

ORIGINAL RESEARCH

The Effects of Massage by Mothers on Mother-Infant Attachment

Mahnaz Shoghi, MS, PhD; Soroor Sohrabi, MS; Mahboobe Rasouli, MS, PhD

ABSTRACT

Context • Transferring a newborn to the intensive care unit due to a premature birth is a major obstacle in the establishment of emotional attachment between a mother and her child. Researchers believe that the formation and continuation of such an attachment have a profound effect on the child's mental development and behavior in the coming years of life. Not all studies have agreed, however, that skin contact alone, such as massage provides, can improve attachment.

Objective • The aim of this study was to determine the effects on maternal attachment behaviors of infants hospitalized in a neonatal intensive care unit (NICU) of massage provided by mothers for their premature neonates.

Design • The research team designed a randomized, controlled trial.

Setting • The study took place at the Hazrat Ali Asghar Hospital of the Iran University of Medical Sciences (Tehran, Iran).

Participants • Participants were 40 mothers and 40 newborns admitted to the NICU at the hospital.

Intervention • The study divided participants randomly into a massage (intervention) group and a control group receiving no massages. Mothers in the intervention group

trained by watching educational videos and practicing the massage on infant manikins. Subsequently, the intervention group massaged its infants according to a 5-d program, in which each neonate received a 15-min massage session per day.

Outcome Measures • Mother-infant attachment behaviors were assessed in both groups 4 times. The maternal attachment scale was used for data collection.

Results • According to the statistical analyses, the between-groups difference was not significant at baseline ($P > .05$). The study showed a statistically significant difference between baseline and postintervention in the mean frequencies of maternal attachment behaviors for both groups ($P < .001$). In addition, a significant between-group difference existed postintervention between the means for maternal attachment between the intervention and control groups ($P = .000$).

Conclusion • Massage given to premature neonates by their mothers on a daily basis can promote and maintain emotional attachment between the mother and her infant. The findings of the present study can be used to investigate the effects of other family members massaging newborns on the emotional attachment between them. (*Altern Ther Health Med.* 2018;24(3):34-39.)

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Approximately half a million premature infants are born in the United States annually, and according to the literature, the preterm birth rate has been increasing around the world.¹ *Preterm birth*, also known as *premature birth*, refers to the birth of a newborn before completion of 37 weeks of pregnancy.^{2,3}

Development of a secure attachment bond between mothers and their premature neonates is always a risk in preterm birth because it usually results in the separation of a mother from her neonate. That separation, in turn, might disrupt the mother's acceptance of her child.^{4,5} The separation and transfer of the infant to a neonatal intensive

care unit (NICU) usually occurs immediately after birth while the mother is hospitalized in another ward.⁶ This separation both affects the vulnerable neonate who needs emotional attachment to his or her mother and exposes the mother to a risk of postpartum depression.⁷⁻¹⁰

Researchers believe that the formation and continuation of emotional attachment between a mother and her child have a profound effect on the child's mental development and behavior in the coming years of life.^{11,12} Sensitive and responsive maternal behaviors results in the safe and healthy development of a child and fosters a positive and mutual interaction between a mother and her child.^{13,14} Research has shown that mothers' first touches increase maternal affection and lead to the development of social and language skills in a child.¹⁵⁻¹⁷

The characteristic feature of a sound and secure attachment lies in mothers' ability to understand infants' behaviors and respond to their needs and desires.¹⁸ Attachment is not an automatic process and should be approached as a unique one. A mother's previous experiences, her feelings about her pregnancy, and her attitude toward the newborn can affect the process of emotional attachment.^{19,20}

The findings of several studies have revealed that 30% of new mothers face severe problems in forming emotional bonds with their newborns. This issue becomes even more complicated in the case of premature infants.²¹

Several factors in a NICU can inhibit the development of emotional attachment between a mother and her child. The small size of a premature infant, the permanent presence of a nurse or other health care provider, a mother's lethargy, her concern about her and her child's future as a result of the premature delivery, and the presence of advanced instruments and devices in the NICU act as barriers to the formation and development of attachment between a mother and her child.²²

Nurses are responsible for both triggering the formation of emotional attachment between a mother and her neonate and accelerating the process of attachment.^{23,24} This help is especially important because new mothers do not have sufficient experience to take care of the newborn, and/or the newborn might be in a hazardous condition because of being born prematurely.²⁵

Mothers and their premature children admitted to a NICU are prone to various physical and psychological traumas and, for that reason, researchers have searched for cost-effective solutions that might trigger a connection between them.^{26,27}

Ferreira et al²⁸ noted that skin-to-skin contact between a mother and her infant during the early hours after birth decreased crying improved the health status of the neonate, and increased the amount interaction between the mother and neonate.

Some studies have examined the benefits of massage. Feber et al²⁹ found that massaging premature neonates improves mother-infant interaction. Onozawa et al²⁶ compared 2 groups, one receiving massage and a control group, and showed that the interaction between a mother and a neonate was stronger in mothers who participated in a

massage program. Their research findings also confirmed that infants who received massage reacted more strongly to the voice and touch of their mothers and had better interaction with them.

Lee²⁷ reported the effectiveness in improving the interaction between mothers and neonates of a 4-week program for infants 2 to 6 months of age in which their mothers applied massage. Another study showed the effectiveness of a 38-day massage program, lasting for 15 minutes per day, in the improvement of attachment behaviors for mothers and neonates.²⁸

A study with a similar finding indicated that neonatal massage accelerated the formation of the mother-infant attachment and encouraged parents to touch their neonates lovingly. Although mother-neonate attachment forms with time, the study showed that massage could accelerate the process. The researchers also showed that neonatal massage not had positive effects not only on mother-infant interaction, but also on maternal depression, especially for teenage mothers.^{33,34}

Not all studies, however, have confirmed the benefits of mother-neonate skin contact. According to Curry,³⁵ such contact alone did not affect maternal attachment during the early hours (36 hours) or at 3 months after the infant's delivery.

The present study aimed at determining the effects of massage on the emotional attachment between mothers and their premature neonates who have been admitted to a NICU.

METHODS

Participants

The present study was a randomized, controlled clinical trial. First-time mothers and their premature infants—born in the late preterm birth stage with gestational ages between 34 and 37 weeks—were recruited for the study. The statistical population included primiparous mothers, whose infants were hospitalized in the NICU because of premature birth problems including respiratory distress, pneumonia, urinary tract infection, and sepsis. The required information, including age, gender, and clinical conditions, was extracted from the medical records of the infants. Massage sessions began between the fifth and seventh day of hospitalization. This interval between the hospitalization and initiation of massage sessions was necessary for relative improvement and stabilization of physical conditions of the infants to become prepared for the study. After obtaining the required permissions, the researcher visited the desired hospital units. After briefing the mothers on the research objectives, they were invited to participate. A written consent was obtained from the parents of all research samples.

The inclusion criteria required (a) the mother's willingness and ability to be present 24 hours per day in the hospital, (b) no addiction among the mothers to drugs or alcohol, (c) a birth without invitro fertilization in vitro fertilization or the mother having experienced years of infertility, (d) a birth weight lower than 2.5 kg, (e) the mother's and the child's ability to breastfeed,

(f) the clinical stability of the infant, and (g) no implementation of phototherapy for the newborns.

An instability in the general conditions of the mothers and newborns was regarded as an exclusion criteria. The institutional review board of Tehran University of Medical Science approved the study, and informed consent forms were obtained from the participants.

Procedures

Demographics. Before initiation of the study, the mothers with the assistance of 1 member of the research team completed the first part of a questionnaire. It covered the demographic information of the mothers—such as age, educational attainment, and employment—and of the neonates—such as gender, the chronological and gestational age of the neonate, and the neonate's duration of hospitalization.

Maternal Attachment. The second part of the questionnaire was the maternal attachment behaviors scale, used to measure mother-infant emotional attachment for both groups. At baseline, the mother-infant attachment was measured before the start of the massage sessions for the intervention group and then measured again on the first, third, and fifth days after their commencement.

To assess maternal attachment, a member of the research team evaluated 15 minutes of mother-infant interaction, using a chronometer. The process of evaluation occurred through direct observation. Care was taken not to interfere with the natural mother-infant interaction. The evaluating team member was not aware of the study's design and did not know whether the mothers and the newborns belonged to the control group or the intervention group.

For the intervention group, the assessment of attachment was performed 1 hour after each massage session when the mothers went to their neonates' bed and prepared for breastfeeding. For the control group, the assessment occurred before they breastfed their newborns, using approximately the same schedule as the intervention group.

Massage Training for Intervention Group. To make sure that the mothers in the intervention group were able to massage their newborns properly, an educational booklet and compact disc published by the Neonatal Health Department of the Ministry of Health of the Islamic Republic of Iran were given to the mothers. Later, a training video was shown to them. Afterward, 2 one-hour training sessions were held for the mothers to practice massage on infant manikins in the presence of 1 member of the research team.

If further massage training sessions were required for a mother, the trainings continued until she properly learned the massage practices. The researcher ensured that the implementation of massage was accurate by observing the mothers' practicing on the manikins. The researcher was present at all stages of the training sessions to provide further explanation to mothers, fix their erroneous practices, and answer their questions. Furthermore, a 24-hour telephone call service was provided to answer mothers' questions, and

the first massage was carried out under the researcher's supervision. The control group received no specialized training.

Intervention

Intervention Group. The mothers and their newborns received routine care (ie, a daily checkup by the doctor, daily weighing, pharmacotherapy, fluid therapy, instruction on proper breastfeeding techniques, adsorption and desorption control, vaccination instructions, instructions for discharge of the neonate, and a proper-feeding evaluation). A head-to-toe massage was given to fully naked or diapered neonates. The newborns received 15 minutes of massage 3 times per day for 5 days.

Control Group. The mothers and their newborns received only routine care (ie, a daily checkup by the doctor, daily weighing, pharmacotherapy, fluid therapy, instruction on proper breastfeeding techniques, adsorption and desorption control, vaccination instructions, instructions for discharge of the neonate, and a proper-feeding evaluation).

Outcome Measures

Maternal Attachment Behaviors Scale. The maternal attachment behaviors scale, developed by Avant,³⁶ was used to measure attachment. This scale assessed (1) emotional behaviors—kissing, looking, cuddling, talking, checking, smiling, cradling, and rocking the neonate; (2) proximity behaviors—hugging with no contact to the mother's body, hugging with close contact with the mother's body, and hugging by wrapping arms around the neonate; and (3) caring behaviors—changing the neonate's diaper and clothes, burping by patting the neonate on the back, and organizing the neonate's clothes.

The tool consists of 14 observable attachment behaviors scored in 15 sections (15 one-minute columns). Two 30-second sections were considered. In the former 30 seconds, the researcher observed mother's behaviors. In the latter part, the researcher recorded each of attachment behaviors. Each observed behavior received the score of 1; otherwise, zero was taken into account. Finally, the total score of the recorded behaviors in 15 minutes was calculated. The maximum score was 15 for each behavior and 210 for the questionnaire. Because 4 behaviors were not observed by the researcher during the study, the total score of attachment behaviors could be 160. The higher the score, the stronger the attachment between a mother and her newborn.

The validity of Avant's scale was first determined by Avant.^{29,30} The researchers confirmed its validity.^{31,32} The reliability of the scale was also confirmed for inter-rater reliability by some researchers in Iran.^{33,34,32}

Statistical Analysis

A *t* test, a repeated measure χ^2 test, and a Fisher's exact test were employed for data analysis. Statistical significance was set at $P < .05$.

Table 1. Comparison of Maternal Attachment Between the Intervention and Control Groups, χ^2 Test

Evaluation Time	Intervention Group (n = 40)	Control Group (n = 40)	P Value
	Mean \pm SD	Mean \pm SD	
Attachment at baseline	44.12 \pm 1.18	43.95 \pm 2.24	.42
Attachment on the first day of massage sessions	45.15 \pm 1.24	44.23 \pm 2.11	.39
Attachment on the third day of massage sessions	49.2 \pm 3.2	47.5 \pm 4.6	.56
Attachment on the fifth day of massage sessions	57.76 \pm 4.20	46.23 \pm 4.35	.000 ^a
Comparison of difference in attachment score between baseline and postintervention	$P < .001^b$	$P < .001^b$	

^aShows significant difference between the intervention and control groups postintervention.

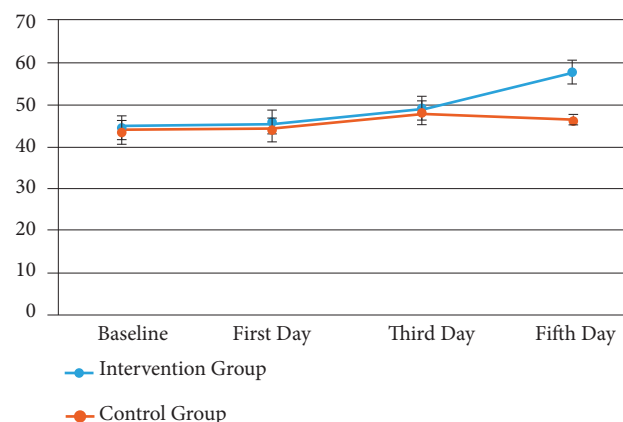
^bShows significant difference between baseline and postintervention for each group.

Abbreviation: SD, standard deviation.

Table 2. Comparison of Attachment in Intervention and Control Groups on First, Third, and Fifth Days of Massage (Analysis of Variance)

Group	Baseline	First Day	Third Day	Fifth Day	P Value
Intervention	44.12 \pm 1.18	45.15 \pm 1.24	49.2 \pm 3.2	57.76 \pm 4.20	.042
Control	43.95 \pm 2.24	44.23 \pm 2.11	47.5 \pm 4.6	46.23 \pm 4.35	

Figure 1. Comparison of 95% CI for Mean of Attachment for the 2 Groups



Abbreviation: CI, confidence interval.

RESULTS

Forty mothers and 40 newborns—20 mothers and 20 newborns in the intervention group (25 girls and 15 boys) and 20 mothers and 20 newborns in the control group (23 girls and 17 boys)—took part in the study. With regard to literacy, 72.5% of the mothers in the intervention group and 67.1% of the mothers in the control group had high school diplomas. Regarding parents' jobs, 62.5% of the mothers in the intervention group and 70% of the control group's mothers were homemakers, and 62.5% of the fathers of the newborns in the intervention group and 55% of the fathers of the newborns in the control group were self-employed.

The type of delivery was not an inclusion criterion; however, it should be pointed out that all mothers in both groups underwent Cesarean sections. The infants in both groups were born at a mean gestational age of almost 35 weeks. The mean age of the neonates was 7.20 \pm 3.02 days in the intervention group and 6.05 \pm 2.92 days in the control group upon their inclusion in the study. If a neonate was discharged before the end of the study, his or her data were not included in the analysis.

Comparing the 2 groups at baseline, using the χ^2 test, the research team did not find any statistically significant differences regarding the genders of the newborns ($\chi^2 = 2.83, P = .73$), the mothers' ages ($\chi^2 = 2.21, P = .89$), the mothers' educations ($\chi^2 = 12.1, P = .14$), the fathers' educations ($\chi^2 = 11.539, P = .061$), the mothers' jobs ($\chi^2 = 0.0, P = .34$), or the fathers' jobs ($\chi^2 = 12.11, P = .54$).

As Table 1 shows, the mean score for attachment between the mothers and their newborns at baseline was 44.12 \pm 1.18 for the intervention group and 43.95 \pm 2.24 for the control group. This between-group difference was not statistically significant ($P > .05$). On the fifth day, postintervention, the attachment value was 57.76 \pm 4.20 for the intervention group and 46.23 \pm 4.35 for the control group. The between-group difference postintervention was statistically significant ($P = .000$).

The last row of Table 1 gives the P value for the changes in maternal attachment for the 2 groups between baseline and postintervention. The results indicate that a statistically significant difference existed between the mean frequencies of maternal attachment behaviors postintervention as compared with baseline for both groups ($P < .001$).

Time by Group Effect

The repeated measure analysis of variance showed that the time by group effect was significant, and the difference in the mean score for attachment for the 2 groups changed through time, with $P = .042$ (Table 2).

Time Effect

The pairwise test of the times revealed that the 2 groups were different only postintervention, with $P < .001$ (Figure 1). The figure shows the trends through time in the attachment process for the 2 groups. Small differences existed between the 2 groups on until the 2 groups diverged on the fifth day.

DISCUSSION

Based on the findings of this study, massage accelerates the attachment behaviors between a mother and her premature newborn hospitalized in a NICU. The results showed a significant between-group difference in the mean score for attachment behaviors by the fifth day of the massage sessions.

The results of the present study contradict the findings of research carried out by Curry.³⁵ Although Curry studied the effects of mother-neonate, skin-to-skin contact on maternal attachment and self-concept, he did not investigate the possible effects of massage on the attachment of mothers to premature neonates.

Newborn massage for mothers and high-risk newborns is now used more often. It is reported that massage regulates the newborn's sleep, respiration, and urinary requirements; decreases colic and stress; and affects mother infant interaction in a positive way.^{35,36} Ferber et al³⁷ showed that mothers giving massage to premature infants had more interaction with their newborns. Moore and Anderson³⁸ also found that skin-to-skin contact between the mother and the newborn in the early period affected the health status of newborn, decreased crying, and increased mother-infant interaction. Onozawa et al²⁶ reported that the interaction between the mothers giving massage and their newborns increased more than for those who did not give massage. Results of another study³⁹ determined that newborns in the experimental group were more responsive to their mother's voice and touch, and attachment between mother and newborn increased as a result of training based on mother-infant interaction given to primipara mothers. In other previously conducted studies, it was emphasized that newborn massage had several positive effects on depressed adolescent mothers.^{26,40} Simpson⁴¹ also highlighted that newborn massage was beneficial in successful mother-infant interaction. Similar to the findings of these other studies on this subject, it is found in the current study that newborn massage increases mother-infant attachment.

As the present study revealed, massage can be an effective intervention for better formation of maternal attachment to premature neonates. Messaging, such as that which nurses can provide to new mothers, can also promote the participation of mothers in taking care of their neonates and enhance mothers' affectionate behaviors toward their newborns. Together, the 2 methodologies can result in the prevention and reduction of long-term complications that inhibit the formation of appropriate attachment between a mother and her child.

In the present study, massage was administered by the mothers. The research team recommends investigation into the effects of massaging by fathers and other caregivers. Paying attention to other effects of massage might be advantageous, including benefits such as regulating the infant's sleep pattern, decreasing his or her crying, and improving his or her nutritional status.

Limitations

One of the limitations of the present study was the presence of 1 member of the research team during the assessment of attachment behaviors, which might have affected the mothers' behaviors in the 2 groups. Other limits of the study were the small sample size and the possible negative effects of the hallway noise in the NICU during the evaluation of mother's attachment behaviors.

CONCLUSIONS

The results of the present study show that massage help to accelerate mother-infant attachment in the NICU. Based on the results of the current study, it was found that training mothers to give massage to their newborns might be an effective way to improve neonatal care, especially in the case of premature infants. Therefore, the research team recommends that heads of hospitals include this simple and cost-effective method in care planning and nursing duties. Executive managers should fund the core classes and practicums to maintain nurses' skills in massage therapy. The research team also recommends that nurses and executive managers provide the quiet and private location in NICU wards for the proper implementation of the method. Finally, the team recommends the inclusion of massage courses in the admission and discharge trainings to enable parents to implement this care technique properly.

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AUTHOR DISCLOSURE STATEMENT

The research team has no conflicts of interest related to the study.

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