Kangaroo Care: The Low-Tech Phenomenon Saving Mothers and Babies Alike

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Kangaroo Care: The Low-Tech Phenomenon Saving Mothers and Babies Alike

Caroline Proue

Carroll College
Signature Page

This thesis for honors recognition has been approved for the Department of Nursing.

Director

Date

Reader

Date

Reader

Date
Dedication

I would like to dedicate this project to my role model and inspiration, my friend and confidante, my mother, Lindy Proue. Together with dad, you have molded me into the individual I am today. Thank you for always supporting me and encouraging me to dig deeper and push harder in life. Without your love and guidance, I would not have made it this far.

I also want to thank my Grandpa, Jake Smith. Thank you for showing me my potential in life. Thank you for always believing in me and supporting my dreams, whether or not you agreed with them. Thank you for always being truthful, but kind.

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Abstract

Approximately 15.2% of all births in the United States end in low birth weight infants (less than 2,500 grams) resulting from prematurity (UVa Health.com, 2006). Nearly all of these babies will be sent to a Neonatal Intensive Care Unit (NICU) where the level of maternal contact will vary depending on the different facility protocols. Kangaroo Care (KC), also known as skin-to-skin care, has been shown to have numerous positive results for both the mother and infant in the NICU setting. It has been shown through evidenced-based practice that KC is beneficial for a preterm infant’s vitals and stability with improvements in thermoregulation, cardiovascular and respiratory health, weight gain, and quiet sleep time both during and after therapy. Mothers who have used KC have experienced increased attachment and bonding to their infants as well as fewer anxious and depressive symptoms and fewer instances of post-partum depression. The purpose of this case study is to gain greater understanding of KC by exploring the experience of KC with a preterm infant-mother couple.
Kangaroo Care: The Low-Tech Phenomenon

Saving Mothers and Babies Alike

Chapter I

Scope of Kangaroo Care

Across the globe, Kangaroo Care (KC), also known as skin-to-skin care, has become a staple intervention for the effects of prematurity on both the infant and the mother. Approximately 15.2% of all births in the United States are premature deliveries, causing an increase in the rate of low birth weight infants (University of Virginia Health System, 2006). These statistics are proving a need for a quality, research based intervention to aid in treating this problem. KC has been shown to have positive effects both physiologically and emotionally for the mother and baby. Infant stability has been improved with this therapy as evidenced by an increase in established thermoregulation, cardiovascular and respiratory function, and increased weight gain and quiet sleep time (Kledzik, 2005). Infants also have shown an enhanced breastfeeding capability which likewise improves the mother’s experience of breastfeeding (Crenshaw, 2004). Other positive maternal effects of skin-to-skin care include a lower prevalence of depression and anxiety symptoms and post-partum depression, as well as improved bonding and attachment between the mother and baby (Burkhammer, Anderson, & Chiu, 2003).

Researchers Ruiz-Pelaez, Charpak, and Cuervo (2004) summarized the advantages of KC: “KC delivers ideal conditions for stable, low birthweight infants to thrive, strengthens parental participation and empowerment, and contributes to the healing process” (p. 1181). KC is a simple intervention with profound effects on both the short and long term health of the mother-baby couple.
**Definition**

KC is an intervention designed to help treat the many negative implications of preterm birth and life in the Neonatal Intensive Care Unit (NICU). It involves the infant, wearing only a diaper, being placed in a prone position, on the mother’s bare chest soon after birth (within 24 hours) and then covered by a warm blanket (Anderson, Moore, Hepworth, & Bergman, 2003b). Sometimes the infant’s head is positioned so the ear is placed over the mother’s heart for a calming effect (Larimer, 1999). Modern NICU’s categorize KC in four divisions based on timing: (a) very early: begins in the delivery room, (b) early: begins soon after birth and early stabilization, (c) intermediate: begins after early or acute intensive care, and (d) late: begins after completing intensive care. It is important to note, KC can include all infants receiving treatment such as mechanical ventilation or continuous positive airway pressure (Dodd, 2005). Dodd (2005) defined KC saying, “KC includes any activities the mother provides while holding her infant skin-to-skin. Usually, this consists of rocking, rubbing the infant’s back or massaging and talking to the infant, or gently holding or falling asleep with the infant” (p. 222). KC can also be implemented by the father of the infant or other family members as well; however, this paper will mainly focus on the maternal benefits.

**Background**

KC first began in Bogotá, Colombia, in 1979 as an intervention to resolve the problem of incubator shortages in the NICU. It was developed by Drs. Edgar Rey and Hector Martinez (Kamarmi, 2002). During this time mothers were not allowed into the NICU to see their babies. Consequently, ineffective attachment resulted and mothers began abandoning their babies upon discharge. Shortly after KC implementation, not
only did maternal attachment improve, but infant mortality was significantly decreased as well (Dodd, 2005).

Before long, this therapy became an internationally known intervention, and hospitals around the globe began using it. This included the technology deficient nations such as South Africa and Zimbabwe, where infant mortality was decreased by as much as 40 percent in very low birth weight infants (1500 grams) (Johnson, 2005). These reported benefits prompted even the most technologically advanced countries to begin implementing KC. Germany has used this therapy to treat infants as small as 500 grams. KC began as a desperate response to insufficient resources and has become a globally known intervention for the stresses of prematurity on both the infant and the mother.

*Target Populations*

KC is an appropriate intervention for any newborn infant or mother. However, there are certain high risk (often inter-related) populations who have been studied who specifically reveal the many benefits of this therapy.

*Preterm and low birth weight infants.* Premature infants are often born with physiologic and developmental deficits. These high risk infants can struggle initially with numerous central nervous system stability requirements, including respiratory stability, oxygenation, heart rate regulation, and temperature regulation. Later in development, the positive effects of KC are manifested in signs such as increased growth rate and weight gain (Dodd, 2005). These findings could be related to the data that breastfeeding is also improved with the KC intervention. The overall breastfeeding experience for both the mother and the baby is improved with skin-to-skin contact. Babies receiving KC have been shown to latch more quickly and feed longer than those who are separated from
their mothers shortly after birth (Crenshaw, 2004).

*Maternal and infant attachment.* A large stressor of the NICU environment is the detachment of the natural mother-child interaction. Often the technology and skill that is required to care for a sick baby sacrifices the immediate bonding that would have taken place in a more typical birth experience. Infant failure to thrive has been directly correlated to lack of touch in previous studies (Dodd, 2005). KC eliminates this negative variable, allowing the mother and infant to effectively bond. This implementation also allows the mother to feel more control and to be an active participant in the care of her newborn. She can learn her baby’s cues and develop a sense of her baby’s personality, all contributing to enhanced maternal awareness and attachment.

*Mothers of multiples and adopted high risk newborns.* Caring for one special needs newborn can be extremely stressful in itself, but caring for multiples creates many new issues for parents to work through. In selected case studies, researchers have found that parents who implement KC have had more successful attachments while the infants also have benefited from the therapy. KC can be implemented in such a way that two, three, or even four neonates can experience the skin-to-skin contact simultaneously. This allows for the mother to bond with each baby equally, thus relieving the stressors of not being able to love and care for multiple babies. Similarly, an adoptive mother of a singleton NICU baby can have excessive worries about caring for and accepting her child in contrast to how she would care for a healthy baby. KC has been shown to alleviate some of these concerns in adoptive mothers and help them bond with their babies more deeply.
Postpartum depression and anxiety. Up to 70% of all postpartum women experience some form of depressive symptoms, ranging from mild to severe (Lowdermilk & Perry, 2004). Post-partum depression (PPD) has more and more become a focus point for researchers. Because of the variability in hormone levels, many women experience a depressive effect on their mood. Women with many risk factors (previous diagnoses of PPD, other mood disorders, substance addictions, etc.) have been known to begin prophylactic antidepressant drug therapy before and after the birth to help decrease the possibility of a negative mothering experience. Recent studies have now shown that KC has been an effective therapy for both the treatment and prevention of depressive symptoms and post-partum depression. Immediate skin-to-skin contact helps the mother get to know her baby and can promote maternal competence (Dombrowski, Anderson, Santori, & Burkhammer, 2001).

Theoretical Framework

Maternal Role Attainment

The Maternal Role Attainment Theory was developed by Ramona T. Mercer. This theory focuses on the importance developing maternal identity both during and after pregnancy. Mercer explains that developing a personal maternal identity is a process. She stated, “The woman moves from seeking information and mimicking observations, to seeking expert models, role-playing, and fantasizing about herself as a mother” (2004, p. 226). Establishing one’s own identity as a mother can be very foreign and seemingly unnatural to many women. It is a crucial but dynamic process in both beginning motherhood and continuing the role with each new child. Mercer explained, “Maternal identity continues to evolve as the mother acquires new skills to regain her confidence in

Motherhood is a transition from the known and comfortable reality to the unknown and unchartable reality. This transition can be affected by several variables including the following: the woman’s personal conditions, cultural beliefs and attitudes, socioeconomic status, preparation and knowledge, and community and societal conditions (Mercer, 2004). A woman’s ability to become a mother is very important in the development and health of the infant. When maternal control is inhibited, studies have shown that the self-esteem and perceived role is strongly diminished, resulting in increased risk of role failure (Mercer, 2004).

This data is relevant to the study of KC in that skin-to-skin contact is one form of giving back some of the control specifically lost during NICU hospitalization. After experiencing KC, one parent of a preterm infant stated, “If you only touch her while she is in the isolette, it seems like she’s so delicate. Once you hold her outside of the isolette, you aren’t so afraid. You begin to realize that she’s not so fragile” (Goodnough, 2004, ¶ 6). As evidenced by the experience of this mother, the more contact and task fulfillment the mother is allowed, the greater chance of mother-infant bonding. In addition, a woman with post-partum depression is at risk for impaired attachment and thus inadequate maternal role attainment. KC is one intervention that has been shown to decrease post-partum depression and accelerate attachment, therefore aiding in role attainment.
Chapter II
Review of Literature

Physiologic Implications of KC for Preterm Infants

Potential positive effects of KC on the physiologic well being of a preterm or critically ill infant have been studied by many researchers, including Dodd (2005), Burkhammer et al. (2003), Charpak, Ruiz-Pelaez, Figueroa and Charpak (2001), and McCain, Ludington-Hoe, Swinth and Hadeed (2005). These studies include research information concerning KC on thermoregulation, cardiovascular health, respiratory function, weight gain, quiet sleep time, and breastfeeding success.

Thermoregulation. As defined by Lowdermilk and Perry (2004), thermoregulation is “the maintenance of balance between heat loss and heat production” (2004, p. 687), meaning, the baby must maintain a stable temperature of at least 37 degrees Celsius. A priority concern with the safety of KC is the thermoregulation of the neonate during this care. During care, the temperature of the neonate can be closely monitored but not controlled, as it would be in an incubator. Recent research, however, has disproved the theory that the baby’s temperature will become unstable without the control of heating instruments and has conversely found that babies are warmer on the mother’s chest (Crenshaw, 2004; Dodd, 2005; Johnson, 2005; Larimer, 1999). Dodd (2005) explains, “In KC, heat transfer takes place with skin-to-skin contact of the parent’s chest with the infant’s body, warming the infant as necessary” (p. 223). Furthermore, KC has been seen to be effective not only after infant stabilization, but immediately after birth as well (Dodd, 2005). In one study, infants were placed on their mother’s chests and temperatures of both the mother’s chest and the infant were taken periodically during KC.
This study concluded that the mother’s and the baby’s temperatures would synchronize and compensate for each other. When the temperature of one would go down, the other would go up. This compensation was seen not only in the mother, but the baby as well (Larimer, 1999). Thus, cold stress is not a proven contraindication of KC. Studies have shown that babies are within normal limits concerning their temperature when receiving KC.

*Respiratory function.* Adequate respiratory function for a neonate is defined as maintaining a regular rate, rhythm, and depth with respirations between 30 to 60 breaths per minute with periods of apnea no greater than 15 seconds (Lowdermilk & Perry, 2004). Maintaining respiratory function and adequate oxygenation is often a difficult task for preterm infants. The safety of KC for these infants has been questioned because of the stress of transferring the baby from the incubator to the mother’s chest, which can increase the risk for apnea (the greatest respiratory concern for unstable infants). However, many studies of KC have shown not only few negative implications of this care, but many positive effects as well. One researcher remarks on the impact of KC concerning respirations: “KC provides an upright to semi-upright position, which enhances respiratory excursion and a chest-to-chest position, which stabilizes the infant’s chest wall” (Dodd, 2005, p. 225). A 1998 study found that apnea during KC decreased by four times the current rate (Ludington-Hoe, 1998). Further research by Ludington-Hoe, Anderson, and Hollingsead was completed in 1999 in a qualitative study. This study examined the results of immediate KC in six preterm infants (between 34-36 weeks gestation). It revealed that KC implemented immediately after birth helped these infants recover and stabilize quickly. A normal respiratory rate and oxygenation were reached
quickly and maintained without difficulty throughout KC. In addition, the infants’ temperature and heart rate also remained stable. All the infants in this study were discharged by 48 hours after birth with no visible effects of their preterm birth (Ludington-Hoe et al., 1999). Although this study is not large enough to assume the results on all 34-36 week preterm infants, it was conclusive for the six infants observed. Thus, KC has been seen as a safe intervention for preterm infants and may even help in maintaining a stable respiratory function.

Not only is respiratory rate important in the premature neonate, but oxygenation is as well. An infant must maintain oxygen saturation greater than 90% to be adequately oxygenated (Lowdermilk & Perry, 2004). Oxygenation during KC has been seen to be comparable, or even more efficient, to oxygenation while in incubator care (Dodd, 2005; Fohe, Siegfried, & Avenarius, 2000). In addition, infants who were on ventilator support were able to tolerate the transfer process well, as evidenced by no reduction in oxygen saturation without an increase in oxygen requirements (Larimer, 1999). Current research on KC has shown that it is safe and can be effective in improving and maintaining adequate respiratory function.

*Cardiovascular stability.* Cardiovascular stability in a neonate includes a steady heart rate between 100 and 160 beats per minute (180 beats per minute within normal limits while the infant is crying) in a normal sinus rhythm. Any extreme increase or decrease outside of these limits is indicative of severe stress (Lowdermilk & Perry, 2004). The concerning issue with KC is the question of whether it will cause an increase in stress, thereby increasing heart rate and causing infant instability. Thus far, studies have shown that KC can “produce changes in heart rate variability that illustrate
decreasing stress” (McCain et al., 2005, p. 690). Although the evidence to support that KC improves cardiovascular status is limited, the evidence supporting its safety is not. Many studies have shown that there is no statistically significant change in heart rate comparing KC and incubator care (Dodd, 2005; McCain et al., 2005). In their quantitative study, Gray, Watt, and Blass (2000) even reported that “skin-to-skin contact prevented the marked rise in heart rate that occurred in control infants” (p. 7).

_Growth and weight gain._ Growth and weight gain are often markers for when an infant is ready to begin less invasive therapy or even leave the hospital. Therefore, any therapy that can help enhance these criteria is of extreme interest. Maternal handling has been shown to decrease the risk of failure to thrive and poor weight gain in an infant, both human and animal (Dodd, 2005). Dodd (2005) stated, “KC increases maternal contact and may therefore improve weight gain and brain growth in preterm infants” (p. 230). She goes on to report that in at least four research studies infants receiving KC had a better daily weight gain than those who received standard care (Dodd, 2005). A similar study done by Charpak et al. (2001) had consistent findings, reporting that infants receiving KC had a greater increase in head circumference than those in the control group. Increased growth and weight gain is a sign that the infant’s health is improving and becoming more stable.

_Quiet sleep._ In any infant, healthy or ill, quiet (or deep) sleep, is very important because it is the time in which the brain and body develop and grow. Skin-to-skin contact has been shown to improve both the infant’s sleep time and quality (Johnson, 2005; Larimer, 1999; McCain et al, 2005.). When KC is implemented in a quiet, calm environment, it usually facilitates a quick transition from awake/alert to sleeping and
Kangaroo care decreases crying time (Larimer, 1999). In a qualitative case study done by McCain et al. (2005), the infant consistently fell asleep within 30 seconds of being placed on the mother’s chest and remained asleep for the duration of the 40 minute research segment (McCain et al., 2005).

*Breastfeeding.* Many premature infants have difficulty learning to breastfeed which prevents them from gaining weight and going home. Because of the inability to latch or suck correctly, these infants must be put on supplemental feeding which usually involves NG tube placement and formula feeding. As with any invasive therapy, the natural method of care is preferable. KC has been shown to improve the breastfeeding experience, both short-term and long-term, for the mother and infant alike (Charpak et al., 2001; Crenshaw, 2004). The obvious advantage of KC and breastfeeding is that the breast is easily accessible to the baby. Often a baby will naturally find his or her way to the breast and self-attach, rather than being forced on (Burkhammer et al., 2003). Additionally, maternal lactation is increased with the skin-to-skin contact with her baby (Larimer, 1999), as well as decreased postpartum breast engorgement and increased exclusive breastfeeding (McCain et al., 2005), further promoting increased breastfeeding.

A quantitative study done by Anderson, et al. (2003a) revealed that infants receiving KC exclusively breastfed six times more often than those receiving standard care (12 times vs. 2 times), needing no supplemental bottle feedings or intravenous fluids, while the other infants had.

Another quantitative case study done by Burkhammer and colleagues investigated the potential healing properties of KC in birthing situations involving grief, anxiety, and perinatal problems. This single case study was derived from a study including multiple
mothers to explore the problem of breastfeeding difficulty 12-18 hours post-birth. Breastfeeding success was rated on the mother’s perception of nipple and breast pain using a visual analog scale. The woman reported in the case study is a 23-year-old, single mother who had experienced a previous stillbirth at 28 weeks gestation. Her breastfeeding experience with the current baby the first 18 hours post-birth had been unsuccessful (scoring 23% out of 100% of the breastfeeding analogue scale) and nipple pain was reported at 44% out of 100% (Burkhammer et al., 2003). During the first KC trial, Burkhammer and colleagues reported that “she relaxed her arms and her infant moved unaided to her breast, self-attached, and nursed successfully (Burkhammer et al., 2001, p. 8). Research done by Jeannette Crenshaw supports this finding. She stated, “Most babies placed skin-to-skin with their mothers immediately after birth will instinctively attach to the breast and begin breastfeeding usually within 1 hour” (2004, p. 37).

After this first experience, the mother reported a breastfeeding success perception of 96% and a nipple pain perception of 9% as recorded on the visual analogue scale. Remarking on this data, Burkhammer and colleagues stated, “Perhaps her KC experience, together with the support of the research nurse, provided the necessary quiet and uninterrupted time to allow her love and unique feelings toward her baby to begin” (2001, pp. 8-9). At a one-month follow-up, the mother reported “exclusive breastfeeding” with 100% success and no nipple pain (Burkhammer et al., 2001, p. 10). As seen in this study, improved breastfeeding is beneficial not only to the infant but the mother as well. It allows for a deeper relaxation and comfort with the baby, leading to a more effective bonding experience.
Mother-Infant Attachment in Relation to KC

Bonding. Mother-infant bonding can often be interrupted by a premature birth. Routine hospital care beginning in the 20\textsuperscript{th} century began separating mothers and infants as births moved from homes to hospitals. Crenshaw (2004) noted, “The medical community believed that babies were safer and mothers rested more with babies in the nursery” (p. 36). It has only been in recent years that healthy babies were brought back to their mothers and allowed to room in. However, because of the emergent situation of most preterm births, mothers are often still not allowed to see their babies for hours after birth and not allowed to hold them for days or weeks. Kangaroo research has revealed that the skin-to-skin contact between the mother and baby allows for the couple to bond more rapidly and intensely (Anderson et al., 2003a; Crenshaw, 2004; Dodd, 2005; Johnson, 2005; Kledzik, 2005; Larimer, 1999; McCain et al., 2005).

The immediate postpartum period is a time of “maternal engrossment with the infant” (Kledzik, 2005) and any contact or touch will improve bonding and set a foundation for attachment. Furthermore, skin-to-skin contact stimulates the release of Oxytocin, a hormone that not only causes the uterus to contract during and after delivery, but also stimulates “mothering” feelings and positively affects the mood, as well as causing breast temperature to rise and milk let-down to be initiated (Burkhammer et al., 2003; Crenshaw, 2004; Dombrowski et al., 2001; Feldman, Eidelman, Sirotà, & Weller, 2002). Dodd (2005) reports that “KC promotes attachment and feelings that enhance nurturing” (p. 228). A participant in the 2003 Burkhammer study commented on her experience with KC saying, “You have shown me a precious way [breastfeeding skin-to-skin] to strengthen the bond between my baby and me. We will treasure it always...
There is a sense of calm and peacefulness between Makaia [her premature son] and me while ‘Kangarooing’” (2001, p. 9). KC is a safe and easy intervention to improve mother-infant bonding and facilitate further, long-term attachment.

Early mother-infant attachment is even more critical in an adoption situation. A qualitative study by Parker and Anderson (2002) examined a situation in which a preterm infant was born to adoptive parents. As the infant was very unstable and ill, the adoptive mother was concerned that the baby would not properly bond with her because of the lack of interaction. On her third day of life, however, the nurses offered the mother and father the opportunity to KC. As a result, both parents reported they “felt an immediate and intense connection to their adoptive daughter and that they began to ‘know’ her at that time” (Parker, Anderson, 2002, p. 231). These feelings of connectedness can help the parents begin to establish more of an identity as the baby’s parents and help them feel that she really does belong to them. Johnson (2005) stated, “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” (p. 54).

Contact time. Mother-infant contact time facilitates adequate bonding and proper attachment. Often times, mothers of premature babies are not allowed the same quality or amount of contact with their babies. A historic 1945 observational study once reported that despite adequate medical care, abandoned and orphaned infants were experiencing failure to thrive and dying. The researchers theorized that this phenomenon was because of lack of affectionate contact. The dying infants were then placed in foster care where they received nurturing touch and contact, and their health rapidly improved (Dodd,
Kangaroo care (2005). KC is an intervention which allows improved quality contact between mother and baby. Dodd (2005) stated, “Maternal-infant contact appears to be an important element in the growth and development of preterm infants” (p. 227). With a similar hypothesis, a quantitative randomized control research study completed by Anderson et al. (2003a) investigated the theory that KC would improve mother-infant contact time, thus improving infant health.

The purpose of the study was “to describe the type and percent time of contact 0-48 hours postbirth for mother-preterm newborn (infant) dyads given kangaroo care (skin-to-skin) or standard care (controls)” (2003, p.604). The sample included 100 preterm infants between 32 and 36 weeks gestation and their mothers in a postpartum and neonatal intensive care unit (NICU) setting. In order to be included in the study, mothers had to be 18 years of age or older and generally healthy (no history or present illness including preeclampsia, severe depression, mental illness, serious substance abuse, etc.). Infants had to meet inclusion criteria of a 5-minute Apgar score of 6 or greater, have a weight between 1,300 and 3,000 g, gestational age between 32 and 36 completed weeks, and no presence of severe congenital anomalies (2003, p. 608).

The study involved mother-infant dyads randomly designated to a control group (standard care with wrapped holding) or to a test group (Kangaroo care). After assignment, both groups received standard care from the medical staff; however the test group also received Kangaroo care from their mothers (baby is placed in a prone position, wearing only a diaper, on the mother’s bare chest then covered with a blanket). The study was conducted separately in both the NICU and the postpartum unit, resulting in four different data sets.
The results of the study suggest that using Kangaroo care as an intervention increases the time of mother-infant contact. The authors (Anderson et al.) stated, “the percent of time that KC mothers spent in both types of contact (skin-to-skin plus wrapped holding) was more than twice that of mothers in the control group” (2003, p. 610).

Further, NICU dyads in the test group spent more time in contact than postpartum dyads (22.0% vs. 7.5% with Kangaroo care and 11.6% vs. 1.8% with wrapped holding). In the control group, percent of wrapped holding time was 13.9% for those in the postpartum unit and 6.1% for those in the NICU. However, the amount of KC was less than expected and the amount of wrapped holding in the test groups was more than expected (2003, p. 610). A possible explanation for this data is that sessions were interrupted or missed altogether because of routine hospital care by staff. Nevertheless, contact time did increase and thus, the researchers concluded that “SS [skin-to-skin contact] increases the mothers’ desire to hold their infants” (Anderson et al., 2003a, p. 611). Increased contact time allows for greater bonding and can, therefore, reduce the risk of impaired mother-infant attachment and postpartum depression.

*Maternal Benefits of KC*

*Depression and anxiety.* Mothers of preterm infants are at an increased risk for postpartum depression following birth, not only because of the rapid change in hormone levels, but also because of the stress associated with a high-risk birth (Feldman et al., 2002). Feelings of inadequacy and anxiety can arise and interrupt the attachment process (Dombrowski et al., 2001). Wang, Chen, Chin, and Lee (2005) reported in their quantitative study that “postnatally depressed mothers were less affectionate and more anxious than non-depressed mothers...” (p. 39). This Taiwanese study was designed to
observe the development of an infant up to one year of age with a mother experiencing depression versus a mother not experiencing depression. Five instruments were used to rate depression and child development including The Perceived Stress Scale, The Interpersonal Support Evaluation List, The Coopersmith Self-Esteem Inventory, The 21-item Beck Depression Inventory, and The Chinese Child Development Inventory (adapted from the Minnesota Child Development Inventory). All instruments had adequate test-retest reliability, internal consistency and construct validity. The study concluded that maternal depression has a “moderate to large effect on maternal-infant interaction…” (Wang et al., 2005, p. 39). Postpartum depression is a problem and increases the risk for ineffective mother-infant bonding.

A qualitative research study done by Dombrowski et al. (2001) revealed that KC can alleviate some depression and facilitate more rapid mother-infant bonding. In this study, a single 22 year-old multiparous woman with known risk factors for depression (history of substance abuse, sexual and physical abuse, placement in foster homes, and previous depression involving suicide attempts) was taught KC with her preterm newborn infant. The first KC session began two hours post-birth. At this time the mother was lying in bed crying, though she was eager to begin KC. She soon stopped crying and began affectionately touching and speaking to her newborn daughter as she KC’d for the next three hours. Six hours after birth, the mother was still moderately depressed, scoring 6.1 out of 10 on the depression analogue scale. This number decreased to 2.4 two hours later and by the next afternoon, the mother reported that all feelings of depression were gone (Dombrowksi et al., 2001). During this time, no antidepressants or therapy of any kind were provided, with the exception of KC. Months later the mother stated, “It [KC] made
me feel closer than I felt holding her regular…It made me close to her and I was scared to be a mother but it gave me a sense of peace that I could do it [take care of the baby]” (Dombrowski et al., 2001, p. 215). KC assists in relaxing mothers and giving mothers a true sense of competency, so they can release their anxiety and worries and focus on the new baby (Tessier, et al., 1998).

Multiples. Mothers of multiples often have concerns about bonding with all of their children equally, especially when the infants are at different levels of health and interaction is limited. In a case study by Swinth, Nelson, Hadeed, and Anderson (2000), a multiperous woman with four children and expecting triplets was found in this situation. This mother verbalized her “fear that she would be unable to spread her love across three infants” (Swinth et al., 2000, p. 214). For this mother, the research team implemented “shared” KC (one person holding all infants at once). This allowed the mother to appropriately bond and attach to each of her infants separately but equally. She established feelings of intense connectedness and regained her confidence after KC stating, “I can do this… I can love and bond with all three at the same time. This is incredible” (Swinth et al., 2000, p. 215). A similar case study conducted by Dombrowski et al. (2000) implemented KC for premature twins and their adolescent parents. Positive results were also reported in this study as the 16-year-old mother and 15-year-old father were seen bonding with their babies during KC and gaining self-confidence as evidenced by affectionate touch and verbalizations. The researchers also reported that “both parents spent as much time with their infants as possible…” (Dombrowski et al., 2000, p. 94). KC is an appropriate intervention for parents of multiples, especially those that are high risk for ineffective coping or bonding as seen in the previously mentioned studies.
Summary

Kangaroo care or skin-to-skin contact can be implemented by the nurse in either a post-partum or NICU setting. This setting not only improves the amount of time the infant and mother spend in contact, but also may facilitate a quicker physiologic recovery for the preterm infant, including thermoregulation, respiratory function, cardiovascular stability, quiet sleep time, growth and weight gain, and breastfeeding success. This intervention also improves bonding in the mother-infant dyad and creates a deeply rooted foundation for attachment. Other advantages of KC the nurse should be aware of are its effects on maternal anxiety and postpartum depression. KC is an easy, low-risk nursing intervention which can be beneficial for both the mother and the baby. Although the advantages of this intervention have been repeatedly defined, the nurse must also weigh the benefits vs. risks in each individual situation when choosing whether or not to implement this care.
Chapter III
Methodology

Case Study

The research method used for this study consisted of a qualitative case study of a voluntary participant of KC who had a premature infant requiring an extended hospital stay in the NICU. As the Center for Organization, Leadership, & Management explained, "[C]ase studies are the preferred strategy when 'how' or 'why' questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context" (Center for Organization, Leadership& Management Research (COLMR), ¶ 14). A case study involves an "unstructured interview" allowing the participant to express and define the situation in his or her own terms (Qualitative Social Science Research Methodology, 2006, ¶ 4).

Data Collection

As this was a qualitative study, the data collected was entirely subjective. The study focused primarily on the feelings of the mother and the attachment process which can not be recorded objectively. As Fain (2004) described, "The focus [of a qualitative study] is on the creation of social experience and emergent meanings, the relationship between participant and researcher, and the environmental issues that may shape inquiry" (p. 193). This type of research allows the participant to explore her feelings uninhibited by the study process and report to the researcher in an unbiased manner.

The method of measurement used for this study was both the written journal of the participant and a tape-recorded interview with the researcher. This interview allowed the researcher to ask the participant open-ended questions regarding her KC experience.
Analysis

The data was analyzed using content analysis identifying recurrent themes as well as problems. Quotes from the participant were utilized to validate the results.

The Participant

The participant in this study delivered a preterm infant approximately one year ago, born with multiple congenital birth defects, thus requiring extended hospital care. The participant was fully informed of the research study purposes, risks, and benefits and gave informed consent. She recorded her thoughts and emotions regarding having a preterm birth as well as her experience with Kangaroo Care (KC) in a journal, and participated in a recorded interview with the researcher.
Chapter IV

Results

The purpose of this case study was to gain greater understanding of KC by exploring the experience of KC with a preterm infant-mother couple and evaluating the current research concerning the therapy. The participant in this study was a primiparous mother in her late thirties who developed complications early in the pregnancy by almost miscarrying at eight weeks gestation. The participant was diagnosed with polyhydramnios (an over abundance of amniotic fluid) and informed that her baby may have some congenital abnormalities. At 38 weeks gestation, she delivered a baby girl weighing 6 lbs. 11 oz. by cesarean section. Because of the complications of the surgery, the participant was put under general anesthesia during the procedure. Immediately after the baby girl was born, it became clear that she had a myriad of complications, most importantly a life-threatening tracheal-esophageal fistula with esophageal atresia (TEF-EA). The baby was stabilized and life-flighted to an out of state hospital; thus, the participant was never allowed to meet her baby girl. Once stabilized, the baby had emergency surgery to repair the TEF-EA. As a result of her cleft lip and palate, she was able to extubate herself and after several reintubations, she was chemically paralyzed and sandbagged for her own safety.

Qualifications for Therapy

The participant in this study met several criteria for KC. She was at an increased risk for impaired attachment related to not being able to meet her baby at birth. She stated, "...the first time I saw her was when she was seven days old. And when I saw her, you know, the connection hadn’t been made. I never made the connection that she
was mine, that she came out of me, that she was my little girl.” A further indication for KC is that the baby went through numerous surgeries and procedures, so she had to remain in the NICU for most of the first few months of her life. Initially, the parents could not hold her because of the risk of dislodging the endotracheal tube that was acting as her airway. Furthermore, the baby had some congenital defects, such as a cleft lip, which caused hesitancy and anxiety and altered the parent-infant attachment.

Themes
Several reoccurring themes were seen throughout the interview with the participant. These themes proved to be risk factors for limited bonding and attachment.

Limited or no contact. The participant was not able to see her daughter for seven days and could not hold her for three weeks. The baby was on a mechanical ventilator and sandbagged for her own protection. She was covered with tubes and wires, including intravenous lines, an electrocardiogram, and blood pressure and oxygen saturation monitors. The participant stated, “when I saw her, we couldn’t hold her, she had had surgery. She had to stay in her bed and not move... for a couple of weeks all I did was sit by her and look at her. I never really made any connections.” When the participant and her husband were allowed to hold their daughter, they were encouraged by the staff nurse to try skin-to-skin holding. She explained this experience stating,

I just loved holding her at that point. And it’s one thing to hold a baby when you’re wearing clothes and they’re wearing clothes and they’re in blankets and bundled up and everything, but it’s another when you’re sitting there, skin-to-skin, naked and just kind of there. It’s very much a natural thing. You put a blanket around both of you and you snuggle together. The bonding that really
happens…it’s amazing. You feel the weight of the child and you smell them, things like that.

Holding the baby proved to be a positive experience for the participant and helped her transition into her role as a new mother and begin the bonding process.

_Hospital environment._ The hospital environment can be a very challenging place for new parents to meet and bond with a new baby. There is limited privacy in addition to a very demanding care schedule. Often the parents are intimidated by all of the equipment and monitors the baby is hooked up to. They are afraid to hold or touch the baby for fear that they might hurt him or her. Describing her experience, the participant said, “I was scared. My little one was hooked up to all these tubes and wires and everything and I was scared I was going to hurt her; she just looked so weak and pale. But then after I held her, it was okay.” Although nurses make efforts to make the new parents feel comfortable and bond with their baby, the NICU is intimidating and attachment between parents and baby often suffers.

_No breastfeeding._ In addition to the emergency surgery directly after birth, the participant’s baby was born with a cleft lip and palate and had increased oxygen needs, so breastfeeding at this point was not feasible. She was not encouraged to pump and freeze breast milk. Breastfeeding has been shown to increase bonding, thus the participant was further at risk for impaired bonding. Although the participant could not breastfeed her baby, she did go through the motions while performing KC. She remarked on the experience stating,

My daughter had a unilateral cleft lip and palate so I was confused about the whole situation. It turns out that it was just to get my daughter to learn about my
smell and my skin and my touch and my voice and just get her to know me.

Basically, the connection; the bonding... We did go ahead and express some milk so she could have a little taste while I was holding her. She kind of rooted, so she kind of went through the motions. She never really latched on and sucked because of the cleft.

Because of the inability to breastfeed her baby, the participant was at a further disadvantage in bonding capabilities.

*Anxiety before KC.* Performing KC in the NICU environment can be initially awkward and intimidating. KC is a very intimate experience, and performing it in a public setting can be challenging. The participant described her feelings of anxiety the first time she performed KC in the NICU. She stated,

> We did pull the curtain. But still, they [other families] knew what was going on behind the curtain. The first time, the first disrobing in front of a complete stranger was kind of nervous for me, especially when you’re not looking and feeling your best. I had some anxiety. I was scared.

Anxiety before and during KC can be a potential complication of the therapy. Privacy of the participant should be addressed and respected by the nurse or caregiver initiating KC.

*Bonding process.* The bonding process is an integral part of the transition to motherhood and parenting. If a mother cannot adequately bond with her baby initially, it is very hard to develop that attachment as it should be. As previously mentioned, the participant in this study had several risk factors for impaired bonding which made her a great candidate for KC. Her bonding was initially delayed and occurred slowly. She explained this stating,
When I saw her the connection hadn’t been made. She looked like my husband’s family, she looked exactly like them. I never made the connection that she was mine, that she came out of me, that she was my little girl. I’m not one of these mothers that fell in love with her baby while she was in the womb. To me it was just something that I had to go though. And when the baby finally came out, I wasn’t there. I was unconscious and out of it, and she was taken away, so I never saw her. I knew that I had a baby somewhere and it was kind of concerning to me and I cared about her, but that was about it.

As she was allowed to see more of her baby and hold her, the bonding and natural attachment increased. The participant explains that the first time she felt connected to her baby was when she finally was able to hold her. She stated,

I think the first time I realized that she’s my little girl was when I was holding her.

Then it felt like, okay, now I’m a mommy. Before it was just, I’m here because I’m supposed to be. It didn’t make sense to me what was going on until then.

Skin to skin contact increases bonding and attachment. The participant remarked on her personal increased bonding that occurred as a result of KC.

*Home KC.* After leaving the NICU, the participant and her husband continued KC care when they returned home. KC proved to be beneficial while they were feeding the baby by a Nasogastric tube (NG). The participant stated,

The night when we came home…when we would feed her, we’d strip down and give her a bottle and she had a NG feeding tube so it worked out really well for us because when we’d feed her through the tube we’d have her either root with me or just cuddle up with her daddy. So we continued it some at home.
The participant and her husband performed KC at home again after the baby was hospitalized a second time for another major surgery. “My husband and I, after she came out of the hospital the second time, we did kind of do it again, the skin-to-skin, Kangaroo Care, just to let her know it was us.” Performing KC at home proved to be important for both the comfort of the baby and the mother.

*Baby response.* KC is not only beneficial for parent bonding, but studies also show it is beneficial for infant attachment to a parent. In this study, the participant described her baby’s response to KC saying, “It would be a way to calm her and she would actually go to sleep.” She went on to say, “One of the things that did happen too is that she started looking at us. Before, we were just somebody who happened to be there. We would hold her and she would lift her little neck and look up at you.”

*Summary*

Several themes were found during this study. The participant was affected by the limited or no contact between herself and her baby, the hospital environment, the lack of breastfeeding, anxiety during KC, home KC, bonding processes, and the baby’s response. These themes affected the participant’s experience of KC; therefore, the results are specific to this study and can not be generalized to other studies.
Chapter V

Discussion

Improved Bonding

The NICU environment is an extremely difficult place to develop a relationship with an infant. Parents are often overwhelmed with the high-tech equipment and may feel a loss of control in their ability to care for the infant. Chia, Sellick, and Gan discussed this issue in their 2006 study and stated, "When an infant is born prematurely the natural bonding process is often hampered, particularly when the infant requires admission to a neonatal intensive care unit (NICU)" (p.20). Bonding can be extremely difficult in the NICU. Phillips and Tooley (2005) identified contributing factors:

Parents are frequently physically and emotionally overwhelmed, and confused and/or intimidated by the high-tech environment of the NICU and the complexities of their infant's care. Amid feelings of grief, fear, anxiety and wonderment over their preterm or critically ill infant, they may be uncertain of their proper roles and responsibilities as parents (p. 434).

As a result of this unnatural birthing experience, they are at risk for ineffective attachment and bonding.

The positive correlation between KC and bonding has been shown in several research studies (Anderson et al., 2003a; Crenshaw, 2004; Dodd, 2005; Johnson, 2005; Kledzik, 2005; Larimer, 1999; McCain et al., 2005). In this study, KC was necessary to promote effective mother-infant bonding for the high-risk couplet. Phillips and Tooley (2005) discussed the demands of the NICU on parents stating, "Birth complications have highlighted the need for parents to be able to see, hold and touch their newborn in order
to facilitate early attachment and bonding” (p. 432). It wasn’t until the participant was able to hold her baby that she embraced her maternal role and created an attachment to her baby. The opportunity for this mother to hold her child skin-to-skin allowed her to develop a lasting bond. DiMenna (2006) concluded that “Kangaroo Care or skin-to-skin holding, is one of the most beneficial development interventions parents can perform with their newborn” (p. 405). The initial skin-to-skin touch allows both parents and their baby to get to know one another and become comfortable together.

Baby Wellbeing

In addition to improving bonding between caregivers and their infant, KC has also been shown to improve the baby wellbeing. Previously, the main concern about KC among healthcare workers is the limited ability to monitor the baby while in KC and the baby’s potential inability to maintain thermoregulation. The NICU is a very controlled environment in which the doctors and nurses are constantly monitoring the patient’s temperature, blood pressure, respirations, heart rate, pain, and intake and output. These values help the healthcare team determine the infant’s stability. KC takes the infant out of that protected situation and into a more natural, but less controlled one. Studies have shown that “nurses were apprehensive about the possibility of apneic spells and oxygen desaturation, dislodgment of intravenous lines and accidental extubation” (Chia, Sellick, & Gan, 2006, p. 21). Research, however, has confirmed that although KC may be less high-tech and exact, it adds no danger to the infant. In their 2005 study, Price and Johnson stated, “Babies in skin-to-skin contact with their mothers maintain body heat and care calmed with regulation of heartbeat and respirations” (p. 154). KC does not put the infant at harm, and it may furthermore increase wellbeing by helping to stabilize his or
her vitals (heart rate, blood pressure, respirations, temperature, and pain). Chia, Sellick, and Gan (2006) explained this phenomena stating, “Findings have shown that during and after KC the heart rate, respirations, and oxygen levels of the neonate remain within normal limits...Positive effects of KC include fewer episodes of idiopathic apnea, improved sleep patterns, and better thermoregulation for the neonate...” (p. 21). DiMenna (2006) further supported this finding stating, “Apnea, bradycardia, and periodic breathing were absent during KC, and regular breathing increased for infants receiving KC” (p.408). KC is safe and effective in maintaining physiologic stability of the NICU infant.

In addition to regulating physiologic status, KC may help to calm the infant as well. The participant noted that her daughter was calmed by KC and first began looking at her when they were skin-to-skin. She remarked that her baby seemed to be less agitated while in KC. Price and Johnson (2005) commented, “It was common to see babies settle when in skin contact, with their mothers stroking and talking to them in a soothing voice” (p.157). Infants and caregivers alike benefit from the closeness of KC and the improved bonding that develops as a result.

*Potential Complications of KC*

As with any therapy, KC involves complications and disadvantages as well as advantages. Performing KC in the NICU can be initially uncomfortable and intimidating. The participant remarked on her feelings of anxiety during her initial KC. Mothers are often asked to disrobe and sometimes breastfeed their infants with limited privacy.

Beyond the difficulties of limited privacy, it can be very challenging and time consuming to transfer the infant from the isolette to the parent. Additionally, it can be
difficult to monitor the infant while in KC, which can be a source of stress for both the parents and nurses. However, research has shown that these disadvantages do not outweigh the advantages. DiMenna (2006) concluded, “There are no apparent short-term or long-term negative effects [of KC]” (p.408). KC is a low-tech, easy intervention to improve the wellbeing of both parents and infants in the NICU.

*Implications for Future Nursing*

KC implementation is not possible without the support and understanding of the nurse. The NICU nurse is the one who must take the initiative to encourage the parents to perform KC and support and calm their fears and anxieties regarding the therapy and care for their infant. The participant noted that it was her daughter’s primary nurse who explained KC to her and encouraged that she try it. Chia, Sellick and Gan (2006) stated,

> Neonatal nurses play a pivotal role in facilitating the attachment process by promoting early parent-infant contact through encouraging parents to touch, hold and care for their infants... as the infant’s primary care provider, neonatal nurses are in a position to either advocate or discourage the use of KC in the NICU (p.20-21).

Nurses need to be educated on research regarding KC so they can become comfortable with the therapy and encourage parents to become comfortable with it as well. Typically, the nurse tends to be more focused on the medical needs of the baby rather than incorporating the bonding needs as well (Chia, Sellick, & Gan, 2006, p. 20). Nurses are the primary support group for parents of infants in the NICU. It is often a frightening and uncertain time and they look to the nurses for reassurance and support. Nurses can aid
these fears by providing “verbal encouragement and reassurance, and provision of a private and comfortable environment” (Chia, Sellick, & Gan, 2006, p.21).

Not only is KC beneficial to the infant and mother, but it can also help decrease the nurse’s work load with the “settling effect on the infant and greater involvement of parents in providing care” and can be “professionally satisfying” (Chia, Sellick, & Gan, 2006, p. 25-26).

**Future Research**

Recently, much research has been done regarding the safety and effectiveness of KC. This research has allowed a progression toward increased mother-infant contact and, thereby, improved bonding. However, more research could be done on the attitudes of nursing and healthcare members regarding KC. If the research can prove that KC is safe and effective for even ventilated infants, doctors and nurses would be more willing to integrate the therapy into their practice.

**Conclusion**

KC is an easy and effective method to improve both parent-infant bonding and infant physiologic stability. Research shows that KC improves attachment processes by increased contact and allows increased parent confidence in their ability to care for their infant. Chia, Sellick, and Gan (2006) stated, “Nurses strongly agreed on the benefits of KC in promoting bonding, enhancing the physical wellbeing on the infant and increasing parents’ confidence” (p. 22). Advocating for KC in the NICU allows parents to connect to their infant despite the harsh and intimidating environment in the hospital. This therapy is a simple intervention with many outreaching advantages and very few disadvantages. DiMenna (2006) remarked on KC, stating, “No study has demonstrated adverse effects to
the parent or baby” (p. 406). Skin-to-skin contact is an intimate therapy that allows for both participants to get to know one another. One participant of KC stated,

Holding that tiny body next to mine, feeling her little hand clutch my collar bone, feeling her drift off to sleep in my arms was truly the most amazing experience of my life. I hope that soon, VERY soon, all parents of premature infants will be able to experience the same (DiMenna, 2006, p.410).

KC is a developing therapy that is becoming increasingly popular in both NICU and home settings. It is a low-tech, non-invasive, inexpensive therapy that could have a great effect on the outcome and attachment of many premature and critically ill infants as well as improved bonding among term infants. It is an “intervention that every parent should be able to experience with his or her newborn, whether premature or term, sick or healthy, big or small” (DiMenna, 2006, p. 411).
Appendix A

Informed Consent for Research Study

I, __________________________, have been invited to participate in a voluntary research study conducted by Caroline Proue, SRN. The purpose of the study is to examine the effects and implications of Kangaroo Care (KC) for both the mother and her premature baby.

Participation in this study will consist of keeping a journal of my thoughts and emotions related to my KC experience with my preterm infant. I give permission to the researcher to review this journal and make copies as needed. Participation will also include a tape-recorded interview with the researcher lasting approximately 60 minutes. I understand that strict confidentiality will be maintained throughout the study, and at no time will my name or any other identifying characteristics be revealed without my permission. There are no risks to my participation in this study. Benefits are limited, but include a potential for further bonding with my infant and aiding in developing further research related to KC. I understand that my participation in this study is strictly voluntary and I have the right to withdraw at any given time. I am aware that if I have any questions I can contact Caroline Proue at (406) 439-1830.

I agree to participate in this study.

_____________________________   _________________________
Name   Date

_____________________________   _________________________
Caroline Proue, SRN   Date
Appendix B

Informed Consent for Use of Pictures

I, ________________________, give my consent as a participant in the research study concerning Kangaroo Care, conducted by Caroline Proue, SRN, give my consent to allow the use of pictures of my child in a visual demonstration. I understand that these pictures will be identifying and presented among several members of the community. I understand that I can withdraw my consent at any time and the pictures will be removed from the presentation. I am aware that if I have any questions I can contact Caroline Proue at (406) 439-1830.

__________________________
Name

__________________________
Date

__________________________
Caroline Proue, SRN

__________________________
Date
Appendix C

Written Interview Questions:

How did you first learn about Kangaroo Care (KC)? Who was the person who presented the care to you? (RN, MD, relative or friend, etc.)

What were your initial thoughts and concerns when learning about KC?

What emotions were you feeling as you performed KC?

What was your mood/affect before KC?

What was your mood/affect during KC?

What was your mood/affect after KC?

What was the baby’s mood/affect before starting KC?

What was the baby’s mood/affect during KC?

What was the baby’s mood/affect after completing KC?

How many times did you perform KC?

In what setting did you perform KC? (Home, NICU, PICU)

Did any other family members or friends perform KC with your child?

Did you have any concerns regarding KC? Any feelings of anxiety or unsure thoughts?
Would you describe your KC experience positive, negative, or neutral? Please explain.

Describe your experience with holding your child for the first time.

Do you have any other comments or concerns regarding KC?
References


