

(d) Initiatives to encourage breastfeeding:

- (i) Kangaroo Mother Care (KMC)**
- (ii) Baby Friendly Hospital Initiative (BFHI)**
- (iii) World Alliance for Breastfeeding Action (WABA)**
- (iv) Others**

A new 'paradigm' ...

A new awakening ...



A new way of starting life

(These two photos with permission from Uppsala 95F)

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Preface: The following information re **KMC** (also referred to as **skin-to-skin care - SSC**) is presented with an aim to raising awareness and to encourage consideration of its implementation. Although I think it has the potential to 'encourage breastfeeding' and impact positively '...on the long term sustainability of Australia's health system', I nevertheless maintain a balanced view of the 'big picture' and am in awe of the amazing abilities of our neonatal professionals who perform 'technological' wonders on a daily basis.

**See: World Health Organization – Kangaroo Mother Care - A Practical Guide: www.who.int/reproductive-health/publications/kmc/text.pdf

(i) KANGAROO MOTHER CARE

Bergman N. J. MB ChB, MPH, MD, **Extract** from CD *Breastfeeding: A Lifelong Investment* (Capers Breastfeeding Seminar, Newcastle NSW, 2006)

References can be retrieved 11/01/07 from: www.kangaroomothercare.com/research



Dr Nils Bergman graduated at the University of Cape Town, and has worked in South Africa, Ciskei and, Sweden, before working seven years as Medical Superintendent and District Medical Officer at Manama Mission, Zimbabwe. Here he, together with Midwife Agneta Jurisoo, developed and implemented **Kangaroo Mother Care (KMC)** for premature infants right from birth. **This resulted in a five-fold improvement in survival of Very Low Birth Weight babies.**

KMC can be defined as:

- maternal-infant skin-to-skin contact (uninterrupted)
- exclusive breastfeeding (mother's milk, & access to nipple and breast)
- providing support to dyad (whether psychological or technological)

Kangaroo Mother Care has been variously defined, but two essential components are **skin-to-skin contact and breastfeeding**. From the biological perspective, in the immediate newborn period of Homo sapiens, skin-to-skin contact represents the correct **habitat**, and breastfeeding the **niche** (pre-programmed behaviour) designed for that habitat.

Biologists describe mammals as developing through a series of habitats, (uterus, mother's body, nest of siblings, the world), and in each habitat, the developing organism is physically capable and neurobehaviourally-programmed to behave in such a way as to provide for its own needs. The **key concept** is that the developing organism is endowed with the required behaviours; ready to be expressed when in the optimal habitat for which they are designed (mother). It is the habitat that provides the needs of the organism.

Evolutionarily, the species Homo sapiens is born extremely immature, with only **25% of final brain size**, compared to 45% for chimpanzees and much higher in the four thousand or so other mammals. This immature brain has been suggested as being a compromise; the consequence of a narrowed pelvis and birth canal following **bi-pedalism** to enable the enlarging brain to still get through the pelvis and continue growing after birth. Homo sapiens therefore developed mechanisms for coping with immaturity. Being born premature is not such a serious mishap for Homo sapiens as for other species, as long as the correct habitat is provided.

Defining for all mammals is that they have breasts (Latin mammae) for suckling their young. Biological research in numerous mammals has shown that the neural events in pregnancy are **highly conserved** ie almost identical in all species. The subsequent **endocrine-priming** of pregnancy is also remarkably similar across species.

Once birth takes place, all mammals studied show a **set sequence of behaviours**, which leads to the initiation and maintenance of breastfeeding behaviour. These behaviours do differ, each species having its own set sequence.

A surprising and key finding in this research has been the finding that **it is the newborn's behaviour that determines the newborn's actions to elicit care-taking responses from the mother.**

Initiated by the newborn, breastfeeding is established through a set of mutual, complex sensory stimulations in mother and child. However, in all species, suckling is a remarkably fragile and transient behaviour, and is easily disturbed by any intervention.

Removed from the correct habitat, all mammals exhibit an identical pre-programmed response referred to as the **protest-despair response**. The protest response is one of intense activity seeking reunion with the habitat. The despair response is one of withdrawal and survival; decreased temperature and heart rate mediated by a massive rise in stress hormones. Reunited with the correct habitat (mother), there is a rapid rise in heart rate and temperature.

Birth represents a **habitat transition**. In the new habitat, the basic needs remain the same. Research over the last ten years provides strong support for the contention that newborns in the skin-to-skin habitat provide their own basic needs, not the mother or the health services.

The correct habitat provides four basic biological needs:

(1) **Oxygenation** has been shown to improve on SSC, to the extent that KMC is used successfully to treat respiratory distress. The breathing becomes regular and stable, and is coordinated with heart rate. Infants removed from incubators and placed in SSC show a rise in temperature and a dramatic drop in gluco-corticoids, as predicted by the protest-depair response.

(2) **Nutrition** is improved, both with respect to the mother's ability to breastfeed, and the newborn's utilisation of the milk. Full-term, un-drugged infants left on their mother's chest and undisturbed, will breastfeed spontaneously within one hour, with no help at all.

(3) **Warmth** and

(4) **Protection** The stimulations the newborn gives the mother during SSC **elicit care-giving and protective behaviours**. Positive effects on the mother are better bonding and healing of emotional problems associated with premature birth, among others.

The **volume** of mother's milk is greatly increased, and the frequency of feeds provided likewise. Even without the increased milk, with the **vagal stimulation** the infant receives, the gut is better able to use the milk provided, and grows faster.



The protest-despair response was first described in orphans after WWII. It was subsequently studied in monkeys and then in many other mammals. **Separation distress calls** have been documented very carefully in rats. Very similar distress calls have been shown in human infants placed in cots, who make 10 times as many cry signals as babies on SSC (skin-to-skin-contact). The calls of SSC babies have a completely different character, and it has been suggested they are intended to elicit assistance from the mother to reach the nipple for suckling.

Immunity is improved, demonstrable even 6 months later. Premature babies seem to have poor immune systems and are susceptible to allergies, infections and feeding problems in the first year of life. Early SSC dramatically reduces these problems. In no published paper is there a single adverse outcome reported for KMC.

Some may feel that human beings, with their massive forebrains, cannot be compared to other animals. There has however been anthropological research further supporting this view. Over the last 3 million years *Homo sapiens* evolved as tropical hunter-gatherers. Changes started 10,000 years ago with the beginning of agriculture, but there are still such peoples living that have been studied.

Common to all these groups is that newborns and infants are carried constantly, sleep with their mothers and receive an immediate, nurturant response to crying. Feeding takes place every 1 to 2 hours, and breastfeeding continues for two years.

During the last 100 years, this million-year pattern of “carry care” changed to one where the child was often left lying still - “cache care” - and separated from its mother. Often the baby was ignored when crying and fed four-hourly by the clock - “nest care”, with formula from a “follow care” species and substitutes from an early age.

Lozoff et al (1977) state that these changes alter the initiation of the mother-infant relationship, which may be "strained beyond the limits of adaptability"...separation causes changes in the fundamental efficiency of systems and early separation can produce major shifts in susceptibility to stress-induced pathology...The origins of many behavioural deviations are unknown...can some be traced back to violations of an innate agenda?"

In our Western paradigm the newborn has generally been regarded as helpless, ("the mother clueless, and the father useless") and requiring help for all its needs. For full-term babies, the mother is seen as providing these needs; for premature babies the health service must remove the newborn from the mother and provide for its needs. The original paradigm suggests otherwise. For the full-term infant, its sole requirement is the correct habitat; not the mother as a caregiver, but the mother as a provider of SSC. The full-term infant is reasonably robust, and the premature frail. However, the premature's need for the correct habitat is even greater than the full-term's. The premature is endowed with the same neuro-behavioural programme and behaviours, but due to its physical immaturity, does require support.

Our present paradigm for premature babies sees the incubator; one for which we have defined 'normal' ranges for heart-rate and temperature. Such a habitat is one of separation from the mother, with a ten-fold increase in stress hormones producing despair, along with lowered heart rates and temperature. In our health care we need to recognise the central place of the mother as the habitat that newborns need as a matter of urgency. This will mean redefining 'normal' values and recognising the capacities of the newborn in providing for its own needs.

While it was observed that ability to suck on a bottle only starts at 34 weeks post-conceptual age, recent research has shown that suckling from the breast (myographically distinct to sucking) is possible at 28 weeks. We need to design our health care and adjust our routines to ensure that primarily support is afforded to the mother to provide the habitat, and assistance is given to the premature to provide for its own needs, recognising the neuro-behavioural capability may not be matched with physical development.

In the KMC paradigm the habitat (mother) and niche (breastfeeding and breast milk as two separate concepts) are the starting points of care, to which we add whatever available technology and support is available.



Physiology and Research of KMC

In the uterine habitat, oxygenation is provided through the placenta and the cord, as well as warmth, nutrition and protection. These are the four basic biological needs. Parturition (birth) represents a **habitat transition**. In the new habitat, the basic needs remain the same. Research over the last ten years provides strong support for the contention that newborn itself in the skin-to-skin habitat, not the mother or the health services, provides these basic needs.

Heart Rate is increased when placed SSC. Though we can regard this increase as being with the clinically normal range, what is seen is actually a return to the physiologically normal heart rate, the lower rate being due to protest-despair behaviour. Infants removed from incubators and placed SSC show a rise in temperature and a dramatic drop in glucocorticoids, as predicted by the protest-despair response. Mothers are able to control the infant's temperature within a very narrow range, far better than an incubator. To accomplish this, her core temperature can rise to two degrees Centigrade if baby is cold, and fall one degree if baby is hot. Skin-to-skin contact is better than incubator for rewarming hypothermic infants.

Self-attachment refers to the phenomenon that fullterm, undrugged infants, left on their mother's chest and undisturbed, will all breastfeed spontaneously within one hour, with no help at all. But this behaviour is dependent on SSC. Mother and infant should NOT be separated. The stimulations the newborn gives the mother during SSC elicit caregiving and protective behaviours from the mother. The baby's legs kicking on the mother's abdomen cause the mother's uterus to contract strongly, preventing post-partum bleeding.

Infections are reduced when SSC and exclusive breastfeeding are firmly introduced. Necrotizing enterocolitis (a potentially lethal and very costly disease to treat) has been dramatically reduced in many units following a KMC programme.

In no published paper is a single adverse outcome reported for KMC. Positive effects on the mother are better bonding, healing of emotional problems associated with premature birth, among others.

BREASTFEEDING

Breastfeeding is a behaviour based on hindbrain functions that regulate hormones, autonomic functions and the somatic system. Key to understanding breastfeeding behaviours in the transitional and newborn periods is "state organisation".

State Organisation refers to the ability to control the level of arousal, or of being awake. A scale of state organisation can be described varying from deep sleep to hard crying, each being associated with particular behaviours and conditions. For breastfeeding an infant should be in an awake state, and should thereafter be in quiet sleep for optimal development. KMC has profoundly beneficial effects on the state organisation of newborns.

"Suckling" is the "chewing movement" an infant makes on the nipple. Quite apart from suckling as a means to ingest food, this behaviour has essential effects. Suckling stimulates the back of the palate, and results in intense vagal stimulation, which is vital for the general wellbeing of the baby. Suckling releases hormones similar to morphine in the brain, and gives powerful pain relief to infants. While it was observed that ability to suck on a bottle only started at 34 weeks post-conceptual age, recent research has shown that suckling from the breast is possible at 28 weeks. Suckling is a myographically distinct behaviour from sucking, and research on sucking on bottles of premature infants shows it clearly to be stressful. Premature infants are unable to coordinate their breathing and their swallowing.

BREAST MILK AND IMMATURITY

Compared to that of other mammals, human milk is extremely thin in terms of protein, fat and carbohydrate contents. In olden days, protein was measured in terms of “nitrogen”, the assumption being that the majority of the nitrogen was a constituent of proteins. For a cow, protein nitrogen is 98%. For a human however, it is only 75%, and the non-protein nitrogen (NPN) is full quarter of the content.

What human milk lacks in terms of concentration, it makes up for in terms of variety, well over two hundred NPN compounds have been found. These are related to the evolutionary immaturity of the newborn.

NEUROSCIENCE AND STRESS

The worst-case scenario, to any newborn is separation from its habitat/mother. This applies to Homo sapiens as fully as to other mammals studied. Protest-despair behaviour is a stress reaction, and the hormones related to this have been extensively studied. At high levels, these hormones are intrinsically neurotoxic to the brain, particularly areas of the hindbrain, and any area that may be already a little hypoxic. SSC has been shown to markedly reduce these levels.



Research Abstracts:

A little help from my friends

Heather Harris, *International Breastfeeding Journal* 2007, 2: 3:10

<http://www.internationalbreastfeedingjournal.com/info/instructions>

This paper is a narrative of some aspects of my work as a midwife with Médecins Sans Frontières (MSF) in West Africa. I was situated in an isolated north-western regional hospital in an area under rebel military control in 2004-2005 in the Côte d'Ivoire during the civil war which divides the north and south of the country. Access to health care is severely curtailed in this politically unstable environment resulting in much avoidable illness including many premature births. It is a short account of methods used to care for premature babies in a resource poor setting. Equipment was basic, necessitating a creative use of available resources. Providing warmth, oxygen and adequate feeding were often sufficient for a successful outcome for many premature babies. This paper is a combination of descriptions of health care interspersed with case studies.

(See full text article p)

Temperature variation in newborn babies: importance of physical contact with the mother

Arch Dis Child Fetal Neonatal Ed. 2005 Nov: 90(6), [Fransson AL](#), [Karlsson H](#), [Nilsson K](#).

(The Queen Silvia Children's Hospital, Goteborg, Sweden)

BACKGROUND: Hypothermia is a major cause of deterioration and death in the neonatal period. Temperature deviations are key signs of illness.

OBJECTIVE: To determine normal patterns of temperature variation in newborn babies and the influence of external factors.

METHODS: Abdominal and foot skin temperature were continuously recorded in 27 healthy full term babies during the first two days of life and related to the care situation-that is, whether the baby was with the mother or in its cot. The recordings were made using no wires to avoid interference with the care of the neonate. Ambient temperature was close to 23 degrees C during the study period.

RESULTS: Mean rectal and abdominal and foot skin temperature were lower on day 1 than day 2. The foot skin temperature was directly related to the care situation, being significantly higher when the baby was with the mother. The abdominal skin temperature was much less influenced by external factors. When the neonates were with their mothers, the mean difference between rectal temperature and abdominal skin temperature was 0.2 degrees C compared with a mean difference between rectal temperature and foot skin temperature of 1.5 degrees C, indicating a positive heat balance. In the cot the corresponding temperature differences were 0.7 degrees C and 7.5 degrees C. A temperature difference between rectal and foot skin temperature of 7-8 degrees C indicates a heat loss close to the maximum for which a neonate can compensate (about 70 W/m²).

CONCLUSION: This study emphasises the importance of close physical contact with the mothers for temperature regulation during the first few postnatal days.



Comparison of skin-to-skin (kangaroo) and traditional care: parenting outcomes and pre-term infant development

Pediatrics. 2002 Jul; 110(1 Pt 1): 16-26, Feldman R, Eidelman AI, Sirota L, Weller A (Department of Psychology Bar-Ilan University, Ramat Gan, Israel)

OBJECTIVE: To examine whether the kangaroo care (KC) intervention in premature infants affects parent-child interactions and infant development.

METHODS: Seventy-three pre-term infants who received KC in the neonatal intensive care unit were matched with 73 control infants who received standard incubator care for birth weight, gestational age (GA), medical severity, and demographics. At 37 weeks' GA, mother-infant interaction, maternal depression, and mother perceptions were examined. At 3 months' corrected age, infant temperament, maternal and paternal sensitivity, and the home environment (with the Home Observation for Measurement of the Environment [HOME]) were observed. At 6 months' corrected age, cognitive development was measured with the Bayley-II and mother-infant interaction was filmed. Seven clusters of outcomes were examined at 3 time periods: at 37 weeks' GA, mother-infant interaction and maternal perceptions; at 3-month, HOME mothers, HOME fathers, and infant temperament; at 6 months, cognitive development and mother-infant interaction.

RESULTS: After KC, interactions were more positive at 37 weeks' GA: mothers showed more positive affect, touch, and adaptation to infant cues, and infants showed more alertness and less gaze aversion. Mothers reported less depression and perceived infants as less abnormal. At 3 months, mothers and fathers of KC infants were more sensitive and provided a better home environment. At 6 months, KC mothers were more sensitive and infants scored higher on the Bayley Mental Developmental Index (KC: mean: 96.39; controls: mean: 91.81) and the Psychomotor Developmental Index (KC: mean: 85.47; controls: mean: 80.53).

CONCLUSIONS: KC had a significant **positive impact on the infant's perceptual-cognitive and motor development and on the parenting process.** We speculate that KC has both a direct impact on infant development by contributing to neuro-physiological organization and an indirect effect by improving parental mood, perceptions, and interactive behaviour.



Family friendly care

Retrieved & summarised 16/01/07 from: www.bmj.com/cgi/content/full/329/7475/1182

British Medical Journal, MJ 2004: 329:1182, Neil Marlow, Professor of Neonatal Medicine, School of Human Development, University of Nottingham, Queen's Medical Centre, Nottingham

Kangaroo Mother Care (KMC) had a dramatic effect on the ability to provide care in its original setting and there is little doubt that it appears a safe and effective approach to caring for premature infants. Although the original aim was to provide effective care in settings with scarce resources, the use of KMC in Western settings would have different aims, which in essence reduce to three main areas: improved contact between mother and infant (and father and infant), quicker establishment of breast feeding, and shorter stay in hospital.

Whether longer-term outcomes in important measures, such as behaviour or developmental progress, are notably improved remains a tantalising possibility, but better early maternal infant interaction may have equally important benefits for both mother and child. The accompanying article makes it clear that in many settings, KMC is welcomed by parents and its use is supported by parent groups, including the UK Charity BLISS. Should we encourage its wide application throughout Western neonatal care?

KMC is often practised in the United Kingdom, not as a long term or 24 hour care environment but as an important part of the facilitation of interaction between mother and infant. In my experience, it is not universally welcomed by all mothers. Some of this may be cultural and out of embarrassment as the neonatal unit is often a busy, hard pressed area that is noisy and to a large extent impersonal.

Neonatal intensive care units in the United Kingdom are becoming friendlier places for parents: unrestricted access to their child, involvement in care, and the provision of quiet areas and overnight rooms are now increasingly available, and in this setting the use of periods of KMC may enhance the experience and interaction of parent and child.

Dramatic improvements in neonatal survival have been won at a cost, and, in parallel to other areas of medicine—such as the management of childhood leukaemia, for example—our aggressive and interventionist care has produced great advances, but we have reached the point at which we have to consider how to continue to maximise outcomes while humanising care. For the technically trained neonatologist and the hard pressed neonatal nurse, backing off from some of the more interventional aspects of care and adapting a more facilitative approach may not come naturally.

Scientific study has provided us with evidence for a range of effective interventions that should be widely practised in all neonatal units. Examples are non-nutritive sucking, use of swaddling and sucrose pacifiers around painful procedures, and encouraging parent support groups. Some recommend more pervasive and complex schemes, such as individualised care and the Parent Baby Interaction Programme. Research is needed to confirm their efficacy and, for the more complex interventions, which of the components are the most effective.

We do not really need evidence from systematic reviews to tell us that being kinder and gentler with babies and using a child's behavioural responses to adapt neonatal care practice is a better approach than a rigid systematic programme of care, nor that encouraging parents to do the same is likely to be better for all partners. From my perspective and in my current setting, KMC forms a valuable and evidence based part of this important repertory of increasingly baby sensitive care.

Retrieved & Summarised 12/01/07 from www.kangaroomothercare.com/Hilda09.htm

PHOTO ESSAY 1: KANGAROO MOTHER CARE – HILDA'S STORY

HILDA was born without problems, and started life with skin-to-skin contact...



She did all the right things ...Hilda comes home and gets to know Dad...



Mum thinks Hilda prefers Dad's hairy chest to her own...

But on the third day she develops jaundice (hyperbilirubinaemia)...
Here she is having standard treatment: overhead lights, or a
"biliblanket"

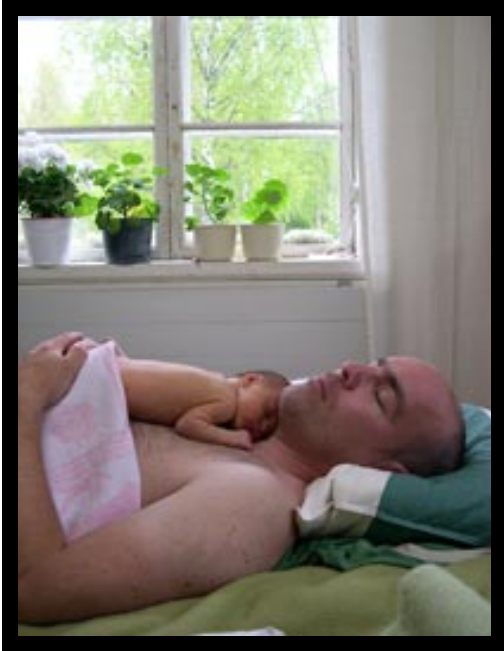


And seeming not to like it very much...
Luckily the night-staff nurse understood Hilda's and Mum's needs,
and she is confident and inventive ...



Hilda settles happily and does well; maintaining her vital signs...

At home phototherapy could continue - sunlight was the original phototherapy first observed by a neonatal nurse...



Hilda continued to be well bonded and attached...



Here at three months, exclusively breastfeeding...



" Am I smart or what ? "

PHOTO ESSAY 2 - PETER

"PETER" (1)

Peter was born at 25 weeks gestation, weighing 520g

Skin-to-skin contact was started on the first day, for 6 or 8 hours a time, days and nights

In these pictures he is 27w gestational age, weighing 620 grams



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"PETER" (2)

Peter is on CPAP, but both parents handle him with confidence and unbundle him, and prepare to transfer him to skin-to-skin

contact, with the nurse there to help.



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"PETER" (3)

Positions and
reconnects:
Transfer
time 75 secs,
Observations
stable!



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"PETER (4)"



After a few
moments ...

... awake and
alert state,



seeking
eye contact.

**SIZE
IS NOT
AN ISSUE !!!!**



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"PETER (5)"

He then settles down to a decent sleep cycle ...
... while mother cleans and does the gavage (tube) feeds.



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"PETER" (6)



Sleep,
rest and
relaxation ...

... brain development in progress.



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"PETER (7)"

Mother providing optimal care ...



... and optimal stabilisation



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"Out of the Mouths of Babes..."

*A person is a person no matter how small,
for of humanity we are all.
In reality our needs are few;
food, shelter and some time with you.
Bestow upon us what you already know,
and clothe us in protection.
Feed us well so we can grow
and don't hold back on affection.
Given all this is said and done,
we mostly need unconditional love.
Then we can really become some one.*

J P Hensby © Dec '99