

Application of Foot versus Hand Massage for Relieving Post Cesarean Section Incisional Pain

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Abstract

Aim of the study: the study aimed to investigate the effect of foot and hand massage for relieving post-Cesarean section incisional pain. **Subjects and methods:** **Setting:** This study was conducted in the department of obstetrics and gynecology (postnatal ward) of El-Manzala General Hospital at Aldakahlia Governorate, Egypt. **Design:** Quasi-experimental research design was used to achieve the aim of the current study. **Sampling technique:** Convenience sampling **Sample:** The sample size was estimated to be 159 subjects divided into 3 groups (53 mothers for each group). **Tools:** Four data collection tools, An interviewing structured questionnaire, Numerical rating scale; Modified McGill pain questionnaire short form (SF-MPQ), and Likert Scale. **Results:** showed that, a statistically significant difference in mean of pain level among study groups at 2, 4, 6 hours post cesarean section; after one hour of the third session mean score of pain significantly decreased in all studied groups foot, hand, foot & hand massage groups (4, 4.58, and 3.24 respectively) where $p = (<0.05)$. Foot and hand massage group had significantly lower pain scores than the other two groups. **Conclusion:** highly statistically significant improvement in pain score post-intervention compared to pre-intervention of application foot massage, hand massage, and foot & hand massage. **Recommendations:** Using of foot and hand massage for relieving post-Cesarean section incisional pain.

Keywords: Foot and hand massage, Incisional pain, post cesarean section, and Relieving pain

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I. Introduction

Cesarean Section (CS) is a surgical procedure used to deliver a baby through incisions in the abdomen and uterus, often performed because vaginal delivery would put the baby or mother at risk (Hogan et al., 2020). The Egyptian Demographic health survey (EDHS) reported that more than one-half of deliveries (52 %) in the five-year period before the survey were by Caesarean section (Elnakib et al., 2019).

Pain is an unpleasant condition experienced during the postoperative period, which has been experienced by most women. Pain stimulus can be physical or psychological; therefore, it can be caused by the surgical wound, including post-cesarean section incisional pain (Cegolon et al., 2020).

Therefore, relieving post-cesarean pain is an issue that cannot be ignored. There are several pharmacological methods to control pain and non-pharmacological methods of pain management (ACOG, 2018). The accepted non-pharmacological methods reflexology (a form of foot and hand massage that targets points on the foot and hand which are believed to correspond with body parts) (Kim, et al., 2020). Massaging the feet and hands stimulates the mechanoreceptors that activate the non-painful nerve fibers which prevent pain transmission from reaching consciousness (Lei et al., 2020).

Nurse has a role to control and relieve acute postoperative pain by using both pharmacologic and non-pharmacologic approaches. Foot and hand massage are alternatives non-pharmacologic pain management may have the potential to improve the outcome of pain management. Foot and hand massage can be applied independently by the nurse, does not need a prescription from the doctor, and does not need special equipment (Youssef and Diab, 2017 & Manjula, 2016).

Significance of the study:

Effective postoperative pain control can be achieved through non-pharmacological therapies. Massage is one of the most widely used as complementary therapies in nursing practice. Foot and hand massage have the potential to aid pain relief (Zaied et al., 2017). Foot and hand massage was a nursing concern because they were inexpensive, no harm to mother and neonate, and can be utilized without medical prescription. So, each nurse, a

midwife can apply safely among women undergoing Cesarean section birth. The application of foot and hand massage on relieving pain wasn't studied before at Suez Canal University, so this study was conducted to evaluate the application of foot and hand massage on relieving post-cesarean section incisional pain.

II. Subject and Methods

2.1. The aim of the study: The aim of the study is to investigate the effect of foot versus hand massage for relieving post-cesarean section incisional pain.

2.2. Study design: Quasi-experimental research design was used in this study.

2.3. The sample of the study: 159 women were recruited in the study. The sample was divided into three groups: first group for foot massage, second group for hand massage while the third intervention group for foot and hand massage (53 for each group).

Power of study estimation

The sample size was calculated using Epi-save software (WHO, 2014) to conduct a comparative study to evaluate the effect of foot and hand massage on relieving post-cesarean section incisional pain. The estimated sample size is made at the assumption of 95% confidence level and 80% power of the study. The sample size was estimated to be 153 subjects approximately 159 subjects (included in the study to detect the change of pain score from 2.5 ± 1.4 to 1.8 ± 1.1) (Abd Elhaleem et al., 2013).

2.4. Study setting: The study was carried out at the postnatal ward of the obstetrics and gynecologic department in Elmnzala General Hospital in Elmnzala city at Aldakahlia Governorate, Egypt.

2.5. Research Hypothesis: Application of foot and hand massage had soon significant improvement on relieving post-cesarean section incisional pain.

2.6. Tools of data collection:

2.6.1. Tool (1): A structured interview questionnaire:

It covered: a) socio-demographic characteristics of mothers as (personal data, name, age, education, occupation), b) obstetrical history of women as gravidity, parity, method of last delivery, number of previous cesarean section, the experience of previous post-cesarean section pain.

2.6.2. Tool (2): Numerical rating scale

Is a pain assessment scale with fixed scale steps, a linear line with marks spaced (1) cm apart ranging from 0 (no pain) to 10 (worst pain imaginable) pain degree.

Scoring system of Numerical rating scale:

No pain (0), mild pain from (1 to 3), moderate pain from (4 to 6), severe pain from (7 to 9), and worst pain imaginable (10). It is widely preferred by national and international investigators for its applicability and clarity in determining the pain intensity of mothers before and after intervention (Basyouni et al., 2018).

2.6.3. Tool (3): Modified McGill pain questionnaire short form (SF-MPQ) (Dworkin et al., 2009):

This scale was used to assess pain characteristics. This tool consists of (14) words that measured pain description pre and post-intervention: palpating pain, shooting pain, stabbing, sharp, cramping, burning sensation, aching, heavy, tender, cutting, tiring, exhausting, fearful, and punching pain.

2.6.4. Tool IV: Likert Scale: It was used to assess mothers' satisfaction towards pain management at 7 hours post-cesarean section. The scale scores are; satisfied = 1, slightly satisfied = 2 and dissatisfied = 0 (Allen et al., 2007).

2.6.5. Reliability of the Tool:

The tool was assessed by using Cronbach's alpha to check the internal consistency, tool I Structure interviewing questionnaire was 0.78, tool II Numerical rating scale was 0.81, tool III Modified McGill pain questionnaire short form was 0.84, finally tool IV Likert scale was 0.79.

2.7. Field work:

The collection of data covered 11 months from October 2018 until August 2019. The investigator attained the study setting during the working days (3 days per week). From the department of obstetrics and gynecology (postnatal ward). During the day work, the investigator has visited the department of obstetrics and gynecology (postnatal ward) from 9 AM to 9 PM. after that the mother was selected from mentioned setting according to the previous criteria. Firstly, the aim of the study was explained to the mother and their oral consent was obtained individually.

Initially, the investigator established a friendly relationship with the mother and explained the procedure simpler, and replied to their questions. Pre CS, Structured interview questionnaire was filed. Then; the mother was asked to lie back on the bed and the researcher, after washing her hands and cleaning the mother's feet or /and hands with a wet towel, performed the massage intervention. The main specialized massage techniques included rotational friction movements, stretching, grasping, and flexing on different parts of hands and feet from wrist to toes without focusing on a certain point (Youssef and Diab, 2017).

The **first intervention group** was received a foot massage for 10 minutes 5 minutes for each foot; while **the second intervention group** was received a hand massage for 10 minutes (5 minutes for each hand). **The third intervention group** was received a post-cesarean section foot and hand massage for 20 minutes (5 minutes for each). Foot and hand massage was applied three times during 2nd , 4th , 6th hours after CS the investigator measure the level of pain before the massage session and immediately after massage and after one hour of massage.

The technique of foot and hand massage: The mother was asked to avoid talking during the massage unless necessary. The investigator applied the massage without using any equipment, which includes petrissage, kneading, and friction applied to the patient's hands and feet using classical massage techniques (**Zaied et al ., 2017**).

Foot 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. The knuckles of one hand stroked the sole with an up-and-down motion. The heel and ankle were kneaded between the researcher's thumb and forefinger. The pillow support was removed to finish the massage (**Youssef and Diab, 2017**).

Hand massage: The researcher held the mother's hand gently in one of her hands. The researcher used thumb and fingers to make circles over the mother's entire palm, all fingers, and the outer surface of the hand. The researcher's fingers spread the palm. Hand massage applied to each hand for 5 minutes avoiding the area of cannula (**Zaied et al., 2017**). The investigator has assessed the level of pain intensity of the mothers by **Numerical rating scale** and recorded three times every session of foot and hand massage (before and immediately post-massage and after one hour of massage). Pain description was assessed pre and post-intervention by **Modified McGill pain questionnaire short form**. The measurements were been repeated and noted pre and post the intervention. Mother's satisfaction was also assessed by using the **Likert Scale** after three sessions of massage.

2.8. Administrative design:

Official permission was obtained by submission of an official letter from the Faculty of Nursing to the responsible authorities of the El Manzala General Hospital and the chairman of the obstetric & gynecological department to obtain the approval to conduct this study.

2.9. Ethical considerations:

Full details and explanations of the aim of the study were provided to the participants focusing on the confidentiality of the personal information and the importance of the study. Oral consent was taken from the participants after confirming that they can withdraw from the study at any time.

2.10. Statistical design:

The collected data was coded, organized, categorized, tabulated, computerized and analyzed using statistical package of the social sciences (SPSS) software program version 25.

III. Results

Table (1): Frequency distribution among the studied groups regarding to their sensory pain description post cesarean section pre and after intervention.

Sensory pain description	Foot Massage (n=53)				χ^2	p-value	Hand Massage				χ^2	p-value	Foot & Hand Massage (n=53)				χ^2	p-value
	Pre		Post				Pre		Post				Pre		Post			
	N	%	N	%			N	%	N	%			N	%	N	%		
Palpitations	6	11.3	26	49.1	5.614	.000**	8	15.1	19	35.8	2.840	.006**	5	9.4	29	54.7	4.943	.000**
Shooting	4	7.5	0	0.0	2.060	.044*	3	5.7	0	0.0	1.766	.048*	7	13.2	0	0.0	2.813	.007**
Stab	51	96.2	0	0.0	36.41	.000**	52	98.1	46	86.8	2.197	.033*	51	96.2	0	0.0	36.41	.000**
Sharp	7	13.2	0	0.0	2.813	.007**	3	5.7	17	32.1	3.667	.001**	49	92.5	1	1.9	14.35	.000**
Spasticity	9	17	45	84.9	9.688	.000**	8	15.1	46	86.8	10.53	.000**	9	17	53	100	15.94	.000**
Heat and burning sensation	23	43.4	33	62.3	2.017	.049*	21	39.6	3	5.7	5.171	.000**	22	41.5	8	15.1	3.435	.001**
Ache	22	41.5	53	100	8.560	.000**	20	37.7	53	100	9.263	.000**	18	34	31	58.5	2.442	.018*
Heaviness	40	75.5	14	26.4	7.076	.000**	43	81.1	19	35.8	6.111	.000**	42	79.2	0	0.0	14.09	.000**
Tender	26	49.1	0	0.0	7.076	.000**	24	45.3	8	15.1	4.742	.000**	27	50.9	0	0.0	7.348	.000**
Intermittent	27	50.9	3	5.7	6.560	.000**	30	56.6	8	15.1	6.075	.000**	28	52.8	0	0.0	7.632	.000**
Tired, exhausted	18	34	2	3.8	4.742	.000**	18	34	3	5.7	4.531	.000**	17	32.1	0	0.0	4.955	.000**
Nasty	10	18.9	0	0.0	3.478	.001**	12	22.6	0	0.0	3.901	.000**	10	18.9	0	0.0	3.478	.001**
Scary	20	37.7	0	0.0	5.614	.000**	23	43.4	5	9.4	5.171	.000**	17	32.1	0	0.0	4.955	.000**
Severe punishment	15	28.3	2	3.8	4.111	.000**	17	32.1	7	13.2	3.478	.001**	13	24.5	0	0.0	4.111	.000**

(*) Statistically significant at p<0.05. (**) highly statistically significant at p<0.01.

Table (1) indicates that, there were statistically significant difference between pre- and post-implementation of an intervention regarding sensory pain description in all studied groups (P= < 0.05).

Table (2): Frequency distribution among the studied sample (foot massage group) pre, post and after one hour of massage at three session regarding to level of pain (n=53).

Levels of pain	First session						Second session						Third session						χ^2	p-value
	Pre		Post immediately		After one hour		Pre		Post immediately		After one hour		Pre		Post immediately		After one hour			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
Mild	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	5.7	21	39.6	41.08	.000**
Moderate	0	0.0	4	7.5	24	45.3	53	100	53	100	53	100	53	100	50	94.3	32	60.4		
Severe	53	100	49	92.5	29	54.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0		
	$\chi^2 = 22.26$ p-value= .000**						$\chi^2 = 15.32$ p-value= .009**						$\chi^2 = 34.61$ p-value = .000**							

(*) Statistically significant at p<0.05. (**) highly statistically significant at p<0.01.

Table (2) reveals that there is highly significant decrease in the level of pain immediately, post and after one hour of intervention comparing to pre-intervention in the three sessions of intervention for foot massage group, where p= (<0.01). Also, there is highly significant decrease in the level of pain after the third session comparing to first and second session, where p= (<0.01).

Table (3): Frequency distribution among the studied sample (hand massage group) pre, post and after one hour of massage at three session regarding to level of pain (n=53).

Levels of pain	First session						Second session						Third session						X ²	p-value
	Pre		Post immediatel y		After one hour		Pre		Post immediatel y		After one hour		Pre		Post immediatel y		After one hour			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
Mild	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	5	9.4	26.37	.002**
Moderate	0	0.0	4	7.5	21	39.6	43	81.1	53	100	53	100	53	100	53	100	48	90.6		
Severe	53	100	49	92.5	32	60.4	10	18.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0		
	$\chi^2 = 27.64$ p-value= .000**						$\chi^2 = 18.25$ p-value= .005**						$\chi^2 = 26.31$ p-value = .000**							

(*) Statistically significant at p<0.05.(**) highly statistically significant at p<0.01.

Table (3) shows that there is highly significant decrease in the level of pain immediately, post and after one hour of intervention comparing to pre- intervention in the three sessions of intervention for hand massage group, where p= (<0.01). Also, there are highly significant decrease in the level of pain after the third session comparing to first and second session, where p= (<0.01).

Table (4): Frequency distribution among the studied sample (foot and hand massage group) pre, post and after one hour of massage at three session regarding to level of pain (n=53).

Levels of pain	First session						Second session						Third session						X ²	p-value
	Pre		Post immediate ly		After one hour		Pre		Post immedi ately		After one hour		Pre		Post immidia tely		After one hour			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
Mild	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	13	24.5	27	50.9	38.32	.000*
Moderate	0	0.0	23	43.4	30	56.6	43	81.1	53	100	53	100	53	100	40	75.5	26	49.1		
Severe	53	100	30	56.6	23	43.4	10	18.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0		
	$\chi^2 = 32.07$ p-value= .000**						$\chi^2 = 20.17$ p-value= .002**						$\chi^2 = 30.71$ p-value = .000**							

(*) Statistically significant at p<0.05.(**) highly statistically significant at p<0.01.

Table (4) reveals that there is highly significant decrease in the level of pain immediately, post and after one hour of intervention comparing to pre- intervention in the three sessions of intervention for foot and hand massage group, where p= (<0.01). Also, there are highly significant decrease in the level of pain after the third session comparing to first and second session, where p= (<0.01).

Table (5): Comparison between the studied groups regarding to level of satisfaction (n=53).

Levels of satisfaction	Foot Massage group		Hand Massage group		Foot & Hand Massage group		X ²	p-value
	N	%	N	%	N	%		
Satisfied	18	34	15	28.3	44	83	18.62	.001**
Slightly Satisfied	32	60.3	35	66	9	17		
Not Satisfied	3	5.7	3	5.7	0	0.0		
Mean (Total= 10)	5.98		6.11		7.45			

(**) highly statistically significant at p<0.01.

Table (5) indicates that there is high significant difference between three group regarding their level of satisfaction at (p=<0.01). Foot & hand massage group was more satisfied than other groups (mean= 7.45).

IV. Discussion

The aim of this study was significantly approved within this framework of the present study hypothesis, which was that application of foot, and hand massage has soon significant improvement on relieving post-cesarean section incisional pain. This hypothesis was significantly approved because there was a highly statistically significant difference in the mean pain score between three intervention groups pre and post-intervention. This difference demonstrated that foot and hand massage could reduce the pain intensity. This result agrees with **Abbaspoor et al., 2014** who measure the pain intensity before, immediately, and 90 minutes after conducting 5 minutes for each foot and hand massage and reported that the pain intensity was reduced after the intervention compared with the intensity before the intervention.

Concerning the studied sample about their sensory pain description post-cesarean section pre and after intervention (table 1), the present study revealed that there is a marked difference in sensory pain description of foot massage group at post-implementation of intervention with statistically significant difference between pre- and post-implementation of intervention at the third session.

This result was in agreement with **Zaied et al., 2017** who applied 20 minutes of hand and foot massage through 1st session 6 hours post-operative, 2nd session 12 hours Post-Cesarean and reported that before massage application, both groups had almost similar descriptions, described their pain as tearing before massage decreased dramatically to a very small proportion after massage. A highly significant reduction of post-cesarean pain intensity was noticed within the experimental group.

Concerning the effect of application of 10 minutes foot massage for each session (first group) pre, post, and after one hour of massage at three sessions about the level of pain (table 2), the present study revealed that there is highly statistically significant difference related to the level of pain at three sessions. In the first session (post 2nd hour of CS), all studied mothers had severe pain before massage where improve to the majority of them at post-massage and more than half after one hour of massage. While in the second session (post-4th hour of CS) all studied groups had moderate pain and changed in the third session (post-6th hour of CS) to less than two-thirds of them after the intervention.

This result agreed with **Dorosti et al, 2019** who apply 10 minutes of foot massage 6 hours post-cesarean pain and reported that the level of pain was significantly reduced in the intervention group after the intervention.

Concerning with level of pain pre, post and after one hour of applied 10 minutes hand massage (hand massage group) at three sessions (table 3), the present study showed that there was a significantly decreased level of pain immediately and after one hour between the hand massage group at three sessions. In addition, the level of pain was progressively decreased over time with the highly statistically significant difference among the first, second, and third sessions.

This result was in agreement with **Tan, 2014** who investigated the effect of 10 minutes of hand massage on post-cesarean section pain and reported that pain decreased significantly before and after intervention in the study group within the first 24 hours after cesarean section.

Concerning with level of pain pre, post, and after one hour of applied 20 minutes foot and hand massage (foot and hand massage group) (table 4), the present study showed that there was a significant decrease in the level of pain immediately and after one hour between the foot and hand massage group at first, second and third massage session. In addition, the level of pain was progressively decreased over time with the highly statistically significant difference among the first, second, and third sessions.

This result relatively agrees with **Yunitasari et al., 2018** who investigated the effect of 20 minutes hand and foot massage and combination on pain intensity post-cesarean section and reported that in the hand and foot massage group before the intervention, the pain intensity was severe controlled pain, while after the intervention was obtained changes in pain intensity moderate pain and there was a significant difference between pain intensity before and after the intervention. From the research point of view, the application of foot and hand massage for 20 minutes at three sessions decreased pain intensity.

Concerning with comparison between the studied mothers about the level of satisfaction (table 5), the present study showed that there is a highly significant difference between the three groups regarding their level of satisfaction. In the foot massage group, more than one-third of mothers had satisfied while more than one quarter was in the hand massage group and most of the foot and hand massage group .

This result with the agreement with **Tan, 2014** who applied 10 minutes of hand massage among postpartum mothers" and found that the studied mothers were satisfied and comforted with hand reflexology as an intervention. In the same line, **Abd Elhaleem et al., 2013** results found that statistically significant difference between the two groups; more than two-thirds of the intervention group satisfied with post-cesarean incisional pain management versus less than quarter in the control group after applying 10 minutes of foot massage post-cesarean pain.

V. Conclusion:

Up on findings of the present study, there was higher statistically significant improvement in pain score post-intervention compared to pre-intervention of application foot massage, hand massage, and foot and hand massage. These supported the hypothesis and aim of the study. Also, the majority of patients post cesarean section were satisfied with the application of foot and hand massage for relieving post-cesarean section incisional pain.

VI. Recommendations:

Based on the results of the present study, the following recommendations were suggested: Using foot and hand massage for relieving post-cesarean section incisional pain, implementing a training program for nurses on the techniques of foot and hand massage, brochure about a foot and hand massage must be distributed among post-cesarean section mothers. Further researches in this field, replication of the present study on larger sample size and different settings.

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