Nurses’ Perspectives on Neonatal Massage Therapy in the Neonatal Intensive Care Unit

Kayla Hanson

A Senior Thesis submitted in partial fulfillment of the requirements for graduation in the Honors Program
Liberty University
Spring 2013
Acceptance of Senior Honors Thesis

This Senior Honors Thesis is accepted in partial fulfillment of the requirements for graduation from the Honors Program of Liberty University.

__________________________________________
Kimberly E. Little, Ph.D.
Thesis Chair

__________________________________________
Mary A. Highton, NNP-BC.
Committee Member

__________________________________________
Chad Magnuson, Ph.D.
Committee Member

__________________________________________
James H. Nutter, D.A.
Honors Director

__________________________________________
Date
Abstract

Research in neonatal massage therapy has shown many possible benefits to the baby and family. Though there has been a growing trend towards family-centered care, along with a substantial and growing body of research, the practice of neonatal massage therapy is not routine in most NICUs. This study was conducted to evaluate neonatal intensive care nurses’ perspectives and attitudes towards neonatal massage therapy before and after evidence-based education. Willingness to discuss benefits of neonatal massage therapy significantly increased after education on neonatal massage therapy. The findings suggest that with proper training on the techniques and safety monitoring of massage therapy, nurses might be more willing to implement massage as part of a family-centered care with appropriate patients.
Nurses’ Perspectives on Neonatal Massage Therapy in the Neonatal Intensive Care Nursery

Background

History of Neonatal Massage Therapy

The history of massage being used as part of the healing arts dates all the way back to records of Hippocrates in 400 BC (Field, Diego, & Hernandez-Reif, 2007). Massage with infants has been recorded in China since the second century BC and is widely accepted in Indian and Chinese cultures as an essential part of infant care (Kulkarni, Kaushik, Gupta, Sharma, & Agrawal, 2010; McGrath, Thillet, & Van Cleave, 2007). Infant massage was brought to the United States in the early 1970s by Vimala McClure who founded the International Association of Infant Massage (McClure, 2000). Since its introduction in the United States, neonatal massage has been studied particularly in the hospitalized neonate population with a variety of methods and subpopulations of premature infants and infants with special needs.

Neonatal massage therapy is the process of using tactile and kinesthetic stimulation through a variety of massage strokes (White-Traut, Dols, & McGrath, 2010). It can be administered either by parents or health care professionals trained in neonatal massage. Early research has shown that the amount of pressure used in neonatal massage therapy has a great impact on outcomes so much so that moderate pressure neonatal massage is now separated from light pressure stroking by different terms. Light pressure stroking of the neonate’s body is referred to as gentle human touch (GHT) and is differentiated from neonatal massage. While studies conducted in the 1990s indicated that GHT provided immediate comforting effects, it was also associated with significant
adverse effects such as, “apnea, bradycardia, decreased oxygen saturation levels, and excessive energy expenditure through increased activity, avoidance behaviors, tachycardia, tachypnea, and hypoxemia” and no long term benefits of GHT were observed (Modcrin-Talbott, Harrison, Groer, & Younger, 2003; Modcrin-McCarthy, Harris, & Marlar, 1997, as cited in White-Traut et al., 2010, p. 390). Since such differences were noted in the outcomes of moderate versus light pressure touch, for the purpose of this thesis, neonatal massage therapy will be defined as a series of moderate pressure strokes used as a therapeutic intervention with neonates.

Two main theories of massage have been studied. Perhaps the most commonly-studied theory involves a technique developed by Tiffany Field at the Touch Research Institute in Miami, Florida (Scafidi et al., 1990). This protocol involves 3-5 minute phases. The first and third segments are tactile stimulation of systematic moderate pressure stroking, while the middle segment is kinesthetic stimulation of flexion and extension of the upper and lower extremities (See Scafidi et al., 1990 for an exact description of the methodology of massage).

The second theory of massage is called auditory, tactile, visual, and vestibular (ATVV) multisensory intervention. This method uses not only moderate pressure strokes, but also natural maternal sensory stimulations. This theory was popularized by Vimala McClure, founder of Infant Massage USA (McClure, 2000). Vimala’s method is focused on total parent and infant interaction and following infant cues. This method of massage is not as structured by time segments as Field’s protocol is, but rather the basis of Vimala massage is providing moderate pressure strokes towards and away from the heart in six anatomical regions of the body: the face, upper limbs, thorax, abdomen, lower limbs, and
back, ending with kinesthetic stimulation of gentle stretches of each limb. A major
difference between Field’s protocol and Vimala massage is parameters for when massage
is paused or stopped. During Field’s protocol, if the infant shows any signs of
disorganization, the massage is paused for 15 seconds, allowing for the infant to regain
organization, and if the infant does not reorganize in 15 seconds, the massage is stopped.
The Vimala massage method specifies that if the infant starts to show any signs of
disorganization, the parent should rest his or her hand on the infant, slowing the massage
and allowing the infant time to organize and adapt without breaking skin contact. Overall,
according to Vimala massage, the speed and order of massage is directly adapted to the
individual infant’s preferences and certain portions of massage can be omitted or time of
massage cut short if the infant shows signs that he or she does not enjoy that portion of
massage.

Studies of neonatal massage therapy generally use a protocol that closely relates
to one of these theories. Early studies from the 1960s to 1990s employed one or the other
of these strategies and mainly focused on the effects of neonatal massage and weight gain
(Scafidi et al., 1990; Scafidi et al., 1986; Wheeden et al., 1993). However, as research in
this area evolved, many more benefits were observed including achievement of quicker
independent oral feeding (Fucile, Gisel, McFarland, & Lau, 2011), decreased stress
measured by stress behaviors, and lower cortisol levels (Hernandez-Reif, Diego, & Field,
2007), increased neurodevelopment and visual acuity (Guzzeta et al., 2009; Guzzeta et
al., 2011; Procianoy, Mendes, & Silveira, 2010; McGrath, 2009), more mature sleep
patterns (Ferber, Laudon, Kuint, Weller, & Zisapel, 2002; Kelmanson & Adulas, 2006;
Dong & Wang, 2010), decreased procedural pain responses (Diego, Field, & Hernandez-
Benefits of Neonatal Massage Therapy

Though there are many documented benefits of neonatal massage therapy, they can be broken down into four main categories: increased weight gain, more effective sleep patterns, increased gastric motility, and enhanced development.

**Increased weight gain.** The most supported of all the benefits of neonatal massage therapy for preterm infants is weight gain (Field et al., 2007; Diego, Field, & Hernandez-Reif, 2005). Weight gain is important, as weight gain is a primary criterion for discharge from the NICU. Studies have shown varying percentages of weight gain for massaged infants, likely due to varying protocols for massage techniques. Early studies conducted by the Touch Research Institute in Miami, Florida using Field’s protocol for 15 minutes, 3 times a day, for 10 days with healthy preterm infants (mean gestational age of 30 weeks) resulted in a 21-47% increase in weight gain in massaged infants over control infants with standard nursery care (Scafidi et al., 1990; Field et al., 1986; Wheeden et al., 1993). Later studies of healthy preterm infants using the same protocol (15 minutes, 3 times a day) for only 5 days also showed 25-48% increase in weight gain over controls, indicating that even 5 days of massage may be sufficient to produce similar
results (Diego, Field & Hernandez-Reif, 2005; Dieter, Field, Hernandez-Reif, Emory & Redzepi, 2003). A review by Field, Diego, and Hernandez-Rief (2010) also indicated weight gain of 21-47% in replications by groups independent to the touch research institute. A meta-analysis of studies with the same protocol (15 minutes of massage, above described, 3 times a day for 5-10 days) by Vickers, Ohlsson, Lacy, and Horsley (2004), showed a mean increase of daily weight of 5.1 grams over the control group, along with sustained weight gain advantage at 4-6 months, and decreased postnatal complications.

Gonzalez et al. (2008) found that weight gain was also significant in infants massaged by their parents using Vimala massage over infants receiving standard nursery care. In the randomized control trial of 60 clinically-stable preterm infants, corrected gestational ages 30-35 weeks done by Gonzalez et al, not only did massaged infants demonstrate a 28% (7.6 grams/day) over control infants, but it is also interesting to note that infants receiving massage were discharged an average of four days sooner than the control group infants (2008).

**Effective sleep.** Another benefit of infant massage is more effective and mature sleep patterns, allowing growth and more efficient body repair. The benefit of more effective sleep for massaged infants is supported by several studies on infant massage and sleep. Though massaged infants slept less, they had a smaller decrease in deep sleep than non-massaged infants, and they also had a greater decrease in heart rate and a greater increase in vagal tone (Deiter et al., 2003). A study of low birth weight infants in Russia, who were massaged from 2-8 months of life, demonstrated that massaged infants were less likely to snore during sleep, required less feeding on waking-up at night, and
appeared more alert during the day, suggesting that massage helped infants to achieve more effective sleeping (Kelmanson & Adulas, 2006). A study of traditional Chinese massage (TCM) massage showed that when full term Chinese infants with dyssomnia were massaged, they scored statistically lower on the Athens Insomnia Scale after massage treatment than previous scores before treatment (Dong & Wang, 2010). Dong and Wang indicates that massage may help infants who have trouble sleeping achieve more effective sleep. Furthermore, though a recent study on levels of melatonin could not be found, an early study by Ferber, Laudon, Kuinit, Weller, and Zispel (2002) provides insight on possible underlying mechanisms of effective sleep. This study indicated that massage therapy administered by mothers helped infants develop coordination of their circadian system, as measured by peaks of activity in the early morning and late afternoon, along with a greater nocturnal excretion of 6-sulphatoxymelatonin, compared to non-massaged infants (Ferber et al., 2002).

**Increased gastric motility.** Increased gastric motility is a third significant benefit of neonatal massage therapy and perhaps an underlying mechanism to increased weight gain. Diego et al. (2005) demonstrated that preterm infants receiving moderate pressure massage showed increased vagal activity and gastric motility measured by specialized electrocardiogram (EKG) and electrogastrogram (EGG) measurements than infants receiving sham (light pressure) massage. During this study, an EKG was placed on the infant’s chest and back to measure sympathetic nervous activity on the heart, vagal activity on the heart, and vagal tone through respiratory sinus arrhythmias. Gastric motility was also measured using an EGG placed on the infant’s abdomen and back to measure gastric activity. Using these methods, moderate pressure massaged infants were
found to have significantly higher gastric motility and vagal nerve activity during and immediately after massage, but baseline vagal activity remained the same across groups. In addition, the amount of gastric motility and vagal activity was also related to increased weight gain (Diego et al., 2005). Another study of 70 preterm infants by Diego et al. (2007) concluded the same results of increased vagal activity and gastric motility during, and immediately after massage, measured through EKG and EGG.

**Enhanced development**

*Neurological development.* Perhaps one of the most interesting benefits of massage therapy that also has the greatest potential for long-term benefits for the preterm infant is increased neurodevelopment. Several studies using complex measurements of brain activity and assessments of preterm infants have shown that massaged infants demonstrate accelerated brain development, improved neurodevelopment even at 2 years corrected age after being massaged in the NICU, and higher behavioral scores as measured by the Bayley scales of Infant Development.

A study of preterm infants gestational ages 30-33 weeks compared brain activity through EEG recordings of both infants who were massaged and those who were not (Guzzetta et al., 2009). This study involved using a massage protocol very similar to Field’s 3 times a day for two blocks of 5 days each, separated by a 2-day interval. Results of this study showed that not only did infants demonstrate behavioral cues as to increased neurological development, but that the brains of the infants who were massaged actually showed a more mature pattern of brain activity. A strong sign of brain maturation is transitioning from discontinuous to continuous activity. In other words, more mature brain waves will have less time between bursts of activity. Since this study was
prospective, meaning that the infants were growing during the study, a shortening of intervals between bursts of brain activity should be expected for all infants. Results of this study, however, showed that massaged infants had significantly larger degrees of shortening intervals between interbursts over infants who were not massaged. The mean reduction of time between interbursts was 7 seconds for massaged infants versus 2.8 seconds for the control infants (Guzzetta et al., 2009).

Guzzetta et al. investigated brain development of massaged preterm infants further in 2011. This study involved 12 days of massage over a 14-day period using a protocol very similar to Field’s with EEG measurements before and after intervention. When a baby is born prematurely, the normal process of brain development is often stunted because of being exposed to harsh extra-uterine stimuli. Preterm infants consistently show lower EEG spectral values, especially the delta band, as compared to term infants. In addition, EEG spectral values decrease over time from birth to corrected term age for preterm infants. While control infants did exhibit the expected decrease in spectral EEG values over the 14 days of the study, massage infants did not exhibit a significant change in spectral EEG power. The stability in EEG spectral value demonstrated in massaged infants supports the hypothesis, suggested by the authors of this study, that massage may provide a protective mechanism and allow brain development to continue more similarly to what it would in utero (Guzzetta et al., 2011).

Procainoy, Mendes, and Silveira (2010) demonstrated with a prospective study that neurodevelopment outcomes are extended even to two years corrected age for very low birth weight infants who received massage in addition to skin-to-skin care versus a control group receiving just skin-to-skin care. Seventy three newborns gestational ages ≤
32 weeks with birth weights \( \geq 750 \) grams and \( \leq 1500 \) grams were randomized to a control group of skin-to-skin care only or an intervention group of skin-to-skin care plus massage. Both groups’ care interventions were administered from 48 hours after birth until hospital discharge from the NICU. These infants were followed until 2 years corrected age and administered the Bayley scales of Infant Development second edition at that time. Children tested from the massage group scored higher on the Psychomotor Development Index (PDI) and significantly higher on the Mental Development Index (MDI) than the control group (Procainoy, Mendes & Silviera, 2010).

Skin-to-skin care has consistently shown multiple benefits for the infant and is currently accepted and used in most NICUs in the United States. The study by Procainoy, Mendes, and Silveira, however, shows support that massage has significant benefits independent and perhaps greater than to skin-to-skin care. Since both groups received the skin-to-skin care, however the massage group scored significantly higher on behavior and mental development, it can be concluded that massage could have long-lasting neurodevelopment outcomes for low birth weight and/or preterm infants who are massaged during their stay in the NICU (Procainoy et al., 2010).

Another interesting study that may provide support for why increased neurodevelopment occurs with massage found that growth velocity during stay in the NICU is directly related to neurodevelopment and growth outcomes at 18-22 months of age for extremely low birth weight infants (Ehrenkranz et al., 2006). It has been well established that a greater growth velocity occurs with infants receiving massage than with infants not receiving massage. Recent findings by a multicenter cohort study of 495 infants with birth weights between 501 grams and 1000 grams birth weight showed that
“growth velocity during an ELBW infant’s NICU hospitalization exerts a significant, and possibly independent, effect on neurodevelopmental and growth outcomes at 18 to 22 months’ corrected age” (Ehrenkranz et al., 2006, p. 1253). At 18-22 months of age, the infants were administered the Bayley Mental Developmental Index (MDI) and Psychomotor Developmental Index (PDI). Results indicated that, “As the rate of weight gain and head circumference growth increased, the incidence of CP, MDI and PDI scores <70, abnormal neurologic examination, and NDI [neurodevelopmental impairment] fell” (Ehrenkranz et al., 2006, p. 1258). Though this study did not directly measure the effects of massage on neurodevelopment, it stands to reason that if massage is associated with greater neurodevelopment, and that massage is also associated with a greater velocity of weight gain, if growth velocity exhibits a possibly independent effect on neurodevelopment for low birth weight infants as suggested in this article, perhaps increased growth velocity associated with massage could be an underlying mechanism for observed increases in neurodevelopment. This is a further hypothesis that needs research to evaluate.

Visual development. Another significant finding of the study by Guzzetta et al., (2009) is that massaged infants not only demonstrated an overall brain maturation, but that the most significant area of maturation was in the visual system. Flash visual evoked potentials (fVEPs) are an index of early visual system maturation. Much like the time between peaks in the overall brain activity, reduction in time between N300 peaks (the most prominent of the fVEPs at this age) also indicates maturation of the brain corresponding to the visual system. Results from massaged infants indicated a 42.8 ms reduction in latency versus only a 10.8 ms reduction in the control infants. The same
massaged infants were observed to have significantly better (45% higher) behavioral visual acuity scores over the same control infants when measured at 3 months post-term age, indicating that the 5 day massage treatment effects lasted even until 3 months after intervention. In addition, the massaged infants also had significantly lower cortisol levels and increased IGF-1 and IGFBP3 levels than control infants. An increase in IGF-1 could be important, because increased IGF-1 and IGFBP3 could be protective against retinopathy of prematurity, according to several studies which found a significant association between levels of IGF-1, IGFBP3, and ROP (Löfqvist et al., 2007; Hellström et al., 2003).

Guzzetta et al. (2009) also included a mini case study as two monozygotic twins were included in different groups of the study. A comparison of identical twins eliminates any genetic variability of response to massage and allows a more uniform comparison to be drawn. Among the twins, the massaged infant demonstrated significantly greater brain development, higher visual acuity at 3 months, increased IGF-1 and decreased cortisol levels than the twin who was not massaged (Guzzetta et al., 2009).

Guzzetta et al., (2009) also provides valuable information on possible mechanisms behind visual development. While providing data on human infants, the other half of this study was a simultaneous study of rat pups. Results from the rat pups indicated all of the same results as the human infants including increased brain development and visual acuity, and increases in IGF-1. However, with the rat pups, more specific data analysis could be done, finding that IGF-1 levels were increased specifically in the visual cortex within the brain. In addition, exogenous administration of IGF-1 also increased visual cortex development in the rat pups and blocking IGF-1 blocked the
effects of the massage. Taken together, these data seem to suggest that stimulation of increased levels of IGF-1 may be the mechanism behind the visual development of the rat pups, and it seems to reason, perhaps also human infants (Guzzetta et al., 2009).

**Social development.** Beyond providing many physiological benefits for the preterm infant, neonatal massage offers many social benefits to the infant and family as part of a family-centered model of care in the NICU. The recent trend in NICU care has been a move towards a more family-centered approach including extended visiting hours and some NICUs even moving towards single family rooms. These trends offer many potential benefits to not only the infant but also the family, providing for better opportunities for bonding that form the foundations for strong families. As part of this model of care, neonatal massage offers increasing maternal awareness to the needs of her infant, increased confidence to provide for the infant’s needs, decreased maternal depression, and increased satisfaction with the NICU and infant’s care (Field, Hernandez-Reif, Diego, Schanberg, & Kuhn, 2005).

I feel “like a visitor, not a mom” is a response by one mother that demonstrates a common feeling often experienced by families in the NICU (Beachy, 2002, p. 39). This 27-year-old mother of three had a 32-week infant in the NICU and 2 other small children at home. Because of her need to care for her other children, she stated that she felt sad and helpless because she did not feel involved in the infant’s care. After a NICU nurse suggested infant massage, the mother was taught the steps of massage and also infant cues and sleep states. After only 2 weeks of massage, the infant showed an increased rate of weight gain and the mother stated that she felt more attached to her infant even though the time of her visits remained the same. She also stated, “I really look forward to
massaging my son” (Beachy, 2002, p. 39). This mom’s experience echoes many others
experienced by mothers who have had the opportunity to implement neonatal massage
with their infants. One mother, though she had been in the NICU with her child often
before, after her first experience with massage stated, “This is the first time I have felt
like his mother” (A. Harris, personal communication, April 23, 2012). The satisfaction
with neonatal massage was echoed by another NICU mother who started massage with
her infant when she was 3 weeks old when she stated, “This is the first time I have had
real contact with my baby” (A. Harris, personal communication, April 23, 2012). It is
evident from these testimonies from mothers and from additional studies assessing
caregiver satisfaction that massage increases their feeling of satisfaction with
involvement with care (Livingston, 2009). It is important to note that “massage given by
parents involves them intimately in their infant’s care, allowing them an active role in
helping their child gain weight and heal” (Beachy, 2002, p. 40).

A review and case study of one NICU’s experience with implementation of a
neonatal massage program lists many social benefits including enhanced parent-infant
bonding, improved parent-infant communication, enhanced parent-child interaction,
noticed parental understanding of infant’s cues, improved tactile communication skills
for parents, and increased prolactin levels in mothers, stimulating nurturing feelings
(Beachy, 2002). Several independent studies have also confirmed these results (Porter &
Porter, 2004; Oswalt, Wilson, Biasini, & Mrug, 2009; Oswalt & Biasini, 2011; Field et
al., 2005; Ferber et al., 2005).

Massage therapy may improve infant-mother interactions, even if not provided by
the mother. In a study by Ferber et al. (2005), 51 preterm infants were randomized into 3
groups: either massage by mothers, massage by a female researcher, or no massage. Both massage groups received massage for 15 minutes, 3 times a day, for 10 days based on a protocol similar to Field’s protocol except that the touch sessions were extended and the kinesthetic stimulation portion was omitted. At 3 months, mothers were video recorded interacting with their infants in their homes in a similar situation in which the mother declared that the infant was content and was not tired or hungry, had eaten and slept well during the previous hours, and was ready for play. Interactions were then watched by researchers and coded using the Coding Interactive Behavior Manual (CIB) (Ferber et al., 2005).

Results indicated that mothers and infants in both massage groups (massaged by a researcher or massaged by the mother) exhibited significantly greater levels of reciprocity between the infant and mother, significantly more social involvement, and significantly less maternal intrusiveness than the control group (Ferber et al., 2005). Maternal-child interaction was improved and did not differ statistically between the groups that were massaged, despite the person who was providing the massage. An increase in maternal-child interactions in both massage groups could be due to increased neurobehavioral development of the infant, the effect of any form of comforting human touch on higher social involvement in infants, increased maternal competence and adaptation to infant cues, or increased infant alertness and decreased stress. In addition, massage may decrease infant passivity, often observed in preterm infants and related to maternal intrusiveness in interactions. This study suggests that while it may be optimal for parents to massage their infants, if massage therapy is not practical for a particular family to
provide, massage therapy by staff may also lead to improved long term maternal-child interactions (Ferber et al., 2009).

Since infants learn from their parents how to cope with stresses through parent-infant interactions. During these interactions, if the caregiver effectively handles stress and adapts, the infant will learn self-regulation. As the child learns self-regulation, he or she will learn to be resilient and will be able to handle greater stresses. However, if a parent is unable to effectively handle stresses and is insensitive to the child’s needs, the infant will not effectively learn to cope with stresses (DiCorcia & Tronick, 2011).

Maternal sensitivity is directly related to the ability to have positive infant-parent interactions and thus teach the infant to resolve stress (DiCorcia & Tronick, 2011). Therefore, an intervention that would help to increase maternal sensitivity and improve infant-maternal interactions, such as massage, would also likely help to increase infant resiliency long term. All of these studies discussed indicate that early maternal-infant interactions are very important for the long-term development of the child. Therefore, if massage can serve to increase positive maternal-child interactions and attachments, it could make a long-term impact on behavioral and social development.

Massage has been shown to have particular social benefits for certain high-risk populations often seen in the NICU including cocaine-exposed preterm neonates, HIV-infected mothers and their infants, recovering substance-abusing mothers and their infants, and teen mothers and their infants. All of these groups of infants present special challenges and potential benefits from massage. Cocaine-exposed infants often face a much higher rate of perinatal complications, neurological, and behavioral abnormalities including, “intrauterine growth retardation, premature birth, and decreased head
circumference, birth weight, and length” along with “lower vagal tone, increased heart rate, and lower Apgar scores” and more “tremor/clonus, restlessness, irritability, hypertonia, and abnormal reflexes” than nonexposed infants (Wheeden et al., 1993, p. 318). For these infants, massage was shown to have a particular benefit through increasing vagal tone, helping these infants to demonstrate significantly fewer postnatal complications and stress behaviors in addition to more mature motor behavioral scores on the Brazelton examination as compared to control infants over a 10 day period. Massaged cocaine-exposed infants in this randomized control trial also demonstrated greater weight gains than control infants. Since cocaine-exposed infants have a higher risk for complications and a greater need for organization and stress relief, massage can really help to improve the clinical course of this population (Wheeden et al., 1993).

Overall, infant massage can provide many long-lasting social benefits to both the infant and parents from all walks of life. Through increasing maternal awareness, confidence, and competence to recognize and respond to infant cues and participate in care that can also have so many physiological benefits for the infant, a mother or father who participates in neonatal massage with his or her child can be empowered to feel not “like a visitor,” but a needed part of the team. With so many benefits for the family as a whole, neonatal massage can be utilized as part of a larger family-centered approach to care of the infant in the NICU. After observing infant massage on an infant, a neonatologist in the Bons Secours system in Richmond, VA reported, “I have never seen her in a calm alert state, this is the first time” (A. Harris, personal communication, April 23, 2012). After implementation of a detailed massage program into the unit, this same neonatologist also remarked, “I can’t imagine from what I have observed, anything but
wonderful for the mother and infant” (A. Harris, personal communication, April 23, 2012).

Nurses Perspectives of Neonatal Massage Therapy

With so much research supporting massage, the question still remains as to what barriers are influencing the fact that only 36% of NICUs use neonatal massage therapy (Field, Hernandez-Reif, Feijo, & Freedman, 2006). As demonstrated by Field et al.’s (2006) survey of 82 American NICUs, a policy of minimal touch was incorporated in 86% of the units. A minimal touch policy is generally implemented to reduce stimulation or the possible risk of infection in preterm infants (Kulkarni et al., 2010). Since minimal touch policies are generally implemented to reduce overstimulation, it is not surprising that neonatal massage therapy, which is a form of stimulation, would not be well accepted by many nurses in neonatal intensive care units. If the massage is implemented through the parents, parental fear to touch or harm their premature infant, demonstrated by the fact that premature infants are less likely to be touched and held by their parents than full term infants, may decrease parental willingness to massage their baby (Browne, 2000). Maternal fear may contribute a further barrier to implementing neonatal massage therapy. If the parents do not perform the massage therapy on the infants and the massage intervention is left for the nurse to implement, time concerns for the nurses may also be a further barrier to implementing massage.

While these are all interesting possible barriers to implementing massage in the NICU, perhaps one of the biggest barriers is a lack of education of the benefits of, evidence for, and methods of safely performing massage on the infant in the neonatal intensive care unit. To investigate this possibility, an original empirical study was
conducted to assess whether education delivered through a 15-minute unit in-service or a three-day conference will increase nurses’ willingness to implement and actual implementation of neonatal massage therapy.

**Methods**

**Sample**

Participants in this study were registered nurses recruited from the Bons Secours Health System in Richmond, Virginia. The three hospitals from which nurses were recruited from included St. Mary’s Hospital, St. Francis Hospital, and Memorial Regional Medical Center. Eligibility criteria included being a nurse in the neonatal intensive care unit at the nurse’s primary place of employment. Since this study specifically assesses an education program and implementation of massage therapy in the NICU, only NICU nurses were included in the study. Nurses spend the most time caring for the patients and will therefore likely be the ones to implement or teach the parents of the infants to implement neonatal massage. Nurses also have a key role in patient advocacy and directing the patient's care (Finkelman, 2012). If nurses do not have knowledge of neonatal massage or do not support massage in the NICU, it will likely not be implemented very often. Yet, little is known on nurses’ perspectives on neonatal massage therapy. A study of nurses’ perspectives on neonatal massage will provide a perspective of possible barriers to the implementation of neonatal massage therapy in the NICU. There were no exclusion criteria based on age, race, gender, education level, or prior experience with massage. However, for the post survey, nurses were excluded if they did not receive the interventional education.
Convenience sampling was used for this study. All three hospitals were within one healthcare system located in Central Virginia. Twenty-four participants participated in the pre-survey. Twenty-three participants were Caucasian, and 1 was Asian. Participants selected their age based on established age group categories. Six participants (25%) were 30-39 years old, 9 (37.5%) were 40-49 years old, and 9 (37.5%) were 50-59 years old. Three participants (12.5%) had 5-9 years of nursing experience, 5 (20.8%) had 10-14 years of experience, 1 (4.2%) had 15-19 years of experience, and 15 (62.5%) had 20 or more years of experience. Educational level varied among participants: 4 participants (16.7%) had a diploma degree, 5 (20.8%) had an Associate’s Degree, 14 (58.3%) had a Bachelor’s degree, and 1 (4.2%) did not state their particular educational preparation.

There were 11 participants in the post-survey group. Ten participants were Caucasian, and 1 was African American. Three participants (27.3%) were 30-39 years old, 2 (18.2%) were 40-49 years old, and 6 (54.5%) were 50-59 years old. One participant (9.1%) had 5-9 years of nursing experience, 1 (9.1%) had 10-14 years of experience, 1 (9.1%) had 15-19 years of experience, and 15 (72.7%) had 20 or more years of experience. There were a variety of levels of highest nursing education among participants. Two participants (18.2%) had a diploma degree as highest education level, 2 (18.2%) were Associate’s degree prepared, 6 (54.5%) were Bachelor’s degree prepared, and 1 (9.1%) was Master’s degree prepared. Of note, not all participants who completed the pre-survey followed thru with the post-survey; therefore, an analysis of the groups was conducted to determine if equal variances could be assumed between the two groups. Levene’s test for equality of variances was conducted and was found to be non-
significant for education \((p = .919)\), age \((p = .365)\), experience \((p = .492)\), and race \((p = .679)\); therefore, the assumption of homogeneity of variance is supported.

**Data Collection**

**Survey.** A 23-question survey was used to evaluate pre- and post-knowledge of, current use of and perceived benefits, risks, and barriers to the use of neonatal massage therapy (See appendix C and D for pre- and post-surveys). The survey was developed by the primary researcher and contained questions pertaining to demographics, education, and attitudes/beliefs of neonatal massage (See Appendix C and D). The survey was delivered through Survey Monkey, and was given before in-service training. The online survey assessed demographics such as gender, age, place of work, highest level of education in nursing, and years of experience. It also assessed pre-knowledge of, attitudes towards, current confidence with, and current implementation of neonatal massage therapy. The participants were then asked to attend an in-service training at their respective hospital.

**Intervention.** The in-services were conducted using the same educational evidence-based presentation (outline included as appendix F) at all 3 hospitals to accommodate as many staff as possible. The information presented was consistent across all three hospitals, with the same presenter at all three. Attendance to the in-services was strictly voluntary according to hospital policy. Attendance at this intervention was controlled through voluntary agreement as a component in the post-test survey. There was no way to insure everyone who participated in the pre-test participated in the educational presentation. The in-service trainings were conducted during the last week of January 2012 and the first week of February 2012. Exact days and times of in-services for
the participant’s hospital unit were sent to the participant via email after he or she completed the pre-survey.

Approximately one month after the in-service, the participants were sent an email asking them to complete the post-test survey. After completion of the post-test, the data were downloaded into an Excel spreadsheet and then coded for input into Version 19 of SPSS. Ideally, paired samples $t$-tests would have been conducted on the pre and post-test sample; however, an error occurred in the pre-test survey that was deployed, as the email identifier was missing. Even though this was corrected the day of survey deployment, the majority of responses on the pre-test were missing the unique identifier of their email that paired them with the post-test. The final sample yielded only three participant responses that were able to be paired. Therefore, statistical analysis could not be conducted.

**Ethics**

Institutional Review Board approval was obtained through both Liberty University in Lynchburg, VA (see Appendix A) and Bons Secours in Richmond, VA (see Appendix B). The form of consent was included as the first page of the pre-survey. Subjects were required to read and accept the informed consent document (see appendix E) by selecting, “Yes, I understand the terms of this survey and consent to participate.” Access to these forms is password protected through Survey Monkey.

The original design of the study was quasi-experimental, one group pre-test, post-test. Due to the projected small sample size, there was not a control group; rather, all nurses employed in the NICU were given equal opportunity to participate in this study.

As part of the survey, nurses were asked to enter their email as an identifier to correlate their pre-test and post-test data. This was the only identifier, and the principal
research investigator and research advisor were the only persons to have access to this information. Once the nurses had completed the pre-test, they were then encouraged to attend the unit in-service, which served as the educational session for this intervention.

**Data Analysis**

Twenty-four participants for the pre-survey and 11 participants for the post-survey were included for analyses. Data from three participants in the post-survey could not be included in the results because they did not complete the in-service education, therefore not accurately reflecting a post-survey and possibly skewing the data. Only those participants who completed the interventional education were included in the post-survey. Total response rate of nurses surveyed was approximately 34%.

The original design of the study was to compare pre-survey and post-survey answers and track any changes in each participant’s responses by pairing the pre-survey and the post-survey using the participant’s email as the unique identifier. However, when the pre-survey was first deployed by Survey Monkey, there was a flaw in the survey in that it did not include the question to enter the participant’s email. The error was realized on the same day the survey was released and was immediately fixed. However, out of the total 24 participants in the pre-survey group, only 13 participants entered their email to be used as the unique identifier. In addition, when the unique identifiers were compared from the pre-survey group to the post-survey group, only 3 participants could be successfully paired. Since only three of the original participants in the pre-test group could be paired according to their stated email address as their unique identifier and confirmed to have completed the pre-survey, intervention, and post-survey, paired samples t-tests could not be conducted with such a small sample size. Due to the lack of a
sufficient sample size to follow through with the original statistical procedures of the study to compare actual changes in responses in each participant, differences in mean group responses could be due to a number of confounding variables (discussed below), and therefore, conclusions drawn from the data are limited.

The three dependent variables that were to be measured in this study included: 1) frequency in discussion of benefits of massage, 2) confidence to perform massage, and 3) support for the theory of minimal stimulation. Additionally, barriers for implementation of neonatal massage therapy were explored.

The two most frequently identified barriers in the pre-survey group included the barrier of time for implementation and inadequate knowledge in performing neonatal massage. The barrier of inadequate knowledge in performing neonatal massage was most frequently cited by 79% of nurses (n = 19) in the pre-survey group, compared with 54.5% in the post-survey group (n = 6).

Time was the second most frequently cited barrier. In the pre-survey group, 33% (n = 8) cited time as a barrier, while 36% (n = 4) in the post-survey group cited it.

Discussion of these barriers will follow in the next section of the paper.

**Discussion of Findings**

One of the main intents of this study was to identify barriers that were perceived by nurses to be the top barriers for implementing a neonatal massage program in the NICU. This study was successful in gathering nurses’ opinions on their perception of top barriers. Knowledge of how to perform and having the time to actually perform neonatal massage with patients were both shown to be the two most frequently- cited barriers to implementation, in both the pre-survey and post-survey groups. Since nurses felt they
lacked the sufficient knowledge and how to perform the massage, as well as adequate time to actually perform neonatal massage, it can be suggested that in order to implement a massage therapy program within a NICU, nurses would require training specific to the massage therapy protocol selected by the hospital and would need practice in teaching these therapies. Additionally, they would need to feel supported in their efforts to perform neonatal massage and not pressured for time.

Based on research findings that massage delivered by mothers or caregivers is just as effective in producing weight gain and other cited benefits of neonatal massage therapy and findings that massage delivered by mothers can provide significant social benefits to the family, lowered stress in the mother, and increased satisfaction with care, it would be optimal to implement a program of neonatal massage therapy taught by nurses to the parents, who could then administer the massage (Ferber et al., 2002; Beachy, 2002; Livingston, 2009; Porter & Porter, 2004; Oswalt, Wilson, Biasini, & Mrug, 2009; Oswalt & Biasini, 2011; Field et al., 2005; Ferber et al., 2005; Feijo et al., 2006). The parents administering the massage would significantly cut back on the time commitment by the nurses to actually provide the massage to the infants, and could potentially offer a solution to the nurses’ perceived barrier of time restraints in actually providing the massage. Though nurses who were certified in neonatal massage therapy could have an additional time constraint of teaching massage to parents, this barrier could also be addressed through a variety of means. One suggestion could include allowing the neonatal massage certified nurses to become specialists in massage and, thus, the resource nurses in the unit. If massage teaching was needed for a family during that shift, teaching could be planned, allowing the neonatal massage certified resource nurse to
receive a lighter assignment that might allow time for teaching to be done with whichever family needed teaching that shift. Additionally, physical therapy could become certified in neonatal massage therapy and could assist in providing bedside teaching to parents on infant cues and massage therapy.

Since a true change in each participant could not be tracked, statistical significance cannot be determined and inferences cannot be made. Though the overall group Likert scores did increase in reports of nurses’ frequency in discussing benefits and confidence in performing neonatal massage, there was no ability to determine statistical significance, and therefore, inferences cannot be drawn, as differences in group responses could be due to other confounding variables. It is hypothesized that the educational intervention was successful in increasing nurse’s willingness to discuss the benefits of neonatal massage therapy. However, due to inadequate number of paired pre- and post-tests, though the post-test group demonstrated a higher percentage of willingness to discuss benefits, a true statistical significance could not be drawn between the increase in nurses’ discussion of benefits and the educational intervention. Since teaching is considered to be the highest form of learning to evaluate whether a patient has truly learned the material being taught, adult patients are often asked to summarize or teach the material they have learned back to the nurse (Carroll & Brinker, 2010). If the participants could truly have been paired according to original study design and it could be shown that a significant increase in the nurses’ frequency of discussing benefits of infant massage with parents or caregivers of the nurses’ patients was observed after educational intervention, it would indicate that the nurses truly learned some of the benefits of infant massage in the intervention (education) and that they support it enough to talk about it
with patients’ families. If the nurses truly learned the material and supported it, it would be expected for the nurses to talk with patients about benefits, since the educational intervention was a presentation of what massage therapy is rather than training on how to actually conduct neonatal massage with patients. If participants could have been paired, and findings were the same as reported, findings would suggest that evidence-based education on neonatal massage therapy may increase the acceptance of and use of neonatal massage therapy in the NICU.

Several possible confounding variables could have caused the differences between group responses. First, there was an overall difference in prior first-hand experience with massage between the pre-survey and post-survey group. Seventy-five percent of the pre-survey participants (n = 18) had seen infant massage used with any of the participant’s patients while 90% of the post-survey participants (n=10) had seen infant massage used with any of her patients. Additionally, 50% of participants in the pre-survey group (n=12) had actually used massage therapy personally with any of her patients compared to 63% of participants (n=7) in the post-survey group that actually used massage therapy personally with at least one patient. If the differences in responses were due to a difference in groups of first-hand experience with massage, differences in groups could be due to this variable. Since the remaining participants could not be paired, it cannot be concluded if changes in responses were due to experience with seeing massage used and/or using it and seeing first-hand possible benefits, or if the differences in responses were due to the effect of the education.

All of the subjects (100%) in both the pre- and post-test groups had heard of neonatal massage therapy before the study and believed there are benefits to it. However,
NEONATAL MASSAGE THERAPY

from experience in talking with NICU nurses at two major teaching hospitals in the US, at which the principal investigator participated in nursing internships, there were many nurses who had never even heard of the therapy before. In the hospitals being studied, there was a move toward family-centered and holistic care during the study, though separate from the study. This initiative was headed by the physicians and included neonatal massage therapy as an intervention. Having massage introduced in the units during the time of the study could likely have been a confounding variable, preventing as significant of a change from pre-tests to post-test. It is likely many of the nurses in the study knew of neonatal massage therapy and some of the benefits because of the introduction of implementation of massage in the unit and not due to the study. In addition, since the study was being conducted during a time in which there was a hospital initiative towards implementation of massage therapy participants could have reported more favorably for neonatal massage therapy based on perceived desire of the researchers for the participant to answer in favor of neonatal massage and not based on true belief in the benefits or true support for massage. If this did occur, it could be identified as a Hawthorne effect, one in which the subjects of a research study change responses based on perceived desire of the researchers for the participant to answer in a particular way (King, 2008).

To expound on this possible phenomenon, as previously reported, 75% of the participants in the pre-survey (n = 18) and 90% (n = 10) of the participants in the post-survey had seen infant massage used on at least one patient, while 50% of participants in the pre-survey (n = 12) and 63% (n = 7) in the post survey reported ever having personally used massage therapy with at least one patient. Since only 36% of NICUs in a
recent sampling of 86 NICUs across the US reported using neonatal massage therapy, the fact that St. Mary’s, Memorial Regional, and St. Francis hospitals were among the small percent of hospitals currently using massage as a therapy may have influenced nurses’ general knowledge of neonatal massage (Field et al., 2006). Since possible prior knowledge of massage may be a confounding factor, the ability to generalize findings to other hospitals is limited.

**Limitations of the Study**

This was a nonrandom sample, and therefore the findings have limited generalizability. If there was no prior knowledge or use of massage among the nurses studied, there may be an even more significant increase in knowledge of neonatal massage after education at an institute in which neonatal massage therapy had not yet been considered as a possible therapy. It is plausible there may have been a slight Hawthorne effect, given the recent initiative towards a more baby-friendly hospital in these chosen hospitals.

This study experienced a 54% attrition rate in the overall number of participants between the pre- and post-test (24 participants in the pre-survey down to 11 participants in the post-survey), indicating it is difficult to recruit and retain nurses in a research study such as this. There was no monetary benefit to the nurses for completing this study. Perhaps issuing continuing education credits in the future would be one way to recruit a larger sample size and retain them.

In addition, only 12.5% of the original pre-test subjects completed the post-survey. This attrition rate was despite contacting the nurses for recruitment with three emails asking nurses to complete the post-survey. Furthermore, only 32 nurses total
participated in the study out of a total of about 100 total nurses recruited. Nurses have long been known to have a low participation rate in research (Sheehan, 2001). In addition, the advent of widespread use of emails and increasing number of emails may contribute to nurses ignoring emails or opting not to complete email-distributed surveys. An expected low email-response rate among nurses is supported by a review that showed that responses to email-sent surveys showed a 24% response rate in 2000, down from a 61.5% response rate in 1986 (Sheehan, 2001). This trend has continued to show a decline, with an overall decreasing rate despite reminders or thank you notes being sent out (Hill, Fahrney, Wheeless, & Carson, 2006). In addition, 40% of the participants in this study achieved an associates or diploma degree as their highest degree. The importance of research is taught at a more in-depth level within bachelor’s or master’s programs. Therefore, if the educational demographics of the participants in this sample are indicative of the population as a whole, the large percentage of nurses who do not have a bachelor’s degree or higher could help to explain the low participation rate.

**Implications for Further Research**

Though this study offers insight into nurses’ perspectives on neonatal massage therapy as a pilot study, due to the small sample size, high attrition rates, and inability to match pre-surveys with post-surveys, the ability to draw conclusions is limited. Whether education actually increased the nurses’ willingness to discuss benefits of neonatal massage or increased their frequency in implementing neonatal massage therapy, this study should be repeated on a larger scale, ensuring both surveys contain email (or other unique identifier) responses so that true changes in participant’s perspectives on neonatal massage therapy can be tracked. In addition, to strengthen the study, participants could be
randomized into a group to receive interventional education on neonatal massage therapy or a group to receive another unrelated topic on neonatal massage therapy. Controlling for effect of education in general would provide stronger evidence the education on neonatal massage therapy was truly the related factor to changes in individual participant’s responses.

Additionally, the high percentages of participants with prior experience in massage therapy, along with other limitations of the study, indicate this study should be replicated on a larger scale in hospitals that do not use massage therapy at all. A further study could also be compared of hospitals in different regions of the country that may be more or less accepting of complementary therapies, since this study was comprised of only three hospitals in the central VA area. Results from more studies measuring change in nurses’ knowledge and attitude towards neonatal massage after education may provide more data on nurses’ perspectives towards neonatal massage therapy.

Further research should be done on the effectiveness of education aimed at increasing nurses’ confidence to perform massage through training on massage techniques and safety measures. Since 100% of participants believed that neonatal massage therapy offers benefits to patients, but identified concern for time limitations and low confidence in performing or teaching massage to parents, there are several suggestions that can be made. First, our findings would seem to suggest that with proper training on the techniques and safety monitoring of massage therapy, nurses might be more willing to implement massage as part of a family-centered care with appropriate patients. Secondly, our findings also suggest that if nurses believe that there are significant benefits to neonatal massage therapy supported by a reputable body of
research, they will might be willing to more frequently encourage it with patients and families, and the practice of neonatal massage therapy in the neonatal intensive care unit could likely increase.
References


doi:10.1093/ecam/nem076


Procianoy, R.S., Mendes, E.W., & Silveira, R.C. (2010). Massage therapy improves neurodevelopment outcome at two years corrected age for very low birth weight


Appendix A:
Liberty University Institutional Review Board Approval

March 1, 2012

Kayla Hanson
IRB Approval 1211.030112: Nurses’ Perspectives of Neonatal Massage Therapy in the Neonatal Intensive Care Unit

Dear Kayla,

We are pleased to inform you that your above study has been approved by the Liberty IRB. This approval is extended to you for one year. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Thank you for your cooperation with the IRB and we wish you well with your research project.

Sincerely,

Fernando Garzon, Psy.D.
IRB Chair, Associate Professor
Center for Counseling & Family Studies

(434) 592-5054

Liberty University
40 Years of Training Champions for Christ: 1971-2011
Appendix B:  

Bons Secours Institutional Review Board Approval

January 25, 2012

Amy Harris, RN
10253 Old Elijah Lane
Mechanicsville, VA 23116

Nurses’ perspectives of neonatal massage therapy in the neonatal intensive care unit

Dear Ms. Harris:

On January 25, 2012 the above referenced study was approved by the Bons Secours Richmond IRB in accordance with 45 CFR 46.111 and the attached Conditions of Approval.

This approval expires on January 25, 2013. Federal Regulations and the Bons Secours Richmond Health System IRB require continuing review prior to continuation past this date. Continuing review notice will be sent to you prior to your next scheduled review.

Only the attached Bons Secours Richmond Health System IRB APPROVED and STAMPED consent/assent form may be used to enroll patients in your study. Subjects who consent to participate must also sign the attached Bill of Rights at the time they sign the informed consent form.

Please direct any questions you have to Ryan Ehrensberger at ryan_ehrensberger@bshsl.org or (804) 627-5157.

Sincerely,

Gerold Keightley, MD
Chair, Institutional Review Board

Attachments: Conditions of Approval
Approved Informed Consent Form
Bill of Rights
Appendix C:

Pre-Survey

INFANT MASSAGE ASSESSMENT TOOL

Please complete this survey by selecting one answer unless otherwise indicated.

Please enter your email address: ________________________

Are you male or female?
1. Male
2. Female

Which category below includes your age?
1. 17 or younger
2. 18-20
3. 21-29
4. 30-39
5. 40-49
6. 50-59
7. 60 or older

Are you White, Black or African American, American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, or some other race?
1. White
2. Black or African American
3. American Indian or Alaskan Native
4. Asian
5. Native Hawaiian or other Pacific Islander
6. From multiple races

What is your highest level of education in nursing?
1. Diploma
2. Associate Degree
3. Bachelors Degree
4. Masters Degree
5. Doctorate
6. Other (please specify) ____________

How many years of experience do you have in nursing?
1. 0-4 years
2. 5-9 years
3. 10-14 years
4. 15-19 years
5. 20 or more years
Where is your primary place of employment? Please state the specific name of your institution.

_________________________________________________________________________

Have you ever heard of using massage therapy on preterm infants?
   1. Yes
   2. No

Did you receive infant massage education as part of your nursing education?
   1. Yes
   2. No

Have you received training or continuing education regarding infant massage separate from your nursing education?
   1. Yes
   2. No

If you answered yes to the prior question, in what form did you receive the training or continuing education?
   1. Infant Massage USA Conference
   2. In-service presentation at my place of employment
   3. Website
   4. Journal Article
   5. Healthcare Provider
   6. Physical or Occupational Therapist
   7. Other (please specify) _____________

How often do you believe your patients benefit from a theory of minimal stimulation?
Patients benefit from a theory of minimal stimulation:
   1. Never
   2. Rarely
   3. Sometimes
   4. Often
   5. Always

Have you ever seen infant massage used with any of your patients?
   1. No
   2. Yes

Have you personally ever used massage therapy with any of your patients?
   1. No
   2. Yes

If yes, how often do you use infant massage with your patients? I use infant massage with my patients:
1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

What, if any, do you feel are benefits to preterm infant massage?
1. Improved weight gain
2. Reduced jaundice
3. Reduced stress
4. Increased gastrointestinal motility
5. Enhanced immune response
6. Increased visual acuity
7. Increase motor development
8. Increased social development
9. Increased satisfaction of the parents with the infant’s care
10. I am not familiar with possible benefits of infant massage
11. I do not believe any of these are benefits of infant massage

What, if any, do you feel are barriers to implementing preterm infant massage?
1. Time consumed with conducting the massage
2. Inadequate knowledge on how to conduct infant massage
3. The baby will not tolerate the massage
4. Increased stress to the infant
5. Decreased oxygen saturation of the infant
6. Increased energy expenditure of the infant
7. Risk of intracranial bleeding of the infant

How confident are you in your ability to teach infant massage to the parents or caregivers of your patients?
1. Not at all confident
2. Not very confident
3. Somewhat confident
4. Confident
5. Very confident

How often do you discuss the benefits of infant massage with the parents or caregivers of your patients? I discuss the benefits of infant massage with the parents or caregivers:
1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

How likely would you be to suggest infant massage to the parents of your patients if evidence-based guidelines were in support of it? I would be:
1. Not at all likely
2. Not very likely
3. Somewhat likely
4. Likely
5. Very likely

Please select any of the following interventions you use or encourage use of with your patients.

1. Blankets on isolettes
2. Waterbeds
3. Music
4. Containment (swaddling and/or surrounded by blanket rolls)
5. Kangaroo Care
6. Breastfeeding
7. Non-nutritional sucking during tube feedings
8. Sucrose use during painful stimuli
9. Preemie co-sleeping
10. Rocking
11. Preemie massage
12. Bathing in a warm water tub
Appendix D:

Post-Survey

INFANT MASSAGE ASSESSMENT TOOL

Please complete this survey by selecting one answer unless otherwise indicated.

Please enter your email address: ________________________

Are you male or female?
1. Male
2. Female

Which category below includes your age?
1. 17 or younger
2. 18-20
3. 21-29
4. 30-39
5. 40-49
6. 50-59
7. 60 or older

Are you White, Black or African American, American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, or some other race?
1. White
2. Black or African American
3. American Indian or Alaskan Native
4. Asian
5. Native Hawaiian or other Pacific Islander
6. From multiple races

What is your highest level of education in nursing?
1. Diploma
2. Associate Degree
3. Bachelors Degree
4. Masters Degree
5. Doctorate
6. Other (please specify) ___________

How many years of experience do you have in nursing?
1. 0-4 years
6. 10-14 years
8. 15-19 years
9. 20 or more years
Where is your primary place of employment? Please state the specific name of your institution.

____________________________________________

Did you attend one of the training sessions or unit updates at your facility (St. Mary’s, St. Francis, or Memorial) that included infant massage?

1. No
2. Yes

If you answered yes to the prior question, where did you receive the training?

1. St. Mary’s
2. St. Francis
3. Memorial Regional
4. Other (please specify)

How often do you believe your patients benefit from a theory of minimal stimulation?

Patients benefit from a theory of minimal stimulation:

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

Have you ever seen infant massage used with any of your patients?

1. No
2. Yes

Have you personally ever used massage therapy with any of your patients?

1. No
2. Yes

If yes, how often do you use infant massage with your patients? I use infant massage with my patients:

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

Do you feel there are benefits to infant massage?

1. No
2. Yes

What, if any, do you feel are benefits to preterm infant massage?

1. Improved weight gain
2. Reduced jaundice
3. Reduced stress
4. Increased gastrointestinal motility
5. Enhanced immune response
6. Increased visual acuity
7. Increase motor development
8. Increased social development
9. Increased satisfaction of the parents with the infant’s care
10. I am not familiar with possible benefits of infant massage
11. I do not believe any of these are benefits of infant massage

What, if any, do you feel are barriers to implementing preterm infant massage?
1. Time consumed with conducting the massage
2. Inadequate knowledge on how to conduct infant massage
3. The baby will not tolerate the massage
4. Increased stress to the infant
5. Decreased oxygen saturation of the infant
6. Increased energy expenditure of the infant
7. Risk of intracranial bleeding of the infant

How confident are you in your ability to teach infant massage to the parents or caregivers of your patients?
1. Not at all confident
2. Not very confident
3. Somewhat confident
4. Confident
5. Very confident

How often do you discuss the benefits of infant massage with the parents or caregivers of your patients? I discuss the benefits of infant massage with the parents or caregivers:
1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

How likely would you be to suggest infant massage to the parents of your patients if evidence-based guidelines were in support of it? I would be:
1. Not at all likely
2. Not very likely
3. Somewhat likely
4. Likely
5. Very likely

Please select any of the following interventions you use or encourage use of with your patients.
1. Blankets on isolettes
2. Waterbeds
3. Music
4. Containment (swaddling and/or surrounded by blanket rolls)
5. Kangaroo Care
6. Breastfeeding
7. Non-nutritional sucking during tube feedings
8. Sucrose use during painful stimuli
9. Preemie co-sleeping
10. Rocking
11. Preemie massage
12. Bathing in a warm water tub
Appendix E:

Informed Consent

CONSENT FORM
Neonatal Massage Therapy in the NICU
Senior Honors Thesis
Amy Harris, RN, principal investigator; Kayla Hanson, co-investigator
Liberty University,
Nursing Department
in conjunction with Bons Secours

You are invited to be in a research study of neonatal massage therapy and its possible use in the neonatal intensive care unit. You were selected as a possible participant because of your position as a primary care nurse working in the NICU at either St. Mary’s, St. Francis, or Memorial Regional Hospital. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Amy Harris, RN and Kayla Hanson, Liberty University honors nursing student

Background Information

The purpose of this study is to evaluate the use of, knowledge of, and opinions of neonatal massage therapy among NICU nurses. There has been much research done on the actual intervention of neonatal massage therapy with preterm infants. However, very little has been done on the feasibility and opinions of nurses on the subject of massage with preterm infants. This study will serve to evaluate the perspective of NICU nurses on the subject and thus provide increased information in the field of neonatal massage therapy.

Procedures:

If you agree to be in this study, we would ask you to do the following things:

1. Proceed with completion of the online pre-survey, consisting of 21 questions by selecting “Yes, I understand the terms of this survey and consent to participate” and clicking next. Both the pre- and post- surveys should take about 10-15 minutes to complete. To be included in the study, please complete the pre-survey before the in-service training, by February 29th. 
2. Attend one of the in-service presentations on neonatal massage therapy. Two in-services will be conducted on each unit during the first, second, and third weeks of March. Exact dates and times for these will be sent out after you complete the pre-survey. In-service times and dates will also be announced on your unit.
3. Complete the post-survey by accessing the online survey sent to you via email approximately one month after you attend the in-service. The post-survey must be completed by May 1st.

Risks and Benefits of being in the Study
The risks in this study are minimal and no greater than those you would encounter in everyday life. Your identity attached to your answers could be revealed if someone saw you completing the survey at a computer at your workplace. Second, if your computer at home is not in a private location, someone could overlook your responses.

The benefits to participation is to increase your knowledge of evidence based practices, specific to neonatal massage, as well equipping you with resources available to provide additional education on neonatal massage

Confidentiality:

The records of this study will be kept private. In any sort of published report, no identifying information will be published, to include scores from pre- and post-surveys. Research records will be stored securely with only researchers having access to the records.

In order to pair pre- and post-surveys, you will be asked to provide your email on the survey. Once the post-survey has been completed, the email address connecting the two surveys will be removed and a code assigned in its place. This will be done by the co-investigator. The codes that could possibly be used to identify participants will be kept separate from the data and will be only be known by the co-investigator and faculty advisor. In order to protect your confidentiality, the codes linked with emails will be kept in a locked file cabinet in the office of the faculty advisor. All identification of the surveys including codes will be removed and permanently deleted within three years after completion of this study. When data is reported out in the principal investigator’s honors thesis, only descriptive statistics will be reported and no identification or codes will be reported. In addition, no one will have access to your survey answers during any time of the study except the researchers. Any form of possible identification will not be shared with managers, supervisors, or any other person in authority over your job.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the Liberty University or the Bons Secours Health System, to include St. Mary’s, St. Francis, and Memorial Regional Hospitals. If you decide to participate, you are free to not answer any question or withdraw at any time with out affecting those relationships.

Contacts and Questions:

The researchers conducting this study are: Kayla Hanson, Dr. Kim Little, and Amy Harris. You are encouraged to contact Faculty Advisor Dr. Kim Little at Liberty University, 434-582-2858, kelittle@liberty.edu, Student Researcher Kayla Hanson at Liberty University, 540-521-9884, krhanson@liberty.edu, or Principal Investigator Amy Harris at St. Mary’s NICU, 804-287-7113, Amy_Harris@bshsi.org with any questions you have.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are encouraged to contact either the Liberty University Institutional Review Board, Dr. Fernando Garzon, Chair, 1971 University Blvd, Suite 1582, Lynchburg, VA 24502 or email at fgarzon@liberty.edu. or the Bons Secours Richmond Health Systems Institutional Review Board, Dr. Ryan Ehrensberger, PhD, director, 8580 Magellan Parkway, Richmond, VA 23227, Work phone: 804-627-5157, or email at ryan_ehrensberger@bshsi.org.
Statement of Consent:

I have read and understood the above information. I have asked questions and have received answers. I understand by clicking next, I consent to participate in the study.

__ Yes, I understand the terms of this survey and consent to participate
__ No, I do not consent and do not wish to participate
Appendix F:

Outline of Educational Intervventional Presentation

A. Neonatal Massage Therapy: A survey evaluation of nurses’ perspectives

B. Appropriate Touch
   a. Neonates need appropriate touch. What is appropriate?
   b. Current research has found, “social touch or comforting measures such as soothing and gently stroking account for less than 5% of the touch preterm infants receive” (White-Traut et al., 2010, p. 389).
   c. The neonatal intensive care unit is a stressful environment for the premature or medically fragile baby (Kulkarni et al., 2010).
   d. Premature infants are less likely to be touched and held by parents than full term infants (Browne, 2000)

C. Light Touch vs. Moderate Touch
   a. Light gentle touch
      i. Can be irritating for the premature infant
      ii. It is associated with “apnea, bradycardia, decreased oxygen saturation levels, and excessive energy expenditure through increased activity, avoidance behaviors, tachycardia, tachypnea, and hypoxemia” (White-Traut et al., 2010, p. 390).
      iii. Not associated with any developmental gains or weight gain (Field, 2002; Field, T., Diego, M., & Hernandez-Reif, M., 2010b).
   b. Moderate pressure massage
      i. Moderate pressure massage, especially with kinesthetic stimulation has shown significant gains (Field, Diego, & Hernandez-Reif, 2010a).
      ii. Improved weight gain (Diego et al., 2007; Kulkarni et al., 2010; Livingston et al., 2009; Massaro, Hammad, & Jazzo, 2009; Merenstein & Gardner, 2006; Procianoy, Mendes, & Silveira, 2010).
      iii. Many other gains

D. Why Use Neonatal Massage Therapy?: Review of Literature
   a. Benefits
      i. Weight gain (Diego et al., 2007; Dieter, Field, Hernandez-Reif, Emory, & Redzepi, 2002; Field, 2002; Field et al., 2008; Field et al., 2010a; Field et al., 2010b; Massaro, Hammad, & Jazzo, 2009; Harrison, Lotas & Jorgensen, 2004; Kulkarni et al., 2010; Livingston et al., 2009; Merenstein & Gardner, 2006; Procianoy, Mendes, & Silveira, 2010).
      ii. Increased alert time with greater activity during those alert times (Kulkarni et al, 2010; Merenstein & Gardner, 2006).
      iii. Significant increase in insulin and insulin growth factors (Field, Diego, Hernandez-Reif, Dieter, Kumar, Schanberg, & Kuhn, 2011)
      iv. Greater gastrointestinal motility and gastric secretions needed to digest and absorb food (Lewis, Dirksen, Heitkemper, Bucher, & Camera, 2011).
      v. Increased parasympathetic nervous system response and vagal activity (Diego & Field, 2009; Diego et al., 2007; McGrath, 2009)
vi. Greater motor outcomes in infants with an initial low motor performance (Ho, Lee, Chow, and Pang, 2010)

vii. Enhance immune function, and reduce pain (Field, Diego, & Hernandez-Reif, 2007)

viii. Decreased stress—measured by cortisol, irritation and pain scores (Diego & Field, 2009).

ix. Shorter hospital stay (Field, 2002).

x. Encourage more appropriate sleep-wake patterns (Dieter et al., 2002).

xi. May increase brain development (McGrath, 2009)

xii. Neurodevelopment improvements long term at two years corrected age (Procianoy et al., 2010).

xiii. Reduced jaundice (Chen, Sadakata, Ishida, Sekizuka, & Sayama, 2011)

xiv. Increase visual acuity and development (McGrath, 2009).

b. Bonding

i. Create a family environment in the NICU.

ii. Massage provides an opportunity for families be involved in their child’s care, feel a sense of control, and feel supported while going through a stressful time.

iii. Provides needed support for the neonates from their parents.

iv. May increase satisfaction of the parents with the infant’s care.

v. Many parents are afraid to touch their infant or be involved in their care, although they may want to. This may lead to parents gently touching or stroking the infant. This type of light touch is irritating and associated with the adverse effects of apnea, increased energy expenditure, and others.

vi. Massage is a way to teach the parents to appropriately touch their child.

c. Cue based care and massage

i. The best state for massage to be done is the neonate’s quiet alert stage.

ii. This may be very short for the premature infant

iii. Massage is tailored to follow the specific infant’s cues

iv. Different strokes are more tolerated and enjoyed by infants depending on their needs

1. Ex. Facial massage for an infant with uncoordinated suck reflex

2. Tummy massage for infant with gas

v. Massage is a way to teach parents signs of infant stress

E. Is it Used?: Review of Literature


i. 36% of 86 NICUs surveyed used neonatal massage therapy

ii. policy of minimal touch was incorporated in 86% of the units

F. Possible Barriers

a. Concern for infection (Kulkarni et al., 2010)

b. Avoid overstimulation
c. Concern for safety

d. Concern that the baby will not tolerate the massage
   i. adverse effects of “apnea, bradycardia, decreased oxygen saturation levels, and excessive energy expenditure through increased activity, avoidance behaviors, tachycardia, tachypnea, and hypoxemia” (White-Traut et al., 2010, p. 390)

e. These were observed with light stimulation

f. Education barrier of nurses and/or parents

G. Goals

a. Right now…. only 5% of our touch, as NICU nurses, is intended for comfort or soothing.

b. Our goal should be to find balance. It could be to give our infants as much positive touch as we give them negative or task type touch.

c. So as they are awakening, or we need to awaken them, it could include more “resting of hands”, positive- medium pressure strokes, “resting of hands”, slow and meaningful touch and movements.

d. To empower our parents and improve bonding with increased confidence.

H. References
a. Appendix G:

Contact Email

Dear _________________________,

My name is Kayla Hanson. I am a Liberty University nursing student in Lynchburg Virginia. I am contacting you because I am currently conducting a study on the implementation of neonatal massage therapy in the NICU for my honors thesis. I have done much research on this topic and am very interested in evaluating the use of neonatal massage therapy in the NICU.

I would like to know how you, as a NICU nurse, view the use of neonatal massage therapy. In order to participate in this survey, I would ask that you to complete three things:

4. Complete a 21 question pre-test by clicking this link: https://www.surveymonkey.com/s/2RRS9JT. This survey should take about 10-15 minutes to complete. You will also be asked to read and agree to a consent form to be included in this study before you are allowed to complete the survey. To be included in the study, please complete the pre-survey by February 29th.

5. Attend one of the in-service presentations on neonatal massage therapy. Two in-services will be conducted on each unit during the first, second, and third weeks of March. Exact dates and times for these will be sent out after you complete the pre-survey. In-service times and dates will also be announced on your unit.

6. Complete the post-test by accessing the online survey sent to you via email approximately one month after you attend the in-service. The post-survey must be completed by May 1st.

Through this study, I hope to evaluate what your current knowledge of, experience with, and perceived benefits and barriers to neonatal massage as well as your knowledge of, experience with, and perceived benefits and barriers to neonatal massage after attending an in-service and having opportunity to implement massage on your patients should you choose. Should you choose to participate in this study, your information will be kept confidential and your name will not be attached to your survey after the data is collected, nor will the results of your particular survey be reported with any identifiable information.

I would greatly appreciate your help in participating in this study. I know your time is valuable, and I would greatly appreciate your time in filling out these surveys and participating in the study. This study is entirely voluntary and is not associated with any financial costs or rewards for participating in this study.

Once the study is completed, the overall results will be made available to your unit. A copy of my finished thesis will also be available to your unit upon completion of my thesis. If at any time during this study, you have questions, please feel free to contact either myself at krhanson@ liberty.edu, Amy Harris, principal investigator at St. Mary’s
NICU, at Amy_Harris@bshsi.org, or my faculty advisor, Dr.Kim Little at kelittle@libery.edu.

Thank you so much for your support of research and my honors thesis!

Sincerely,
Kayla Hanson
Appendix H:

Unit Flyer

Neonatal Massage Therapy Study
A study of opinions and knowledge of use of massage in the NICU

Kayla Hanson
Liberty University Nursing Honors Thesis Study • In conjunction with Amy Harris, and St. Mary’s, St. Francis, and Memorial Regional NICUs • February-April 2012

Purpose: To evaluate the use of, knowledge of, and opinions of neonatal massage therapy among NICU nurses.

Who: All NICU nurses working at St. Mary’s, St. Francis, or Memorial Regional Hospitals are invited and encouraged to participate!

What: As a participant you will be asked to:
1. Complete a 21 question pre-survey which will be sent to you through your email.
2. Attend an on unit in-service on neonatal massage therapy the first weeks of March. Exact times and dates will be emailed and announced at a later time.
3. Complete a 21 question post-survey which will be sent to you through your email.

When: You can expect to receive further information through your work email this week!

Will my answers be confidential?
Yes. All data will be kept confidential. Exact details will be outlined in the informed consent paperwork.

Is participation voluntary?
Yes. Participation is completely voluntary, although your participation is greatly valued and appreciated!

For any questions please contact:

Kayla Hanson • email: krhanson@liberty.edu • Liberty University Nursing Student
Amy Harris • email: Amy_Harris@bshti.org • Boys Secours Principal Investigator
Appendix I:

Certification of Research Training of Principal Investigator

Certificate of Completion
The National Institutes of Health (NIH) Office of Extramural Research certifies that Kayla Hanson successfully completed the NIH Web-based training course “Protecting Human Research Participants”.

Date of completion: 11/12/2011
Certification Number: 803912
Appendix J:
Certification of Neonatal Massage Therapy of Principal Investigator

[Certificate image]

International Association of Infant Massage

CERTIFICATE

Kayla Hanson

is hereby granted the title

Certified Infant Massage Instructor

having completed our training program and examination. This certificate entitles the instructor to conduct courses, inservices and seminars in infant massage as developed by Vimala McClure as long as certification procedures are followed.

[Signature]

Date

I AIM International Trainer

The purpose of the International Association of Infant Massage is to promote nurturing touch and communication through training, education and research so that parents, caregivers and children are loved, valued and respected throughout the world community.