

# Kangaroo Holding Beyond the NICU

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## Updates & Kidbits

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A major nursing challenge in the neonatal intensive care unit (NICU) is supporting parents in the intensive, technology-driven environment by merging physiologic care of the infant with maternal interventions to enhance parent-infant interactions of touch and communication (Neu, 1999). This challenge forms the basis for the nursing intervention of kangaroo or skin-to-skin holding in the NICU. Over the last 10 years, kangaroo holding is increasingly being adopted as part of nursing practice in nurseries across the United States. Research suggests that kangaroo holding promotes maternal-infant attachment through feelings of closeness, builds maternal confidence, improves breastfeeding success, and may be a stress-reducing experience for both the mother and infant (Ludington & Engler, 1999). To date, kangaroo holding is primarily an intervention limited to the intensive care nursery environment, yet the benefit of kangaroo holding extends well beyond the NICU. The purpose of this article is to examine the evidence on kangaroo holding to determine the long-term benefits of kangaroo holding beyond the NICU for infants and make recommendation to practice.

### Global Kangaroo Holding Interventions

Kangaroo holding began in Bogotá, Columbia in the early 1980s as an intervention to maintain infant body temperature when incubators were not available. This practice of skin-to-skin holding of infants dressed only in diapers against their mothers' or fathers' chest for hours at a time spread worldwide due to the reported benefits. In Germany, infants as small as 500 grams are kangaroo-held routinely after birth (Ludington & Engler, 1999). In South Africa, kangaroo holding is considered a health promotion intervention that provides the optimal opportunity for breastfeeding. In a study conducted in a remote mission hospital without incubators in Zimbabwe, infant mortality was reduced by 40% for infants weighing less than 1500 grams (Bergman & Jurisoo, 1994). In this study, kangaroo holding was implemented for maintaining thermoregulation, or physiologic stability, in the premature population.

The International Network for Kangaroo Mother Care (INK) recommends kangaroo holding of infants as much as 24 hours per day in the nursery environment as well as at home based on global research findings. INK sponsors inter-

national workshops for experts in kangaroo care who examine current research and propose global recommendations for kangaroo holding practices. These evidence-based recommendations include early kangaroo holding, early infant discharge from the hospital, and exclusive breastfeeding. Because INK indicates there is a correlation between prolonged separation of mother and infant and the risk for infant abandonment and/or child abuse, attachment research provides additional support for kangaroo holding. Research of Lau and Morse (1998) supported to this correlation by demonstrating that mothers' separation from their compromised infants may interfere with mother-infant attachment relationships as well as contribute to delayed physical and/or intellectual development of the infant.

### Kangaroo Holding Evidence

Early research examining the effect of kangaroo holding on a small sample of premature infants ( $N = 12$ ) noted that infants maintained physiologic stability, measured as thermoregulation and cardiovascular status, during and after kangaroo holding (Ludington-Hoe, Hadeed, & Anderson, 1991). To date, there are no reported adverse physiologic effects on infant temperature, cardio-respiratory function, or oxygen saturation (Ludington-Hoe et al., 1999; Ludington-Hoe & Swinth, 1996). Additional research of Dr. Ludington has demonstrated that infants are warmer on the mother's chest than in an incubator, infant breathing improves, and quiet sleep time doubles for the infant during kangaroo holding (Ludington & Engler, 1999). Messmer and colleagues (1997) examined behavioral and physiologic parameters of 20 premature infants before, during, and after kangaroo holding. Findings of increased sleep and decreased agitation support the work of Dr. Ludington. Moreover, mothers of the infants studied reported increased maternal confidence and optimism with kangaroo holding in the NICU. These findings make it clear that the benefits of kangaroo holding are not limited to the infant.

Maternal benefits of kangaroo holding are reported in a qualitative study as feelings of intense connectedness and increased satisfaction with active parenting (Neu, 1999). Mothers described their holding experiences as nurturing and relationship-building. Many of these mothers continued the kangaroo holding intervention at home long after discharge. There are case study reports that suggest additional maternal benefits of kangaroo holding. In one case, a woman with known risk factors for postpartum depression reported rapidly decreasing depression scores over the first 32 hours with planned kangaroo holding (Dombrowski, Anderson, Santori, & Burkhammer, 2001). A larger study is needed to support this suggested finding.

In a case study of three clinical experiences of mothers with full term infants, the kangaroo holding intervention prior to breastfeeding improved the ability of the infant to latch on for feeding success (Meyer & Anderson, 1999). The March of Dimes prematurity Web site builds on these studies by describing maternal benefits as increased maternal

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**Table 1. Benefits of Kangaroo Holding**

<i>Gains feelings of closeness</i>	<i>Maternal Benefit</i>	<i>Infant Benefit</i>
<b>Gains feelings of closeness</b>	<b>X</b>	<b>X</b>
<b>Improves breastfeeding</b>	<b>X</b>	<b>X</b>
<b>Promotes relaxation</b>	<b>X</b>	<b>X</b>
<b>Decreases stress, agitation</b>		<b>X</b>
<b>Improves sleep state</b>		<b>X</b>
<b>Analgesic effect</b>		<b>X</b>
<b>Builds confidence</b>	<b>X</b>	

confidence, improved breastfeeding success, improved breast milk production, and decreased maternal anxiety, although research evidence is not cited to support these statements ([www.marchofdimess.com/prematurity](http://www.marchofdimess.com/prematurity)). The Web site offers relevant information and support for mothers, families, and the public on kangaroo holding at home.

### Benefits of Infant Touch

A comparison of kangaroo holding with traditional holding found no significant difference between maternal stress pre- and post-holding using the Parental Stress Scale and the Parental Expectations Survey (Roberts, Paynter, & McEwan, 2000). Moreover, infants in both groups had equivalent weight gain over the first 6 months and similar breastfeeding experiences. Although stress scale scores were high for both groups, this stress did not interfere with reported maternal confidence levels (Roberts et al., 2000). These findings suggest that one benefit of infant touch is improved maternal confidence.

There are several studies that compare infant responses to pain during heel lance procedures for lab draws. In each study, infants were either kangaroo held before, during, and after the heel stick or remained in the crib or incubator. Johnston and colleagues (2003) used the Premature Infant Pain Profile and videotapes to measure responses of a large sample ( $N = 74$ ) of premature infants between 32 and 36 weeks gestation in a crossover design. The extent of differences of pain responses between infants' kangaroo held or not held were statistically significant ( $p < .002$ ) in favor of the kangaroo holding and clinically important as an analgesic intervention. These findings are supported by the findings in a similar study of healthy newborns (Gray, Watt, & Blass, 2000). In a controlled trial design, infant response behaviors measured as changes in heart rate, grimacing, and crying were compared during and after blood collection. Again, the skin-to-skin intervention had significant calming effects for the newborn sample ( $N = 30$ ). The findings of these studies suggest that another benefit of infant touch is a calming, analgesic effect.

There are numerous studies examining the effects of touch therapy as a complementary therapy to promote relaxation, stress reduction, and healing (Peters, 1999). Although findings of physiologic and biochemical correlates are inconsistent in this body of literature, positive effects of relaxation and lessened anxiety are the most prominent findings. In a study examining biological markers of adult stress responses before and after touch therapy, anxiety was signif-

icantly reduced following therapy (Wardell & Engebretson, 2001). Anxiety was measured with the State-Trait Anxiety Inventory and blood pressure readings and compared to stress measured with salivary cortisol levels. Although the stress measurements were not significantly different pre- and post-test, this study validates touch therapy as an intervention that increases human relaxation and decreases anxiety. Kangaroo holding is a touch therapy intervention with long-term benefits for mothers and their infants.

### Long-Term Benefits of Kangaroo Holding

Research evidence underscores the fundamental role of maternal-infant attachment to improved long-term infant outcome (Davis, Mohay, & Edwards, 2003). With maternal-infant attachment as the overriding goal, interventions that facilitate attachment should promote maternal confidence and competence through education and foster optimal maternal-infant relationships through interaction. Kangaroo holding may be the key intervention that promotes excellent maternal-infant attachment. The common theme that emerges from research is that kangaroo holding is a human-touch intervention that promotes intense connectedness, decreases anxiety, and promotes active parenting. While this intervention has the potential for long-term benefits for mothers and their infants, it does not yet have a widespread application outside of the hospital NICU environment. This may be due, in part, to the dissemination of study findings; much of this body of knowledge is focused as a NICU intervention.

Few studies examine the long-term benefits of kangaroo holding beyond the NICU or beyond the hospital. A longitudinal study of premature infants ( $N = 146$ ) examined the effects of kangaroo holding on self-regulatory processes of infants over a 6-month period (Feldman, Weller, Sirota, & Eidelman, 2002). Infants were matched in two groups for birth weight, gestational age, and demographics. The kangaroo-held infants demonstrated better-organized sleep-wake cycles than the control group when measured at full-term. At 3 months of age, the kangaroo-held infants had higher thresholds to negative emotions, thus crying less than the control group. In addition, the held group had improved attention modulation in interaction over the control group. The findings at 6 months were similar in that the results underscored the emotional and cognitive regulatory benefits of kangaroo holding. The kangaroo-held infants displayed less negative emotions, engaged in interaction more frequently, and demonstrated improved sleep-wake cycles over

the control group. These findings suggest that kangaroo holding during the first 6 months of life may improve maternal-infant attachment and long-term infant outcome.

Long-term benefits of kangaroo holding (see Table 1) are just starting to emerge in the research evidence. Although many of these benefits were not studied as long-term effects, making the leap from benefits in the NICU to long-term benefits is straightforward thinking. Interestingly, many of the benefits cross over from mother to infant. Maternal benefits of sleep and analgesia are absent in the kangaroo literature, but building a case for these benefits would be fairly simple using the touch therapy literature. Furthermore, the relationship of maternal-infant attachment to the benefits facilitates an understanding of the correlation of positive qualities, such as maternal confidence and decreased infant agitation to successful attachment.

### Implications for Nursing Practice

The challenge of facilitating optimal maternal-infant relationships has life-long implications on the emotional well-being and neurobehavioral development of the infant, as well as implications for families (Higley & Miller, 1996). Interventions that facilitate this relationship should promote maternal confidence and competence through education and foster optimal maternal-infant relationships through interaction. Kangaroo holding is an intervention that promotes maternal-infant attachment through proximity and relationship. Additionally, the intervention is relatively effortless in the hospital and home environment and has no costs to consider. The problem arises in that if kangaroo holding is to become an intervention beyond the NICU, nurses will need to guide the application to practice.

Nurses in acute and long-term care pediatric units can promote kangaroo holding by parents on the unit. In addition, parents can be taught the procedure both in the hospital and during primary care visits. Implications for nursing practice are largely dependent upon the practice setting and roles of the individual nurse. This section will look at the roles of the nurse educator, the nursery nurse, the pediatric nurse, the community nurse, and the advanced practice nurse to ascertain specific implications to practice.

**Nurse educator.** The hospital-based nurse educator is responsible for teaching the underlying principles of kangaroo holding to parents attending prenatal classes. This is based on the premise that education for positive parenting must begin prenatally and continue from birth through infancy (Higley & Miller, 1996). This is the most advantageous time to discuss the fundamental role of maternal-infant attachment to long-term infant outcome. However, it may be just as helpful to teach this procedure to parents whose infant is hospitalized in an acute care setting. They may feel just as powerless as do NICU parents in their desire to provide comfort to their child.

The use of visual aids and materials to read at home or in the hospital setting are important tools to facilitate learner retention of information. Services available at hospitals vary by location and populations served. Hospitals with service excellence for new families or young families may have discussion boards on the hospital Web page to have their questions answered as they occur. Other hospitals may have an educational series for new families; still others use a phone call follow-up system to assess parent needs. Regardless of the program, hospitals with programs that support new families have higher patient satisfaction ratings by staff and the community. However, it is essential that the nurse educator remains informed of policy changes and current research to assure that state-of-the-art programs are developed and made available to all patient populations.

**Nursery nurse.** Nurses in the well newborn or intensive care nurseries are the front line educators with the responsibility of promoting maternal confidence and competence in caring for the newborn within time constraints of short hospital stays. Interventions that facilitate the educational process while involving the mother in caring for the newborn are essential. Because birth fatigue and discomfort are barriers to learning, nurses need to assure that mothers have adequate rest and treatment of pain. In a small descriptive study, early kangaroo holding was determined to be conducive to recovery from birth-related fatigue (Ludington-Hoe et al., 1999). Therefore, there is good evidence that kangaroo holding early in the postpartum period promotes recovery and attachment. Documentation on all discharge paperwork is essential for continuity of care and provision of follow-up services beyond hospitalization.

**Pediatric nurse.** Infants are often admitted to the hospital for various infectious, pulmonary, or GI problems. While there have not been studies that explore the effects of kangaroo care in the acute care setting, there appears to be nothing that contradicts it. The use of IVs and oxygen does not preclude the practice of kangaroo holding. Parents, and even grandparents, sit by the bedside for hours looking for ways to comfort their infant. Pediatric nurses working on infant units should have an inservice on kangaroo care and the modifications that can be made in their environment. Because little is written about kangaroo care with older infants with various medical problems, this is an area for possible research endeavors and certainly an area that warrants future publications for pediatric nurses.

**Community nurse.** It is common practice for the community nurse to manage the initial infant care following discharge from the hospital. Discharge paperwork is routinely forwarded to the community agency providing home nursing visits, as well as to the primary care provider. The community nurse is an advocate for the infant and family and assures the availability and effectiveness of the intervention services. Changing practice by taking kangaroo holding beyond the NICU to the home environment requires that community nurses be included in the planned interventions. The nurse educator should invite the community nurses to the hospital-based prenatal education program to see the directions and guidance given to parents-to-be. Inclusion in this program will facilitate two outcomes: (a) continuous educational services from prenatal to postpartum periods will positively affect family learning, confidence, and satisfaction; and (b) bridge the collegial relationship among nurses.

**Advance practice nurse.** The advance practice nurse is best able to follow an infant through well-child visits to facilitate parenting. As the primary care provider, this nurse can assist in promoting maternal confidence and competence through assessment, intervention, and referral. Again, advance practice nurses need to be included in the plan to take kangaroo holding to the home environment.

### Summary

The primary goal for maternal-child nurses in caring for parents and their infants is to support parental confidence and competence through education and services to assure optimal parental-infant attachment. Kangaroo holding in the hospital and home environment is one intervention that encourages parental-infant interaction as well as provides the benefits of closeness, proximity, and touch. Nurses in hospitals, private practice, the community, and beyond must work together to change practice by adding the intervention of kangaroo care for the benefit of infants and their families.

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