les travaux de Didier Anzieu et d'E. Bick a montré la place des échanges tactiles dans la structuration psychique de l'individu et ce qu'ils peuvent induire comme confirmation affective chez celui-ci. Dans le domaine de la périnatalité, l'haptonomie (F. Veldman) a cherché à faire expérimenter chez le tout petit, dans la vie utérine et dans les jeux et relations vécus après sa naissance, un sentiment de sécurité favorisant son développement et son ouverture à l'autre. Prenant appui sur une phénoménologie de l'affectivité et sur les bénéfices constatés de la méthode kangourou, cette présentation interrogera donc la notion de sécurité affective et les enjeux qu'elle comporte dans la manière de prendre soin du bébé naissant, de le toucher et de le porter.



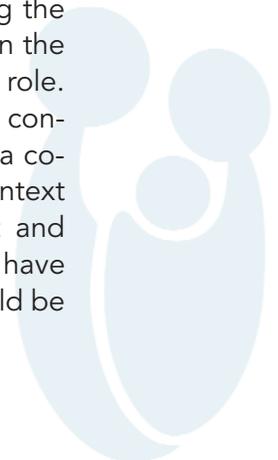
### #P33 IMPLEMENTATION OF THE KANGAROO MOTHER CARE METHOD FOR RURAL AND URBAN FAMILIES OF TERM BABIES IN VALLE DE SAN JOSÉ (COLOMBIA)

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\* Student Interchange Program .University Laval Quebec, Canada.

\*\* Psychologist, Integral KMC program, San Ignacio teaching hospital, Javeriana University and Kangaroo Foundation

Objectives: To implement the Kangaroo Mother Care (KMC) method within a group of term newborns in a rural part of and to evaluate the impact over the children's integral development, family environment, feelings and parental roles  
Design: Descriptive, exploratory and longitudinal study. Setting: a little town located in the Department of South Santander at the northeast of . Its population is mainly composed of farmers traditionally showing high sexism and domestic violence rates. Traditionally in this environment the father represents a figure of aggressive authority, low pattern sensitivity with the activities that involve the care and education of the baby  
Patients: 30 families with term newborns less than 15 days living in areas of high level of poverty, high risk of intrafamilial violence, low level of education of parents and inadequate conditions of housing and feeding.  
Intervention: Implementation of the principles and methodology of the KMC method in an ambulatory clinic: skin-to-skin contact, breastfeeding, father's involvement, good practices of care and stimulation, expertise of father and mother and social support.  
Outcome measures: All children were evaluated during the first six months of life with the Familiar APGAR, MPPBQ, HOME, 's and Bailey's tests. In addition, clinical status and anthropometric parameters were evaluated at the same time.  
Results: Up to 6 months, children's somatic growth, health and nutrition were adequate for age according to standardized curves. The quotient of general and subscale child development was within the expectations for their age (rural: 103.46 and urban: 101.72). The family environment was adequate and oriented towards the development of children and family. Mothers felt more competitive, with higher self-esteem and a feeling of social and family support. During this pilot study the role of the father was modified, he carried his baby in kangaroo position more than the mother during the first month of life: third week Father (61.5%) Mother (38.5%) 4th week father (61.5%) mother (38.5%).  
Conclusion: This pilot study showed the feasibility of implementing the KMC method even in term babies of rural areas in with the same benefits on the feeling of the mother and with a modification of the traditional paternal role. Experimental studies need to be performed to evaluate these findings and continuous "comprehensive" program starting during children's early life, with a co-participative methodology and an acknowledgement of a socio-cultural context could positively influence a child living in a disadvantaged environment and his/her family, acting as a tension softener of the negative effects that it can have on his/her integral development (resilient effect). This kind of programs should be widely on the Colombian territory.



## #P34 EARLY SKIN-TO-SKIN (KANGAROO) CARE (KMC) AND TOE TEMPERATURE (TT) IN PRETERM INFANTS

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Objective: Skin-to-skin (SS) KMC has documented vagal effects. Optimal functioning postbirth for preterm infants depends on generalized vascular perfusion. This research was done to investigate the effect of KMC on preterm infant TT as a possible index of vascular perfusion. Design: NIH-funded randomized controlled trial with Institutional Review Board approval registered with ClinicalTrials.gov (NCT00917085). Randomization was done using minimization after eligibility was confirmed. Sample: Non-ventilated preterm infants, 32-36 completed weeks (N=100). We studied all infants who were held during the first 6 hours postbirth (9 KMC and 9 Control infants). Groups were similar. Intervention: Mothers held their diaper-clad infants upright, chest-to-chest, and SS between their breasts. Outcome Variable: TT was measured with a skin probe that was placed on the ventral surface at the base of the right toe and connected to an electronic monitor (SpaceLabs). Methods: Informed consent was obtained during early labor. KMC began as soon as possible postbirth and occurred as often and as long as possible each time Days 0-5. Control infants were wrapped and held at parents' request (standard care). TT was measured continuously by monitor. During the first 6 hours postbirth TT was recorded from the monitor every 15 minutes; type of contact was recorded concurrently using the Index of Mother-Infant Separation (I-MIS). Recording times were objectively determined by preset electronic timer. Pretest-Posttest Analyses: An event that qualified for analysis included 1 or 2-6 consecutive 15-minute periods of KMC or holding that were preceded by 3 consecutive 15-minute periods alone and also followed by 3 consecutive 15-minute periods alone. Eleven KMC and 14 Control events were identified. Monitor strip data were not suitable for analysis. Results: For pretest, test/control, posttest periods, mean TT was 32.5, 32.8, and 33.0 °C (90.5, 91.0, and 91.4 °F) for KMC infants and 32.1, 31.8, and 32.0 °C (89.8, 89.2, and 89.6 °F) for controls. Longer periods of KMC led to greater increases in TT; longer periods of wrapped holding led to greater decreases. Conclusions: Mean TT increased during and after KMC and decreased during wrapped holding suggesting KMC is safe for similar infants. Conclusions are tentative due to small sample size, but suggest hypotheses for future testing. We speculate that TT and vascular perfusion of internal organs are positively correlated, and higher TT posttest for KMC infants reflects stimulation of thermoregulatory processes by KMC. Alternatively, warmer TT in KC group only reflects heat from the mother's current or recent presence. These thoughts suggest hypotheses for future testing in RCTs that focus on definitive measurement of toe and core temperatures.



## #P35 KANGAROO CARE: HOW FATHERS AND MOTHERS FEEL ABOUT IT AS AN INTERVENTION TO MANAGE PAIN IN THEIR PRETERM INFANTS.

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**Aim.** Maternal skin-to-skin or kangaroo care (KC) has been consistently shown to diminish procedural pain and improve physiological recovery. To date, studies examining Kangaroo Care (KC) as an intervention for pain management has focused primarily on mothers. There have been no reports of others' experience providing KC during heelstick. The purpose of this study was to understand father's attitudes in comparison to mothers after they have provided KC to their preterm infant during a heel lance. **Methods.** Fathers and Mothers of infants participating in a multi-centered randomized cross-over trial of KC to reduce pain during heel lance were asked to complete a questionnaire following the procedure. **Results:** 69 mothers and 36 fathers completed the questionnaire. The average age was similar for the fathers and mothers, 31 and 29.7 years respectively. All except four were Caucasian. 23% of mothers and 27% of fathers had provided KC at least once in the past for a non pain condition. Mothers were more likely to have a higher number of exposures. For mothers, number of prior exposures ranged from 0 to 17 times, and for fathers from 0 to 5 times. Father and mother's expressed similar feelings after KC. Responses fell within four primary themes: being a parent; anxiety, ambivalence, empathy. When asked if KC was doing anything beyond helping the infant, fathers and mothers reported only positive feelings: "promoted bonding", "felt more involved", "connected", and "decreased parental stress". Finally, all fathers and mothers would do it again and would recommend it to other parents. **Conclusion:** Both fathers and mothers almost unanimously supported Kangaroo care during heel lance, the most commonly occurring painful event in the NICU.



## #P36 INTENTION OF ABANDONMENT IN MOTHERS OF PREMATURE BABIES: THE ROLE OF PROTECTIVE METHOD KANGAROO

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Introduction: Prematurity is one of the known risk factors for the abandonment of children, especially when it comes to low-income families thus contributing to the increased infant mortality. One of the possibilities to face this problem is the establishment of hospital practices that encourage early formation of a bonding between mother and child. Objectives: To know the perceptions of pre-terms' mothers about abandonment and the possible protector effect that the Kangaroo Mother Care method (KMC) has about this sense. Methodology: Descriptive study with qualitative approach. The research was realized with mothers whose pre-terms babies were hospitalized in two different places - Neonatal Intensive Care Unit (NICU) or Kangaroo Unit and also at follow-up care of University Hospital of Federal University of Maranhão. The non-inclusion criteria considered were: mothers of malformed babies and babies with asphyxia. It was used saturation criterion on the sample, with a total of 12 interviews. The period of data gathering was from September 2007 until March 2008. It was used triangulation techniques: semi-structured interviews, participant observation and focus group. It was used content analysis in the modality of thematic analysis. Results: The paper highlights the changes in maternal representation in accordance with the period of hospitalization of the infant. The mother's abandonment by their partners and family as well as adverse economic conditions were elements brought by the mothers as possible determinants of intention to abandon. The host team, the skin-to-skin contact, the baby's care by the mother, still in the hospital, will gradually strengthening the bond. The support of family and social networks built from the basics of kangaroo method makes the mother care easier and modifies the intention of abandonment. Conclusion: The results pointed to the importance of kangaroo method in the reassessment of the decision to forsake the baby. It must be highlighted the need for a support network composed of professionals, the partner and family, in this moment of maternal fragility. This protection should start in the prenatal and continue throughout the postpartum period. From this protection, these mothers will be able to reframe fear, guilt and be empowered in the care of the baby.



### #P37 DESCRIPTION OF THE PATERNAL ROLE AT 3 MONTHS OF CORRECTED AGE IN KANGAROO FAMILIES CARE FOR IN AMBULATORY KANGAROO MOTHER PROGRAM (KMCP) IN BOGOTA

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Objective: To describe the paternal role and the sensitive care behavior of the father in kangaroo families cared for in a ambulatory KMCP. Traditionally the father in Colombia is not participating in the care of the newborn and the infant during the first year of life. Setting: Ambulatory KMCP in a teaching hospital in Bogotá, Colombia. Patients: 30 fathers (paternal figure) and their preterm and/or low birth weight infants free of malformations and major pathologies; having an emotionally and physically healthy mother older than 17, living with her husband and settled in Bogotá. Design: Descriptive and exploratory research including qualitative and quantitative analysis. Outcome measures: Every dyad father-child was evaluated at three months of corrected age under natural conditions by means of a semi-structured interview (role, involvement) and the application of the Q-Sort psychological test of sensitivity at upbringing (Pederson and Moran, 1990). Results: The mother keeps on being the main caregiver assuming the main responsibility on her child's upbringing. The father started to change his traditional role and gets more involved with his child, carrying out more care and upbringing activities. All fathers could hold their babies in kangaroo position and could feel more able as time passed by. Likewise, the father could identify and give a prompt, adequate and consistent response to the cues emitted by his preterm baby (sensitivity). Conclusion: KMC supports father-child early and continuous contact making easier the apprenticeship and development of sensitive care behavior with their infant. There is a improved competence due to the engrossment effect associated with the typical empowerment of the Kangaroo mother care method.



## #P38 INTRODUCING KANGAROO MOTHER CARE IN KUMASI, GHANA

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Background In 2007 kangaroo mother care (KMC) was implemented in the Kumasi Metropolitan District after a day introductory workshop during a neonatal care course. Aim • To describe the process of introducing KMC in hospitals in Kumasi Metropolis. • To demonstrate progress in KMC implementation over 3 years. Method of implementation • The neonatal situation prior to the introduction of KMC was assessed. • A leader in each facility was identified and trained before the newborn training. They assisted with the workshop facilitation and formed the Kumasi KMC steering committee core. • Changes were suggested in the referral system between hospitals. • Qualitative data were collected on the experiences of key role players in this process. • Key role-players visited South Africa for a more in-depth orientation in KMC. • Barriers to implementation included lack of physical and human resources, extended working hours, heavy workloads and no dedicated KMC budget. Outcomes of implementation • 582 infants have received intermittent KMC in the Komfo Anokye Teaching Hospital (KATH) since 2007. The uptake of KMC has increased from 50% to 95%. • Currently infants are transferred to 2 of the 5 submetro hospitals for continuous KMC. 241 infants were transferred between May and December 2009. • 120 health professionals have been trained in KMC since 2007 and in-service training is ongoing. • Existing materials were adapted and new materials developed. • Referral processes of neonates and communication between hospitals seem to have improved. • Some hospital refurbishments facilitated the implementation of KMC. Conclusion KMC was enthusiastically received by local health care personnel and is being practiced in Kumasi three years following the initial training. KMC's potential for reducing perinatal mortality, overcrowding in neonatal units and empowering the personnel in sub-metro and district hospitals and health centres is acknowledged. Requisites for successful implementation include visionary leadership, communication and effective teamwork.



**#P39 KANGAROO MOTHER CARE: APPLICATION IN A SUBURBAN ARGENTINEAN HOSPITAL. THE HOSPITAL MAGDALENA V. DE MARTINEZ EXPERIENCE.**

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After the Kangaroo Mother Care (KMC) was developed in Colombia in the 1970s, a lot of underdevelopment countries hospitals ´ began with their clinical application. In the hospital Martinez the model is implemented using intermittent KMC with sessions of one or a few hours skin-to-skin contact for a limited period, but there are common prolonged mother/parent-infant skin-to-skin contact; kangaroo position, transport in kangaroo position, kangaroo exclusive breastfeeding nutrition. Due to the increasing evidence of the benefit of KMC for infants and mother in all intensive care settings, the industry introduced improvements that include an ideally controlled microclimate with the benefit of kangaroo care combined with continuous temperature monitoring outside an incubator. We use this high-tech environment only with extreme premature infants for the implementation of the KMC model. In our Neonatal Intensive Care Unit (NICU) we implemented the KMC method, as soon as possible after birth, as continuous skin-to-skin contact, as extent that this is possible and appropriate, and as continue for as long is appropriate. Our approaches include a high level of parental participation in the NICU facilitated by a comprehensive team that includes dedicated, specially trained personnel as nurses, psychologists and social workers.



**#P40 PROJECT FOR STRENGTHENING THE KANGAROO MOTHER CARE IN BRAZIL: IMPLEMENTATION OF THE POLICY OF HUMANIZED ATTENTION TO THE LOW BIRTH WEIGHT NEONATE**

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**INTRODUCTION:** The neonatal mortality rate is still high in some areas of Brazil, so the actions aimed at expansion, organization and classification of maternal and neonatal care have joined since the end of the 90s, the appointments of priority policies in different areas of management of the Brazilian health system. The implementation of Kangaroo Care as National Health Policy should be understood in the context of the classification of neonatal care. It was established by the Technical Department of Child Health and Breastfeeding of the Ministry of Health focused on humanized care for low birth weight neonate. It was governed by technical standard released in December 1999 and has been expanding the care to the baby, adding the need for attention on parents, siblings, grandparents and family networks and social support. During the first five years of the policy, 170 training courses involving 328 hospitals and 7036 professionals have been conducted. The training changed practices by changing the paradigm of neonatal assistance in Brazil. In 2005 it was performed an evaluation of the results and since 2009 has been developed a project for the strengthening of this policy seeking the decentralization and awareness for the adoption of the method. **OBJECTIVE:** To promote the autonomy of each state to design and implement the kangaroo care method in all units of reference for the high-risk pregnancies in the country. **METHODOLOGY:** The project was developed in three phases: contact with state managers, training of five tutors from all the Brazilian states in the National Reference Centers for Kangaroo and, eventually, 27 state courses for dissemination in other maternities. After the training stage, the hospitals will be evaluated and certified by the Ministry of Health. In the end, the results will be evaluated seeking quantitative and qualitative indicators. **RESULTS:** It was conducted in 2009 a National Meeting with 42 managers including 27 state coordinators of the Child Health Area. Each State Department indicated a Reference Maternity to be able to deploy the Kangaroo Method. Five Regional Courses were performed, 27 maternities and 198 health professionals were trained. In the first half of 2010, 27 courses of dissemination were conducted in the Brazilian states enabling 810 professionals. In the second half of 2010 it will be held to evaluate the project and monitoring of services that have implemented the Kangaroo methodology.



## #P41 TRAINING AND EDUCATION IN THE IMPLEMENTATION OF KANGAROO MOTHER CARE IN SARDJITO HOSPITAL

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To provide low birth weight infants (LBWi) with a safe method and simple humanized care were to facilitate mothers in caring their LBW at home as well as to provide a role model of health service institution. KMC started at Sardjito hospital during the multicentre study 1995. We then attempted to develop KMC despite lack of fund. Mothers and health personnel are the targets of KMC training and education. Mothers were trained to care for their tiny babies by them on their chest by skin to skin contact, to learn about prevention of infection, to promote breastfeeding and continuing it at home. Health personnel were trained to understand and apply KMC in their work places and teach 'mothers' to carry out KMC. Communicative and personal approach were applied to mothers attending the KMC program, meanwhile health personnel were approached through formal institution, professional organizations, informal and individual encouragement. The training included feeding, hypothermia management, prevention of infection, bonding, recognition of dangerous signs in LBW infants and their management with simple interventions. Some of the KMC program are parts of other trainings such as LBW module for midwives and nurses in the community. Some training, however, is focused on KMC only, in which it is presented in class with models and in ward. A conducive environment is required to make KMC program successful. Adequate facilities such as mother's room and holders, capable and experienced trainers and support from family and relatives of mothers as well as directory or directory board of hospitals/health centers are needed. KMC environment is expected to raise the participants awareness of KMC. Ninety-five percent of mothers could apply KMC while at the hospital; however, it decreased to 60% after they left the hospital and became lower to 40% at the second visit. Only 50% health personnel outside the Sardjito hospital conducted the training. The check list of KMC activities is a necessity. The principles of training and education were applicable in general neonatal cares depending on the participants and venues. KMC has been initially introduced to pre-service. In addition it is included in the Training of Comprehensive emergency on Neonatal and Obstetrics in District hospitals. It was shared with others by dissemination and collaboration with the chief and colleagues of the work places. KMC should not only be provided by hospitals/Health centers but also by the place the mothers live.



## #P42 FULL TERM AT BIRTH KANGAROO MOTHER CARE AND MOTHER-BABY BONDING-ATTACHMENT

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Background: Breast Crawl (BC, At Birth KMC) is a natural and physiological event that creates opportunity for skin to skin contact of mother and baby immediately after birth. BC also is a kind of perinatal care that conducts better COPE in parenting and infants' psycho-motor and behavioral development. This study is about effeteness of At Birth KMC in term newborn on Bonding and Attachment of Mother and Babies. Methods: This is a quasi-experimental study with control group that operated in a tertiary teaching hospital on 100 full term healthy mothers (50 mothers in study group and 50 mothers in control group). In study group newborns received skin to skin contact immediately after delivery for at least one hour and control group had a routine care without skin to skin contact. All of newborns were evaluated after one month for bonding and attachment with PBQ (Postpartum Bonding Questionnaire) questionnaire. Results:In this study bonding and attachment of mother and baby was significantly ( $P<0.001$ ) better in study group and also impaired bonding, rejection and anger, anxiety about care and risk of abuse in study group were significantly ( $P<0.001$ ) lower than control group. Anxiety about care occurred in 5.8% in study group compare to 10.9% in control group. Also, rejection and anger were 1.7% and 2% in study group compare to 2.5% and 7% in control group. Conclusion:At birth Kangaroo Mother Care produce better mother-baby relationship and increase chance of successful exclusive breast feeding in term newborns.



## #P43 A FEMINIST PHENOMENOLOGICAL STUDY OF SKIN-TO-SKIN CONTACT

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Skin-to-skin contact has been shown in both scientific and experiential literature to be beneficial to both mother and her infant; however, despite mounting evidence indicating its efficacy it continues to be an intervention that is underestimated and inconsistently practiced within health care institutions around the globe. As a relational phenomenon, skin-to-skin contact between mothers and their preterm infants is positioned, within the NICU, against a backdrop of Cartesian dualism, an epistemology where disembodiment, hierarchy and power relations are often inherent. The purpose of this inquiry by way of a feminist phenomenology was to explore an experiential understanding of skin-to-skin contact within the context of the NICU. Meanings embedded in the practice of skin-to-skin contact for both mothers and nurses within the highly technological environment of the NICU were revealed through conversational interviews and participant observation sessions. Utilizing thematic analysis four themes emerged from the participant's stories: Skin-to-Skin Contact - The Chiasmic Relationship, Mothers-Infants and Nurses – Embodied Relations, Skin-to-Skin Contact through Technology – The Perfect Blend and Skin-to-Skin Contact - A Relationship of Empowerment. The knowledge generated from the study informs our understanding of the meaning of skin-to-skin contact between a mother and her infant and thus may offer strategies to enhance knowledge uptake and thereby guide and improve clinical practice, influence and inform organizational policy and potentially stimulate future research that will lead to wider dissemination of the practice of skin-to-skin contact.



#### #P44 HEALTH PROFESSIONALS' KNOWLEDGE, ATTITUDES AND PERCEPTIONS OF KANGAROO CARE IN A TERTIARY REFERRAL HOSPITAL IN GERMANY

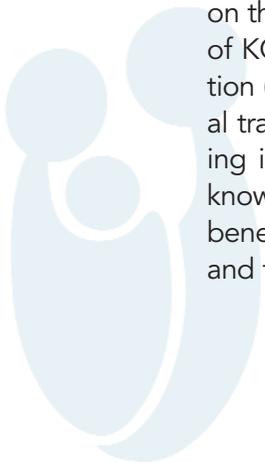
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The care of premature and low birth-weight (LBW) infants challenges health services in Germany, as the economy tightens and the cost of care increases. Very limited research has been done in Germany on the knowledge, attitudes and practices (KAP) of tertiary-care staff working in the neonatal environment. **Method.** A questionnaire was designed for a KAP survey on KC among personnel and managers who were in contact with LBW infants and their families. It contained a section with six demographic items, whereas the 16 KAP items required a response on a scale of 0-3 (Strongly disagree, Disagree, Agree, Strongly agree). The survey was conducted in 2009 among personnel and managers of a neonatal unit in a tertiary referral hospital prior to the introduction of KC. A total of 45 questionnaires were disseminated, with 45 returned. This is a response rate of 100%. **Results.** The questionnaire was completed by 31 staff members, 11 managers and 3 with unknown designation. Six were males and 39 females. Respondents had an average of 14.68 years of work experience. An average score out of 3 was calculated for each KAP item and for each of the three domains. The overall knowledge score was 2.21 out of 3 (73.8%). The attitude score was somewhat lower at 2.06 (68.5%), with the perception of practice score the highest at 2.31(77.0%). The knowledge item scoring the highest was KC's effect on bonding (2.8), followed by KC's effect on physiological stability (2.6), equal benefits of KC provided by mother and father (2.6) and KC's effect on the immune system (2.1). Items that scored the lowest were the protection of KC against infection (1.7) and the safety of transporting babies in KC (1.5). Attitude scores ranged between 1.6 and 2.3, with the two items related to education and training of parents and staff scoring the highest (2.3), followed by two items on enabling parents to do KC 24 hours per day (2.2 and 2.0 respectively) and items on fathers' feelings about KC (1.9) and a greater focus on the mother (1.6). Among the practice score the importance of creating awareness of KC benefits scored highest (2.5), followed by the importance of KC staff orientation (2.3), the development of KC guidelines (2.3) and the importance of professional training and continuous education in KC (2.1). **Conclusion** Tertiary-care staff working in the neonatal environment scored quite high on perception of practice and knowledge of KC, while the attitude score was lower. Staff attitudes about KC would benefit from increased awareness though orientation, training, continuing education and the use of written guidelines.



## #P45 MEDICAL AND PSYCHOLOGY ASPECTS OF THE INTERACTION IN "MOTNER-CHILD-MEDICAL STAFF" SYSTEM IN NICU

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Annual growth indices of preterm deliveries, recurrent miscarriage in Ukraine set conditions for high speed and degree of implementation kangaroo methods not in the big perinatal center but in first level maternity hospitals or/and in the district unit of perinatal pathology. In spite of survival rate and risk of severe pathology formation the volume of the application framework of KMC which was accepted as The order of Health Ministry in 2003, become the main flag of the quality of medical service in neonatology. During stay of preterm babies in NICU create special system with close relations between newborn, parents and medical staff. Therefore in the list of main indices of the quality in NICU activities side by side with survival, formation of chronic disease and disability important place occupy psychology indices, such as claims settlement about medical service level, full information volume about infant's state, treatment and absent of discomfort in mother/father. The creation of optimal conditions for the family of preterm baby with 24-hours joint stay in intensive care wards, relaxation room, simulation room, psychologist consultation in crisis period got a tactic decision on all step of intensive care of preterm infants especially in rural maternity hospitals. The joint stay parents and their preterm baby in intensive care wards with kangaroo position, stimulation of breastfeeding make it possible to implement the early discharge on II rehabilitation stage, new system of infections control and reduce the monitoring load on the newborn. As results we have the creation of more close relation with preterm infant, decreasing of the rate of renunciation of parent's rights and more active family participation in follow-up and rehabilitation program. Unfortunately, the implementation of KMC in regional perinatal centers restrain by majority of nurse staff, increasing amount of parents with high education and firm belief in greater success by usage of high technology. During last two years we take notice of quickly growth of kangaroo ward with 24-hours skin-to-skin contact in rural area versus slow appearance common rooms for mother education, training and breastfeeding.



## #P46 REVITALIZATION OF THE KANGAROO CARE IN BRAZIL AS A NATIONAL POLICY

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**INTRODUCTION:** The neonatal mortality rate is still high in some areas of Brazil, so the actions aimed at expansion, organization and classification of maternal and neonatal care have been included among the priorities, of the Brazilian Ministry of Health since the end of the 90s. The implementation of Kangaroo Care as National Health Policy should be understood in the context of the Unified Health System (SUS), which provides universal access to comprehensive health care. One of the principles of SUS is the humanization of care. Therefore, Kangaroo care was elected as the strategy for the humanized care for low birth weight neonate. In December 1990, it was published the technical standard of the Method, which included not only the care to the baby and mother, but also the need for attention on fathers, siblings, grandparents, family networks and social support. During the first five years of this policy, 170 training courses were conducted involving 328 hospitals and 7036 professionals. The courses aimed changes in practices by shifting the paradigm of neonatal assistance in Brazil. In 2005 the policy was evaluated and as a result a project of revitalization of the Kangaroo Care as a national policy was developed in 2009. The main focus of this project is the decentralization of the actions for expansion and strengthening of the Method. **OBJECTIVE:** To promote the autonomy of each Brazilian state for designing and implementing the Kangaroo Care in their neonatal units. **METHODOLOGY:** The project was developed in three phases: (1) contact with state managers, training of five professionals to serve as multipliers of the Method (tutors) in each state, selection of one unit in every state as a Reference Center for Kangaroo Care, and, eventually, 27 state courses for dissemination of the Method to other maternities; (2) evaluation and certification of the units by the Ministry of Health; and (3) evaluation of the project through quantitative and qualitative indicators and monitoring of the services adopting the Method. **RESULTS:** It was conducted in 2009 a national meeting with 42 managers including 27 state coordinators of the Child Health Area. Each State Department indicated a Reference Maternity to be the state reference for the Kangaroo Method. Five Regional Courses were performed, with participation of 27 maternities and 198 health professionals. In the first half of 2010, 27 courses of dissemination are planned to be conducted in the 26 Brazilian states and Federal District enabling 810 professionals. In the second half of 2010 the project will be evaluated and the services with Kangaroo Care will be monitored.

## #P47 KANGAROO METHOD: INTEGRATED HEALTH CARE FOR NEWBORNS AND THEIR FAMILIES

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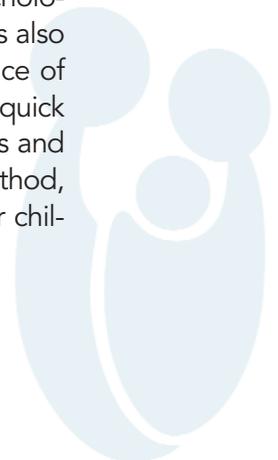
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This work is an experience report based on the implantation of Kangaroo Method in the Neonatology Service of the University Hospital of the Federal University of Maranhão (HUUFMA), in Brazil. HUUFMA is an important teaching center of health care professionals of the State and occupies a prominent role with regard to health care of women and children, in both ambulatory and hospital level. It is a reference hospital for high-risk pregnancy and for excellence in Kangaroo Care. The Neonatal Unit was originally divided into two sectors: Neonatal Intensive Care Unit (NICU) and Intermediate Unit (IU). The Kangaroo Method implementation guarantees the mother presence during all day, and has made necessary to create a new place called Kangaroo Unit, where the mother involves herself directly with the child's care and prepares herself for discharge. The father is invited to participate as much as possible and it is offered for the siblings and the grandparents the opportunity to visit. Each family receives individualized attention, the family members can have their questions addressed and they are encouraged to build social networks for the care of the child after discharge. Follow-up is carried through all stages of care, for intern and out patient care, and aims at indentifying the family structure, the risk of abandonment and the construction of social networks of support. During the Hospital stay, the mother receives guidance and encouragement for breastfeeding and to practice the Kangaroo Method at home. The outpatient follow-up care also aims at evaluating the growth and psychomotor development; and diagnosing early deviations, sequels and clinical situations of risk. For this purpose, the Hospital has a multidisciplinary team of pediatricians, nurses, nursing assistants, occupational therapists, social workers and psychologists, who carry out individual and interdisciplinary consultations. The outpatients also have the support of specialists and diagnostic services. The Neonatology Service of HUUFMA, besides providing assistance care aimed at neonate admission and quick egress from the NICU, also promotes teaching activities that capacitate students and professionals for the Kangaroo Method practice. Since the implantation of the Method, the mothers at discharge felt more secure and empowered to take care of their children, what implicates in better survival chances.



**#P48 THE CONSTRUCTION OF MATERNAL ROLE FROM THE EXPERIENCE IN THE NEONATAL INTENSIVE CARE UNIT IN THE TRADITIONAL ASSISTANCE MODEL AND IN THE KANGAROO MOTHER**

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**INTRODUÇÃO:** Mothers of preterm neonates face feelings of fear and guilty with regard to their hospitalized child. In general, they have difficulty to be close and take care of their child. **OBJECTIVE:** This study aims to analyse the construction of the maternal role from the birth of a preterm child hospitalized in the Neonatal Intensive Care Unit (NICU), through the analysis of experience in two models of assistance - the first, the traditional care and the second, the Kangaroo Mother Care (KMC).The two models privileged the good clinical care afforded to the babies, however the second incorporated the continued presence of the mother in the Kangaroo Unit. **METHODOLOGY:** Qualitative and exploratory study realized in four brazilian NICU: two using the KMC and two using the traditional method. It was realized 20 semi-structured interviews. The number of interviews was determined by the criterion of saturation. Mothers of babies hospitalized in the period of one until three months were interviewed. The interviews were recorded and transcribed after, and the analysis used the hermeneutic dialectic for the comprehension and interpretation of the speeches. First, it was realized exhaustive reading; then the major themes were identified and in a third stage the speeches were deconstructed and contextualized. **RESULTS:** Significant differences between the two assistance models were identified. KMC was identified as a technology of care that influences the mother's perception about the baby and her participation. In the places that use the KMC, mother's experience in the process of caring and the proximity to her child has been important in building her self-image as a mother. KMC has also influenced the mother's expectations for the period after discharge. Mothers who experienced this method felt more confident to continue the care at home and reported hope and belief in the baby's future. However, mothers who experienced the traditional model reported fear of the baby getting ill and other concerns such as fear of visits, sudden death and incurable diseases. **CONCLUSION:** It was observed that KMC offers women ways to facilitate the performance of their role, privileging the use of own resources in the defense and the conduct of what is happening with her and her baby, bringing as a result, their empowerment.



## #P49 KANGAROO MOTHER CARE: A SOLUTION TO A RISING DILEMMA

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**Introduction.** After January 12 2010 earthquake, the Haitian health system, is now facing conditions resulting from the aftermath of the catastrophe. Among those conditions, a rising number of premature births will bring new challenges. The State University hospital's Pediatric ward, main reference facility for Haiti, is badly damaged and today the neonatal section is hosted under a tent installed on the hospital yard. **Background.** The State University hospital's Pediatric ward was a 90 beds capacity structure with a neonatal section. This section had a premature newborn care unit (with a capacity of 5 incubators), a newborn admission area (with 4 warmers and 6 cribs) and a newborn hospitalization area (with a capacity of 20 beds). Due to the limited capacity of the premature newborn care unit, most premature newborns were managed in the hospitalization area. Today those 5 incubators and 7 cribs are gathered under a tent and represent the new neonatal section. **Objectives.** The goal is to demonstrate the importance of prematurity in the Pediatric ward of the State University hospital and the need to introduce a method yielding to a better management of this fragile category, particularly with the new living and working conditions after the January 12 tragedy. **Method.** We reviewed data from the Pediatric ward records. Different period of time had been compared and prematurity's stand within the neonatal causes of hospitalization and death had been determined. **Results.** From January to December 2008, 220 premature newborns were cared for in that section, compare to 154 in 2007 and 120 in 2006. Prematurity rate represented 12.90% of the newborn hospitalization in 2006, 14.48% in 2007 and 21.18% in 2008. Premature newborn death represents 49.09% of total neonatal death for 2008. Hypothermia and infections were among the most common causes of admission. **Discussion.** On January 12 2010 the destructive earthquake that hits Port-au-Prince lead to more than 200,000 deaths and 1 million people relocated. Most of Haiti's capital infrastructures and buildings were devastated thus creating new living conditions for the population. Those displaced are now living under tents within an unfit environment. With a birth rate of 32 ‰ inhabitants, and Port-au-Prince having a population of 3 million inhabitants, we can envision 96000 pregnancies for this year. Those women living in harsh conditions, without proper prenatal care and having economic limitations are more prone to premature labor. Kangaroo mother care could be the tool needed to guarantee the survival of Haiti's premature newborn babies. **Conclusion.** The benefit of kangaroo mother care has been proven by different studies (1). The urgent need to cope with the ratio between the increase number of premature births and the hospitalization capacity, render the implementation of this method a must.



#P50 EFFECTS OF KANGAROO MOTHER CARE ON THE CRYING TIME OF  
LOW-WEIGHT NEWBORNS, 2010

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## #P51 COMPARATIVE RESEARCH ON EFFECTIVENESS OF TAKING CARE OF LBW

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The aim of this study was to determine the heart and respiration rates, temperature and number of nutrition and vomiting, sleeping time, number of crying and crying time of low-weight newborns, after application of kangaroo mother care in case group, and incubator in control group. Method: 40 healthy low-weight newborns of both sexes were studied in two groups (case=20 and control=20). None of them had neurological, cardiac and/or respiratory deficiencies. Assessments were made after the newborn had been left in an ordinary cot for 30 minutes and after 180 minutes of kangaroo mother care, on six consecutive days in case group and control group were in incubator for six days. For these evaluations, a sensor for pulse oximetry, a thermometer and a chronometer were utilized. Results: There were significant decreases in heart rate ( $p < 0.001$ ) after applying kangaroo mother care. However, there were significant increases in axillary temperature ( $p < 0.001$ ) and a significant decrease in respiration rate ( $p < 0.001$ ). There were significant increases in nutrition and sleeping time ( $p < 0.001$ ), and there were significant decrease in vomiting ( $p < 0.05$ ), crying rate and crying time ( $p < 0.05$ ). Conclusion: These results support earlier findings of the beneficial effects of Kangaroo mother care on promote improvement in body temperature, and decreased respiration rate (thus providing greater respiratory comfort for the newborns) and decrease heart rate. It promotes nutrition (it means increase growth rate), increase sleeping time (it helps growth and decrease stress) Kmc decrease crying time and vomiting, therefore kangaroo mother care contributes towards beneficial alterations in the low-weight newborns.



**#P52 EVALUATION DU NIVEAU D'ANXIÉTÉ DES MÈRES D'ENFANTS NÉS PRÉMATURÉS: EXPÉRIENCE DE L'UNITÉ MÈRE KANGOUROU DE L'HÔPITAL LAQUINTINIE DE DOUALA (CAMEROUN).**

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Introduction. L'objectif de cette étude est de mesurer le niveau d'anxiété des mères à différents moments (A l'entrée, pendant le séjour et à la sortie) auprès des mères hospitalisées dans l'Unité Mère Kangourou de l'hôpital laquintinie de Douala. Matériel et méthodes. Nous nous sommes servis dans le cadre de ce travail de la Stai (State Trait Anxiety Inventory) test d'anxiété de SPIELBERGER dans sa forme Y-B et Y-A : La Stai Y-B ou anxiété trait de personnalité évalue le niveau d'anxiété général d'un individu et La Stai Y-A ou anxiété trait de caractère évalue le niveau d'anxiété ponctuel. Critères d'inclusion. a) Avoir accouché un enfant interné dans cette unité; b) Prendre personnellement soin de son enfant; c) Pratiquer ou non la méthode kangourou. Résultats. Une tendance à la réduction du niveau d'anxiété se dessine lorsque nous dépouillons nos données par un traitement statistique simple : également sur la Stai Y-A. A l'entrée, 44.4% des répondantes présentent sur la Stai forme Y-B un niveau d'anxiété élevé et 44.4%. Pendant le séjour, 33.3% des répondantes présentent une anxiété situationnelle critique. A la sortie, 33.3% répondantes présentent une anxiété situationnelle critique. Conclusion. La pratique de la méthode mère kangourou dans un service hospitalier participe à réduire le niveau d'anxiété des patientes.



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