Effect of Preterm Infant Massage by the Mother on the Mood of Mothers Having Preterm Infants

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ABSTRACT

Objective: The purpose of this study was to determine the effect of preterm infant massage by the mother on the mood state of mothers of preterm infants.

Methods: This experimental study assessed 52 mothers of preterm infants (born at 30-37 weeks of gestation) hospitalized in the neonatal intensive care unit of Afzalipour Hospital of Kerman University of Medical Sciences, Iran. Recruitment was done using the convenience sampling method, and participants were randomly assigned into intervention and control groups. In the intervention group, massage therapy was done once a day for 5 consecutive days. Infants in the control group received the usual care. Data were collected using a questionnaire of demographic information and the Profile of Mood State questionnaire and analyzed using SPSS version 19 (IBM Corp, Armonk, New York) and Kruskal-Wallis, Mann-Whitney U, Wilcoxon, and χ^2 tests.

Results: Comparison of the mothers' mean mood scores between the intervention and control groups showed no significant difference before the intervention ($P = .51$), whereas mean scores differed significantly after the intervention between the groups ($P = .005$). Mothers' mean mood scores improved significantly in the control group ($P = .02$) and the intervention group ($P < .001$), whereas the intervention group showed a greater improvement (-4.155 vs -2.238).

Conclusion: Those mothers performing massage on their preterm infants showed greater improvement in their mood compared with those in the control group. Teaching massage to the mothers of these infants could be considered as a possible intervention to enhance a mother's mood and the quality of care she provides to her infant. (J Chiropr Med 2019;18:67-76)

Key Indexing Terms: Mothers; Infant, Premature; Massage; Psychology

INTRODUCTION

A preterm infant complicates neonatal health and may also cause sorrow, stress, and mental crisis for parents because

they may feel helplessness, guilt, or fear about the survival of or long-term effects of illness on their preterm infants.¹ The World Health Organization defines preterm infants as those born earlier than 37 weeks of gestational age, based on the last menstruation of the mother.² According to statistics, about 10% to 12% of babies born in developing countries are preterm.³ Iran is among the countries with a high incidence of preterm birth. Approximately 5000 babies are born daily in Iran, about 12% of whom are preterm or low-birth-weight neonates.⁴ On average, about 9% of babies require care in a neonatal intensive care unit (NICU) after birth.⁵

Generally, preterm infants need sophisticated supportive therapeutic measures because of their physical, mental, and psychological problems.⁶ Furthermore, preterm infants who survive have higher levels of physical disability and complications resulting from NICU compared to full-term infants.⁷ These conditions may induce stress and anxiety on parents regarding how to take care of the infant, meet the physical needs, and handle the financial costs.⁶⁻¹⁰ Parents with an infant in NICU may not be physically, emotionally, and psychologically

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prepared for the health complications and costs they will go through for the preterm infant.¹¹ Therefore, a preterm infant's hospitalization in NICU can be a severe psychological crisis for both parents, especially for mothers.¹² Mothers have been educated for taking care of a full-term neonate, but the unplanned arrival of a preterm infant, with different needs, complicates the normal process of taking care of the infant.¹³ Such mothers need time to adapt to the appearance of the preterm infant and to change their perceptions about a normal infant. Compared with mothers of full-term newborns, mothers with preterm infants have delayed attainment of the maternal role,^{14,15} and such mothers face many challenges associated with neonatal care.^{15,16}

The hospitalization of a preterm infant, particularly in the NICU, exacerbates the mother's stress.¹⁷ About 70% to 80% of mothers of preterm infants experience high levels of stress, expressed by fear, restlessness, crying, anxiety, depression, irritability, distraction, and disappointment.^{12,18} A study by Gray et al¹⁹ showed that mothers of preterm infants experience higher stress levels than mothers of full-term infants.¹⁹ Dahdari et al studied the performance of mothers taking care of preterm infants hospitalized in the NICU, and their results showed that only 16.82% of mothers had an appropriate performance (in the initial hours of admission) in 5 types of care for preterm infants, including massage.^{19,20} Malakouti et al conducted a descriptive study on 20 mothers of preterm infants and showed that mothers of preterm infants hospitalized in the NICU experience a sense of alienation, lack of control, care, and deprivation.²¹

Involvement of parents in taking care of a hospitalized preterm infant can facilitate the neonate's development and help with early discharge from hospital and help decrease length of hospital stay, costs, and hospital infections.²² One supportive measure that mothers can provide for their preterm babies is techniques that compensate for sensory stimulation the infant did not receive intrauterine. Various forms of sensory stimulation include dynamic touching techniques (massage), skin-to-skin contact, gentle touch (and rubbing), passive movements of the mouth (pacifier), and sounds (music, a heartbeat, uterine voices, mother's voice).²³ In developed countries, the use of complementary medicine and infant's stimulation has recently increased, and massage is considered a complementary supportive measure for infants in the NICU.²⁴ Research has shown that massage by the mother, in addition to the benefits mentioned above, can reduce costs compared with massage by a nurse, which is expensive and time consuming.²⁵ Moreover, complementary treatments are not only economic, they also have no serious adverse effects, drug reactions, or interactions, and are easy to perform and accepted by the patient.²⁶

Several studies have emphasized the importance of massage as a complementary therapy.²⁷⁻²⁹ In massage, the physical contact between the mother and infant improves their relationship and accelerates the physical and mental growth and development of preterm infants.^{20,30} White and Castle

published the first report regarding massage therapy techniques on infants in 1964.³¹ In recent years, various studies have addressed the effects of touch and dynamic techniques, performed by trained personnel³²⁻³⁴ and mothers,²⁵ on the growth and development of preterm infants. However, the mood and mental state of mothers after massaging their preterm infants has been less addressed.³⁵ A review of previous studies showed limited information on the mood and mental state of mothers of preterm infants. Most studies have examined the effects of massage on the physical and psychological state of the preterm infants,¹⁵ not the mothers. Therefore, the present study aimed to determine the effect of massage of a preterm infant by the mother on the mother's mood state.

METHODS

Study Design

This experimental study examined 52 mothers of preterm infants hospitalized in the NICU of Afzalipour Hospital of Kerman University of Medical Sciences, Iran. All mothers of preterm infants (born at 30-37 weeks of gestation) who could speak Persian and had at least a minimal level of literacy were included in the study after signing the written informed consent. Mothers with mental or chronic illness, having an infant with a congenital anomaly or severe respiratory disease, or having an infant who needed a ventilator were excluded from the study.

Based on the results of previous studies³⁵ and considering a confidence level of 95% and test power of 90%, the sample size in this study was considered to be 26 mothers in each of 2 groups (intervention and control) (total of 52 mothers). Sampling was done using the continuous and convenience sampling method, and participants were randomly assigned to the intervention or control group.

Study Tools

To collect data, 2 questionnaires were used. The Demographic Information questionnaire collected data on the mother's age, age at marriage, educational level, place of residence, occupational status, type of infants' nutrition, type of delivery, the infant's sex and the mother's satisfaction from the infant's sex, neonatal age, and weight at birth.

The Profile of Mood State (POMS) questionnaire (used to measure the current mood state or the mood state in the past year, month, week, or day) collected data on 65 mood factors in 6 subscales, including anxiety, depression, fatigue, confusion, anger, and ability with 9, 7, 15, 12, 8, and 7 items, respectively, each scored based on a 5-point Likert scale (0 = not at all, 1 = a little, 2 = moderately, 3 = quite a bit, 4 = extremely). A further 7 demonstrative items were for enriching the questionnaire and were not considered in counting the scores. Therefore, the scores ranged from 0 to 36 for anxiety, 0 to 48 for anger, 0 to 60 for depression, 0 to 28 for fatigue and confusion, and 0 to 32 for

ability. To calculate the total mood score, the scores of the 5 mood factors of anxiety, depression, anger, fatigue, and confusion were added; then the score of the positive factor (ability) was subtracted from the total. Thus, the total mood score ranged from 0 to 168; lower score indicated better mood state.³⁶

The POMS questionnaire is a standard questionnaire with confirmed validity and reliability by Albert et al.³⁷ The validity and reliability of the Persian version of this questionnaire was confirmed by a Cronbach's α of 0.81 and 0.93, respectively, by Fazel et al³⁸ and Tirgari et al³⁹ on 20 participants undergoing mastectomy.

Ethical Considerations

Before data collection, the study was approved by the Ethics Committee of Kerman University of Medical Sciences (Ir.kmu.res.1395.117). Before recruitment, the objectives of the study were explained to eligible mothers and written informed consent was signed by them.

Intervention and Data Collection

Before conducting massage intervention, an educational pamphlet on massage therapy (prepared from a massage therapy book of the Iranian Infants' Health Bureau) with a training movie was provided to mothers, then the researcher provided a 30-minute training session for the mothers on how to massage dolls and then infants to ensure that the mothers could massage correctly.

After sufficient training, mothers were invited to the NICU to perform the massage therapy on their preterm infant for 15 minutes for 5 days. In each session, first, the mothers washed their hands and warmed them by rubbing them together. Then, the infant was laid on their stomach, wearing only a diaper, and the mother massaged him or her from head to toes in 3 phases, each phase lasting for 5 minutes (Fig 1). During the first phase, the infant was massaged with mild pressure using the smooth and soft parts of the fingers of both hands. In this elementary phase, each of the following 5 areas was massaged for 1 minute: (1) 12 moves of massage (5 seconds per move) from head downward on both sides of the face to neck and vice versa; (2) 12 moves of massage (5 seconds per move) from the back of the neck across the shoulders and vice versa; (3) 12 moves of massage (5 seconds per move) from the upper part of the back down to the waist and vice versa; (4) 12 moves of massage (5 seconds per move) from the thighs down to the ankles and vice versa; and (5) 12 moves of massage (5 seconds per move) from shoulders to wrist and vice versa.

In the second phase, the infant was laid supine, and each of the following 5 areas was massaged for 1 minute: (1) 12 moves of massage (5 seconds per move) touching the face and cheeks; (2) 12 moves of massage (5 seconds per move) touching the chest; (3) 12 moves of massage (5 seconds per move) touching

the abdomen; (4) 12 moves of massage (5 seconds per move) touching the palms; and (5) 12 moves of massage (5 seconds per move) touching the feet soles.

In the final phase, the infant was laid supine, and 6 extension and flexion movements (1 every 10 seconds) were applied on 6 areas (shoulders, elbows, knees, wrists, hands, and feet).⁴⁰

Infants in the control group received routine NICU care. Mothers of both groups completed a POMS questionnaire before and after the intervention. In the control group, the researcher explained how to complete the questionnaire, then the questionnaire was given to the mothers once at admission of their infant to NICU and once before their discharge.

Data Analysis

Data were analyzed using SPSS version 19 software. (IBM Corp, Armonk, New York) The Kolmogorov-Smirnov Test was used to study normal distribution of data. Because the data distribution was not normal, nonparametric tests were used, including Kruskal-Wallis, Mann-Whitney, Wilcoxon, and χ^2 tests. A significance level of $P \leq .05$ was considered for all tests.

RESULTS

Demographic Information

Based on the results of the χ^2 test, the 2 groups were matched regarding mother's age ($P = .33$), age at marriage ($P = .09$), type of delivery ($P = .22$), mother's employment status ($P = .17$), and mother's contentment with infant's sex ($P = .53$) (Table 1); and infant's sex ($P = .76$), type of infant's nutrition ($P = .63$), infant's birth weight ($P = .35$), and infant's age ($P = .22$) (Table 2). However, for educational level ($P = .001$) and place of residence ($P = .001$), there was a significant difference between the 2 groups (Table 1).

The Impact of Massaging the Preterm Infant by the Mother on the Mother's Mood State

The results of Mann-Whitney U test showed that the mean mood scores of mothers with preterm infants were not significantly different between the control and intervention groups before massage ($P = .833$), but was significantly different after the intervention ($P \leq .005$) (Table 3).

Results of the Wilcoxon test showed that the mean score of mother's mood in the intervention group was 152.42 ± 4.56 before the massage and 118.92 ± 3.45 after the massage ($P < .001$). In addition, the mean of mother's mood score in the control group was 153.76 ± 5.5 first, which reduced to 141.73 ± 6.1 (Table 4).

Comparing the demographic characteristics of mothers of hospitalized preterm infants, there was no statistically significant difference in the mood scores of mothers for residence, infant's age, mother's educational level, age at marriage, mother's occupational status, infant's birth weight, type of infant's nutrition, and type of delivery; however, based

Fig 1. Illustration of the infant's massage by the mother.

on mother's age ($P = .046$) and infant's sex ($P = .002$), there was a significant statistical difference in the control group.

Comparison of group differences in demographic characteristics is shown in Table 5. As demonstrated in this table, comparison of mean scores of mood of mothers with premature infants in the 2 study groups based on some of their demographic characteristics showed a significant difference in the control group regarding mother's age and infant's sex, but other characteristics showed no statistically significant difference.

DISCUSSION

This study aimed to evaluate the effect of massage of the preterm infants admitted to the neonatal intensive care unit by the mother on the mother's mood. The findings showed that although the mood of both groups of mothers improved, mothers who massaged their preterm infants had a better mood than those who did not massage their infants. In addition, studying the subcategories of mood in both groups showed that the rates of anxiety, depression, fatigue, and confusion reduced after massage in the intervention group, and ability

had a significant increase. This finding is consistent with those of Gold et al, who studied the higher risk of depression in women with sick infants and considered the mother's psychological state important to the newborn's level of care.⁴¹ In a study by Feijó et al, 40 mothers with preterm infants hospitalized in the NICU were investigated and the results showed lower scores of anxiety and depression in mothers who massaged their infants compared with mothers who did not massage their infants,³⁵ which is in line with the results of the present study. The results of other studies, indicating higher satisfaction in parents present at emergence from anesthesia⁹ and lower anxiety scores in parents involved in neonatal care,^{8,42} are also consistent with the results of the present study. Also, Onozawa et al showed that learning infant massage by depressed nulliparous mothers is an effective treatment to facilitate interactions between mother and infant in mothers with postpartum depression,⁴³ which is consistent with the results of the present study on reduced depression after massage therapy.

In this study, we selected POMS as a reliable and valid tool to measure different aspects of mood, although the scoring system is complex. Despite the complex scoring system, it is an easy questionnaire for patients to answer, so we chose this

Table 1. Demographic Characteristics of Mothers of Preterm Infants

Demographic Characteristics	Control Group		Intervention Group		χ^2	<i>P</i>
Mother's age						
18-25	8	30.8	5	11.6	0.214	.336
25-35	13	50	15	57.7	—	—
>35	5	19.2	6	23.1	—	—
Age at marriage						
<18	7	26.9	2	7.7	4.63	.09
18-35	19	73	24	92.3	—	—
Level of education						
Under high school diploma	8	30.8	2	7.7	17.36	.001
Diploma	13	50	4	15.4	—	—
Bachelor and higher	5	19.2	20	76.9	—	—
Type of delivery						
NVD	6	23.1	10	38.5	1.44	.22
C/S	20	76.9	16	61.5	—	—
Satisfied with the infant's sex						
Yes	20	76.9	20	76.9	1.15	.53
No	6	23.1	6	23.1	—	—
Employment status						
Employed	6	23.1	12	46.2	3.45	.169
Housewife	20	76.9	14	53.8	—	—
Place of residence						
Urban	12	46.2	20	76.9	13.45	.001
Rural	14	53.8	6	23.1	—	—

C/S, C-section; NVD, normal vaginal delivery.

and used an expert team and valid software for calculation of the scores. Nevertheless, most studies mentioned earlier have only evaluated 1 mood aspect, like depression or anxiety.

According to the results of this study, the mood state of the control group also improved, probably because the second mood state was measured before discharge, when the infant's condition has improved. This result is in agreement with that of Padovani et al, who reported high levels of anxiety, restlessness, and depression in mothers of preterm infants during NICU hospitalization that reduced near and after discharge of the infant.⁴⁴ But this improvement in the mood state of the control group in the present study was lower than

that of the intervention group (-2.238 vs -4.155, respectively), which indicates the efficacy of the intervention.

Infants with mental health problems show minimal excitement and response to objects, low levels of acoustic activity, high excitability, low motor activity, lethargy, indolence, stressful behaviors, low epinephrine levels, and impaired sleep patterns.⁴⁵ Slow massage can increase the blood flow to the skin, improve stress, relieve sore muscles, and create a pleasant feeling.⁴⁶ In addition, affectionate touching of an infant and massaging by the mother increases the mother's self-confidence and love and affection for the infant and grows the neonate's social, emotional, and intellectual skills, reducing

Table 2. Demographic Characteristics of Preterm Infants Referring to the Neonatal Intensive Care Unit

Demographic Characteristics	Control Group		Intervention Group		χ^2	<i>P</i>
Infant's sex						
Male	8	30.8	9	34.6	0.87	.76
Female	18	69.2	17	65.4	—	—
Type of nutrition						
Breast milk	23	88.5	24	92.3	0.22	.63
Formula	3	11.5	2	7.7	—	—
Birth weight						
<1500 g	9	34.6	8	30.8	2.08	.35
1500-2500 g	17	65.4	18	69.2	—	—
Infant's age						
1 wk	11	42.3	9	34.6	0.47	.22
1-2 wk	15	57.7	17	65.3	—	—

Table 3. Comparison of Mothers' Moods Between the Intervention and Control Groups

Time/Group	Mean $\pm$ SD	Mann-Whitney U	P
Before massage			
Intervention	152.42 $\pm$ 4.56	-0.211	$P = .833$
Control	153.76 $\pm$ 5.5	—	—
After massage			
Intervention	118.92 $\pm$ 3.45	-2.87	$P = .005$
Control	141.73 $\pm$ 6.1	—	—

SD, standard deviation.

Table 4. Pre and Post Mean Score for Mothers' Moods in 2 Groups

Group/Time	Mean $\pm$ SD	Wilcoxon	P
Intervention			
Before	152.42 $\pm$ 4.56	-4.155	$P \leq .001$
After	118.92 $\pm$ 3.45	—	—
Control			
Before	153.76 $\pm$ 5.5	-2.238	$P = .025$
After	141.73 $\pm$ 6.1	—	—

SD, standard deviation.

their risk of crying and getting sick. According to previous research, nearly 30% of new mothers have problems establishing an emotional bond with their babies.⁴⁷ Therefore,

giving knowledge to mothers about the benefits of touching and massaging the infant could potentially have a great effect on mood improvement and anxiety reduction in mothers. Training

Table 5. Comparison of Mother's Mood According to Demographic Characteristics

Demographic Characteristics	Control Group (Mean $\pm$ SD)	Intervention Group (Mean $\pm$ SD)	Control	Intervention
Mother's age				
18-25	130.37 $\pm$ 7.1	146.5 $\pm$ 5.56	$P = .04$	$P = .41$
25-35	145.14 $\pm$ 8.5	151.66 $\pm$ 5.22	$H = 6.16$	$H = 1.76$
>35	113.70 $\pm$ 4.80	148.42 $\pm$ 12.66	—	—
Age at marriage				
<18	125.57 $\pm$ 5.38	158 $\pm$ 1.00	$P = .467$	$P = .070$
18-35	140.27 $\pm$ 7.5	151.9 $\pm$ 4.9	$Z = -0.727$	$Z = -0.387$
Level of education				
Under high school diploma	127.1 $\pm$ 6	158 $\pm$ 1.00	$P = .590$	$P = .085$
Diploma	139.46 $\pm$ 7.2	157 $\pm$ 11.4	$H = 1.054$	$H = 0.314$
Bachelor & higher	140 $\pm$ 20.6	150.9 $\pm$ 5.57	—	—
Type of delivery				
NVD	135 $\pm$ 9.06	151.3 $\pm$ 6.60	$P = .784$	$P = .751$
C/S	136 $\pm$ 6.7	153.12 $\pm$ 6.33	$Z = -0.274$	$Z = -0.317$
Employment status				
Employed	130.5 $\pm$ 10	140.66 $\pm$ 11.33	$P = .51$	$P = .071$
Housewife	135.6 $\pm$ 6.8	162.21 $\pm$ 5.8	$H = 1.34$	$H = 5.28$
Place of residence				
Urban	125.8 $\pm$ 4.9	150.13 $\pm$ 4.9	$P = .080$	$P = .366$
Rural	144.2 $\pm$ 8.8	167 $\pm$ 8.00	$Z = -1.75$	$Z = -0.903$
Infant's sex				
Male	163.37 $\pm$ 12.1	155.77 $\pm$ 6.1	$P = .002$	$P = .068$
Female	123.5 $\pm$ 12.9	150.64 $\pm$ 6.2	$Z = -3.11$	$Z = -0.405$
Type of nutrition				
Breast milk	135.3 $\pm$ 6.19	161.5 $\pm$ 25.5	$P = .335$	$P = .050$
Formula	139 $\pm$ 6.5	151.3 $\pm$ 6.60	$Z = -0.964$	$Z = -0.675$
Birth weight				
<1500 g	143.66 $\pm$ 11.54	144.37 $\pm$ 9.4	$P = .590$	$P = .590$
1500-2500 g	131.58 $\pm$ 5.8	154.62 $\pm$ 5.56	$H = 1.47$	$H = 1.92$
>2500 g	0.000	167 $\pm$ 8.00	—	—
Infant's age				
<1 week	127.8 $\pm$ 5.7	141.11 $\pm$ 8.1	$P = .590$	$P = .590$
1-2 wk	141.6 $\pm$ 8.4	160.14 $\pm$ 5.8	$H = 0.753$	$H = 3.72$
2 wk-1 mo	0.000	160 $\pm$ 1.00	—	—

C/S, C-section; NVD, normal vaginal delivery; SD, standard deviation.

at the infant's NICU bedside provides an opportunity for mothers to repeat the skills and for the nurses to supervise the mother's performance, resulting in improved care of a preterm infant.²⁰ Using the results of this study, managers and planners of the health system can encourage clinical nurses to teach massage as a nonpharmacologic strategy to improve the mood of mothers with premature infants.

Limitations

The comparison of mean scores of mood of mothers with premature infants in the 2 study groups based on some of their demographic characteristics showed a significant difference in the control group regarding mother's age and infant's sex. This result is consistent with the findings of Lashkaripour et al, Foruzandeh et al,⁴³ and Bahadoran et al⁴⁸ that showed a significant relationship between postpartum depression and mother's age and satisfaction with neonate's sex. In parents whose infant's sex was not what they wanted, higher levels of depression were observed. This could be a cultural issue in Iranian families who may give special attention to male infants as the supporters of family and responsibility takers.⁴⁹

Another important difference between the groups was the higher educational level of mothers in the intervention group (4 times BSc and higher) than the control group and that a greater proportion of mothers in the intervention group resided in urban areas (3 times) compared with the control group, which could play a role in the mental status of mothers.⁵⁰ This could be because we included the mothers based on convenient sampling method and randomized them to the groups without matching the intervention and control groups based on demographic characteristics, which can be considered in future clinical trials.

Future Studies

According to the United Nations, mothers' health is an important health indicator and one of the indicators of development in countries.⁵¹ Mothers with mental disorders are not responsive mothers, do not have enough energy to care for their children, have less positive interactions with their children, and are less sensitive when interacting with their children.⁵² Parents who experience high levels of stress are at high risk for behavioral and social problems with their child.⁵³ Therefore, paying attention to maternal mental health is very important. The present study was one of the few studies to investigate the effect of massage therapy on preterm infants by the mother on the mother's mood state, but did not investigate the effect of preterm infant massage on fathers or infants themselves and only considered 1 method for increasing maternal-neonatal bonding. Thus, it is suggested that further studies consider other methods of increasing maternal-neonatal bonding and its efficacy on both parents and neonates in the future.

CONCLUSION

According to our findings in this study, massage of a preterm infant by the mother reduced maternal anxiety and depression and improved the mother's mood more than the control group. Inclusion of educational massage programs for mothers in neonatal care of preterm infants could possibly play an important role in the mother's mental health and reduction of a mother's mood disorders.

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No funding sources or conflicts of interest were reported for this study.

CONTRIBUTORSHIP INFORMATION

Concept development (provided idea for the research): B.L.
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Practical Applications

- The findings showed that although the mood of both groups of mothers improved, mothers who massaged their preterm infants had a better mood than those who did not massage their infants.
- The rates of anxiety, depression, fatigue, and confusion reduced after massage in the intervention group, and ability had a significant increase.

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