

Effect of Foot and Hand Massage on Post-Cesarean Pain Intensity and Initiation of Breast Feeding

¹Wesam Kamal Farag, ²Anwaar Anwar Tayel, ³Tahany Hassan Alam

^{1,2,3}Lecturers of Obstetrics and Gynecological Nursing, Damanhour University

Abstract: Pain and delayed initiation of breast feeding are the most common problems after cesarean section. The use of sedative is the most common strategy for alleviating the pain. It impairs women's abilities to remain awake and alert during the critical transition to parenting in general and to bond with, breast feed and nurture their new born in particular. Furthermore, the adverse effects of these drugs and lack of access to them for some patients, has led to an increase in application of non-drug methods such as massage. Massage is one of the used non-pharmacological therapies in pain practice but its effect on post-cesarean pain and initiation of breast feeding still under investigated in obstetric nursing practice. Therefore the aim of this study was to determine the effect of hand and foot massage on post-cesarean pain intensity and initiation of breast feeding. To fulfill the study aim a non randomized controlled clinical trial research design was used. Setting: This study was conducted at the post cesarean section ward of Damanhour general hospital in Elbehera Governorate. Subjects: Convenience sample of 80 post cesarean section women were recruited according to inclusion criteria. They were equally assigned to one of two groups: a control (40) and experimental group (40). Tools of the study: five tools were used for data collection. Socio-demographic & clinical profile structured interview schedules, Visual analogue scale (VAS), a modified version of Chamber Price pain rating scale (CPPRS), Johansson Pain-0- Meter Scale (JPOM) and newborn breastfeeding Assessment tool (NBFAT).Result: the study results reveals that the post-cesarean pain intensity was significantly decreased by using Visual analogue scale (VAS),Behavioral pain response as measured by a modified version of Chamber Price Pain Scale (CPPRS)and modified version of Johansson Pain- O Mater Scale (JPOM) i.e. affective and sensory pain responses (as reflected by Pain – rating Index rank).Also the intensity of pain was negatively correlated with the success of breast feeding and evaluation of the breast feeding pick up. Conclusion: foot and hand massage can be a cost effective, safe, new and independent nursing intervention that can be used to decrease post-cesarean pain intensity and increase early initiation of breast feeding. This can improve the quality of women's post-cesarean experience. Thus, it can be encouraged as a beneficial non-medical approach in obstetric practice.

Keywords: Foot and hand massage, Cesarean pain, initiation of breast feeding.

I. INTRODUCTION

A caesarean section (CS) is a surgical procedure in which incisions are made through a mother's abdomen and uterus to deliver one or more babies. This procedure is performed whenever, abnormal conditions complicate labor and vaginal delivery such that the life or health of the mother or baby is threatened ^(1,2).On the other hands, The most common problem and complaint experienced by the mothers undergoing surgery is pain and delayed initiation of lactation due to pain present ⁽³⁾.

Generally, pain is defined as an unpleasant feeling that is conveyed to the brain by sensory neurons. The discomfort signals actual or potential injury to the body. However, pain includes not only the perception of an uncomfortable stimulus, but also the response to that perception. The word "pain" is derived from the Greek word "poine" which means punishment ^(4,5).

The two main causes of post C-Section pain are nerve pain (covered here) and muscle pain. Muscle pain can happen spontaneously; however, it can also be triggered by trauma (like surgery or childbirth). Throw in the hormonal changes of pregnancy and delivery as well as the lack of sleep and the stress of caring for a newborn and you have many of the ingredients for a chronic pain condition⁽⁶⁾.

Many women who deliver by CS are less likely to breastfeed, or delay breastfeeding initiation. Breastfeeding within the first hour post-delivery has been cited as an important predictor of continued breastfeeding. Delays in breastfeeding initiation accompanying C-Section delivery are associated with maternal/infant separation, reduced suckling ability, decreased infant receptivity, and insufficient milk supply, which are predictive of shortened breastfeeding duration⁽⁷⁾.

Breastfeeding is associated with infant health benefits, such as fewer childhood illnesses, lower blood pressure and cholesterol levels, lower prevalence of obesity, and improved intelligence as adults. Maternal benefits of breastfeeding include faster involution of the uterus and lower risk of hemorrhage after birth, in addition to lower lower lifetime incidence of type II diabetes, breast and ovarian cancer⁽⁷⁾.

Pain relief is a sustainable priority in satisfying women's physiological needs. In general, two main approaches for pain relief during labor are distinguished: pharmacological and non-pharmacological approaches^(8,9). Most pharmacological methods cannot be instituted until labor is established because they tend to slow the progress of labor, while non-pharmacological approaches can help women cope with their labor much earlier⁽¹⁰⁾.

Non-pharmacological methods of pain relief have many advantages over the pharmacological methods. Besides having no adverse effects on the mother and the fetus, they do not interfere with the course of labor. They are pleasant for the mother and fetus. These methods include continuous labor support, relaxation techniques, imagery, maternal movement or position, sterile water injection, homeopathy, breathing techniques, music, aromatherapy, transcutaneous electrical nerve stimulation (TENS), hypnosis, therapeutic touch, acupressure, acupuncture, hydrotherapy and massage.⁽¹¹⁾

One of the complementary therapy methods to reduce pain is foot and hand massage. Massage is a systematic and rhythmic form of touch, using certain manipulations of the soft tissues of the body in order to promote patients' comfort, well-being and pain relief. Foot and hand massage stimulates the nerve fibers to produce pain-relieving endorphins⁽⁹⁾. Since the highest concentration of pain receptors are in the hands and feet (each of the extremities has more than 7,000 nerve endings), foot and hand massage and neurons' stimulation may be a good technique for assuaging pain and anxiety after cesarean section⁽¹²⁾.

The practice of using massage as a healing method derives from customs and techniques deeply rooted in ancient history⁽¹³⁾. The word massage is derived from the word "mass", meaning "to press" which has been used for thousands of years. It is defined as the manipulations of the soft tissues; these manipulations are most efficiently performed with palmer aspect of the hand and administered for the purpose of producing effects on the nervous system as well as on the local and the general circulation of blood and lymph^(14, 15).

Massage may be used as a primary therapeutic intervention or as an adjunct to other therapeutic techniques. Uses can include the following: Mobilization of intertissue fluids, reduction of edema, increase of local blood flow, decrease of muscle soreness and stiffness, moderation of pain, facilitation of relaxation and prevention or elimination of adhesions⁽¹⁶⁾.

However, few studies have been performed on massage therapy and its impact on post-cesarean pain and anxiety. Most studies have been carried out on specific population groups, such as patients in intensive care units, the elderly, pregnant women, and patients undergoing chemotherapy, patients with multiple sclerosis, cancer patients and patients with non-surgical conditions⁽¹⁷⁾. Considering the facts that safe and effective post-cesarean pain relief methods are of great importance, since the results can influence the early interactions of mothers with their infants, and the rate of cesarean in Egypt is higher than the international acceptable rates, this study was performed to determine the effect of foot and hand massage on post-cesarean pain and initiation of breast feeding.

Significance of the study the incidence of cesarean section (CS) is incredibly worldwide in general and in Egypt in particular. A according to a 2014 demographic and health survey in Egypt, cesarean section rate surged from 6.6% in 1995 to 51.8% in 2014⁽¹⁸⁾. When foot and hand massage procedures are integrated as an element of postsurgical (Post-Cesarean) protocol; less pharmacological drug may be desired, with the added benefit of hardly any adverse effects⁽¹⁹⁾.

However, the effect of hand and foot massage on pain generally and during pregnancy and labor particularly have been extensively studied, but there is still lack of evidence to support its effectiveness in relieving post-cesarean pain and consequence increase initiation of breast feeding. The present study was conducted to determine the effect of foot and hand massage on post-cesarean pain and initiation of breast feeding in an attempt to provide sound research findings in relation to using new nursing strategies to help mothers post-cesarean to retrieve their maternal role of caring for their newborns, families and themselves.

II. MATERIALS AND METHOD

MATERIALS

Research design:

This is a non randomized controlled clinical trial research design where the effect of one independent variable (hand and foot massage) after cesarean section on two dependent variables (post cesarean pain intensity and initiation of breastfeeding) were investigated.

Settings:

- This study was conducted at the post cesarean section ward of Damanhour general hospital in Elbehera Governorate. This hospital was particularly chosen because cesarean section turnover is satisfactory for the study.

Subjects:

A convenience sample of 80 post cesarean section women who were available at the time of data collection were recruited from the above mentioned setting. Subjects were selected by using the non- probability technique was according to the following criteria:

Inclusion criteria:

1. Conscious
2. Free from any medical disease.
3. With intact hand and food skin and free from arthritis, phlebitis, burn wound, injury, inflammation and eczema.
4. Normal course of pregnancy.
5. Full term infant ,free from physical or congenital problems
6. Mother's breasts with normal shape, size, and nipples.
7. Willing to participate in the study.

The Epi - Info program was used to estimate the sample size using the following parameters.

1. Target population 800 per 3 months
2. Expected frequency=50%
3. Accepted error=5%
4. Confidence coefficient=95%
5. Sample size=80

Subjects who fulfilled the inclusion criteria were assigned to one of two groups:

Control group (G1) comprised 40 post cesarean women who followed the routine hospital care.

Study group (G2) comprised 40 post cesarean women who were received foot and hand massage.

Tools:

Five tools were used to collect the necessary data:

Tool I: Socio-demographic and clinical data structured interview schedule

This tool was developed and used by the researcher to elicit the basic data as follows:

- Socio-demographic characteristics, including: age, level of education, occupation, current residence and body mass index.
- Obstetrical history including:- gravidity , parity, number of abortion , and number of living children.
- Type of anesthesia.

Tool II: Visual analog scale (VAS)

- This tool was originally developed by Melzack and Katz (1994)⁽²⁰⁾. It is a self-report scale for measuring pain intensity. It was adopted and translated into the Arabic language to suit the Egyptian culture. It consists of a horizontal line used for subjective estimation of the patient's pain. It comprises a 10 point numerical scale, corresponding to the degree of pain with zero representing no pain and 10 representing the worst degree of pain. In between these two opposite ends, words as mild, moderate, severe and unbearable are assigned to each 2 cm distance, respectively

Tool III: Behavioral response (A modified version of Chamber Price Pain Rating Scale (CPPRS)) for measuring quality of pain. It was originally developed by Chamber and Price (1967)⁽²¹⁾. It is used to measure the behavioral response to pain. It includes four dimensions: posture, gross motor activity, facial expression and verbalization. For each of these four major behavioral responses one of three alternative choices were elicited by the researcher. For posture, the choice is between relaxed or guarded or tense posture. For gross motor activity, the choice is between quiet, slightly restless and restless. For facial expression the choice is between no frowning, some frowning and constant frowning or grimacing. Finally, for verbalization the choice is between normal no sound, groans/moans and cries/sobs.

- Each of the 12 alternatives was scored as either absent (0), (1) for mild or (2) for severe. The total score ranges from 0-8 Statistically, this score was translated to the corresponding pain intensity as follows:

- No pain (0)
- Mild pain (1-2)
- Moderate pain (3-4)
- Sever pain(5-6)
- Unbearable pain (7-8)

Tool IV: A modified version of Johansson Pain-o-meter (JPOM):-This tool was originally developed and validated by Johansson (1973)⁽²²⁾. Then after, adopted, translated and used by the researcher. It was used to assess the intensity of sensory and affective component of pain (pain quality) by calculating the total parturient choice of words after translating it into Arabic language. It is composed of 11 affective and 12 sensory pain word descriptors. **Affective pain words** were rated as follows: Torturing(5), killing (5), suffocating (5), terrifying (5), dreadful (4), fearful(4), troublesome (3), tiring (3), irritating (2), nagging (1) and happy (0). While **sensory pain words** were rated as follows: cutting(5), tearing (5), sharp(5), burning (4), cramping (4), pressing (4), aching (4), gnawing (3),pinching (3), stinging (2), pricking (2) and sore (1).

The total parturient choice of words was calculated to determine pain intensity. A pain rating index rank (PRIR) was used, based on accumulation of numerical values assigned to the chosen words. The PRIR were scored as follows:

- (0) no pain
- 1-3 mild pain
- 4-6 moderate pain
- 7-10 sever pain
- More than intolerable pain

Tool V: newborn breastfeeding Assessment tool (NBFAT).

It is a modified version from Matthews (1988);⁽²³⁾ and Adams and Hewell (1997).⁽²⁴⁾ It was used by the researcher immediately after birth (10-30 minutes) to measure the success of breastfeeding and latch on. It included two parts:

Part I: Assessment of successful breastfeeding:

It is a short assessment of the baby breastfeeding competence, which measures readiness to feed, rooting, fixing (Latch on), and suckling pattern. The range of scores for each of the four components is 0-3. Thus a total score ranges from 0-12. A Successful breastfeeding is achieved with a score of 8 or above. It was ranked as follows:

- Unsuccessful breastfeeding 0 – 7
- Successful breastfeeding 8 - 12

Part II: Assessment of successful Latch on

It measures the latch, audible swallowing, comfort, and holding. The range of scores for each of the four components was 0-2. Thus, a total score ranged from 0-8. A Successful latch on was achieved with a score of 5 or above. It ranked as follows:

- Unsuccessful latch on 0 - 4.
- Successful latch on 5 - 8.

METHOD**The study was executed according to the following steps:**

1. The researchers attended a training workshop on how to conduct hand and foot massage at Females' faculty of sport, Alexandria University and an accredited certificate was obtained.

2. Approval:

Official letter from the Faculty of Nursing, Damanhur University was directed to the responsible authorities of the study setting to take their permission to collect data after explaining the study purpose.

3. Tools development:

The study tool I was developed by the researcher based on extensive review of relevant and current literature. Tools II, III, IV and V were translated into Arabic with some modification to suit the study. They were tested for content validity by a jury of 5 experts in the field.

4. Tools' reliability:

Tools reliability was tested using Cronbach's Alpha test (internal consistency). Its result was 0.78 which indicates a satisfactory and accepted reliability of the tool.

5. Pilot study:

After the development of the tools, a pilot study was carried out on 8 randomly chosen women (who were excluded from the actual sample)

The purposes of the pilot study were to:

- Ascertain the clarity and the applicability of the tools.
- Detect any problem peculiar to the statements such as sequence and clarity that might interfere with the process of data collection. The necessary changes were undertaken.

Results of the pilot study:

After conducting the pilot study, it was found that:

- The tools were clear and applicable; however, few words were modified.

International Journal of Novel Research in Healthcare and Nursing

Vol. 6, Issue 2, pp: (1255-1271), Month: May - August 2019, Available at: www.noveltyjournals.com

- The tools were relevant and valid.
- No problem that interfered with the process of data collection was detected.

Following this pilot study the tools were reconstructed and made ready for use.

6. *Filed work:*

- Collection of data covered over period of 4 months (from `December 2018 to March 2019). Each women was individually contracted and informed about the aim of the study in order to obtain her oral consent.
- Data of tool I was collected from both groups through an interview schedule for 10 – 15 minutes during 1st day of postpartum, it was conducted individually and in total privacy for both groups.
- The control group 40 women followed the routine hospital care (administration of pain medication).
- For the study group, comprise 40 women upon whom hand and foot massage was applied by the researcher. The massage was applied through 2 sessions, first session 2-4 hours postoperative and second session 6 hours after surgery. The massage was conducted according to the following steps: the researcher held the mother's hand gently in one of her hands and used thumb and fingers to make circles over the mother's entire palm, all fingers, and the outer surface of the hand. The palm was spread by the researcher's fingers. Hand massage was applied to each hand for 5 minutes. Following hand massage, the mother's foot was elevated by supporting it with a pillow. The sole was spread and rubbed by the researcher's fingers. The thumb was used to make circles over the entire sole of the foot. The knuckles of one hand stroked the sole with an up and down motion. The heel and ankle was kneaded between the researcher's thumb and forefinger. The pillow support was removed to finish the massage. Also; foot massage was applied to each foot for 5 minutes.
- Tools II, III, IV were used to assess pain intensity for the both groups two times: in control group once after at approximately 2-4 hr and the second times after 6 hr post operative .In study group once after at approximately 2-4 hr (before applying the massage sessions)and the second immediately after the massage sessions.
- Both groups were assessed for successful breastfeeding and latch on -approximately 6 hours and initiation of breastfeeding (in hour) and duration (in minutes) by using tool V.
- Data was collected from the control group first then from the study group to avoid sample contamination.
- Comparison between the two groups was made to determine the effect of hand and foot massage on post-cesarean pain intensity and initiation of breastfeeding.

7. *Statistical analysis:*

Statistical analysis was done by the researcher after collection of data by using Statistical Package for Social Sciences (SPSS) version 20 program. A descriptive and analytical statistics were utilized such as frequency distribution table, percentages, means, standard deviations and comparison between study and control group was done. Chi-square-test and fisher exact test, significant at ≤ 0.05 level to find out the statistical significant difference of the results.

8. *Ethical consideration:*

For each recruited subject the following issues were considered:

- Securing the subject's informed consent.
- Keeping the subject's privacy.
- Assuring the subjects of their data confidentiality.
- The right to withdrew at any time.

III. RESULTS

The results of this study will be presented according to the following headings:

- 1 - General characteristics:
 - Socio-demographic data

2- comparing post-cesarean pain intensity among intervention and control group before and after intervention as measured by:

- Visual analogue scale(VAS)
- A modified version of Chamber Price pain rating scale (CPPRS).
- A modified version of Johansson pain -o- meter scale (JPOM)

3- Comparing newborn breast feeding characteristics among intervention and control group before and after intervention as measured by New born breastfeeding Assessment tool (NBFAT).

1 - General characteristics:

Table (I) shows the socio-demographic characteristics of the study subjects. As regarding **age**, it was observed that the mean age was almost the same (20.73 ± 3.382 and 20.93 ± 4.405 years) among the control and experimental groups respectively. One half (50 %) of the experimental group age was between 15 to less than 20 years old while 47.5% of the control group had the same age. Concerning **level of education**, it was obvious that 37.5% and 50 % of the control and experimental groups respectively had primary and preparatory education. It also shows that 90% and 55% of the control and experimental groups respectively were **housewives**. While, (10% and 45%) of the control and experimental groups respectively were **working**. As regards to **current residence**, it was noticed that 67% and 60% of the control and experimental groups respectively were **urban** dwellers. finally, it shows that 70% and 40% of the control and experimental groups respectively were 80 -100 kg in weight while, 47% and 50% of the control and experimental groups respectively their height was 149 to less than 160 cm. No statistically significant difference was found among the two groups in relation to their socio-demographic characteristics.

Table (I): Number and percent distribution of the study subjects according to their socio-demographic characteristics

Socio-demographic characteristics		Control		experimental		Test of significance (P-value)
		N n= 40	%	N n= 40	%	
Age (years)	▪ 15-	19	47.5	20	50.0%	Chi-square test $\chi^2=12.676$ (P=0.473)
	▪ 20-	8	20.0	12	30.0%	
	▪ 25-	8	20.0	4	10.0%	
	▪ 30+	5	12.5	4	10.0	
Mean±SD		20.73±3.382		20.93±4.405		
Min – Max		17 - 30		16 – 33		
level of Education	• Illiterate	9	22.5	5	12.5	Chi-square test $\chi^2=7.030$ (P=0.206))
	• read and write	9	22.5	12	30.0	
	• Primary and preparatory	15	37.5	20	50%	
	• Secondary	4	10.0	2	5.0	
	• University	3	7.5	1	2.5	
Occupation	• Housewife	36	90.0	22	55.0	Fisher's exact test (P=1.0)
	• Working	4	10.0	18	45.0	
If working what the type of work	• employment	1	25.0	6	33.0	Chi-square test $\chi^2=16.388$ (P=0.001)
	• house keeping	2	50.0	2	11.0	
	• farming	1	25.0	10	56.0	
Original Residence	▪ Rural	13	32.5	16	40.0	Chi-square test $\chi^2=0.487$ (P=0.321)
	▪ Urban	27	67.5	24	60.0	

Body mass index Wt. kg	▪ 70-79 kg	11	27.5	15	37.5	Chi-square test $\chi^2=22.787$ (P=0.089)
	▪ 80-100 kg	28	70.0	16	40.0	
	▪ More than 100 kg	1	2.5	9	22.5	
Height cm	▪ 149-	11	27.5	20	50.0%	Chi-square test $\chi^2=12.676$ (P=0.473)
	▪ 160-	19	47.5	15	37.5%	
	▪ 180+	10	25.0	5	12.5%	

Table (II) portrays the reproductive history and pain characteristics of the study subjects. It was obvious 50% and 47.5% of the control and experimental groups respectively, were primigravida while 40% and 47.5% of them had two pregnancies. 52.5% and 62.5% of the control and experimental groups respectively, had no abortion compared to 10% and 0.5% of them had two abortions. Concerning factors increasing pain, it reveals that 47.5% and 50% of the control and experimental groups respectively, reported no factors increasing pain while, the respiration was reported as a factor increasing pain among 25% and 10% among them respectively. On the other hand, 72.5% and 55% of the control and experimental groups respectively, reported the accommodation was one factor decreasing pain compared to 0.5% of the both groups reported no factors decreasing pain. The relationship between two groups reproductive and pain characteristics data were not statistically significant difference.

Table (II): Number and percent distribution of the study subjects according to their Reproductive history and pain characteristics.

Reproductive history and pain characteristics		Control		experimental		Test of significance (P-value)
		N n= 40	%	N n= 40	%	
Number of pregnancy	• One	20	50.0	19	47.5	Chi-square test $\chi^2=0.940$ (P=0.622)
	• Two	16	40.0	19	47.5	
	• Three and more	4	10.0	4	0.5	
Number of abortion	• Non	21	52.5	25	62.5	Chi-square test $\chi^2=1.257$ (P=0.580)
	• One	15	37.5	13	32.5	
	• Two	4	10.0	2	0.5	
Causes of pain increased	▪ Don't increased	19	47.5	20	50.0	Chi-square test $\chi^2=7.670$ (P=0.259)
	▪ With eat and drink	7	17.5	5	12.5	
	▪ With respiration	10	25.0	4	10.0	
	▪ With movement	3	7.5	10	25.0	
	▪ With cold	1	2.5	1	2.5	
Causes of pain decreased	▪ Don't decreased	2	0.5	2	0.5	Chi-square test $\chi^2=7.618$ (P=0.102)
	▪ With walking	5	12.5	6	15.0	
	▪ With accommodation	29	72.5	22	55.0	
	▪ With sitting and rest	1	2.5	3	7.5	
	▪ With warm fluid	3	7.5	7	17.5	

Table (III) clarifies the study subjects' pain intensity according to visual analogue scale. It was a highly statistically significant difference before and after intervention (p=0.000) among the experimental group, where it was relieved after intervention to 37.5% among them and no women experienced severe pain after foot and hand massage. On the other hand, a sizable proportion of the control group 32.5% and 22.5% experienced no pain and severe pain respectively, finally it was statistically significant difference between two groups after intervention(p=0.016).

Table (III): Number and percent distribution of the study subjects according to their post cesarean pain intensity- as measured by visual analogue scale (VAS) before and after intervention.

Visual Analog Scale (VAS) (Pain intensity)	G1 (control group)				G 2 (experimental group)			
	After 2-4 hrs post operative		after 6 hrs post operative		Before massage (After 2-4 hrs post operative)		After massage	
	N n= 40	%	N n=40	%	N n=40	%	N n= 40	%
No pain(0)	4	10.0	13	32.5	1	2.5	15	37.5
Mild (1-3)	9	22.5	11	27.5	12	30.0	16	40.0
Moderate (4-6)	10	25.0	7	17.5	25	62.5	9	22.5
Severe (7-10)	17	42.5	9	22.5	2	5.0	0	0
Test of significance (P-value)	Chi-square test $\chi^2=7.956$ (P=0.0469)				Chi-square test $\chi^2=22.351$ (P=0.000)**			
Test of significance (P-value) after intervention between two groups	Chi-square test $\chi^2=10.319$ (P=0.016)*							

Table (IV) demonstrates the behavioral response to post-cesarean pain intensity as measured by modified version of chamber price pain rating scale (CPPRS) across two time measures before and after intervention of the control and experimental group using Chi-square test. The table obviously shows that there was a statistically significant difference of pain intensity measures among women in the experimental group. Where 40% of the women had severe pain before the session of intervention and it decreased to 5% immediately after intervention. A statistically significant difference was detected among women of the experimental group before & after intervention, where (P =0.001). On the other hand, less than one half (47.5%) of women in the control group experienced severe pain before the routine care and slightly decreased to 32.5% after the intervention with no statistically significant difference among the control group before and after intervention (P=0.5316). A statistically significant difference was detected among the both groups immediately after intervention (P=0.003).

Table (IV): Number and percent distribution of the study subjects according to behavioral response to post-cesarean pain intensity as measured by Modified Version of Chamber Price pain Rating Scale (CPPRS) before and after intervention.

behavioral pain response to labor pain	G1 (control Group)				G2(experimental group)			
	After 2-4 hrs post operative		after 6 hrs post operative		Before massage (After 2-4 hrs post operative)		After massage	
	N n=40	%	N n=40	%	N n=40	%	N n=40	%
No pain(0)	4	10.0	7	17.5	1	2.5	13	32.5
Mild (1-3)	9	33.5	11	27.5	4	10.0	23	52.5
Moderate (4-6)	8	20.0	9	22.5	19	47.5	2	5.0
Severe (7-10)	19	47.5	13	32.5	16	40.0	2	5.0

Test of significance (P-value)	Chi-square test $\chi^2=2.202$ (P=0.5316)	Chi-square test $\chi^2=48.307$ (P=0.001)*
Test of significant (P-value) immediately after intervention between two groups	Chi-square test $\chi^2=18.557$ (P=0.003)*	

Table (V) clarifies distribution of the experimental and control groups according to their sensory pain description as measured by modified version of Johansson pain O- Meter scale (JPOM), reflected by sensory pain rating index- before and after intervention. A highly statistically significant difference was found between both groups in relation to mean total score of pain $p=0.000$. Moreover, another highly significant difference was also detected among women of the experimental group before & after intervention in relation to their intensity of post-cesarean pain as measured by JOPM (sensory response), where (P =0.000), where about two thirds (65%) of them had severe pain before intervention and dropped sharply to only 7.5% after the intervention. On the opposite no statistically significant difference was detected among women in the control group before and after the routine care, where 27.5% of them experienced severe pain before the intervention and slightly decreased to only 20% after the intervention. Accordingly, it can be deduced that the foot massage had a significant effect in reducing post-cesarean pain intensity among women within the experimental group compared to the control group.

Table (V): Number and percent distribution of the study subjects according to their sensory pain responses as measured by modified version of Johansson Pain O- Meter scale (JPOM), reflected by sensory pain rating index- before and after the intervention.

Pain intensity (sensory pain response) Rating index	G 1(control group)				G 2(experimental)			
	After 2-4 hrs post operative		after 6 hrs post operative		Before massage (After 2-4 hrs post operative)		After massage	
	N n=40	%	N n=40	%	N n=40	%	N n=40	%
No pain(0)	10	25.0	8	20.0	0	0.0	1	2.5
Mild (1-3)	6	15.0	8	20.0	0	0.0	26	65.0
Moderate (4-6)	13	32.5	16	40.0	14	35.0	10	25.0
Severe (7-9)	11	27.5	8	20.0	26	65.0	3	7.5
Test of significance (P-value)	Chi-square test $\chi^2=0.730$ (P=1.292)				Chi-square test $\chi^2=31.591$ (P=0.000)*			
Test of significance (P-value) immediately after intervention between two groups	Chi-square test $\chi^2=18.631$ (P=0.000)*							

Table (VI) portrays the number and percent distribution of the study subjects according to their evaluation of successful breast feeding, it was noticed that the ready of breast feeding, child mouth creasing, pick up nipple and follow suckling were higher score among 75%, 52.5%, 85% and 70% of the massage group respectively, compared to completely absent among the control group. In conclusion the total score of their evaluation of successful breast feeding was successful among 90% of the massage group compared to only 2.5% among the control group. A highly statistically significant difference was found between both groups in relation to evaluation of successful breast feeding $p=0.000$.

Table (VI): Number and percent distribution of the study subjects according to their evaluation of success breast feeding

Evaluation of success of breast feeding		Control		experimental		Test of significance (P-value)
		N n= 40	%	N n= 40	%	
Ready to breast feeding	▪ 0	28	70.0	0	0.0	Chi-square test $\chi^2=66.933$ (P=0.000)*
	▪ 1	10	25.0	2	37.5	
	▪ 2	2	5.0	8	12.5	
	▪ 3	0	0.0	30	75.0	
Child mouth creasing	• 0	33	82.5	0	0.0	Chi-square test $\chi^2=68.235$ (P=0.000)*
	• 1	6	15.0	3	7.5	
	• 2	1	2.5	16	40.0	
	• 3	0	0.0	21	52.5	
Pick up nipple	• 0	30	75.5	0	0	Chi-square test $\chi^2=68.00$ (P=0.000)*
	• 1	9	22.5	3	7.5	
	• 2	1	2.5	3	7.5	
	• 3	0	0.0	34	85.0	
Follow suckling	▪ 0	35	85.0	0	0.0	Chi-square test $\chi^2=74.000$ (P=0.000)*
	▪ 1	6	15.0	2	5.0	
	▪ 2	0	0.0	10	25.0	
	▪ 3	0	0.0	28	70.0	
evaluation	▪ 0-7(not successful)	39	97.5	4	10.0	Chi-square test $\chi^2=69.251$ (P=0.000)*
	▪ 8-12(successful)	1	2.5	36	90.0	

Table (VII) shows the number and percent distribution of the study subjects according to their evaluation of successful latch on the breast. It was observed that the placement of nipple and comfort the breast had higher score among 50% and 92.5 of the massage group respectively, compared to the same percent 2.5% among the control group. As regards to Sound swallowing and Position during feeding, an equal percent 67.5% of the massage group had high score compare to only 5% among the control group. Finally the most (97.5%) of the massage group had successful latch on the breast on the other hand only 10% of the control group had successful latch on the breast. A highly statistically significant difference was found between both groups in relation to evaluation of successful latch on the breast p=0.000.

Table (VII): Number and percent distribution of the study subjects according to their evaluation of Evaluation of successful of latch on the breast.

Evaluation of latch on the breast		Control		experimental		Test of significance (P-value)
		N n= 40	%	N n= 40	%	
Placement of nipple	▪ 0	28	70.0	0	0.0	Chi-square test $\chi^2=76.098$ (P=0.000)*
	▪ 1	11	27.5	20	50.0	
	▪ 2	1	2.5	20	50.0	
Sound swallowing	• 0	30	75.0	0	0.0	Chi-square test $\chi^2=68.235$ (P=0.000)*
	• 1	8	20.0	13	32.5	
	• 2	2	5.0	27	67.5	

Comfort the breast	• 0	30	75.5	0	0	Chi-square test $\chi^2=52.742$ (P=0.000)*
	• 1	9	22.5	3	7.5	
	• 2	1	2.5	37	92.5	
Position during feeding	▪ 0	30	75.0	0	0.0	Chi-square test $\chi^2=52.742$ (P=0.000)*
	▪ 1	8	20.0	13	32.5	
	▪ 2	2	5.0	27	67.5	
evaluation	▪ 0-4 (not successful)	36	90.0	1	2.5	Chi-square test $\chi^2=66.508$ (P=0.000)*
	▪ 5-8 (successful)	4	10.0	39	97.5	

Table (VIII) clarifies the number and percent distribution of the study subjects according to their starting of breast feeding and time of the breast feeding. About two thirds (62%) among the control group didn't start the breast feeding while more than half (57.5%) of the massage group started the breast feeding after 2-3 hours in addition more than two fifths (42.5%) of them started the breast feeding after only one hour. A highly statistically significant difference was found between both groups in relation to starting of the breast feeding $p=0.000$. Regarding the Time of breast feeding, the table also shows that 62.5% among the massage group fed their baby from 10 to 20 minutes compared to 32.5% among the control group. No statistically significant difference was found between both groups in relation to the time of breast feeding $p=0.1154$.

Table (VIII): Number and percent distribution of the study subjects according to their Start of breast feeding and Time of breast feeding.

Start breast feeding		Control		experimental		Test of significance (P-value)
		N n= 40	%	N n= 40	%	
Start breast feeding	▪ After 30 minutes	1	2.5	0	0.0	Chi-square test $\chi^2=49.100$ (P=0.000)*
	▪ After 1 hours	2	5.0	17	42.5	
	▪ After 2-3 hrs	8	20.0	23	57.5	
	▪ More than three hours	4	10.0	0	0.0	
	▪ No breast feeding	25	62.0	0	0.0	
Time of breast feeding	• From 1-4 minutes	0	0.0	9	22.5	Chi-square test $\chi^2=4.318$ (P=0.1154)
	• From 5-10 minutes	27	67.5	6	15.0	
	• From 10-20 minutes	13	32.5	25	62.5	

Table (IX) presents the correlation between pain intensity, success of breast feeding and evaluation pickup of the breast feeding. It was found that the intensity of pain was negatively correlated with the success of breast feeding and evaluation pickup of the breast feeding ($r=-.332^{**}$ & $r=-.424^{**}$ respectively), while it was positively correlation between success of breast feeding and evaluation pickup of the breast feeding ($r=.924^{**}$).

Table (IX): Correlations between pain intensity, Assess success of breast feeding and Evaluation pickup of the breast feeding.

Items		Intensity of pain	Assess success of breast feeding	Evaluation pickup of the breast feeding
Intensity of pain	Pearson Correlation	1	-.332**	-.424
	Sig. (2-tailed)		.003	.000*
	N	80	80	80
Assess success of breast feeding	Pearson Correlation	-.332**	1	.924
	Sig. (2-tailed)	.003		.000*
	N	80	80	80

Evaluation pickup of the breast feeding	Pearson Correlation	-.424**	.924**	1
	Sig. (2-tailed)	.000	.000	
	N	80	80	80

** . Correlation is significant at the 0.05 level (2-tailed).

IV. DISCUSSION

Postoperative pain management for women who have given birth through cesareans requires a multimodal, integrative approach. The traditional practice of administering analgesics for pain control impairs women’s abilities to remain awake and alert during the critical transition to parenting in general and to bond with, breastfeed, and nurture their newborns in particular ⁽²⁵⁾.

In the present study, the effect of hand and foot massage on post cesarean pain intensity was assessed by using three tools namely; Visual analog scale (VAS), Behavioral response (A modified version of Chamber Price Pain Rating Scale (CPPRS) and A modified version of Johansson Pain-o-meter (JPOM). As expected, no significant difference was founded before intervention in relation to post cesarean pain intensity among the massage and control groups. However a significant difference was obviously monitored between the two groups immediately after the intervention. Where, the Pain intensity score immediately after foot and hand massage were significantly lower than those before it, vise versa among women of the control group.

These results are in line with the study conducted by Saatsaz et al (2016), titled " Massage as adjuvant therapy in the management of post – cesarean pain and anxiety: a randomized clinical trial" in Iran, which indicated that significant reduction was observed in the intensity of pain immediately after massage ⁽²⁶⁾. Such similarities among the result of the current study can be attributed to what is elicited in the literature about the possible positive physiological and psychological effects of massage to reduce pain intensity. These include: improvement of circulation, relaxation of muscles stimulation of the lymphatic system, speeding up the elimination of waste products, helping digestion, inducing sleep, enhancing mental and physical relaxation, encouraging the release of emotional tension and thereby encouraging communication⁽²⁷⁾.

Also the present finding is similar to the findings of study conducted by xue et al (2016), titled "post operative foot massage for patient after cesarean delivery" in China, the study results revealed that the pain intensity score obtained 60 min after massage was significantly lower in the study group than the control group. So, it was concluded that post operative foot massage can reduce pain intensity after cesarean delivery⁽²⁸⁾.

Moreover, the present finding is matching with the study matches with the study of El- Shehata et al (2016) on " Effect of foot pressure points on pain level among patients after abdominal surgery " in Menoufia, Egypt, which revealed that there was a statistically significant decrease of subjective pain score among the study group rather than the control group after interference and Ahmed et al (2012) in Mansura Egypt; investigated the utilization of natural measures on relieving post cesarean pain. They reported that there was a statistically significant difference in the mean of pain level among the study and control groups ^(29, 30).

Promotion of early initiation of breast feeding has great potential, worldwide 22 percentage of neonatal mortality can be prevented of breastfeeding initiated within an hour after birth. UNICEF, WHO, WABA and all other government agencies recommend that breast feeding should be initiated in the first hour of birth⁽³¹⁾. Breast milk is the natural first food for babies, it provides all the energy and nutrients that the infant needs for the first months of life, and it continues to provide up to half or more of a child’s nutritional needs during the second half of the first year, and up to one-third during the second year of life. Breast milk promotes sensory and cognitive development, and protects the infant against infectious and chronic diseases. Reflexology as an effective tool in relaxing mothers, allowing a more nurtured body, mind and spirit, which in turn help establish and maintain lactation⁽³²⁾. However, limited evidence suggests some beneficial effects of foot and hand massage on breast milk supply. The present study aimed to assess the effect of foot and hand massage on initiation of breast feeding ⁽³³⁾.

The result of the present study showed that a highly statistically significant difference (P=0.000) between study and control groups in relation to evaluation of success of breast feeding where a half of study group had successful breast feeding compared to only 2.5% among control group.

The present result is similar to the results of Tipping L et al (2002), who did investigate the effect of reflexology on homeostasis and milk production, they had reported that the reflexology has been shown to increase milk, such that performing reflexology three times a week for 21 days resulted in 10 ml of milk secretion among mothers⁽³⁴⁾.

In addition, this finding is also in agreement with the study of SavabiEsfahani M et al (2015), who assessed the effect of acupressure on the volume of milk among mothers, they concluded that the difference in mean breast milk volume in 2 and 4 weeks after acupressure on depression related acupressure points was statistically significant in acupressure group ($p < 0.001$)⁽³⁵⁾.

Such similarity between the finding of the current study and the mentioned studies can be attributed to what is elicited in the literature Reflex zone stimulation may be one of the most effective natural healing method which uses pressure points, touch or massage in certain location on the feet with the goal of improving the health and promotion relaxation in turn can promote lactation in breastfeeding mothers. And its ability to induce a relaxed state in the body has been found to assist postpartum mothers with milk production.⁽³⁶⁾

Latch breast feeding assessment scale is widely used in assessing breast feeding. The latch tool appears most useful in objective scoring of effective breast feeding. The present study founded that a highly statistically significant difference ($P=0.000$) between study and control groups in relation to evaluation of latch on the breast, the most of the study subject had successful latch on the breast compared to only 10 % among the control group, from my point of view it can be attributed to the study group experienced lower pain after intervention than the control group which allow the mother to use the appropriate breast feeding position and applying the steps of breast feeding without pain.

The finding of the present study is in matching with Laura Thomas et.al, (2007), who conducted a study to assess the effectiveness of therapeutic reflexology to support breastfeeding and increase lactation. They concluded that therapeutic reflexology nurtures the body, mind and spirit, reduces stress, and aids hormonal balance, thereby helping to alleviate the problem of insufficient milk supply⁽³⁷⁾.

When discussing the time of starting the breast feeding among the both groups, the present study was noticed that a highly statistically significant difference ($P=0.000$) between the study and control groups, where less than two thirds of the control group not started breast feeding compared to completely absent among the study group.

The results of the present study agree with the results of Sakha & Behbahan (2005), who conducted a study on the effects of caesarean section on breastfeeding, they reported that there was a significantly lower postpartum prolactin level in the caesarean section group. The median time of breastfeeding initiation was 12 hours after birth for caesarean section group⁽³⁸⁾.

The present study revealed that less than two third of the study group had from 10 to 20 minutes in the duration of breast feeding compared to more than two thirds of the control group had from 5 to 10 minutes in the duration of breast feeding. The results of the present study is congruent with the results of Sakha & Behbahan (2005), who concluded that Caesarean section was an important hazard for a shorter duration of breastfeeding within one year after childbirth⁽³⁸⁾.

Finally, the findings of the present study showed that the intensity of pain was negatively correlated with the success of breast feeding and evaluation pickup of the breast feeding, while it was positively correlation between success of breast feeding and evaluation pickup of the breast feeding. The result of the current study is in harmony with Karlstrom A et al (2007), who investigated the post operative pain after cesarean birth affects breastfeeding and infant care; they concluded that post operative cesarean pain negatively affected infant care and breast feeding⁽³⁹⁾.

Moreover, the result of the present study is similar to the result of Alizadeh S et al (2017), who assessed the effect of foot reflexology massage on breast milk volume of mothers with premature infant, they showed that positive effect of foot reflexology on increasing breast milk of premature infants' mothers.⁽⁴⁰⁾

According to the results, it can be concluded that the foot and hand massage can be used as an effective intervention to decrease the post operative cesarean pain and promote the initiation of breast feeding. Foot and hand massage is a simple, no reported side effects and highly acceptance, so it should be available, whenever applicable to women, as one of the options for analgesia after cesarean section.

V. CONCLUSION

Based on the findings of the present study, it can be concluded that:

1. Hand and foot massage after cesarean section appears to have a remarkable effect on post-cesarean pain quality and initiation of breast feeding as measured by JPOMS i.e. affective and sensory pain responses (as reflected by Pain – rating Index rank) were significantly lowered after intervention and increase initiation of breast feeding.
2. Hand and foot massage after cesarean section was likely to have an outstanding decline in intensity of post-cesarean pain as measured by CPPRS. i.e. behavioral manifestation or responses to post-cesarean pain significantly decreased among women after application consequence increase initiation of breast feeding. Therefore, hand and foot massage can be a cost effective independent nursing intervention and a new useful safe method that can be used to decrease post-cesarean pain which in turn will improve the quality of women's post-cesarean experience. Thus, it can be encouraged as a beneficial non-medical approach in obstetric practice.

Recommendations Based on the findings of the present study, the following recommendations are suggested:

1. Hand and foot massage should be advocated as a non-pharmacological approach for management of post-cesarean pain
2. Hand and foot massage should be recommended in hospital protocols for management of post-cesarean pain.
3. Training should be disseminated for obstetric nurses and midwives to utilize the hand and foot massage for obstetric indications, since it is non-invasive, efficient and easy to use.

Further researches are recommended where replication of the current study on a larger population size and different settings for the purpose of better generalization. Assessment of women's satisfaction with the use of non-pharmacological techniques for management of post-cesarean pain, especially hand and foot massage.

REFERENCES

- [1] Kumar A, Lalitha R, Chitra M. effect of reflex zone stimulation on lactation among postcesarean mother's at srimakrishna hospital colmbatore. Available at: URL: <http://repository-/3tnmgrumu.ac.in/6293/1/3003041deepthi.pdf>.
- [2] Majzoobi M, Pouya F, Biglari M, and Poorolajal J. Comparing quality of life in women after vaginal delivery and cesarean section. *Journal of Midwifery and Reproductive Health* 2014; 2(4):207-14.
- [3] Ward S, Hisley S, Kennedy A. *Maternal child nursing care*. 2nd ed. USA: Davis Company, 2016;473-79.
- [4] Sofaer B. *Pain principles, practice and patient*. 3rd ed. United Kingdom: Stanley Thornes Publishing, 2003;14-15.
- [5] Hazinski M. *Nursing care of the critically ill child*. 3rd ed. USA: Elsevier, 2013; 78-84.
- [6] Chin E. *The Symptom experience of postpartum pain after cesarean birth*. Published dissertation .University of Illinois at Chicago. 2012 .
- [7] Hobbs A, Mannion C, Brokway M, rough S. the impact of ceasearean on breast feeding initiation, duration and difficulties in the first four monthes postpartum. Available at: URL: <http://www.ncbi.nlm.nih.gov/pmc/articles/pmc4847344>.
- [8] Davim RM, Torres GV, Melo ES. Non-pharmacological strategies on pain relief during labor: pre-testing of an instrument. *Rev Latino-Am Enfermagem*. 2007; 15(6):1150-56.
- [9] Lowdermilk D, Perry S, Cashion K, Alden K. *Maternity women and health care*. 11th ed. China: Elsevier, 2016;382-88.
- [10] Wong D, Hockenberry M, Perry S. *Maternal child nursing care*. 5th ed. London: Mosby Company, 2014; 356-58.
- [11] Parikh K, Batheti D. *Analgesia and anesthesia in labor and delivery*. London: Japeebrothers medical publishers, July 2013;1(2)377-78.

International Journal of Novel Research in Healthcare and Nursing

 Vol. 6, Issue 2, pp: (1255-1271), Month: May - August 2019, Available at: www.noveltyjournals.com

- [12] Irani M, Kordi M, Tara F, Bahrami H. Effect of hand and foot massage on post-caesarean pain and anxiety. *Journal of midwifery and reproductive health*. 2015;3(4):465-471.
- [13] Salvo S. *Massages therapy: principle and practices*. 5th ed. Canada, Elsevier: 2016; 11-20.
- [14] Sinha A. *Principle and practice of therapeutic massage*. 2nd ed. India: Jypee brothers, medical publisher, 2009;108-9.
- [15] Dryden T, Moyer C. *Massage therapy*. 1st ed. Integrating research and practice. USA: Human Kinetics, 2012; 85.
- [16] Demetriou A, Cayle-Demetriou M. *Integrating complementary and conventional medicine*. 1st ed. Oxford, New York: Radcliffe Publishing, 2016;78-90.
- [17] Shephard R. *An illustrated history of health and fitness from pre-history to our post modern world*. 1st ed. UK: Springer, 2015;644-45.
- [18] Embong NH, Soh YC, Ming LC, Wong TW. Perspectives on reflexology: A qualitative approach. *J Tradit Complement Med*. 2016 Dec 3; 7(3):327-331.
- [19] Alrifia R. Trend of caesarean deliveries in Egypt and its associated factors evidence from national surveys 2005-2014. 2017 Dec. (17):417.
- [20] Ludington E. Statistical analysis of total labor pain using visual analogue scale and application of analgesic effectiveness during child birth. *International anesthesia, research society journal* 1998;87 (7) 723 -7.
- [21] Walsh L. *Midwifery community based care during child bearing years*. Philadelphia, W.B. Saunders company, 2001.100-10.
- [22] Johansson F. Measurement of pain: the psychometric properties of the Pain-O-Meter, a simple, inexpensive pain assessment tool that could change health care practices. *J Pain Symptom Manage*. 1996;12:172-81.
- [23] Matthews M. Developing an instrument to assess infant breastfeeding behavior in early neonatal period. *Midwifery* 1988; 4:154-65.
- [24] Adams D, Hewell S. Maternal and professional assessment of breastfeeding. *Journal of Human Lactation* 1997; 13:279-83.
- [25] Sakalis, V., William, T., Hepworth, G., Hartmann, P., & Tamimi, G. (2013). A comparison of early sucking dynamics during breast feeding after cesarean section and vaginal birth. *Breastfeeding Medicine*, 8, 79-85. <https://doi.org/10.1089/bfm.2012.0018>
- [26] Saatsaz S, Rezaei R, Alipour A, Beheshti Z. Massage as adjuvant therapy in the management of post-caesarean pain and anxiety: A randomized clinical trial. *Complementary Therapies in Clinical Practice*. 2016 ;24:92-8. doi: 10.1016/j.ctcp.2016.05.014.
- [27] Ball A, Medforth J, Stables S, Walker J. *Oxford handbook of midwifery*. 3rd edition. Congress library. Oxford university ;2017: 90-4.
- [28] Xue M, Fan L, Ge LN, Zhang Y, Ge JL, Gu J, Wang Y, Chen Y. Postoperative Foot Massage for Patients after Caesarean Delivery. *Z Geburtshilfe Neonatol.* 2016;220(4):173-8. doi: 10.1055/s-0042-104802. Epub 2016 Aug 10
- [29] El-Shehata A, Abd-Elsalam E. Effect of foot massage on pain level among patients after abdominal surgery. *Journal of Nursing and Health Science* 2016;5(2): 18-24
- [30] Ahmed H. Investigate the utilization of natural measures on relieving post caesarean pain. *Asian Journal of Nursing Education and Research*, 2012; 4(4):383-290.
- [31] Woods A, Crist B, Carroll J and Warren J. A cross-sectional analysis of the effect of patient controlled epidural analgesia versus patient controlled analgesia on post-caesarean pain and breastfeeding. *Journal of Obstetrics, Gynecology and Neonatal Nursing* 2012; 41 (3): 339-346.

- [32] DeChateau P, Wiberg B. Long term effect on mother-infant behaviour of extra contact during the first hour postpartum. *Acta Paediatrica*.
- [33] Amanda Gwynne long. Reflexology in Pregnancy and Birth. Available from: <http://www.highlandholistics.co.uk/Reflexology.pdf>.
- [34] Tipping L, Mackereth P. A concept analysis: The effect of reflexology on homeostasis to establish and maintain lactation. *Complement Ther Nurs Midwifery* 2000;6:189-98.
- [35] SavabiEsfahani M, Berenji-Sooghe S, Valiani M, Ehsanpour S. Effect of acupressure on milk volume of breast feeding mothers referring to selected health care centers in Tehran. *Iran J Nurs Midwifery Res* 2015;1:7-11.
- [36] Illingworth RS. Abilities and reflexes of the newborn in The development of the infant and young child: Normal and abnormal. Available from: ([http:// www.pubmed. Com](http://www.pubmed.com))
- [37] Laura Thomas. Reflexology to Support Breastfeeding and Increase Lactation. Available from: [www.mamatoto.co.za/reflexology –breastfeeding](http://www.mamatoto.co.za/reflexology-breastfeeding).
- [38] Sakha, k. & .Behbahan, A.G. The onset time of lactation after delivery. *Medical Journal of the Islamic Republic of Iran*. 2005; 2(19) 135-137.
- [39] Karlström A1, Engström-Olofsson R, Norbergh KG, Sjöling M, Hildingsson I. Postoperative pain after cesarean birth affects breastfeeding and infant care. *J Obstet Gynecol Neonatal Nurs*. 2007;36(5):430-40 .DOI: 10.1111/j.1552-6909.2007.00160.
- [40] Alizadeh-Charandabi S, Mirzaie P, Goljarian S, Mirghafourvand M, Hoseinie MB. The effect of foot reflexology massage on breast milk volume of mothers with premature infants: A randomized controlled trial. *European Journal of Integrative Medicine*. 2017;17:72-8. doi: <https://doi.org/10.1016/j.eujim.2017.11.010>.