

Effect of Deep Tissue Massage on Women's Wound Pain, Comfort, and Breastfeeding after Cesarean Section

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Abstract

Background: Pain and delayed breastfeeding initiation is the most typical complications following a cesarean operation, which affect women's comfort. Adverse effects of using medications to relieve pain and lack of access to them for some women have led to an increase in the application of non-drug methods such as massage. **Aim:** To assess the effect of deep tissue massage on women's wound pain, comfort, and breastfeeding after cesarean section. **Design:** The study employed a single-blinded, randomized clinical trial. **Setting:** The study was conducted at the postpartum ward at Women's Health Hospital, Assiut University. **Subjects:** with a convenient sample size of 160 women (divided into two equal groups study and control). **Tools:** Structured interview, Visual Analogue Scale, Postpartum Comfort Questionnaire, and Breastfeeding Assessment Scale Latch LATCH were the four tools used. In the study group, DTM was implemented. **Results:** There is a highly statistically significant difference in wound pain, comfort, and breastfeeding following cesarean section between the study and control groups $p < 0.01$. **Conclusion:** Applying DTM played a vital role in the management of post-cesarean section (CS) pain and improving mothers' comfort, and breastfeeding. **Recommendations:** DTM should be recommended in hospital protocols for the management of post-cesarean pain that leads to improvement comfort, and encouraging breastfeeding.

Keywords: *Breastfeeding, Cesarean Section, Comfort, Deep Tissue Massage & Pain*

Introduction:

A Caesarean section (CS) is a surgical procedure that involves incisions in the mother's abdomen and uterus to deliver one or more infants. This procedure is utilized when abnormal conditions complicate labor and vaginal delivery to the point that the mother's or baby's life or health is compromised (Farag et al., 2019). There are many social, physiological, and emotional changes in women in the post-cesarean period, but the pain is the first finding that occurs after surgery. Further, as a woman's movements are restricted in this period, her comfort is also likely to deteriorate, also there is delayed initiation of lactation due to the presence of pain (Benton et al., 2019).

Pain is typically defined as an unpleasant sensation communicated to the brain via sensory neurons. The discomfort implies that there is 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 (Cohen et al., 2018)

In the profession of midwifery, comfort begins with determining the patient's, families, or community's comfort needs. It, therefore, requires that the necessary measures be taken for the determined comfort needs and that both the basic level of comfort

and the post-intervention levels are evaluated (World Health Organization, 2018).

Many women who give birth through caesarean section are less likely to breastfeed or delay breastfeeding. An important predictor of breastfeeding success has been discovered as nursing within the first hour following birth. Breastfeeding delays following a C-Section are associated with maternal/infant separation, poor suckling ability, decreased neonatal receptivity, and insufficient milk production, all of which are predictors of shorter breastfeeding duration (Johar et al., 2021).

Although the rate of caesarean birth differs by country, it is on the rise globally. Cesarean sections account for over half of all deliveries in Egypt (Hussein et al., 2021). Therefore, it is very important to eliminate the pain and fatigue experienced by women in this period to restore the impaired comfort while also protecting and improving the health of the mother (Farag et al., 2019).

Various non-pharmacological ways have been employed for pain management, creating comfort, and speeding up the healing process in the postpartum period, in addition to pharmacological methods. One of these approaches is massage. After the massage, general relaxation, rest, deep breathing and sleepiness have been observed (Cluny et al., 2020).

Deep tissue massage (DTM) is a therapeutic massage technique that focuses on the body's deep tissues, particularly the muscle, fascia, and connective tissue. This technique is designed to target tense areas (such as the neck, waist, or shoulder) that are causing pain (Gülbahar, & Metin, 2020).

DTM incorporates all of the traditional massage techniques, but its movements are slower and more focused on the tense and painful areas than traditional massage (s). Stretching techniques are used in addition to applied pressure and massage techniques. This technique makes use of finger joints, punches, elbows, and varied positions. Massage aids in the enhancement of nutrient supply in the tissue by boosting circulation, which aids in metabolite excretion and speeds up recuperation. Furthermore, DTM is highly effective in the treatment of strained and shortened muscles, as well as the pain associated with them (Güney & Uçar, 2021).

Maternity nurses provide new mothers and their families with physical care, emotional support, and education. The reduction of pain and stress to promote wellness for the mother and her newborn is critical to this role. Previous research has revealed that unplanned or emergent cesarean deliveries may have a deleterious impact on breastfeeding, particularly in the early postpartum period (Simonelli et al., 2018).

Significant of the study:

The incidence of cesarean section (CS) is quite high worldwide, especially in Egypt (Farag et al., 2019). In Egypt, over 50% of births are delivered by cesarean section (Hussein et al., 2021).

The impact of massage treatment on post-cesarean pain and comfort, on the other hand, has received little research. Given the fact that safe and effective post-cesarean pain treatment methods are critical since the outcomes can affect mothers' early connections with their newborns (Saatsaz et al, 2016). Only a few researches (Güney & Uçar, 2021) have looked into the effect of DTM on pain and comfort levels in women who have had a caesarean section. As a result, the purpose of this study is to see how DTM affects post-CS women's pain comfort and breastfeeding.

Aim of the study:

To assess the effects of deep tissue massage on wound pain, comfort, and breastfeeding after cesarean section.

Research hypothesis:

Implementation of deep tissue massage may reduce women's sensation of wound pain; improve comfort and facilitating the initiation of breast feeding after cesarean section.

Subject and Methods:

Subjects and methods of this study are displayed into four designs technical, operational, administrative, and statistical design.

Technical Design:

Which involved research design, setting, study sample, and tools of data collection.

Research Design:

Single-blinded, randomized clinical trial was used in this study.

Setting:

This study was conducted at the postpartum ward, Women Health Hospital, Assuit, Egypt.

Sample:

A convenient was sample formed of 160 post cesarean section women. The sample size was calculated using the Epi info program with a 95% confidence coefficient, 10% tolerable error, 50% predicted frequency, and population size of 5000. The program revealed a sample size of 154 reproductive women, which was later raised to 160. The sample was divided into two main groups' study (who applied DTM after CS) and control (who received routine hospital care), each group involved 80 postpartum women.

Randomization:

Using the random integer generator method from the "Numbers" subtitle on the Random.org site, a single column with two groups between 1 and 160 was created (Random, 2021). At the beginning of the study, the number of women was assigned to the study or control groups that were determined by drawing lots. Women in the study group were assigned to the number 1 in the column, while women in the control group were assigned to the number 2.

Inclusion criteria:

All women who were admitted to postpartum ward after CS operation at Women Health Hospital, Egypt, with the following criteria.

- Moderate or severe pain according to the Visual Analogue Scale
- Having a single and healthy newborn
- Not reacting badly to any attempt at the touch, such as massage
- Complete and healthy tissue integrity in the area to be massaged
- A healthy, full-term baby with no physical or congenital abnormalities
- Breasts of the mother with normal shape, size, and nipples

Exclusion criteria:

- Cesarean section under general anesthesia
- Any problems diagnosed before or during birth (such as oligohydramnios, preeclampsia, heart disease, diabetes mellitus, or placenta previa)

- The development of any postpartum complications to mother or baby (including bleeding, hypertension, or the requirement of neonatal intensive care).

Tools of the study

There are four tools were used in this study:-

Tool (I): Socio-demographic and obstetric data structured interview

It involved age, occupation, educational level, residence, parity, and abortion.

Tool (II): Visual Analogue Scale (VAS)

Visual Analogue Scale VAS was used to assess pain severity, and the scale was created with the range of 0–10 mm. According to the scale, a score of 0 mm implies that the pain is not at all, whereas mild pain is reported between 1 and 3 mm, moderate pain between 5 and 7 mm, and severe pain between 8 and 10 mm (R.C. Aitken (1969).



Tool (III): postpartum Comfort Questionnaire (PPCQ):

The PPCQ was developed by Karakaplan & Yildiz (2010) to measure the comfort level. The PCQ includes 34 items, related to physical (14 item), psycho-spiritual (10 item), and sociocultural comfort (10 item). The questionnaire was designed with a 5-point Likert scale ranged from “totally disagree” (1 point) to “totally agree” referred to the highest comfort level (5 points). The total score was ranged from 34 (the lowest score) to 170 (the highest score for the scale). The highest total score referred to the highest comfort level, while the lowest total score referred to the lowest comfort level.

Tool (VI): Breastfeeding Assessment Scale Latch LATCH

The breastfeeding Assessment scale was developed by Jenson et al (1994). This scale consists of 5 components (Latch, audible swallow, type of nipple, comfort, and hold), each one was scored from 0-2, so the total score ranges from 0 to 10. Scoring least favorable = (0- 3), favorable = (4 – 6), and most favorable = (7 – 10).

Tools Validity:

A panel of five specialists in the fields of maternity and newborn health nursing, as well as obstetrics and gynecological medicine, examined all tools for clarity and comprehensiveness

Tools Reliability:

Reliability analysis was measured using Cronbach Alpha coefficient and was found to be 0.871 for structured interview questionnaire, 0.814 for Visual Analogue Scale (VAS), and 0.850 for postpartum Comfort Questionnaire (PPCQ) and found 0.780 for Breastfeeding Assessment Scale Latch (LATCH).

Ethical considerations:

- Ethical approval was obtained from the scientific research ethical committee at the Faculty of Nursing, Assiut University.
- Informed consent was obtained from each woman after explaining the purpose of the study.
- Tools of data collection were not touched on the moral, religious, ethical, and cultural aspects of women’s life.
- Confidentiality was maintained, and the researcher explained the purpose of the study to the postpartum women.
- The postpartum women were advised of their right to withdraw from the study at any point.

II) Operational design:

The operational design included the preparatory phase, pilot study, and fieldwork

Preparatory phase:

An official permission was obtained from Women Health Hospital, director in Assiut University, as well as an ethical approval on the ethical committee of the Faculty of nursing at Assiut University. Verbal informed consent was taken from every woman before inclusion in the study. The researcher has received a DTM training program on how to perform DTM, which took a 2weeks duration with two hours daily under the guidance of physiotherapist in physiotherapy department at Assiut University Hospital. Tool (II) was used to assess the level of wound pain before inclusion in the study and no and mild pain was excluded from the study

Pilot study

A pilot study was carried out on 10% (16 women) of the study sample to test the clarity of the study tools. The women participated in the pilot study was involved as there were no modifications done to the tools.

Fieldwork:

Data collection of the study took about 6 months started at the beginning of July 2021 and was completed by the end of December 2021. It involved two phases as the following:

Intervention phase:

- The researcher interviewed the woman at the postpartum ward and collect the data recorded in the questionnaire. The researcher explained the nature of the study and took a woman’s consent to be included in the study.

- Data in the tool (I) was collected from both groups (study and control group) through interviews after 2 hours post-CS.
- The **control group** (80 women) followed the routine hospital care (administration of pain medication).
- For the **study group**, comprise 80 women upon whom DTM was applied by the researcher. The massage was applied through 2 sessions, the first session 2-4 hours postoperative and the second session 6 hours after surgery.
- DTM was applied to the upper back region (trapezius, evator scapulae, Rhomboideus major and minor muscle) of the study group by the researcher.
- DTM was performed in the patients' rooms, and visitors were discharged to ensure privacy.
- Each woman was placed in a side-lying position. The upper leg was positioned to be bent 90° from the knee and hip. The bent leg was supported by a pillow. Generally, each woman was positioned to be comfortable. DTM was performed to the women in the study group for 15–20 minutes. The women in both groups continued to receive routine postpartum care until the study was finished.

Post-intervention:

- Tools II, III, and VI were used to assess pain intensity, comfort status, and breastfeeding latch process respectively for both groups after 6hrs postoperative (after intervention).

Administrative design:

This study was carried out with the approval of Assiut University's faculty of nursing's ethical committee, as well as official permission from the director of Woman Health Hospital. Each woman who participated in the study gave oral informed consent, and confidentiality was ensured. The woman has the option to leave the study at any time.

Statistical design:

Statistical Package for Social Sciences (SPSS) V.26 was used to organize, categorize, code, tabulate, and analyze the acquired data. Numbers, percentages, averages, and standard deviations were used to portray data in tables and charts. T-test was used to compare means. chi square test was used to determine statistical significance. A P-value of <0.05 was considered statistically significant.

Results

Table (1): Socio-demographic characteristics and obstetric history of studied women in the study and the control groups (N=160):

Variable	Study group		Control group		chi-square	
	N(80)	%	N(80)	%	X ²	P-value
Age/ years						
Less than 30 years	33	41.3	29	36.3	0.53	0.468
30 years or more	47	58.7	51	63.7		
Mean age± SD	31.4±4.7		32.1±3.9			
Residence						
Urban	25	31.3	18	22.5	1.97	0.161
Rural	55	68.7	62	77.5		
Educational level						
No education	7	8.7	10	12.5	2.03	0.567
Basic education	12	15.0	16	20.0		
Secondary education	45	56.3	41	51.3		
University or higher	16	20.0	13	16.2		
Occupation						
House wife	69	86.3	71	88.8	0.29	0.592
Occupied	11	13.7	9	11.2		
Parity						
Primi para	18	22.5	15	18.8	0.42	0.518
Multipara	62	77.5	65	81.2		
Previous abortion:						
Yes	4	5.0	7	8.7	1.07	0.302
No	76	95.0	73	91.3		

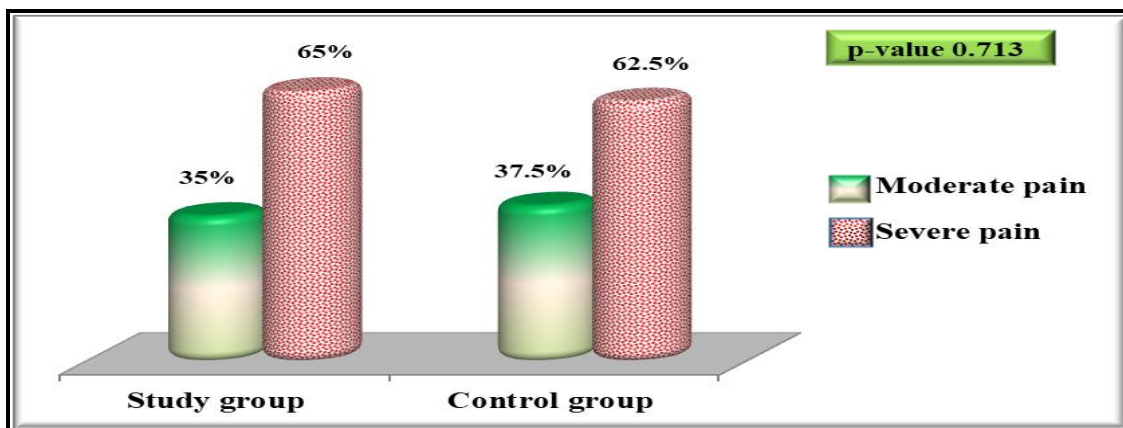
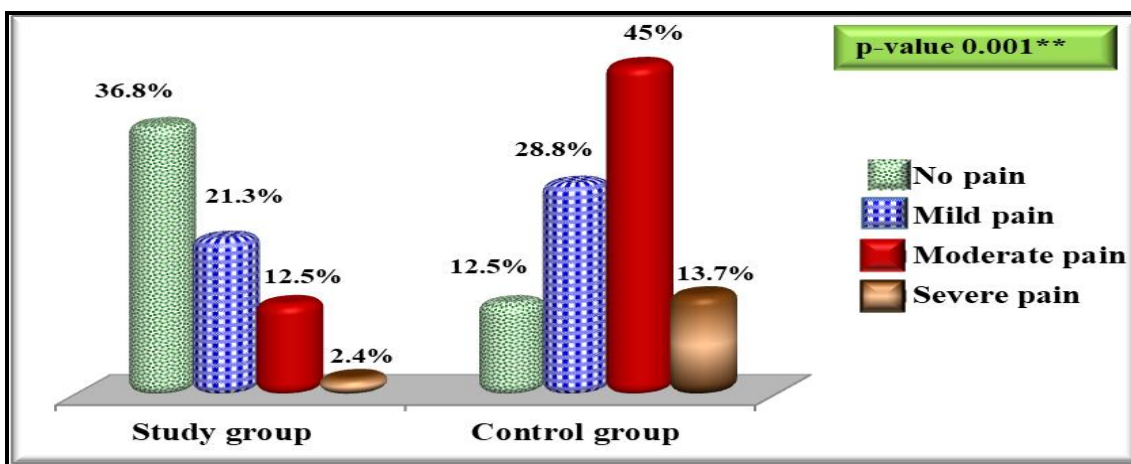


Figure (1): levels of pain in the study and the control groups before intervention (N=160)



(**) Highly statistical significant difference

Figure (2): levels of pain in the study and the control groups after intervention (N=160)

Table (2): Mean and SD of pain score before and after intervention in the study and the control groups (N=160):

	Study group	Control group	T test
	Mean ±SD	Mean ±SD	p-value
Before intervention	7.1 ±2.6	7.3 ±2.7	0.738
After intervention	2.9 ±1.3	4.2 ±3.2	0.001**

(**) Highly statistical significant difference

Table (3): Mean and SD of the study and the control groups regarding postpartum women’s comfort before and after intervention (N=160):

Variable	Study group	Control group	t- test
	Mean ±SD	Mean ±SD	p-value
Before intervention			
• Physical comfort	45.3 ±6.4	46.2 ±6.1	0.671
• Psycho-spiritual comfort	39.1 ±5.3	40.0 ±4.4	0.148
• Sociocultural comfort	38.7 ±6.3	37.9 ±5.6	0.297
Total comfort	123.1 ±6.5	121.1 ±5.7	0.245
After intervention			
• Physical comfort	63.3 ±6.2	50.2 ±4.9	0.037*
• Psycho-spiritual comfort	47.1 ±1.9	42.0 ±4.0	0.001**
• Sociocultural comfort	46.9 ±2.4	41.9 ±5.1	0.001**
Total comfort	157.3 ±3.3	134.1 ±4.7	0.001**

(*)Statistical significant difference

(**) Highly statistical significant difference

Table (4): Breast feeding assessment before and after intervention in the study and the control groups (N=160):

Variable	Study group		Control group		Chi square	
	N(80)	%	N(80)	%	X ²	p-value
Before intervention						
• Most favorable	8	10.0	6	7.5	1.42	0.492
• Favorable	14	17.5	19	23.8		
• Least favorable	58	72.5	55	68.7		
After intervention						
• Most favorable	65	81.2	47	58.8	16.9	0.001**
• Favorable	10	12.5	11	13.7		
• Least favorable	5	6.3	22	27.5		

(**) Highly statistical significant difference

Table (5): Mean and SD of breast feeding assessment score before and after intervention in the study and the control groups (N=160):

	Study group	Control group	t-test
	Mean ±SD	Mean ±SD	p-value
Before intervention	4.2 ±1.8	5.1 ±1.9	0.632
After intervention	7.8 ±2.2	6.1 ±3.2	0.001**

(**) Highly statistical significant difference

Table (6): Relation between socio-demographic characteristics, obstetric history of studied women in the study and the control groups and level of pain before intervention (N=160):

Items	Level of pain before intervention							
	Study group		Chi-square		Control group		Chi-square	
	Moderate (52)	Severe (28)	X ²	p-value	Moderate (50)	Severe (30)	X ²	p-value
	N (%)	N (%)			N (%)	N (%)		
Age/ years Less than 30 years 30 years or more	19(36.5) 33(63.5)	14(50.0) 14(50.0)	3.7	0.054*	21(42.0) 29(58.0)	8(26.7) 22(73.3)	5.19	0.022*
Residence Urban Rural	18(34.6) 34(65.4)	6(21.4) 22(78.6)	4.3	0.037*	9(18.0) 41(82.0)	9(30.0) 21(70.0)	3.9	0.046*
Educational level No education Basic education Secondary education University or higher	5(9.6) 8(15.4) 33(63.5) 6(11.5)	2(7.1) 4(14.3) 12(42.9) 10(35.7)	16.8	0.001**	7(14.0) 8(16.0) 30(60.0) 5(10.0)	3(10.0) 8(26.7) 11(36.7) 8(26.7)	16.6	0.001**
Occupation House wife Occupied	47(90.4) 5(9.6)	22(78.6) 6(21.4)	5.3	0.021*	47(94.0) 3(6.0)	24(80.0) 6(20.0)	8.6	0.003**
Parity Primi para Multipara	6(11.5) 42(88.5)	12(42.9) 16(57.1)	24.9	0.001**	2(4.0) 48(96.0)	13(43.3) 17(56.7)	42.7	0.001**
Previous abortion: Yes No	2(3.8) 50(96.2)	2(7.1) 26(92.9)	1.06	0.305	5(10.0) 45(90.0)	2(6.7) 28(93.3)	0.85	0.356

(*) Statistical significant difference

(**) Highly statistical significant difference

Table (7): Relation between socio-demographic characteristics, obstetric history of studied women in the study and the control groups and breast feeding before intervention (N=160):

Items	Breast feeding before intervention									
	Study group					Control group				
	Most favorable (8)	Favorable (14)	Least favorable (58)	Chi square		Most favorable (6)	Favorable (19)	Least favorable (55)	Chi square	
	N (%)	N (%)	N (%)	X ²	p-value	N (%)	N (%)	N (%)	X ²	p-value
Age/ years										
Less than 30 years	2(25.0)	4(28.6)	27(46.6)	12.04	0.002**	1(16.7)	7(36.8)	21(38.2)	13.6	0.001**
30 years or more	6(75.0)	10(71.4)	31(53.4)			5(83.3)	12(63.2)	34(61.8)		
Residence										
Urban	3(37.5)	5(35.7)	17(29.3)	1.6	0.437	2(33.3)	9(47.4)	7(12.7)	28.4	0.001**
Rural	5(62.5)	9(64.3)	41(70.7)			4(66.7)	10(52.6)	48(87.3)		
Educational level										
No education	1(12.5)	1(7.1)	5(8.6)	26.7	0.001**	1(16.7)	3(15.8)	6(10.9)	4.07	0.667
Basic education	3(37.5)	3(21.4)	6(10.3)			1(16.6)	3(15.8)	12(21.8)		
Secondary education	3(37.5)	8(57.2)	34(58.6)			3(50.0)	9(47.4)	29(52.8)		
University or higher	1(12.5)	2(14.3)	13(22.5)			1(16.7)	4(21.0)	8(14.5)		
Occupation										
House wife	6(75.0)	1(78.6)	52(89.7)	7.7	0.021*	5(83.3)	16(84.2)	50(90.9)	2.8	0.236
Occupied	2(25.0)	3(21.4)	6(10.3)			1(16.7)	3(15.8)	5(9.1)		
Parity										
Primi para	1(12.5)	4(28.6)	13(22.5)	7.9	0.019*	1(16.7)	6(31.6)	8(14.5)	10.4	0.005**
Multipara	7(87.5)	10(71.4)	45(77.5)			5(83.3)	13(68.4)	47(85.5)		
Previous abortion:										
Yes	1(12.5)	1(7.1)	2(3.4)	5.9	0.051*	1(16.7)	2(10.5)	4(7.3)	4.5	0.106
No	7(87.5)	13(92.9)	56(96.6)			5(83.3)	17(89.5)	51(92.7)		

(*) Statistical significant difference

(**) Highly statistical significant difference

Table (8): Relation between level of pain of studied women and breast feeding in the study and the control groups before intervention (N=160):

Breast feeding before intervention	Level of pain before intervention							
	Study group		Chi-square		Control group		Chi-square	
	Moderate (52)	Severe (28)	X ²	p-value	Moderate (50)	Severe (30)	X ²	p-value
	N (%)	N (%)			N (%)	N (%)		
Most favorable	7(13.5)	1(3.6)	11.8	0.003**	6(12.0)	0(0.0)	18.6	0.001**
Favorable	11(21.1)	3(10.7)			14(28.0)	5(16.7)		
Least favorable	34(65.4)	24(85.7)			30(60.0)	25(83.3)		

(**) Highly statistical significant difference

Table (1): Illustrates that 58.7% of the studied sample in the study group and 63.7% in the control group had an age group from (30 years or more), with a mean age of 31.4±4.7 and 32.1±3.9 respectively. Concerning residence, 68.7% in the study group and 77.5% in the control group were from rural areas.

Regarding the level of education, 56.3% of the studied sample in the study group and 51.3% in the control group have a secondary education. with no statistically significant difference between study and control groups.

Table (2): Illustrates that mean and SD of pain level before intervention was 7.1 ± 2.6 in study and 7.3 ± 2.7 in control group, while after intervention, mean and SD of pain level was 2.9 ± 1.3 in study and 4.2 ± 3.2 in control group.

Table (3): Shows the mean and SD of postpartum women's comfort before and after the intervention and illustrates that there is no statistically significant difference between the study and control group regarding postpartum women's comfort before the intervention, while after intervention there is statistically significant difference between study and control group $p = 0.001^{**}$.

Table (4): Clarifies the breastfeeding assessment process before and after the intervention, and reports that there is no statistically significant difference between study and control group regarding breastfeeding assessment before the intervention, while after intervention there is a statistically significant difference between the study and control group $p = 0.001^{**}$.

Table (5): Shows mean and SD of breast feeding assessment scores, and reports that before intervention 4.2 ± 1.8 and 5.1 ± 1.9 were the mean and SD of study and control group respectively, while after intervention the mean and SD was 7.8 ± 2.2 in study group and 6.1 ± 3.2 in control group.

Table (6): Reveals the relation between socio-demographic characteristics, obstetric history of studied women in the study and control group and the level of pain after intervention, and finds that there is relation between the level of pain before the intervention and age, residence, educational level, occupation and parity in the study and control group $p < 0.05$. There is no relation between the level of pain before intervention and previous abortion in study and control group $p > 0.05$.

Table (7): Reports the relation between socio-demographic characteristics, obstetric history of studied women in study and control group and breastfeeding before the intervention, and finds that there is a relation between breast feeding before intervention and age and parity in study and control group $p < 0.05$.

Table (8): Reveals that there is a relation between the level of pain and breastfeeding before intervention in the study and control group $p < 0.01$.

Figure (1): Displays that there is no statistically significant difference between the study and control group regarding the level of pain before intervention $p = 0.713$.

Figure (2): Demonstrates that there is a statistically significant difference between the study and control group regarding the level of pain after intervention $p = 0.001^{**}$.

Discussion:

Postoperative pain management for women who have had cesarean deliveries requires a multimodal, integrative approach. Women's skills to stay alert and aware during the essential transition to parenthood in general, and to bond with, breastfeed, and nurture their newborns in particular, are harmed by the customary practice of taking analgesics for pain control (Farag et al., 2019). Therefore, this study was conducted to assess the effects of deep tissue massage on women's pain, comfort, and breastfeeding after cesarean section.

Regarding pain level, the current study found that there was no statistically significant difference between the study and the control groups before the intervention, but after the intervention, nearly half of the women in the control group had moderate pain, compared to less than one-sixth of them in the study group, with a statistically significant difference between them p -value (0.001).

This on the same line with (Basyouni et al., 2018), who conducted research in Egypt to determine the effect of reflexology on post-cesarean pain, and concluded that there was no statistically significant difference between the massage and control groups in terms of post-CS pain intensity before intervention. After the intervention, however, there was a statistically significant difference between the massage and the control groups.

A similar result was found by (Irani et al., 2020), who conducted a study in Iran to see how foot and hand massage affected patients' pain, anxiety, and vital signs after cesarean surgery (Abbaspoor et al., 2016), who conducted their study in Iran to see how hand and foot massage affected patients' pain, anxiety, and vital signs after cesarean surgery, (Zarei et al., 2020), who achieved their study to identify the effect of non-pharmacological self-care training methods on pain management in women undergoing cesarean section, and (Saatsaz et al., 2016), who titled "Massage as adjuvant therapy in the management of post-cesarean pain and anxiety", who reported that significant reduction was observed in the intensity of pain immediately after massage. Such resemblances in the current study's findings can be linked to what has been discovered in the literature on the prospective physiological and psychological benefits of massage in reducing pain intensity. Improvement of circulation, muscle relaxation, stimulation of the lymphatic system, speeding up the elimination of waste products, assisting digestion, inducing sleep, enhancing mental and physical relaxation, encouraging the release of emotional tension, and thus encouraging communication are just a few of the benefits (Ball et al., 2017).

Regarding comfort status, the real study's findings demonstrate that there is no statistically significant difference between women in the study and the control groups before the intervention, but there is a statistically significant difference between them after the intervention. This was noted through improvement in comfort status after applying massage, and support the vital role of deep tissue massage in enhancing women's comfort.

This was matching with those (Güney & Uçar, 2021), who applied their study in Turkey to determine the effect of deep tissue massage (DTM) applied by the midwife on pain and comfort after cesarean section and clarified that there was no statistically significant difference between experimental and control group before intervention regarding postpartum comfort, however after intervention there was a statistically significant difference between experimental and control group.

Also on the same line (Çankaya & Ratwisch, 2020), conducted research to assess the effect of reflexology on lactation and postpartum comfort in primiparas who gave birth via cesarean section, and (Karaca & Vural, 2022), who achieved their study to see how hot application affected post-cesarean section acute pain and postpartum comfort, and found that there was a statistically significant difference in postpartum women's comfort between the non-pharmacological treatments utilized and the control group. This similarity of findings explains the vital role of massage in enhancing women's comfort after CS. So, the non-pharmacological method should be taken a chance in postpartum care in relieving pain and enhancing women's comfort.

The current study's findings show that the significant difference between the study and control groups has shifted from no statistically significant difference before DTM implementation to a statistically significant difference after implementation (Tamil Nadu et al., 2017), which conducted a study in India to investigate the effect of reflex zone stimulation on lactation in post-cesarean moms, found a statistically significant difference between the experimental and control groups following the intervention. As a result, it shows that post-cesarean moms who received massage had a greater influence on lactation than those who received regular care. This encourages all post-partum women to participate in DTM as part of their post-partum care.

In terms of the relationship between socio-demographic characteristics, obstetric history, and the level of pain before intervention in the study and control groups, the current findings show that there is a relationship between the level of pain before intervention and age, residence, educational level, occupation and parity in both groups. This supporting

that advancing age, high educational level, urban, employment and parity had an effect on sensation to level of pain.

This was in line with the findings of (Jasim et al., 2017), who identified a link between post-CS pain, age, and residence in a study undertaken in Malaysia to document the CS rate, measure pain severity, and identify preoperative variables that may predict post-cesarean discomfort in women.

Concerning the relation between socio-demographic characteristics, obstetric history of studied women in the study and control groups and breastfeeding before the intervention, and finds that there is a relationship between breastfeeding before intervention and age and parity in the study and control groups. This was noted through most of women with advanced age and multipara had a most favorable breast feeding.

The same opinion was reported by (Paksoy & Erbaydar, 2020), who applied their study to assess the relationship between cesarean section and early breastfeeding practices among primipara, and showed that there was a positive relationship between early breastfeeding practices and age, residence, and educational level.

The present findings report a relationship between the level of pain and breastfeeding before intervention in the study and control group, which was agreed with (Farag et al., 2019), who found a relation between the intensity of pain and success of breastfeeding, as the pain level decrease leads to improvement in the breastfeeding process. This similarity ensures that the level of pain affect on the mothers' ability to breastfeed their babies.

Conclusion:

Applying DTM was effective in the management of post-cesarean section (CS) pain and enhancing improving mothers' comfort, and breastfeeding.

Recommendations:

- The curricula of basic nursing education, as well as continuing education, should entail DTM as non-pharmacological management of post-CS pain, improving comfort and enhancing breastfeeding.
- DTM should be recommended in hospital protocols for the management of post-cesarean pain that leads to improvement comfort, and encouraging breastfeeding.
- Implement in-service training for the nurses, especially on using the DTM method to relieve post-CS pain.
- The study should be generalized to include postpartum women in both governmental and health hospitals.

- Supported maternity nurses with an instructional booklet regarding DTM to improve their knowledge and practices regarding it.

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