

# The Effect of Premature Neonates Massage by Mothers on Maternal Anxiety and Self-Esteem: A Randomized Clinical Trial

Fatemeh Abbasi<sup>1</sup>, Leila Abadian<sup>2</sup>, Hadi Ranjbar<sup>3</sup>, Aida Safaiee Fakhri<sup>4</sup>, Batool Pouraboli<sup>5\*</sup>, Aida Ravarian<sup>6</sup>

## Abstract

**Background:** Mothers experience challenges when a premature infant is born and admitted to the neonatal intensive care unit (NICU).

**Aim:** The present study was conducted with aim to investigate the effect of infant massage by the mother on maternal anxiety and self-esteem.

**Method:** This randomized clinical trial study was performed on mothers of 63 premature infants admitted to the neonatal intensive care unit. Mothers were randomly assigned into the intervention and control groups. Mothers in both groups completed Rosenberg's Self-esteem and Beck Anxiety questionnaires. The mothers in the intervention group were trained to massage their infants. They applied a 15-minute massage 3 times a day for two weeks. The mother in the control group received routine education of hospital including pamphlets and self relaxation techniques. After two weeks, the mothers in both groups again completed Rosenberg Self-esteem and Beck Anxiety questionnaires. Data were analyzed by SPSS (version 16) and Mann-Whitney U and Wilcoxon test.  $p < 0.05$  was considered statistically significant.

**Results:** The mean score of anxiety reduced more significantly in the intervention group compared to the control group (39.12 vs. 11.52) ( $p < 0.05$ ). The mean score of self-esteem showed a 16.94-point increase in the intervention group compared to 1.58 points increase in the control group ( $p < 0.05$ ).

**Implications for Practice:** Massage of premature infants by their mothers is a useful and cost-effective way to reduce maternal anxiety and increase maternal self-esteem in the NICUs. Therefore, educating this technique is recommended in the NICUs.

**Keywords:** Anxiety, Infant, Massage, Mothers, Premature, Self-esteem

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1. MSc in Nursing, Tehran University of Medical Sciences, Tehran, Iran
  2. PhD Candidate, Trauma Nursing Research Center, Faculty of Nursing, Kashan University of Medical Sciences, Kashan, Iran
  3. Assistant Professor, Mental Health Research Center, Psychosocial Health Research Institute, Iran University of Medical Sciences, Tehran, Iran
  4. School of Public Health and Paraclinics, Qazvin University of Medical Sciences, Qazvin, Iran
  5. Associate professor, Department of Pediatrics and Neonatal Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran
  6. University of Social Welfare & Rehabilitation, Tehran, Iran

\* Corresponding Author Email: [b-pouraboli@sina.tums.ac.ir](mailto:b-pouraboli@sina.tums.ac.ir)

## Introduction

Self-esteem refers to an individual's self-worth and can lead to positive outcomes such as feeling capable, valuable, and competent (1,2). It is useful in coping with fears and stressors and is influenced by environmental and psychological factors (3). Strong maternal self-esteem can help mothers manage negative feelings and interact better with their infants, which is especially important for mothers with premature infants who may experience severe stress and imbalanced family roles that (4) can lead to reduced maternal self-esteem (4). The neonatal intensive care unit is a source of anxiety and concern for parents, particularly mothers, whose infants are admitted. Parents of premature infants often experience psychological distress because they are not involved in their infant's care, leading to high levels of anxiety (5). Anxiety is characterized by restlessness, distress, and impatience (6) that can lead to traumatic symptoms for mothers. Studies indicate that 77% of mothers experience anxiety one month after birth, and 49% experience anxiety even up to one year after birth. Chronic traumatic symptoms can have a negative impact on an individual's quality of life and potentially lead to depression (7).

Premature birth, which is defined as birth before 37 weeks of gestation, has been more common in recent decades and have higher survival rates due to advancements in science and technology (8). As a result, there has been an increase in the number and duration of NICU stays for premature infants who require medical and nursing care for several weeks or months. This can also affect their families. Preterm birth is a traumatic event for parents, causing stress and fear (9). Touch is the first sensory system which develops and is the basis for early communication between infants and parents. Massage therapy is one of the most important ways for emotional exchanges between parents and infants (10). Massage by mothers can help weight gaining in premature neonates (11). Badiie et al. (2011) compared the effect of massage applied by mothers and nurses on weight gain in premature infants and reported that massage by the mother was more effective on the weight gain of infants. Therefore, since massage by the mother was cost-effective and reduced nurses' workload, they recommended it for weight gain of infants (12).

The Neonatal Health Department in Iran has introduced NIDCAP (Newborn Individualized Developmental Care and Assessment Program) to improve neonatal intensive care. NIDCAP emphasizes skin-to-skin contact and tactile stimulation through massage in physical and brain development. NIDCAP also promotes family-centered care, allowing families to be involved in the infant's care and strengthen their emotional connection (13). Studies have shown that parents who perform massages for their infants in the NICU experience less stress, anxiety, and depression; also mothers who massage their preterm infants show improved mood and reduced anxiety levels (10,14,15). Additionally, kangaroo care, another form of skin-to-skin contact, improves maternal self-esteem and premature infants' physiological stability (16). Literature review showed that most of the studies investigated the effect of massage on the anxiety of mothers with premature infants. Since self-esteem is an important factor affecting a mother's mood, reduced anxiety and increased self-esteem lead to faster discharge, better care, and less readmission of the infant (17). The present study was performed with aim to investigate the effect of premature infant massage performed by the mother on maternal anxiety and self-esteem.

## Methods

This clinical trial study was conducted at Neonatal Intensive Care Unit, Ayatollah Mousavi hospital, Zanjan, Iran. Sampling was done by the main researcher within five months (from July 2018 to November 2018). The sample size was determined based on the study of Alizadeh et al. (18) using a two-tailed hypothesis, alpha of 0.05, power of 0.80, a standard deviation=2.1, and  $d=2.07$ . Accordingly, the minimum sample size was calculated as 30 subjects for each group. Inclusion criteria were mothers of infants with weight 1500 to 2500 gr, no congenital anomalies, no seizure diagnosis, no intracranial hemorrhage, and no mechanical ventilation. Exclusion criteria were the discharge before completing all measurements and worsening the general condition of the baby or mother.

The Beck Anxiety Inventory (BAI) questionnaire was used to measure the severity of anxiety through the specified grading. The anxiety score was calculated from the sum of scores obtained from answering the questions of the Beck Anxiety Questionnaire and the severity of anxiety through the specified grading. The Beck Anxiety Inventory (BAI) is a self-reported measurement tool consisting

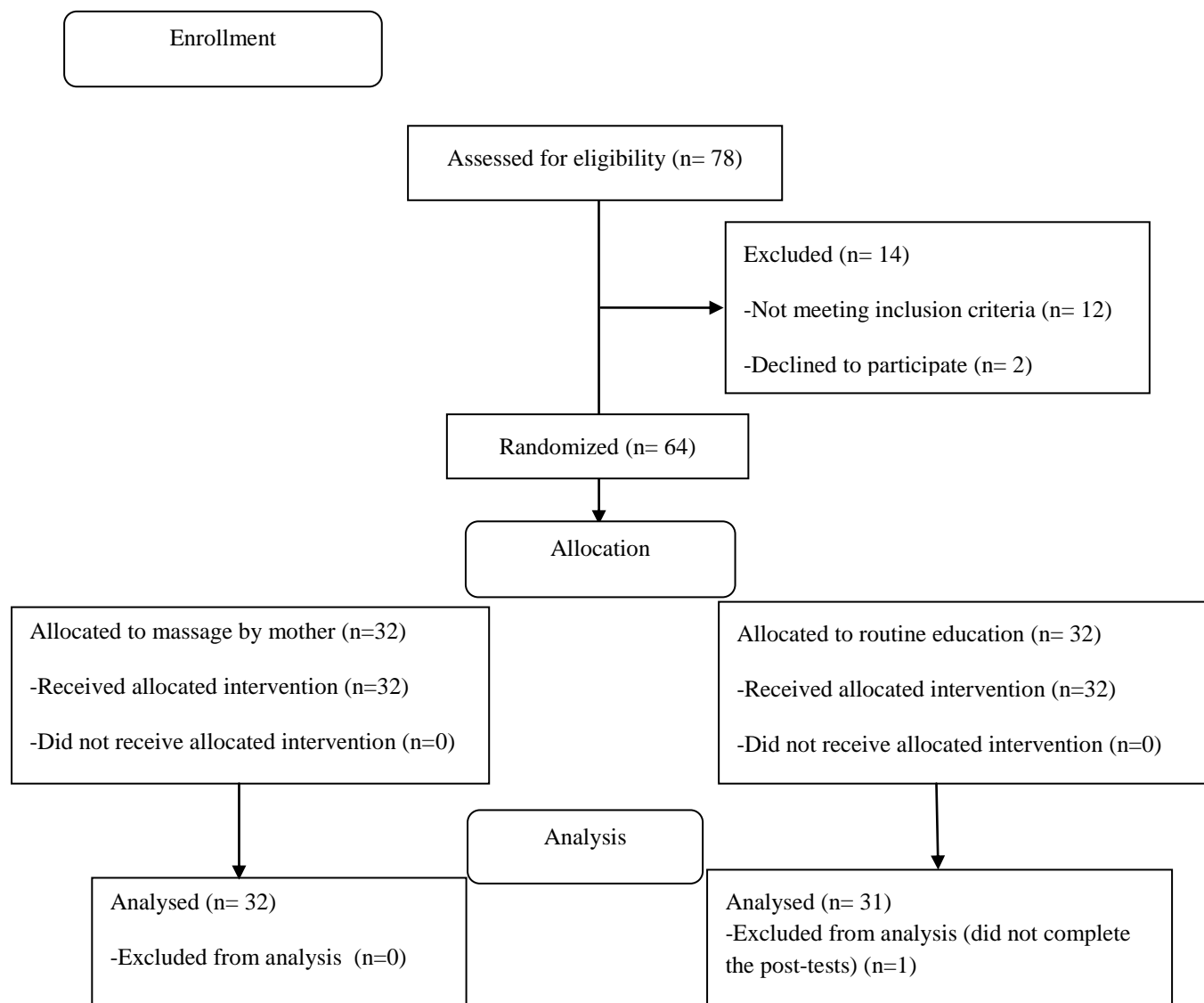
of 21 items (on a four-point scale) used to assess the intensity of physical and cognitive anxiety symptoms experienced in the past week. Scores may range from 0 to 63, with 0-7 indicating minimum anxiety levels, 8-15 mild anxiety, 16-25 moderate anxiety, and 26-63 indicating severe anxiety (19). The Persian version of the Beck Anxiety Inventory (BAI) have a good reliability ( $r=0.72$ ,  $p<0.001$ ), very good validity ( $r=0.83$ ,  $p<0.001$ ), and excellent internal consistency ( $\alpha = 0.92$ ) (20). The internal consistency of the scale in the current study was calculated ( $\alpha=0.92$ ).

The Rosenberg Self-Esteem Scale (RSS) is a unidimensional 10-item self-report measure of global self-esteem (Rosenberg, 1979). Responses were scored on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The RSS-Persian had moderate internal consistency (Cronbach's  $\alpha=0.69$ ) and acceptable test-retest reliability ( $r=0.78$ ) (21). The instrument is positively correlated with the Cooper Smith self-esteem inventory (0.69) and negatively correlated with the Symptom Checklist-90 (SCL-90) (22,23). The internal consistency in the current study was calculated using Cronbach's  $\alpha$  ( $\alpha=0.88$ ).

Permission was obtained from the Ethics Committee of Tehran University of Medical Sciences. After receiving a letter of introduction and obtaining written permission from physicians, the head nurse, and the nurse responsible for the infant, the researcher talked to parents about infants' current stable condition and massage. Also, the research aims and methods were explained to parents, especially mothers, and written consent was obtained from them. All eligible mothers whose neonates were admitted to the two NICU wards were included in the study by convenience method. Sixty-three participants were included in this study: 32 in the intervention group and 31 in the control group. Mothers in the control group received a routine care including standard education and pamphlets. The research units were randomly allocated in the intervention and control groups by the block design. The researcher contacted the statistical advisor and asked about the type of group (the researcher did not know the sampling sequence). The blocking was conducted at the subject level. The blocks contained two individuals from the intervention group (A) and two from the control group (B) to balance samples in both groups. According to the block design, the intervention group was known as A and the control group was known as B. Infants were blocked in a way that there was AA from the intervention group and BB from the control group. Then, they were divided into six forms as follows: 1-AABB 2-ABAB 3-ABBA 4-BABA 5-BBAA 6-BAAB. Then, the dice were frequently thrown to complete the samples. The diagram of study subject's recruitment and randomization was presented in Figure 1.

Before the intervention, the mothers of the control and intervention groups completed Beck anxiety and Rosenberg self-esteem scales questionnaires, and then the mothers in the intervention group were trained for the massage. At first, the mothers were trained how to massage infants and applied a 30-minute massage on dolls and then on their infants. The massage was applied to infants with clinical stability one hour after breastfeeding 3 times a day. Mothers massaged the infants for 15 minutes (three 5-minute steps) for two weeks. The mother washed and warmed her hands; the infant's clinical condition was rechecked before the massage, and then the massage began in three steps. Each 15-minute massage was divided into three 5-minute phases with tactile stimulation in the first and third phases, and sensory stimulation in the middle phase. During tactile stimulation, the infant was lying on the abdomen or either side, moderate pressure massage was applied on the following areas with both palms and fingers: a) the infant's head to the neck and returning upward, b) from the neck to shoulders and vice versa, c) from back to the hip and vice versa (simultaneously in two legs from the hip joint to the tip of the toe and returning to the hip joint; two arms simultaneously from shoulders towards the wrist and vice versa). At least 10 reciprocal movements were performed in each area, and the infant was supine in the sensory stimulation phase and each 5-minute phase, six passive movements of flexion and extension were performed in the form of cycling-like motions: (a) right arm, b) left arm, c) right leg, d) left leg, and e) both legs simultaneously. The message temporarily stopped if the infant started crying or his/her diaper had to be changed (24). To comply with the ethical principles, an educational CD on how to massage was given to the mothers in the control group at the end of the study.

The mothers of both the intervention and control groups completed the Beck Anxiety scale and the Rosenberg Self-Esteem scale at the end of the intervention. Nine samples were excluded due to incomplete questionnaires and discharge of the infants before the intervention (Figure 1).



**Figure 1- The Flowchart Diagram of the Study**

The researcher explained the research objectives to the participants and the written informed consent was obtained. They were told that their participation was voluntary and they could leave the study at any stage if they wished. They were also reassured that their information would remain confidential. Data were analyzed by SPSS statistical software (version 16). The normal distribution of the numerical variables was investigated using the Shapiro-Wilk test. Anxiety and self-esteem scores were compared using the paired samples t-test and independent samples t-tests or Mann-Whitney U and Wilcoxon tests. Descriptive statistics were used to adjust the frequency table of the research units in terms of educational level, living place, employment status, type of pregnancy, mode of delivery, and the infant sex. In addition, tables were separately presented to compare the groups' homogeneity. Chi-square, Mann-Whitney, and Wilcoxon tests were used to achieve the research objectives.

## Results

In this study, 63 participants were included (32 in the intervention group and 31 in the control group). Table 1 presented the demographic characteristics of the two groups. Of the 90 mothers assessed for eligibility, 72 enrolled in the study. To reach the minimum sample size, one mother was replaced for each drop-out. The data of drop-outs were not used in the analysis, and only the participants who completed all three measurements were included in the analysis. The results also

demonstrate the homogeneity of mothers in the control and intervention groups in terms of demographic variables, such as maternal age, employment status, level of education, mode of delivery, type of pregnancy, history of NICU admission, and infant sex.

**Table 1- Demographic characteristics of study participants**

Variables	Group	
	Massage (n=32)	Control (n=31)
<b>Age (yr)*</b>	27.41 ± 4.26	27.06 ± 6.78
<b>Type of pregnancy</b>		
Intended	27 (84.4%)	25 (80.6%)
Unintended	5 (15.6%)	6 (19.4%)
<b>Level of Education</b>		
High school and lower	15 (46.9%)	25 (80.6%)
Bachelor and above	17 (53.1%)	6 (19.4%)
<b>Mode of delivery</b>		
Cesarean	23 (71.9%)	21 (67.7%)
Vaginal delivery	9 (28.1%)	10 (32.3%)
<b>Employment status</b>		
Housewife	6 (18.8%)	0 (0%)
Employed	26 (81.3%)	31 (100%)
<b>Newborn sex</b>		
Male	18 (56.3%)	18 (58.1%)
Female	14 (43.8%)	13 (41.9%)
<b>Anxiety*</b>		
Before intervention	48.09 ± 11.41	47.26 ± 11.24
After intervention	8.97 ± 2.96	35.74 ± 14.27
<b>Self-esteem*</b>		
Before intervention	7.973 ± 5.01	12.42 ± 4.23
After intervention	24.91 ± 2.29	14.00 ± 4.63

\*Mean ± SD

Multivariate linear regression was used to evaluate the effect of the intervention and other demographic variables on the reduction of anxiety and increase of self-esteem. Table 2 evaluated the effect of massage on a mother's anxiety by controlling the demographic variables, and pre-intervention anxiety and self-esteem. Based on the findings, the intervention group experienced a 30% increase in self-esteem, while the anxiety levels decreased by 45%. The rise observed was statistically and clinically significant. The results of Table 2 showed that participants in the massage group had a lower level of anxiety after the intervention compared to participants in the control group. Additionally, pre-intervention anxiety was effective in the score of anxiety after the intervention.

**Table 2. The effect of variables on post intervention anxiety using multiple linear regression**

Variables	B	S.E.	t	P	95% Confidence Interval	
					Lower Bound	Upper Bound
Intercept	23.43	16.76	1.40	0.168	-10.19	57.06
Group (Massage/Control)	-28.81	3.29	-8.77	0.001	-35.40	-22.22
Gender (F/M)	2.44	2.50	0.98	0.333	-2.57	7.46
Pregnancy (wanted /unwanted)	1.74	3.54	0.49	0.626	-5.37	8.84
Education (Nonacademic / Academic)	-1.86	3.24	-0.57	0.569	-8.36	4.65
Delivery (NVD / CS)	-1.62	2.80	-0.58	0.564	-7.24	3.99
Job (Housewife / working)	-0.68	4.59	-0.15	0.883	-9.88	8.53
Anxiety Before intervention	0.36	0.16	2.29	0.026	0.05	0.68
Self-esteem Before intervention	-0.22	0.40	-0.53	0.596	-1.02	0.59
Age	-0.05	0.25	-0.18	0.859	-0.55	0.46

R<sup>2</sup> = 0.728, S.E.: Standard Error

Table 3 showed that massage was also effective in increasing self-esteem, and participants in the massage group had a higher level of self-esteem after the intervention compared to participants in the control group.

**Table 3. The effect of variables on post intervention self-esteem using multiple linear regression**

Variables	B	S.E.	t	P	95% Confidence Interval	
					Lower Bound	Upper Bound
Intercept	10.64	5.84	1.82	0.074	-1.08	22.35
Group (Massage/Control)	12.20	1.15	10.65	0.001	9.90	14.49
Gender (F/M)	0.52	0.87	0.60	0.553	-1.23	2.27
Pregnancy (wanted /unwanted)	1.78	1.24	1.44	0.155	-0.69	4.26
Education (Nonacademic / Academic)	0.46	1.13	0.41	0.684	-1.81	2.73
Delivery (NVD / CS)	1.15	0.98	1.18	0.245	-0.81	3.10
Job (Housewife / working)	-0.01	1.60	-0.01	0.996	-3.22	3.20
Anxiety Before intervention	-0.08	0.06	-1.40	0.167	-0.19	0.03
Self-esteem Before intervention	0.27	0.14	1.93	0.059	-0.01	0.50
Age	0.03	0.09	0.35	0.725	-0.15	0.21

$R^2 = 0.783$ , S.E.: Standard Error

## Discussion

The purpose of the present study was to evaluate the effect of premature neonates massage by the mothers on maternal anxiety and self-esteem. The findings indicated that massaging the neonates by mothers can increase maternal self-esteem and reduce anxiety. Accordingly, mothers can benefit from massaging their NICU admitted infants because it can increase maternal self-esteem and lower their anxiety. This result is in line with the findings of some previous studies. Afand et al. (2017) evaluated the effectiveness of infant massage on state anxiety in mothers of preterm infants before hospital discharge and concluded that maternal state anxiety significantly decreased on the day of discharge (10). Mokaberian et al. (2016) in Iran studied the effect of neonatal motor-tactile stimulation on maternal anxiety. They concluded that neonatal motor-tactile stimulation was a cost-effective and beneficial method to reduce the anxiety of mothers with premature infants (25). Kashaninia et al. (2014) reported that kangaroo care reduced the stress and anxiety of mothers of premature infants admitted to neonatal intensive care units (26). The present study supports the results of their study because massage is a type of skin contact. Lack of mother-infant skin contact may impair attachment, increase the risk of infection, decrease weight gain, cause poor communication with parents, and increase the length of stay in the hospital and medical costs. Therefore, the interventions such as infant massage can be very beneficial because facilitate skin contact and communication with parents (26). Galanakis et al. (2015) studied the effect of infant massage on maternal stress in Egypt. Their results showed that infant massage by the mother could reduce maternal stress. The current study supports their findings. The mother's anxiety is reduced when she massaged her infant (27). Nurses' support can reduce the mental problems of mothers of premature infants; nurses can teach mothers how to massage their infants and reduce their stress (28).

Sweeney et al. (2017) studied the impact of kangaroo care on parental anxiety and parenting skills for the care of premature infants in the neonatal intensive care unit in the U.S. Their results showed a reduction in parental anxiety and an increase in self-esteem in taking care of their infants (29). The current study also supports the findings of Sweeney et al. care for the premature infant. Dehghan et al. (2016) also studied the effect of kangaroo care on the self-esteem of mothers of premature neonates admitted to the neonatal intensive care unit in Iran. They concluded that kangaroo care could promote mothers' self-esteem (7). The results of the present study were in line with their study due to using a similar research method as well as the Rosenberg scale. Also, kangaroo care, like massage, has favorable effects on infant maturity, and maternal involvement in care reduces the sense of guilt associated with preterm birth and enhances her self-esteem. Porter and colleagues (2015) studied the effect of infant massage by parents on the stress, self-esteem, depression, attachment, and interaction of substance-abuse mothers in the U.S. They concluded that infant massage by the mother reduced maternal stress and depression symptoms, but had no effect on self-esteem, attachment, and mother-infant interaction (3). The results of the present study did not support their study. It may be due to the

difference of study population which included mothers with substance abuse problem in their study. According to the findings of the current study, the infants' massage by the mother can reduce the mother's anxiety and increase the mother's self-esteem, therefore, it can be recommended to all mothers whose babies are hospitalized in the neonatal intensive care unit. Lee et al. (2011) studied the impact of kangaroo care on maternal self-esteem and infant physiological stability in South Korea. The results showed an increase in maternal self-esteem and infant physiological stability through kangaroo care (16). The results of the current study were in line with their study indicating that parental involvement in care, especially mothers, can increase maternal self-esteem (16).

The limitation of this study was that some mothers experienced severe pain after delivery and could not massage their infants three times a day and excluded from the study. However, it was tried to reduce this limitation by administration of analgesics drugs before infant's admission to the neonatal intensive care unit.

### **Implications for practice**

Mothers often experience severe anxiety, anger, and stress and subsequently poor self-esteem in the case of premature infant. Parental involvement, especially mothers, to care the infant is one of the best and most effective ways to prevent traumas related to an admitted premature infant. The infant massage by the mother is one of these interventions. The results of this study showed that massage by mothers could reduce anxiety and increase the self-esteem of mothers of premature infants admitted to the neonatal intensive care unit. It is recommended that other maternal contributions to infant's care be assessed at the level of maternal anxiety and self-esteem.

### **Acknowledgments**

This article was derived from a master's thesis performed under the supervision and approval of the research deputy of Tehran University of Medical Sciences, Tehran, Iran (Ethical approval code: IR.TUMS.FNM.REC.1397.094). Also, the trial is registered in the Iranian registry clinical trial (IRCT20181004041229N1). The authors would like to thank all mothers who participated in this study.

### **Conflicts of interest**

The authors declared no conflict of interest.

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