

THE EFFECT OF SLOW STROKE BACK MASSAGE ON PHYSIOLOGICAL INDICATORS OF PRIMIPAROUS MOTHERS IN THE FIRST POST-PARTUM DAY

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ABSTRACT

Anxiety in first post-partum days leads to stimulation of sympathetic nervous system and the appearance of changes in physiological indicators, which can have undesirable effects on health condition of the mother and infant. Relaxation technique of massage is one of the most important non medical interventions to balance sympathetic nerve. The present study was done in order to determine the effect of slow stroke back massage on physiological indicators of primiparous mothers in the first post-partum day. This single blind clinical trial was conducted on 100 primiparous mothers having a normal vaginal delivery and aged from 18 to 45 years old. This study was done in after-birth section of Shahidan Mobini Hospital (Iran, Sabzevar) in year 2015. Using double block method, research participants were randomly placed in two groups who received massage (n=50) and control group (n=50). The first group received 20 minutes of regular and steady slow stroke back massage between 4 to 18 hours after giving birth. Both groups completed questionnaire of demographic information before intervention was done and also physiological indicators of mothers (systolic and diastolic blood pressure, respiration, heart rate and temperature) were measured and recorded before and immediately after Intervention. Data were analyzed using SPSS Software Version 22 and also t-student and chi-square tests with significance value of $P < 0.05$. Mean age of mothers of the present study was 22 years old. The two groups of study did not have any significant statistical differences regarding variables such as age, education, drug intake during labor and after birth; the groups were homogeneous. In this study massage significantly reduced physiological indicators of mothers in the first post-partum day ($P < 0.001$). Slow stroke back massage balances physiological indicators of mothers in first days of puerperium period and it can be used to relax mothers.

Keywords: *Massage, Physiological Indicators, Postpartum*

INTRODUCTION

For women postpartum days are the greatest period of vulnerability (Hidayati *et al.*, 2014). Child birth is an important and significant transitive event of life especially for primiparous mothers. During first weeks after giving birth, physiological changes happened in pregnancy return to the previous condition of before pregnancy and this recurrence happens more quickly in the first days after childbirth (Yelland *et al.*, 2010). In this period women also face with various psychological changes. It can be anxious to adjust with these changes (Cheng *et al.*, 2006). On the other hand conforming to the new life and accepting maternal responsibilities can be stressful and anxious (Kudo *et al.*, 2014).

Under the effect of this stress and anxiety, sympathetic system is stimulated continuously. If the sympathetic nerve system is stimulated for a longer time, secretion of catecholamine's specifically adrenaline and noradrenalin increases which causes enhancement of cells' permeability as compared to calcium and sodium, and as a result myocardium is stimulated and following that the number of heart rate, blood pressure and respiration increases; temperature production mechanisms are activated in the

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body and can even lead to dangerous side effects in mothers (Lange and Herrmann-Lingen, 2007). Anxiety reduces plasma levels of prolactin and oxytocin in lactating mothers. This reduces milk production and causes disorder in reflection of milk secretion out of breast (Dennis *et al.*, 2013). In a study conducted in Japan by Nakakita, the highest level of sympathetic nervous system activity is reported to be the first day after childbirth (Nakakita, 2011).

At the present time various methods are used to prevent sympathetic reaction; a number of these methods are as following: medical and non-medical methods (complimentary medicine) such as sports, nutrition, music therapy, massage and psychological support. Using medicine has many psychological and physiological effects on the mother and infant; besides that medicine can't be used for all mothers (Abbasi *et al.*, 2007). Touching therapy and massage are amongst the oldest nonmedical methods (Ejindu, 2007) and the fourth type of therapy (5/2 percent) used in the U.S is complementary and alternative medicine (Fisher *et al.*, 2010).

Massage reduces levels of hydrocortisone, adrenaline and nor adrenaline with automatic regulation of nervous system. Moreover, stimulation of touching afferent nerves in the skin affects a person's body and mind. Regular presses exerted during massage escalate blood circulation in lymphatic drainage (Meftahi *et al.*, 2014) which causes a change in heartbeat and blood pressure (Ejindu, 2007). A number of researchers believe that massage has beneficial effects on visceral activity that is caused by stimulation of environmental and nervous terminals leading to a change in physiological indicators (Abbasi *et al.*, 2007). Massage also loosens the muscles, relaxes and reduces pain and eventually diminishes anxiety and balances physiological indicators (Adib-Hajbaghery *et al.*, 2014). Using complementary medicine in taking care of mothers can reduce medical interventions and their side effects on the infants (Williams and Mitchell, 2007); it also creates comfort and relaxation, corrects disorders in physical performance and changes physiological responses (Vizeh *et al.*, 2012).

Massage influences central nervous system and releases B central analgesic substances such as endorphin and enkephalin, which prevent P substance (neurotransmitter) release, reduce sympathetic system stimulations and increase parasympathetic system stimulations; as a result heartbeat and respiration rate diminishes.

Moreover following massage, smooth and skeletal muscles are relaxed and following that capillary volume is increased and blood pressure is lowered (Peng *et al.*, 2015). Reducing activity of sympathetic nervous system after child birth creates relaxation which prevents postpartum depression and grief and enhances the emotional bond between mother and infant (Nakakita, 2015). It is also a necessary component in health care services due to its significant beneficial effects on individuals' health (Paul *et al.*, 2013). Timely prevention techniques and interventions can reduce appearance of psychological and physical postpartum disorders to a minimum and also improve evolutionary implications of the infant (Quintero *et al.*, 2014).

The finding of studies conducted in the field of massage and physiological indicators are various and sometimes contrary to each other. Some studies state that massage is effective on physiological indicators; for instance Abbasi *et al.*, (2007) and Peng *et al.*, (2015) in their study indicated that back massage reduces systole and diastole blood pressure. Findings of a number of other studies showed no change in the mentioned variables; study of Meftahi *et al.*, (2014) can be an example. The findings of their study indicated no significant difference in two experimental and control groups (Meftahi *et al.*, 2014). On the other hand Nakakita (2015) believes that the effect of back massage on physiological indicators is not clearly recognized yet and is still under study. These kinds of uncertainties in medical societies are one of the major challenges of employing these activities in nursing and midwifery fields

This problem necessitates a rich research support for a quick entrance of these activities into midwifery. Therefore the present study is conducted to determine effect of back massage on physiological indicators on mothers in early postpartum days.

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METHODS AND MATERIALS

Methodology

The present research is a two-group single blind clinical trial, studying 100 primiparous mothers hospitalized in Shahidan Mobini Hospital (Iran, Sabzevar) from July to October of 2015. This hospital is the only state and referral hospital providing gynecology department with 91 beds and 4 wards (surgery, NICU, postpartum and women internal). The present study was approved by Ethics Committee of Medical Science University with approval code of (IR.IUMS.REC.1394.26109) in June 3rd of 2015 and was recorded in Clinical Trials' Registry Center of Iran with code of (ID IRCT: 201506042248 N15). Then required licenses to go into sampling section were taken from Chancellor of Sabzevar Medical University and head of Shahidan Mobini Hospital.

The single blindness of this study is due to lack of statistical information regarding grouping of samples until the end of study. According to required criteria to participate in the study, about 45 percent of mothers were allowed to take part in the study. Therefore, 105 qualified mothers participated in the study and 5 of them voluntarily left the group of participants (Figure No.1).

Research samples were selected by continuous sampling method and put into two groups of massage (n=50) and control (n=50) using dual-block method.

For a dual-block design, we specified two in one block, so we made two possible sequences of AB and BA. Using a random number table, we defined the order of blocks. Based on the list, we put each mother in experimental or control groups.

Criteria to be included in the study are as following: primiparus mothers aged between 18 to 45 years old, having normal vaginal delivery, having the ability to read and write, a healthy infant and successful breast feeding. Criteria to be excluded from the study are as following: history of chronic disease, drug abuse, identified mental health problems, unexpected accidents happening in the last 3 months for the individual or first degree relatives, history of infertility, using epidural anesthesia during labor and after childbirth and ulceration, infection or any other injury that prevents back massage. Due to exhaustion and sleeplessness after childbirth the intervention was done 4 to 18 hours after delivery (Nakakita, 2015).

In this study after explaining some points in regard of research goals, the agreement of units under study were taken in written form and then the questionnaire of demographic specifications were completed by research participants. After that the mother was transferred to the quiet room with temperature of 27 ° and soft light without any environmental stimuli.

Five minutes after full deployment of the mother on the bed in sitting position, mother's vital signs were measured and recorded by the researcher including blood pressure using a mercury sphygmomanometer from left arm, heart rate using a radial pulse touch for one minute, respiration rate using observation of expansion and contraction the chest for one minute without the mother being noticed, and body temperature using oral thermometer for 3 minutes. In group A (intervention) the researcher massaged the mother using slow stroke back massage method for 20 minutes in a sitting position; and in group B (control) the researcher stood by the mother for 20 minutes. Immediately after the time was over, mother's vital signs were measured and recorded by researcher's assistant.

Slow stroke back massage was given by the researcher using odorless Vaseline oil, so that to preserve the smell of the mother which is an important stimulant for the infant (Varendi *et al.*, 1997) and a requisite to keep the emotional bond between mother and infant (Imura *et al.*, 2006).

The sample size is 50 individuals for each group by taking into account the following cases: confidence level of 95% and test ability of 80%; supposing that the effect size of slow stroke back massage on physiological indicators of primiparous mothers in the first postpartum day is at least 2 score so that the effect of intervention is statistically significant and also taking into account the 10 percent probability of sample loss.

In order to analyze data, for all quantitative variables in both groups the normality test was taken to examine normal distribution.

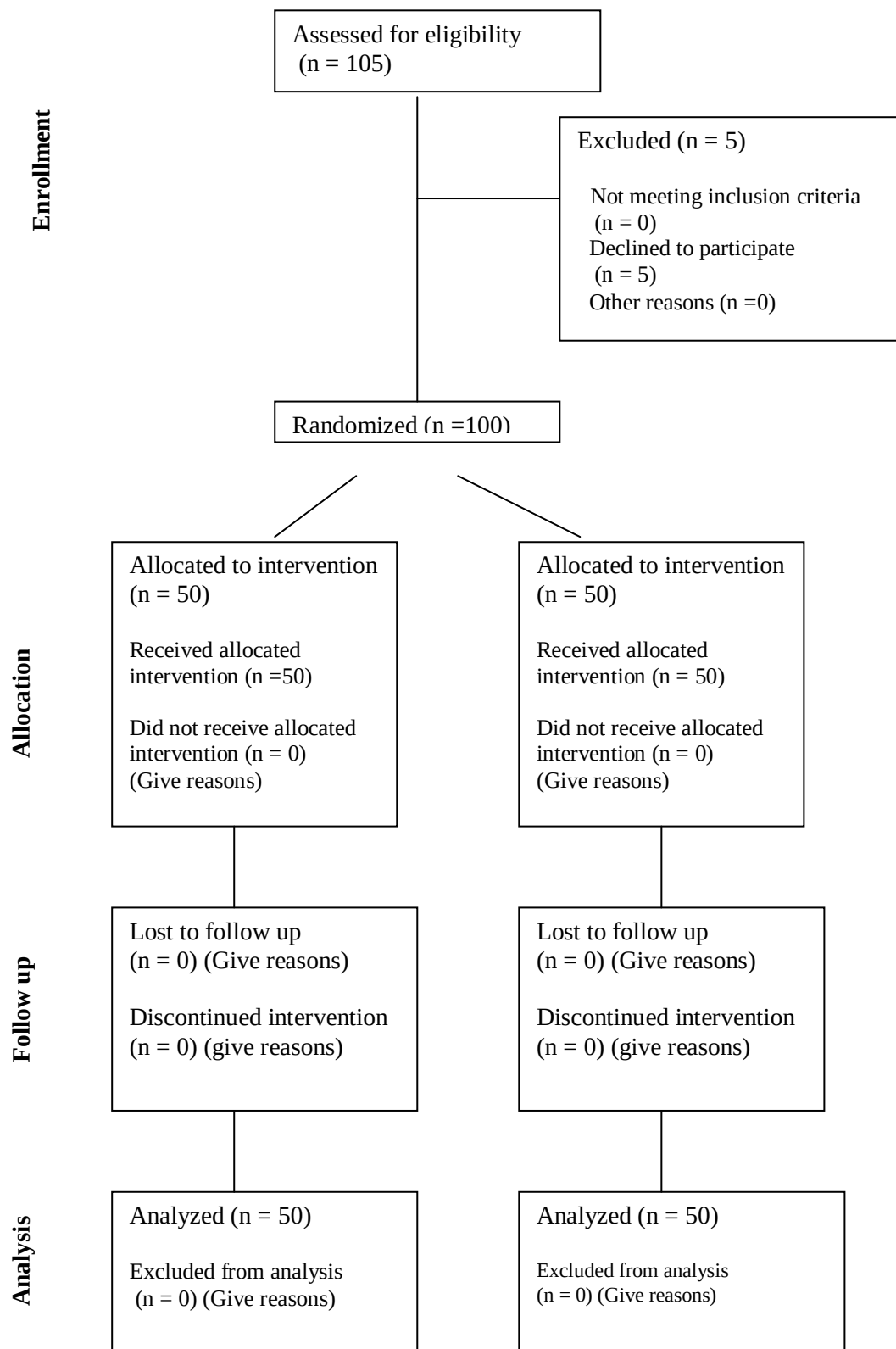


Figure: 1 Consort Flowchart of the Study

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Then parametric statistics was used for normal variables and non-parametric statistics was used for abnormal variables. To deliberate homogeneity of two groups regarding their qualitative variables, chi square test and Fisher exact test were used. For quantitative variables with normal distribution t-student test was used with confidence coefficient of 95% and p-value of 0.05 and all computations were done using SPSS version 22.

Data Collection Tools

In this study, demographic information questionnaire and vital signs record was used to collect data; they didn't require reliability determination because included personal information and to determine their validity, content face validity method was used. In order to do this first by searching and using resources, books, articles the data collection and record form was arranged by the researcher and watched over by supervisor and advisor and then it was given to 10 members of faculty's staff. After collecting and doing the corrections, it was sent to Ethics Committee and confirmed by the committee.

In order to measure physiological indicators the following tools were used: a mercury sphygmomanometer and a standard stethoscope of Richter brand of Germany, standard oral thermometer of Nasim Teb brand of Iran and a standard chronometer of Joerex brand of China. These tools are used to measure blood pressure, time and temperature. Most scientific studies have proved the accuracy and precision of mercury sphygmomanometers as compared to bouncy and electronic sphygmomanometers and this type of sphygmomanometer is highly accurate and don't need calibration. Heart Association of America still believes that mercury sphygmomanometer is a preferred tool (Liz, 2005).

Also in order to determine reliability of measuring tools of physiological indicators by the researcher, the equivalent reliability was used; in order to do this the physiological indicators of 10 individuals of research units were completed separately by the researcher and his/her research associate (who is in equal education and experience levels with the researcher) and correlation coefficient of $r = 0.97$ was confirmed between them.

Slow Stroke Back Massage

The massage was given by the researcher as following: first the patient sits on edge of bed leaning her head on a pillow, in second step the shoulders of the patient are held by both hands of the researcher and at the same time the thumbs are put in the base of the skull in both sides and small rotational movements are done up the neck. Third is to stroke surface the base of the skull to the sacrum using palm of one hand and repeat the procedure on the other side of the spine using the other hand's palm, while at this the first hand moves to the base of the skull.

In the fourth step the hands are put at two sides of the neck under ears and strokes are exerted downward on clavicle bones exactly on the scapula by using thumbs. This is repeated several times. In the fifth step thumbs are put at either side of the spine near shoulders and moved down to the waist; sixth, palms are placed in either side of the neck and regular and sweeping strokes are exerted down to the neck, all over the shoulder and downward to the spine. All movements of this pattern were repeated in the given order in 20 minutes (Mok and Woo, 2004).

RESULTS AND DISCUSSIONS

Research Findings

The participants of the present study included 105 mothers but 5 of them left the study due to their reluctance to participate (Figure 1). All research units were homogeneous regarding personal characteristics before the study ($P > 0.05$); in a way that mean age of the participant mothers was 22 years old and mean age of their husbands was 27 years old; among them 61% were businessmen; and 46% of the mothers had secondary education and 94% were housewives. With relation to the economic situation, 81% of them had a moderate situation. The ethnicity of most mothers of the study was Fars. And 94% of them had wanted pregnancy and 82% of them had a pre-planned pregnancy. Most mothers' hemoglobin level was over 11. (Table No.1)

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Table 1: Demographic Sample Characteristics

Variable	Control Group	Massage Group	Therapy	P Value
Mothers' s Age, y	3.74±22.98	3.65 ±22.26		0.333
Husband's Age, y	27.06±3.82		27.60±4.36	0.512
Gravidity	1.14±0.49		1.14±0.40	>0.999
Hemoglobin	11.15±0.94		11.40±0.99	0.199
Hematocrit	34.82±2.80		35.52±2.45	0.188
Ethnicity				0.803
Fars	90%	84%		
Turk	6%		12%	
Kurd	2%		2%	
S Education 'Mother				0.427
Middle School and Lower	26%		32%	
High School	42%		50%	
University Degree	32%		18%	
Husband's Education				0.679
Middle School and Lower	42%		48%	
High School	34%		34%	
University Degree	24%		18%	
Mothers' s Profession				>0.999
Housewife	94%		96%	
Working	6%		4%	
Wanted Pregnancy	94%	94%		>0.999
Husband's Profession				0.670
Workless	2%		2%	
Worker	16%		28%	
Self-Employment	66%		56%	
Employee	16%		14%	
Economic Situation				0.399
Good	6%		12%	
Moderate	72%		74%	
Week	22%		14%	

No significant statistical difference was observed in physiological indicators of the two groups (blood pressure, heart beat and temperature) at the time of joining the study and before the intervention is done ($P>0.05$), but respiration mean was significantly high in experimental group before massage was given as compared to the control group ($P=0.033$). After the intervention, the results obtained from independent t-test indicated a significant reduction in heartbeat rate, blood pressure, respiration and temperature mean ($P<0.001$) (Table: 2). Results of intergroup comparison using paired t-test in the two groups showed a significant reduction in mean of systolic and diastolic blood pressure, heartbeat and respiration of experimental group and a significant increase in mean of systolic blood pressure, heartbeat and respiration of control group ($P<0.001$). But no significant statistical difference was observed in mean of diastolic

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blood pressure (P=0.351) and temperature (P=0.255) in control group and also temperature mean (P=0.518) in experimental group (Table: 3).

Table 2: Comparison of Physiological Indicators in Both Groups Before and After the Intervention

Outcome	Before Intervention Mean SD	Immediately After the Intervention	P-Value
Massage Therapy Group			
SBP	102.30±12.17	95.30±11.22	<0.001
DBP	54.80±9.73	50.00±7.55	<0.001
HR	75.72±11.34	72.20±10.39	<0.001
RR	22.26±2.93	19.96±2.39	<0.001
T	36.51±0.47	36.44±0.65	0.518
Control Group			
SBP	100.80±13.02	104.30±11.82	<0.001
DBP	57.00±10.15	57.80±9.95	0.351
HR	80.20±12.31	83.10±11.74	<0.001
RR	20.96±3.08	21.50±2.80	0.023
T	35.96±4.76	36.72±0.49	0.255

SBP: Systolic Blood Pressure, DBP: Diastolic Blood Pressure, HR: Heart Rate, RR: Respiratory Rate, T: Temperature

Table 3: Comparison of Physiological Indicators of the Intervention and Control Groups

Outcome	Massage therapy Group	Control Group	P- value
Systolic blood pressure, mm Hg			
Before intervention	102.30±12.17	100.80± 13.02	0.553
Immediately after The intervention	95.30± 11.22	104.30± 11.82	<0.001
Diastolic blood pressure , mm Hg			
Before intervention	54.80±9.73	57.00±10.15	0.272
Immediately after The intervention	50.00±7.55	57.80±9.95	<0.001
Heart rate			
Before intervention	75.72±11.34	80.20±12.31	0.061
Immediately after The intervention	72.20±10.39	83.10±11.74	<0.001
Respiratory rate			
Before intervention	22.26±2.93	20.96±3.08	0.033
Immediately after the intervention	19.96±2.39	21.50±2.80	<0.001
The temperature			
Before intervention	36.51±0.47	35.96±4.76	0.420
Immediately after The intervention	36.44±0.65	36.72±0.49	0.019

Discussion

The results of the present study are indicative of a significance difference between intervention and control groups regarding their physiological indicators (systolic and diastolic blood pressure, heartbeat, respiration and temperature). These findings are in accordance with results of the following studies: Nakakita (2015) concerning diastolic blood pressure and heartbeat rate; Dreyer *et al.*, (2015) concerning blood pressure and heartbeat rate (Dreyer *et al.*, 2015); Chung *et al.*, (2006) concerning heartbeat; Chen *et al.*, (2013) concerning blood pressure, heartbeat and respiration. The mentioned studies believe that

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these results are due to stimulation of parasympathetic nervous system by massage which leads to reduction of physiological indicators. Despite this, Meftahi *et al.*, (2014) in relation to blood pressure and heartbeat and Supa *et al.*, (2013) in relation to blood pressure and heartbeat, reported no significant difference between the two groups. The probable reason of this difference may be in massage type, position of the person being massaged and usual care type. In this research in both groups the mothers are sitting while being massaged and the type of massage is slow stroke back massage, whereas in their study the person being massaged is lying on the belly and the type of massage is Swedish massage. The position of lying down on the bed even if no massage is given relaxes the individual that escalates activity of parasympathetic nervous system and diminishes physiological indicators due to it (Nakakita and Takenoue, 2009).

Findings of the present study are indicative of a significant decrease of heartbeat rate, respiration and blood pressure after intervention in mothers receiving massage. This finding is in accordance with the following studies: Dreyer *et al.*, 2015; Mok and Woo 2004; Supa *et al.*, 2013; Meftahi *et al.*, 2014; Nazari *et al.*, 2012). Therefore, the reduction reasons of physiological indicators observed in this study and similar studies may be: 1) massage stimulants, 2) vasodilation due to stimulation of parasympathetic nervous system and 3) blood flow increase induced by environmental vasodilation after massage (Nakakita, 2015). Study of Nakakita (2015) showed no significance decrease on systolic blood pressure and heartbeat rate in intervention group which is contrary to the findings of the present study. It seems that the reason of this disagreement is due to difference in type of massage or the environment in which the intervention is done; in the present study slow stroke back massage is given in a separate room without any environmental stimulants but in their study Nidnig, rub, stroke and press methods of massage are given in the same room in which mother is hospitalized.

Limitations and Strong Points of the Study

The present study has a number of limitations. First limitation is that this study was not a dual-blind research; the researcher and his/her assistant were informed and could not be blinded because of their responsibility to measure the participant mothers' physiological indicators. The second limitation is absence of evaluating tolerance of samples. Besides this, doing the research in a hospital made possible the control of interfering variables such as environment and treatment protocols but at the same time was a barrier in generalizing research findings. The following cases can be mentioned as strong points of the study: it is an applicable study which can be used in treatment environments; using an assistant to measure vital signs after intervention has reduced probability of making errors by the researcher.

Conclusion

In general considering the findings of the present study and analyses made of other studies, it can be concluded that massage therapy is one of the effective, easy and safe methods of complementary medicine for mothers to upgrade their calmness and change physiological criteria of relaxation. Therefore, in order to increase relaxation and health of mothers, it is suggested to the midwifery personnel to use massage techniques in postpartum days besides other care services.

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Authors' Contributions

Study concept and design: FreshtehJahdi, Maryam Mehrabadi. Acquisition of data: Maryam Mehrabadi. Analysis and interpretation of data: Hamid Haghani, FreshtehJahdi, Maryam Mehrabadi, MozhdehNavinezhad. Drafting of the manuscript: Maryam Mehrabadi, ForoughMortazavi. Critical revision of the manuscript for important intellectual content: FreshtehJahdi, ForoughMortazavi. Statistical analysis: Hamid Haghani

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The authors declared no conflicts of interests

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