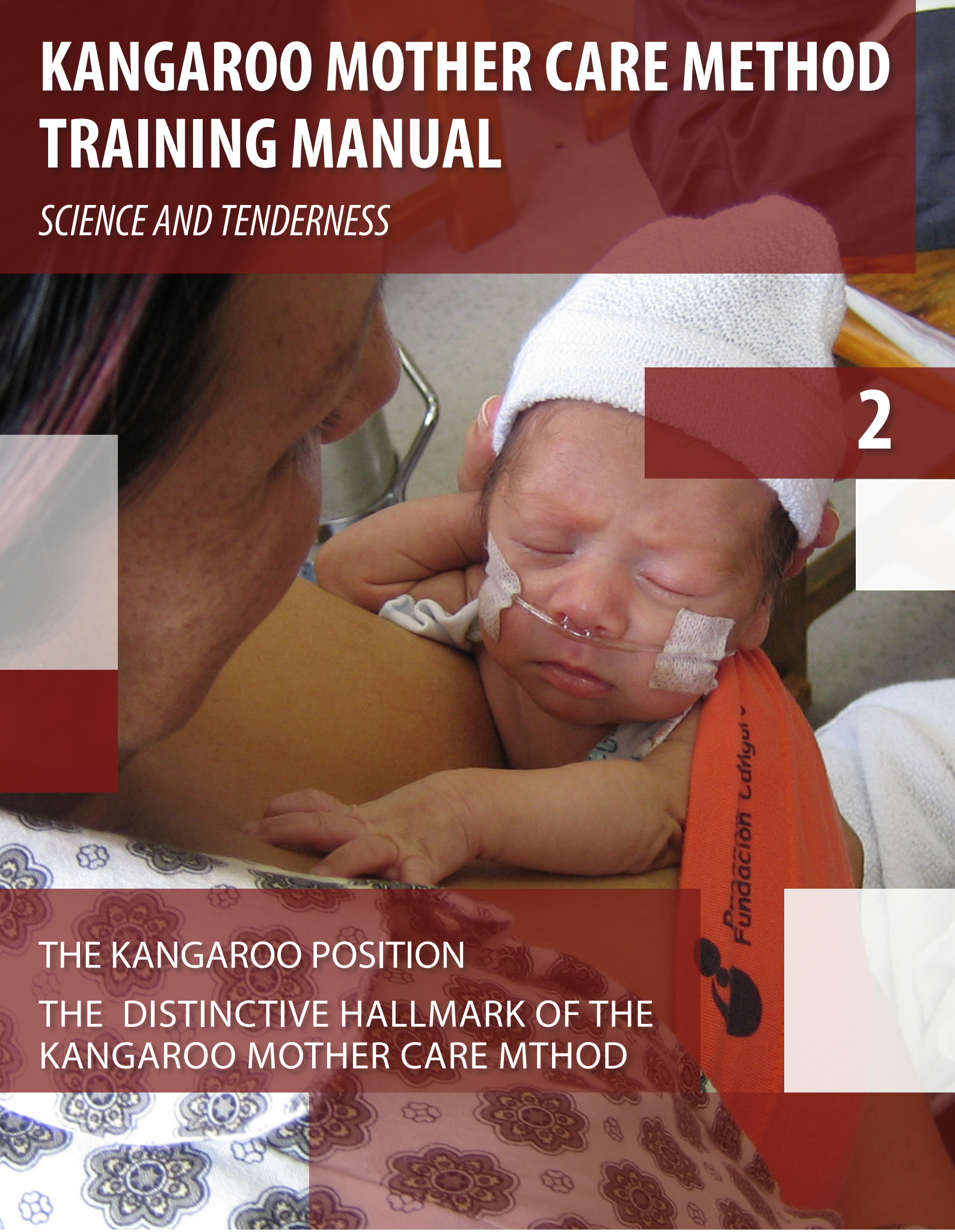
KANGAROO MOTHER CARE METHOD TRAINING MANUAL

SCIENCE AND TENDERNESS



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THE KANGAROO POSITION

THE DISTINCTIVE HALLMARK OF THE KANGAROO MOTHER CARE MTHOD

WFP Naciones Unidas Programa Mundial de Alimentos PMA
MCHIP Maternal and Child Health Integrated Program
JSI
MinSalud Ministerio de Salud y Protección Social
PROSPERIDAD PARA TODOS

KANGAROO MOTHER CARE LEARNING PORTAL
For the implementation, strengthening and updating of KMC programs

The Ministry of Health and Social Protection of Colombia, the World Food Program of the United Nations with the technical support of the Kangaroo Foundation, prepared this training kit for all health professionals in charge of preterm or /and low birth weight infants .

This tool summarizes the knowledge and experience gained by pediatricians, nurses, psychologists, social workers, physiotherapists, ophthalmologists, optometrists in the management of these children.

The goals of this tool are to support the dissemination of the Kangaroo Mother Care Method, to decrease infant morbidity and mortality worldwide and to improve the quality of survival of preterm and Low Birth Weight infants. The original version was released in Spanish and can be found on this website.

Maternal and Child Health Integrated Program (MCHIP), and JSI Research & Training Inst. supported the finalization of the English version. The coordination of this English version was assured by:

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This Learning Portal is developed for professionals who have received a theoretical and a practical training in a KMC implementing site.This training kit is prepared only for educational purposes, and should not be used for profit activities.

The videos and photographic material used in this Learning Portal received the appropriate authorization from the parents and / or guardians of the preterm infants.

Contents

1. THE KANGAROO POSITION: THE DISTINCTIVE HALLMARK

The kangaroo position, along with the kangaroo feeding strategy and the early discharge policy, is one of the three components of the Kangaroo Mother care Method (KMC).

The kangaroo position should be proposed to all preterm (less than 37 weeks of gestational age) and/or low birth weight (LBW) infants, weighing less than 2500g at birth[1] . These recommendations do not include offering permanent skin-to-skin contact to healthy, full-term infants[2].

This module is based on the up –dated "Evidence-based clinical practical guidelines for an optimal use of the Kangaroo mother care method in preterm and/or low birth weight infant at birth". This document was coauthored by Doctors J.G. Ruiz and N.Charpak and published by the Kangaroo Foundation in 2007(School of Medicine of the University Javeriana - Bogota).

1.1. Reference definition of the Kangaroo Position (KP)

The infant is placed almost naked in a strict upright ventral position between the mother´s breasts, in direct contact with her skin, under her clothes, 24 hours a day. Therefore the skin of the infant's chest and abdomen is in direct contact withthe mother's chest skin. The baby's extremities are flexed against the mother's body and his head placed sideways, avoiding flexion or hyperextension of his neck in order to prevent the obstruction of his airway. The head's position is switched frequently. Fathers and other family members can also be Kangaroo providers.

Kangaroo Position

(Taken from the "Pratical guideline for the Kangaroo care method" WHO)

1 The kangaroo position could be used for any infants losing weight during the perinatal period and weighing less than 2, 500 g.

2 Benefits of the kangaroo position for full term infants are well recognized , WHO recommends to place every healthy newborn in skin to skin contact during 2 hours afterbirth.

Mothers in KP maintain the infant's temperature (replacing the incubator). They are also the main source of nutrition and stimulation.

The baby's position on his mother has been described as "frog-like."The child is under the clothes covering the mother's thorax, protecting his head and back and avoiding heat loss through radiation. The child usually wears a cap preventing heat loss through the head as well as a diaper, socks, and a shirt covering his back but allowing direct and large contact between the child's skin and his mother's chest skin. The child is maintained in the position by the mother`s arms and the tension of her clothes. A cloth support or girdle (cotton or elastic material[3]) is used to allow the provider of the kangaroo position to relax or even sleep while the baby is permanently kept in KP. The cloth support helps to prevent the child's airway from being obstructed by changes in position. This is particularly important as preterm infant are usually hypotonic. Without this support, obstructive positional apneas may occur.

The kangaroo position is the distinctive hallmark of the Kangaroo Mother Care Method.
The kangaroo position has been the basis of parental involvement in the care of their preterm and/or LBW infants and is crucial for the humanization of care in neonatal units.

3 A Lycra ™ girdle (above) was developed by the Kangaroo foundation and recognized to be very helpful for mother and child.

1.2 Implementation of the kangaroo position

Implementing the Kangaroo Mother Care Method in maternities and Neonatal Units requires preparation and motivation from health professionals and administrative staff.

It is necessary that parents have easy and rapid access to their hospitalized child and that explicit "open door "policies are officially and clearly formulated. Such policies include i) minimal visit restriction for parents in terms of scheduling and duration; ii) facilities for parents to stay in the unit for prolonged periods of time (up to 24 hours a day); iii) before beginning kangaroo adaptation, parents must have access to appropriate furniture, (comfortable reclining chairs or equivalent), food, restrooms, entertainment, and physiological support.

It is important to minimize the separation between mother and infant and to allow parents to have appropriate physical interaction with their babies (gradual, safe and supervised contact, in accordance with the baby's clinical status, maturity and physiological stability). Therefore, maternities and Neonatal Units must be flexible and "family friendly." It is important that adequate breastfeeding policies are implemented, supported by appropriate infrastructure and adequate staff training.
All mothers and families facing the possibility of a premature delivery must receive information on the Kangaroo Mother Care Method, especially on the kangaroo position. This will promote the initiation of the KP as soon as the baby's status allows it. [i]

KP should be initiated as soon as it is feasible and appropriate, and to be prolonged as long as the infant's and the mother's status allow it. The goal of the Kangaroo Method is to avoid disrupting the mother-immature infant dyad by placing mother and infant in the least stressful position possible and supporting the transition to extra uterine life.

According to the duration of the kangaroo position sessions, two different ways of implementation are identified:

a) Continuous kangaroo position

The child is placed in kangaroo position 24 hours a day until he can regulate his temperature and 'asks to be removed' from it. The mother and the father can share the time and are usually the main providers of the kangaroo position; grandparents and siblings can also participate after training. This mode of implementation is considered ideal as it limits or avoids separating the child from his mother while in the incubator.

Neonatal Units implementing the KMC Method for the first time frequently feel unprepared to have parents staying continuously with their infants in KP in the department; however, they quickly become confident to implement the method.

b) Intermittent kangaroo position

The child is placed in kangaroo position for short periods of time, one or several times a day for an uneven number of days. This may be the only way the kangaroo position is implemented, or more often, it is implemented only as a gradual adaptation stage, leading to continuous kangaroo position according to the child's status and the mother's health and availability.

1.3 Advantages of the Kangaroo Position

Besides the physiological benefits of skin-to-skin contact in terms of thermoregulation, the kangaroo position fosters the progression of the mother-infant interrelation. Mother-infant bond facilitates various adaptations following birth, improving the newborn physiological stability, his neurobehavioral organization, and the immediate initiation of breast feeding.

Maternal stress and depression are minimized through various mechanisms, primarily through the infant`s searching for or suckling of the nipple during the first minute of life. Suckling boosts oxytocin release; oxytocin is a neuro-endocrine mechanism that fosters attachment interaction and uterine involution.

KP also increases the mother's self-esteem and her confidence in her ability to care for her child. The mother becomes an active participant in the child's stabilization process during the first minutes following birth

1.4 Negative effects of the Kangaroo Position

At the present time there are no known disadvantages for the child or the mother using the kangaroo position. This is true as long as the eligibility criteria for its implementation are respected.

2. EVIDENCE BASED RESEARCH ON THE KANGAROO POSITION

Since late 1980s, several studies have been conducted on the effects of the Kangaroo Mother Care Method and specifically on the kangaroo position. The studies survey and validate KP effects on the infant physiological stability; behavior of mother and infant; somatic growth; short and long term psycho-motor development (maturation, organization), and psycho-social effects.

The kangaroo position, used intermittently in Neonatal Care Units, alternately with incubators, was one of the first aspects to be investigated. Following this research, , other aspects were assessed mainly in Europe and the United States, such as the effect of different points of initiation of kangaroo position: at birth or during hospitalization ,in intensive or intermediate care units. Studies in neonatal Units and during follow up visits, preferably randomized controlled studies, documented the long term effects of the KMC Method for the child, the mother, the family and the health facilities.

The reader may further study in detail the benefits mentioned below, by referring to the State of the Arts: Guide of Scientific Evidence of the Benefits of the KMC.

2.1. KP and thermo regulation

Preterm and/or many LBW infants are not able to regulate their temperature; therefore it is necessary to provide them a neutral thermal environment that allows them to maintain adequate body temperature without extra energy expenditure. Outside of a neutral thermal environment, the infant spends energy to get warm or to get cold.

Research results show that when a stable preterm infant is placed in skin-to-skin contact, his body temperature raises. Regardless of the method used to measure, the temperature, remains within clinically acceptable limits. Both the kangaroo position and an incubator, correctly used, can provide a neutral thermal environment safely and effectively.

At least 16 studies of good quality confirm that temperature regulation during kangaroo position is as efficient as thermoregulation in an incubator.

According to Ludington, when children of more than 32 weeks gestational age in kangaroo position need to decrease their body heat, they do so by taking an arm or

a leg out of the blanket that covers them while in the position. [ii]

Some studies[iii] found physiological instability associated with mild hypothermia in very immature and stable children while in kangaroo position. On the other hand, if the children are stable, even while in mechanical ventilation, they regulate temperature and physiological parameters appropriately. This holds true even for children of the lowest weight.[iv]

2.2. KP and Regulation of heart rate

The heart rate of a child placed in kangaroo position, is more or less similar compared to the heart rate of the child in an incubator and sometimes it can increase by 5 to10 beats per minute.[v] A meta-analysis of 23 studies conducted with stable preterm infants monitoring their heart rates in incubators, in kangaroo position, and then back in incubators, showed that the variability of heart rates in those three situations was not significant and it remained within normal measures. [vi]

Several descriptive studies as well as pre-test and post-test reports have shown evidence of a low incidence of bradycardia in kangaroo position.[vii] Only one controlled study has revealed an absence of bradycardia episodes in kangaroo position ,while there were bradycardia episodes in the incubator.[viii]

This certainly suggests that the stability of heart rate is at least as good, or even superior to that observed in an incubator.

2.3. KP and regulation of respiratory rate

In stable preterm infants, oxygen saturation and respiratory rate are similar to those observed in incubators; regulation of respiratory pattern and a decrease in periodic breathing and apnea has been observed. [ix]

Observations made during the stabilization process in preterm infants suggest that the kangaroo position helps to keep physiological variables within normal ranges. [x]
A Cochrane Meta-analysis, confirmed that the respiratory rate of preterm infants in kangaroo position is lower, within normal range than in incubator. [xi]

To summarize, heart and respiratory rates of stable preterm infants remain within normal limits in kangaroo position and are more stable than in incubator. [xii]

2.4. KP and gastro esophageal reflux

There are no studies that evaluate the relationship between kangaroo position and the incidence or severity of gastro esophageal reflux (GER). However, studies on the prevention and management of GER have pointed out the need to maintain the child's head above the level of the abdomen. The kangaroo position fulfills this requirement. Therefore, it is appropriate to hypothesize that given the similarity of the kangaroo position to the generally recommended anti-reflux position; it will certainly not increase the risk for GER. Moreover, it may have a protective effect. In fact, while the child is in skin-to-skin contact with the mother's chest, he is kept in vertical prone decubitus during the day, and with a 30º to 45º incline at night or while the mother is resting.

On the other hand, a lower incidence of GER has been reported in breast fed newborns. This practice is fostered by the KP and is part of the Kangaroo Mother Care Method.

2.5. KP and oxygen saturation

Oxygen saturation may increase between 2 - 3 %in kangaroo position as compared to the saturation in an incubator [xiii] even during painful procedures. One meta-analysis conducted in Japan on the duration of kangaroo position, shows that oxygen saturation may decrease up to 0.6%.[xiv] The evidence helps to confirm that oxygen saturation is variable but remains within acceptable clinical standards.[xv]

Controlling the position of the child's head and neck is essential in order to guarantee the stability of breathing and avoid apneas due to obstruction of the air way.

2.6 KP and apnea

There is no direct evidence that the kangaroo position prevents the incidence or severity of episodes of apnea of prematurity. In short periods and in stable patients, the frequency of apnea and periodical breathing are similar to those observed in the same children while in incubators.

Evidence has demonstrated that infants in KP do not have an increased risk of apnea.

2. 7. KP diminishing stress and pain

Cortisol release has been evaluated as a sign of physiological stress in preterm children. Most measurements done after 20 minutes in kangaroo position have shown a reduction of up to 60% in cortisol level [xvi] as compared to children in incubators. Elevated cortisol could be associated with the suppression of the immune system function, and therefore indicate an increased risk of infection.

Preterm infants placed on the mother's chest in kangaroo position are observed to be more relaxed, calmer, and are able to sleep more easily. [xvii]

Maintaining the child in KP during painful procedures, has demonstrated to reduce the intensity and duration of subsequent crying.[xviii] The physiological disruptions (disorganized behavior, disorder of the quality of sleep, and greater intensity of the response to new painful stimuli) are decreased, which constitutes a non-pharmacological alternative for pain relief, avoiding the risk of using analgesics. It was found that when taking a blood sample on a child in KP the motor disorganization and extension movements in response to acute pain are reduced and there is a decrease in signs of neurobehavioral stress during one hour after the procedure. [xix]

The American Academy of Pediatrics[xx] in 2006 recommended using the kangaroo position in order to reduce the intensity and duration of the reaction triggered by mildly to moderately painful procedures.

2.8. KP and early breastfeeding

Even though studies have demonstrated the benefits of breastfeeding for preterm and/or LBW infants, the prevalence of breastfeeding in this group of children is low.[xxi]

One of the advantages of continuous mother-infant contact is to stimulate breast feeding.

Research done in places where the KMC Method has been implemented has demonstrated that mothers who are in skin-to-skin contact with their children are producing more milk than those in the control group.[xxii]

These studies have also revealed that mothers who did not hold their babies in kangaroo position more frequently interrupt breastfeeding. A controlled random clinical study showed that 98% of preterm infants who were placed in kangaroo position 13.5 hours a day received exclusive breast milk at 40 weeks gestational age, as compared with 76% of neonates who were not in kangaroo position. [xxiii]

Random studies conducted with mothers of babies weighing less than 1500g, found a higher frequency of breastfeeding at six weeks in groups of mothers who were in skin-to-skin contact with their children (55% vs. 28%). [xxiv] More recent studies have found a significant prolongation of breastfeeding in "kangaroo mothers," to 6months (5.08 months versus 2.05 months).[xxv]

2.9. KP and neurologic development

The KMC Method seems to foster early neurologic development in preterm infants, showing an improvement in behavioral organization, in the sleep-wake cycles, in the quality of sleep, maturation of neurologic and psycho-motor functions as measured by standardized tests.

In reference to the behavioral organization and sleep of the preterm baby, it is known that in the kangaroo position, the sounds of the mother's body (heartbeat, breathing, and voice) may induce the child to sleep and help him to have less waking episodes while also having a positive effect on the duration of the infant's sleep, contributing to a calm awakening. Brain maturation may be measured by the brain signals obtained by an electro encephalogram. A greater complexity has been observed in children between 32 to 40 weeks of gestational age who are placed in kangaroo position, as opposed to children who were not. It has been demonstrated that five regions of the right hemisphere show greater maturation in children placed in kangaroo position. Studies propose that neurologic and psycho motor development improve in kangaroo position through two mechanisms: a social one, by involving the family, turning the care in kangaroo position into a more adequate source of stimulation; and a neurologic one, which is achieved through better regulation of the brain organization.

2.10. KP and organization of alertness states

Stress in the Neonatal Intensive Care Units may affect the early extrauterine development of the brain and the neuro-behavioral response of preterm and/or LBW infants.

It has been demonstrated [xxvi], that the KMC Method minimizes the negative impact of hospitalization on development. When used used 5 times a week for periods of more than 30 minutes, the kangaroo position has demonstrated to be a positive intervention, which increases the states of alertness and attention in children evaluated at 37 weeks of gestational age, at six months, and at 12 months. [xxvii]

It has been demonstrated that in children in kangaroo position the quality and duration of the periods of deep sleep improved as compared to those children who were not held.[xxviii] With respect to crying, it is evident that children in kangaroo position cry less than in the incubator. [xxix]

3. IMPLEMENTATION OF THE KANGAROO POSITION

As described above, preterm and or LBW infants are not able to regulate and maintain their body temperature; it is necessary to provide them with a neutral thermal environment. Kangaroo position provides neutral thermal environment similar to the one provided by an incubator.

The Kangaroo Position can be implemented at different periods in the infant's life: immediately after birth if the infant is "near term" and stable or later due to the condition of the infant or mother.

It is recommended that health care professionals use a standardized protocol based on scientific evidence for the adaptation and implementation of the kangaroo position.

Such protocol will maximize the advantages of the position for children and parents while limiting the risks. Therefore, **each health facility must develop its own implementation protocol. This protocol** must define eligibility criteria and what is understood by physiological stability. Acceptance and adherence to this protocol by the responsible, trained health team must be guaranteed.

Go to video "The kangaroo position: The hallmark"

3.1 Implementing the protocol for the initiation of Kangaroo position

a) Information for mothers/parents

It is fundamental to prepare the parents, especially the mother, before implementing the kangaroo position. In the case of a possible preterm delivery (or even during routine antenatal visits) the benefits of the KP must be explained.

In case of premature delivery, if it is possible, the advantages of KP should be repeated to motivate the mother to be with her child as much as possible, highlighting KP as the best option for the newborn to face the transition from intra to extrauterine life.

Subsequently, all practical aspects regarding visits or prolonged/permanent stay during the child's hospitalization should be given to parents. These precautions will allow a gradual transition from touching and caressing the baby, to then holding him in kangaroo position.

b) Identification of beneficiary mother-infant dyads of KP

The infants who could benefit from the kangaroo position are usually identified at an early time by a Kangaroo team member, usually a nurse. This can be done in the delivery room, in the mother's room, when they are rooming-in together, or at admission to the Neonatal Unit. The role of the" kangaroo nurse" is crucial, as she will be the direct contact for the mothers and the provider of information on the Kangaroo Mother Care Method.

The mother is considered the ideal and main provider of the kangaroo position, but if she is temporarily unavailable, the father can immediately begin the kangaroo position in her place.

Kangaroo Position providers must be free of the following conditions:

- Contagious rash or skin lesions
- Fever
- Non controlled epilepsy
- Not controlled mental illness
- Morbid obesity
- Tired mother or mother under sedative drugs or in the recovery process from general anesthesia (the supervision of the mother must not be delegated to the family).

c) Assessment of clinical status of infant and mother

The situation of both infant and mother must be evaluated to decide when to begin the adaptation process to the kangaroo position. Considering the benefits and minimal risks. The ideal scenario is to begin as soon as possible. This may happen in the delivery room, if the baby is close to term and the mother is alert, or later in other cases.

c) Adequate clothes for mother and infant

When the mother is ready to place her baby in kangaroo position for the first time, she must wear appropriate clothes (with easy frontal access to the breast, e.g. hospital gown with frontal opening). The mother's fingernails must be kept short, clean and free of enamel. She must have proper body hygiene, particularly the chest, which will be in direct contact with the child. Her hair must be pulled back and she must not wear jewelry, rings, cosmetics or perfume.
The mother may be able to hold her baby in her arms, but it is inappropriate to expect her to hold him continuously since there is a risk of her falling asleep and letting the kangaroo baby slide. A support system must be provided in order to hold the baby comfortably and to help maintain the baby in Kangaroo position. The supporting device must be firm enough to keep him attached to the mother's chest with minimal support from her arms, but flexible enough to allow the baby's movements, both respiratory and of other types.
In many kangaroo programs a cotton Lycra™ girdle or band is used with success.
- It may be used by any provider of the kangaroo position: mother, father, or others.
- It can be easily pulled down at any time to breast feed or to change and clean the baby.
- It gives mothers freedom of movement to perform routine activities, such as eating without having to depend permanently on third parties for help.

In the market there are Lycra™ shirts, also known as "bodies," or "top" which can be more comfortable in warm climates. The support system or kangaroo carrier (girdle, top, body or whichever device may be more appropriate and locally available) must be an aid for the mother to feel more confident, but must not replace the vigilance the mother must exercise with her child.

A cap, in wool or cotton depending on the climate, is essential to prevent the heat loss by the head which is a large surface compared to the infant's body. Ideally, the hospital will have complete kangaroo kits for these babies in delivery room.

It is recommended to dress the baby with a sleeveless cotton shirt, open at the front. This way the child's back is protected from heat radiation and thorax and abdomen are in skin-to-skin contact with the mother's skin. In very warm climates, this shirt may not be necessary, especially if the back is kept covered by the girdle. In hot and humid climates, a moist cotton cloth may be placed between the baby's face and the mother's skin, wrapping it around the mother's neck to absorb perspiration, providing comfort to the mother. The infant has to wear a diaper in order to protect both mother and child from the baby's urine and stools, which are uncomfortable and irritant for both of them and chilling for the infant.

e) Placing the infant in Kangaroo position

Placing the child in kangaroo position,

especially for the first time, is a process that must be done with extreme care. It requires that a properly trained health professional (usually a nurse), helps the mother or the provider of the position, until they feel confident and comfortable holding the baby.

While the kangaroo baby is held against the mother's chest, he must be placed in an upright position and ventral decubitus, with his body and head (cheek) against the mother's chest. After every feeding, the head is turned on the other side. It is important to keep the air way free and permeable. Lateral decubitus position of infant must be avoided, since obstructive apneas are frequent in this position, especially in the most hypotonic preterm infants. The infant should be in "frog-like" position.

The mother must be instructed on the correct way to hold her baby easily and safely. She must hold him by placing one hand on the neck and back, with her fingers under his chin, to prevent the head from dropping, blocking the air passage while the baby is in vertical position. The other hand is placed under the baby's buttocks.

f) Maintaining the infant in Kangaroo position

It is necessary to explain to the parents that the kangaroo baby must always be kept in kangaroo position, except during diaper change and breastfeeding. During breastfeeding, the lateral position is recommended since it allows continued skin-to-skin contact. This issue is important given that breastfeeding periods can be prolonged, especially in the early phases of child care of the kangaroo baby, in particular in the more immature babies who are easily exhausted when feeding directly from the breast.

As said, the preferred kangaroo carrier is the mother, given the positive effects of the position on milk production and the establishment of a good mother-infant relationship. However, the father must participate and help her, especially during the times when she must perform her own personal grooming and in order to establish a father-child relationship which is also vital for the future of the child. If the father is unavailable or if it is culturally more appropriate, the grandmothers can also help as kangaroo carriers, given that all healthy humans have adequate thermoregulation to maintain the baby's temperature. The important factor is to maintain the child in skin-to-skin contact 24 hours a day. The carrier's position during the night is highly demanding and can be experienced by some as excessive and difficult to do it. The carrier must be in a reclined position, of at least 30º. Thus, the beds in kangaroo wards and the chairs in Neonatal Units must be designed to that effect.

Breastfeeding may be initialized as soon as possible to allow the infant to receive the colostrums with all of its widely known immunological, nutritional and digestive advantages. If, for any reason, the kangaroo position was not initialized at the moment of birth, it can be done as

soon as it is appropriate.

g) Monitoring the adaptation to the kangaroo position

During the adaptation phase, the tolerance of Kangaroo position (both for infant and mother) should be assessed frequently to decide whether it can be maintained in a continuous and prolonged manner or if it must be interrupted. It is important to monitor the stability of the child's vital signs, the regularity of his breathing, his alertness, his color, his general aspect, his posture, his apparent comfort or discomfort, and the presence of sleep and alert periods while in kangaroo position. The mother's attitudes, tolerance, emotional state (calm, stress, or any other) are also observed.

In any case, it is the child's pediatrician/ neonatologist's responsibility to take the decision to initiate the kangaroo position during the immediate neonatal period. This physician is responsible for the supervision of the adaptation and must be able to provide any needed assessment or care. It is also his responsibility to interrupt the kangaroo position if some problems appear and to decide on appropriate care.

3.2 Eligibility criteria for Kangaroo position at birth in delivery room

Before initiating the kangaroo position in a preterm and or LBW infant, the following criteria must be met:

1. The child is stable: all vital signs and other physiological parameters (except temperature) are within normal ranges during the handling needed to place him and keep him in kangaroo position. All of these physiological parameters must be monitored, at least clinically.

2. Identified Kangaroo Provider: Once the mother or the person designated as the primary provider of the kangaroo position has received all the information and all doubts and worries have been cleared, they must freely express their desire to implement the position. This desire must be confirmed once the mother/other provider has experienced the kangaroo position.

If the position is implemented in the delivery room, it is essential that healthcare personnel provide meticulous care. Even if the baby is stable and the mother is alert, the health personnel must give close support and careful and frequent assessment. In every case, adaptation of the kangaroo provider-child dyad must be carried out under the supervision of a trained nurse who follows an explicit and detailed protocol developed by each health facility.

If the newborn becomes unstable, the kangaroo position must be interrupted or postponed in order to provide the necessary care under the supervision of the responsible pediatrician.

3.3 Kangaroo Position in the case of mothers post C-section, surgery or illness

In the case of cesarean section when the mother is monitored after the surgery or requires medical care due to an illness and cannot provide kangaroo position, the infant may be carried by the father or a surrogate and placed in kangaroo position from the time of birth.

If the mother is not under general anesthesia during a cesarean section and if considered feasible, the baby may be placed in skin-to-skin contact on her chest for a short period, before being placed on the father's chest.

If mother and baby are separated, a picture of the child may be taken and given to the mother. The mother should be allowed to visit her child as soon as her health and medical care conditions allow. When a mother cannot visit her child in Neonatal Intensive Care Unit by herself, she must receive assistance to go from the maternity to the NICU to be with her child as long as possible, without unnecessary restrictions.

When a mother requires treatment in another facility, such as an Intensive

Care Unit for adults, the infant may be transported by the father in kangaroo position or taken in a transport incubator accompanied by health professionals from the NICU to visit his mother. These professionals stay with the child for prolonged observation and care and to offer the mother skin-to-skin contact, as extensive as possible, bearing in mind both the mother and the infant's care needs.

3.4. Kangaroo Position when no technological resources are available

This paragraph refers to premature deliveries or birth of LBW infants in a rural community or hospital that lacks special equipment (incubators, radiant heater, oxygen, drugs, and preterm formula) and specialists (pediatricians, neonatologists, and gynecologists) to care for preterm and or LBW infants.

It is important to insist that preterm or LBW infants should be referred in kangaroo position to a health institution adequately equipped and staffed to care for those infants. The idea is not only to guarantee survival but also to offer the best quality of life possible.

When immediate transportation of the newborn is not possible or if the health facility in reference is not offering adequate care, the infant must be dried thoroughly after birth and placed in continuous skin-to-skin contact on his mother's chest. The baby should be dressed only with a diaper and cap and protected by the mother's clothes or blanket. Colostrum and then breast milk may be extracted and administered with a dropper, a spoon, or a catheter to avoid hypoglycemia.

The kangaroo position offers good temporary protection against hypothermia, primary apnea of prematurity and hypoglycemia.

Health personnel must know the protocols well for the baby's adaptation to breastfeeding. In this case, training the mother and the preterm infant to breastfeed is a matter of survival, especially when no other feeding alternative exists.
It is true that in many primary care health centers in developing countries there are neither alternatives to care for those infants in the facility nor any possibilities for referring them to other facilities. Under these circumstances, the risk of death is high for the smaller and more immature babies (< 1500 g and/or < 34 weeks G.A.).

It is very difficult to recommend offering **only** kangaroo position and nutrition to very immature babies who could die in this first level of care. **Nevertheless, in some circumstances, the Kangaroo Mother Care Method is the only opportunity for survival for these babies.** This should be a temporary practice and it must be a priority to make the KMC method known and to have access to medical centers with the capacity to manage these fragile infants.
It must be remembered that the KMC method does not treat illnesses and does not replace neonatal care that a preterm and or LBW infant may need.

3.5 Kangaroo position in Neonatal Intensive Care Units (NICU)

The advantages offered by the kangaroo position, as well as the possibility of avoiding separating the newborn from his parents, are good reasons to implement it in the NICU in stable infants . However, if the infant is in a critical state and his life is at risk, the kangaroo position may be inappropriate. The potential benefits and risks must be very carefully considered and the decision to adopt the position must be made based on local experience, always with authorization, and under close supervision of the neonatologist.

Currently, as greater survival rates have been achieved in preterm and/or LBW infants, the goal has been extended to decrease negative short and long term effects for these infants. In these cases the kangaroo position acts as a protective element with the advantages already described: i) physiological stability; ii) stimulated milk production; iii) reduced risk of nosocomial infection; iv) decreased pain and stress; v) improved brain maturation and neurobehavioral development; vi) decreased maternal anxiety and vii) improved bonding with the parents by making them primary and active part of their child's recovery.

This process, supported by technology, health teams and parents, makes it possible to offer holistic management to preterm and or LBW infants, positively impacting in the baby's neuro development.

Every NICU must establish its own procedures, according to its needs, the needs of its clients, and the skills of its health team implementing the kangaroo position with incubated babies. The kangaroo position must **not** be initialized in children in critical condition without having a protocol accepted by the entire team. Rather, kangaroo position should be done with children who are more stable. Children in a more critical condition may be included when the team is more skilled.

Several aspects for implementation in NICU will be reviewed.

3.5.1. Preparation of parents in case of NICU hospitalization

Parents must be informed of any risk of premature delivery due to high risk conditions during pregnancy, as well as the possibility for the infant to be admitted to the NICU.

They should be informed about the benefits of this possible admission and about the therapeutic value of the kangaroo position when the health staff recommends it.

It is important to keep in mind the following recommendations:

- Familiarize the parents with the health staff and the different medical equipment used in the NICU.

- As much as possible, all activities, such as tube feeding, insertion of a new tube, diaper change, blood samplings, intravenous injections, and thoracic auscultation must be performed on the child in kangaroo position. Therefore there must be an indirect light source in the space to care for the infant, to allow the personnel to carry out procedure safely.

- Begin sensory contact (physical-touch, auditory, visual, and olfactory) as soon as possible.

- Offer appropriate information, supported in written material, such as handouts or videos, and conduct individual and group introductions on how the kangaroo position is initiated. This will prepare parents to make of this contact a pleasant, positive, and unforgettable process.

- Determine whether the parents are eligible to begin the kangaroo position based on an assessment of the following aspects.

- The parents' health, including their emotional state (anxiety management).
- The parents' knowledge about the Kangaroo method and their expressed will to start it.
- The decision to breastfeed.
- The parents' available time (to stays for two or more hours).

3.5.2. Preparation of health team if Kangaroo position in NICU.

The health team must be sensitive not only to the newborn but also to his family. Having The family's active involvement in their baby's care improves the overall quality of care, making it more humane, which in turn raises feelings of satisfaction and competence in the medical team.

The NICU health team must work according to their own protocols and requirements to implement the kangaroo position in their department, recognize its benefits, and define eligibility criteria and contraindications.

The team must also acquire the ability to implement the kangaroo position, be prepared and able to teach the parents to detect alarm signs, and receive permanent updates on the development of the Kangaroo Mother Care Method.

Clinical records before, during, and after applying the kangaroo position must be kept.

3.5.3. Eligibility criteria for kangaroo position in NICU

Eligibility criteria for kangaroo position are described here based on the implementation of the KMC Method in Neonatal Units in the city of Bogota, Colombia.

Preterm infants from 30 weeks gestational age who fulfill the criteria described below are considered eligible to begin the kangaroo position.

- Stable vital signs: heart rate, respiratory rate, temperature and blood pressure within normal range at rest.
    o Some anomalies in vital signs may be present, such as tachycardia resulting from agitation, that still permit eligibility as it can improve while in kangaroo position, if permanently monitored.

- Bradycardia between 85-100 beats/min with spontaneous recovery and not more often more than 1 to 3 times in an hour.

- Respiratory pause lasting less than 10 seconds with a frequency of less than 3 per hour, and with no desaturation.

- Desaturations, up to 85% with spontaneous recovery with oxygen
- Tolerance of manipulation: no disruption or minimal change, quick recovery when manipulation is over.

- Administration of supplementary oxygen: if oxygen is administered through Hood chamber or nasal cannula.

- Blood gases: within normal parameters.

3.5.4. Contraindications for kangaroo position in ICU

Kangaroo position must not be started in preterm infants presenting the following signs:

- Physiological instability: deterioration of the clinical condition and vital signs 24 hours before beginning kangaroo position.

- Moderate hypothermia while in incubator.

- Blood pressure anomalies (hypotension or hypertension).

- Bradycardia of less than 85 beats/minute of any duration or frequency or of 85-100 beasts/minutes, occurring more than 4 times per hour.

- Apneas with a desaturation of less than 85% or any respiratory pause of more than 10 seconds or that requires stimulation.

- Any desaturation lower than 85%.

- Physiological instability when manipulated.

- Difficult position of venous or arterial access, which makes them unstable (central catheters, arterial lines, umbilical arterial catheters, thoracic tubes).

- Use of vasopressor drug.

- Mechanical ventilation with a need for increasing parameters in the previous 24 hours, fluctuation of the ventilation parameters.

- Life-threatening medical conditions in the last 24 hours.

- Intracranial hemorrhage grade III-IV.

- Cardiorespiratory arrest.

- Clinical signs or laboratory parameters of sepsis.

- Immediate post-surgery.

- Abnormal blood gases.

- Compromised neurological state due to lethargy and severe hypotonia.

3.5.5. Transferring infants to the Kangaroo Position in NICU

Transfer and installation in Kangaroo position must be decided by a physician and be organized by a trained nurse. Parents should be accompanied and supported until they are able to perform the transfer by themselves.

Go to video "NICU open 24 hours" -Transferring baby from incubator to Kangaroo position

a) Transfer from incubator to caregiver

Transfer from incubator to kangaroo position should be performed according to the following steps.

- Verify and register the newborn's vital signs.
- Prepare the newborn, wake him gently, and, in an attempt to communicate with him, talk to him about the procedure.
- Dress the baby with his cap, booties, short-sleeved shirt with frontal opening and diaper.
- The mother or father may stand or sit as agreed, next to the incubator with the Lycra ™ girdle underneath.
- Intravenous fluids and oxygen lines are organized, if needed.
- **The baby is held with one hand around the neck and the other around the buttocks, in a flex position while transferring to his mother's chest.**
- **The baby is placed in vertical position with both arms and legs flexed; with his head straight to avoid the hyper extension or flexion of the neck. The girdle is pulled up.**
- If parenteral fluids are being administered, the connections must be

assessed and secured.
- Vital signs must be registered again.
- The mother must be reminded of the danger signs, which she must report to the health care personnel.
- The child must be evaluated every 5 to 10 minutes for the first 15 minutes and then every half hour or every hour, according to each child's needs and risks.
- Offer a quiet, private environment that allows the kangaroo position to be used as long as possible and through complete sleep cycles (1 hour).
- The child may be fed while in kangaroo position, even though gavages, or by techniques for reestablishing breastfeeding, if needed.
- End the procedure at the request of the parent or if the child presents any danger signs.
- Transfer the child to the incubator taking him by the neck and buttocks.
- Adjust all connections and perfusions and, when done, register vital signs and the child behavior while in kangaroo position (inactive alert, active alert, quiet sleep or active sleep with crying).
- Ask the parents about their experience, concerns, and feelings.
- Repeat the importance of the kangaroo position for the child's development.

Transfer while standing: The position provider (father or mother) leans slightly forward, picks up the infant in a flexed position (with support to keep both legs and hands in flexion), places the child in kangaroo position on his or her chest and returns to the chair/bed, sitting or reclining in a comfortable position.
Transfer while sitting: a nurse or the other parent picks the baby up, maintaining support in a flexed position for arms and legs, and places him in kangaroo position on the other parent's chest, once he or she is seated.

b) Transfer of infants with assisted ventilation

The easiest way to do this transfer is by standing and picking the child up.

The other parent or the nurse disconnects the ventilator from the tracheal tube before the transfer and reconnects it as soon as kangaroo provider sits down.

During the transfer, one or two persons, (depending on the number of tubes and lines connecting the infant to the monitor, ventilator, or infusion pumps) a nurse, and/or the other parent holds and secures the ventilation tube and lines to the baby's clothes with adhesive tape.
For more details during transportation from incubator to Kangaroo position and back t to the incubator, please see very the very detailed procedure proposed by Dr., Susan Ludington-Hoe (Appendix 2).

Dr K.Nygvis (Sweden) presents criteria to initialize the kangaroo mother care method in the context of high technology hospitals with very preterm and very low birth weight infants[xxx] (Please see Appendix 1).

3.6The Kangaroo position in Intermediate and Minimal Neonatal Care Units

Intermediate neonatal Unit in Helsinborg, Sweden

Children are hospitalized in intermediate or minimal care units because they suffer from different conditions that require specific treatment. They may come from the delivery room, recovery room or directly from the Intensive Care Unit once they overcome the severity of their condition. They also could be readmitted from outpatient services

Kangaroo position with skin-to-skin contact between mother and infant is the best environment to ensure a neutral thermic environment while promoting physical and neurological development.

Intermittent kangaroo position is promoted in NICU, from 2 hours to as long as possible. In the Intermediate or Minimal Care Units the kangaroo position can be prolonged up to 24 hours or patient discharge in kangaroo position can be proposed when the situation allows it. The goal is to minimize the separation parents - infant.

The Kangaroo Position reduces the length of infant hospitalization and prepares the parents for caring for their infant at home through progressive transfer of the responsibility from the heath staff to them. [5]

The kangaroo position offers a more stimulating environment for recovery and development and allows direct feeding from the mother's breast.

5 Module 4 Early Discharge section 4.6

3.6.1. Eligibility criteria for kangaroo position in Intermediate or Minimal care units.

Newborns are eligible for the Kangaroo position if they are physiologically stable for at least the last 24 hours, even if they may need:

- Oxygen through a hood or nasal cannula (hood may be replaced by nasal cannula), and show normal saturation while in KP.

- Parenteral fluids adequately held in place.

- Partial or total oral feedings, even with gavage.

Newborns with the following conditions are not eligible.

- Infants with open wounds or important skin lesions

- Infants under continuous phototherapy if there is no available biliblanket.

- Infant with unstable metabolic situation.

Go to video Assisted kangaroo, from the "Hospital Universitario 12 de Octubre, Madrid España", folder.

3.6.2. Transfer from the incubator to the kangaroo position

The technique is similar to the one described in paragraph 3.5.6, and it should be repeated to the parents as many times as necessary. It is important to perform it with them until they are confident and perform the all processes autonomously.

Parents who practice the kangaroo position in NICU are generally experts, but it is recommended that health care personnel remind them that in spite of the improvement of his condition, their infant is still fragile and needs them 24 hours a day.

It is pertinent to remember that the KP sessions must be prolonged and that parents can begin and end the sessions on their own, with the support of the health staff to start and conclude the records, following the protocol of each Intermediate and Minimal Care Unit.

3.6.3. Care and precautions

The health team must adhere to the policies of the kangaroo position in the Intermediate and Minimal Units. Ideally, all personnel must have the skills to teach and perform the kangaroo position process.

- Remind the parents of the importance of personal hygiene: proper hand washing, no smoking before the procedure, avoid using cologne or perfume, and keep fingernails short.

- Offer a comfortable chair with footrest to the mother/father-child dyad.

- Parents must be educated to take care of the infant at home; they should know the danger signs that require immediate care and also the precautions that are a necessary part of the adaptation process.

- If the mother seems to be exhausted and the father is unavailable, the support of another relative may be allowed with the mother's permission.

3.7. Kangaroo position for neonatal transportation

The health infrastructure is not optimal in many developing countries. Often small and fragile infants are born in places where adequate care is not available and they require neonatal transportation in order to be treated in units with adequate equipment and staff.

Transportation of the newborn, rapidly and under optimal conditions, is an important process that can protect and often save the infant's life. This is often difficult due to scarce or non-existent specialized transportation units able to guarantee at least a stable thermic environment for the baby during the transport. Transporting the infant in kangaroo position is an effective alternative.

A study[xxxi] in 2004, evaluated the behavior of 31 stable preterm babies transported in kangaroo position by different caretakers (mother, father, nurse and physician). The study showed heart and respiratory rates as well as oxygen saturation and rectal temperature remained stable during transportation (10 minutes to 5 hours) in kangaroo position. The distance ranged from 2 to 400 kilometers. Parents felt comfortable and secure and appreciated this method of transporting their baby. Transportation done in kangaroo position promotes closeness between mother and child and can decrease the risks of transportation in incubator.[xxxii]

Nevertheless, transportation in kangaroo position is considered **inappropriate** for critically ill children who need repeated manipulations and therapeutic interventions during transportation.

APPENDIX 1

Nyqvist, K. H. (2011). Swedish mothers' experience of continuous Kangaroo Mother Care.

Parent information:

Contents: Benefits for infant and parents, practical aspects of performance, timing of initiation, substitute KMC provider

Timing: Ideally before delivery, both parents present; continued throughout hospitalization

Initiation of KMC:

GA >32 weeks: Continuous KMC from birth; exceptions: medical condition or parents/ substitute unavailable.

- Initial infant assessment on mother's chest in delivery room if possible

- Mild problems in adaptation after birth: Immediately after initial stabilization, as permitted by infant's condition and care

- Infant with CPAP: After stabilization transport to mother for KMC with monitoring and

- Observation: CPAP/ventilator treatment does not constitute an obstacle to KMC.

GA 28-31 weeks: Immediately after the initial assessment/stabilization, as permitted by infant's medical condition and care

GA 26-27 weeks: During 1st week of life: based on individual medical assessment (weight, sensitivity, sodium, osmolarity) before each session, and that continuous KMC possible

GA < 25 weeks: During first week of life based on individual medical assessment(weight loss, sensitivity, sodium/osmolarity levels) before each session

Caesarean -section:

Short period on mother's chest immediately in the operating room, if possible continued during post-op observation; after that the mother is assisted with transportation to the NICU for as much KMC as possible without unwarranted restrictions; father/substitute act as primary KMC provider.

When mother is unable to visit NICU after the delivery, infant can be transported to her (a) in kangaroo position (KP) by father (accompanied by NICU staff when required to monitor the infant), or (b) in transport incubator by NICU staff, who stay for infant's observation and care and assist mother in providing KP to the extent that this is possible.

Maternal criteria: Mother unable to visit the NICU because of her own condition and care: infant transported in kangaroo position by father or in transport incubator by staff to the mother's unit for as much KMC as possible. Father acts as primary KMC provider

Duration of session: Give infants KMC sessions that last at least one hour.

APPENDIX 2

Transfer of ventilated children to kangaroo position and back of in NICU

For these children, Susan Ludington-Hoe presents a series of steps to be followed.[xxxiii] Where this protocol may be established, it will be necessary to complement it with practical training.

A. Before the transfer

1. Register SMV/IM (Synchronized Mandatory Intermittent Ventilation / Intermittent Mandatory Ventilation), Positive Inspiratory Pressure) PEEP (Positive End Expiratory Pressure) FiO2 (Inspired Oxygen), HR (Heart Rate) RF (Respiratory rate) SO2 (Oxygen Saturation), axillary temperature.

2. Place the baby in supine position. Note his tolerance to the change in position.

3. Auscultate the thorax, suction ETT (Endotracheal tube) if necessary. Check that the endotracheal tube is secured; also the drainage and the ventilator circuit mix.

4. Change the diaper, put on the cap and blanket.

5. Wait until all physiological parameters return to their baseline before placing the child in kangaroo position.

6. Place the mother standing or sitting close to the incubator.

B. Transfer while standing

If the mother feels comfortable, do the transfer in a standing position as indicated below.

1. The mother stands next to the incubator.

2. All lines must be gathered at the incubator's door.

3. A second person disconnects the ventilator from the child following Unit protocols.

4. The mother places her hands under the blanket and picks up the child, placing him on her chest.

5. The mother walks backward, looking for the chair to accommodate her.

6. The ventilator is reconnected; the line is placed and taped in place over the mother's shoulder.

7 The baby is accommodated in such a way as to remain in skin-to-skin contact and have his back covered.

8. The baby must be in flexed position.

9. The baby's neck and head must be in a position that provides him a clear airway.

10. It is necessary to auscultate the baby's respiratory sounds through the mother's nightdress.

11. The mother must be helped to keep her feet elevated as to avoid thrombophlebitis.

12. It is necessary to monitor and register the baby's vital signs and ventilation parameters every ten to fifteen minutes.

13. The intubated baby must be kept in kangaroo position for at least an hour to organize his sleep and promote brain development.

14. The incubator must be set in controlled air to maintain an appropriate neutral thermal environment.

C. Transfer while sitting

If the mother is uncomfortable transferring the baby in standing position, it is possible to transfer to the kangaroo position with the mother sitting. The procedures are similar: the mother sitting close to the incubator and the second person picking up the infant and placing him on the mother's chest (similar procedure as described above)

D .Transfer from standing kangaroo position to the incubator

1. Assist the mother in moving her chair in front of the incubator, keeping her feet on the floor.

2. Disconnect the ventilator from the child following Unit protocols.

3. It is necessary to help the mother stand up with her baby and verify that all lines are secure.

4. After she is standing, a second person helps the mother place the child in supine position in the incubator, while the endo-tracheal tube and lines are stabilized.

5. The ventilation tube must be reconnected and the child positioned.

6. Respiratory sounds must be evaluated to see if the endo-tracheal tube is in place.

7. The incubator is reset to patient control.

8. The baby's vital signs are monitored until he recovers the baseline prior to the kangaroo position.

E. Transfer from sitting kangaroo position to incubator

The procedures are similar to the transfer form standing position to incubator except that if the chair is reclined, it must be adjusted to an upright position and the footrest should be removed .

In any case, if the procedure ends before the agreed time--at the parents request or if the child shows changes in his vital signs that do not return to a baseline prior to kangaroo position--it may indicate intolerance of the Kangaroo position .

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