How to Cite:
Dawoud, S. E. S. M., Atwa, A. M. E.-S., & Saber, N. M. (2023). The effect of deep tissue massage application on post cesarean women's pain and anxiety. *International Journal of Health Sciences*, *6*(S7), 7000–7014. https://doi.org/10.53730/ijhs.v6nS7.13981

The effect of deep tissue massage application on post cesarean women's pain and anxiety

Salwa El Saied Mahmoud Dawoud
Nursing Fellow (Woman's Health and Midwifery Nursing), Students Hospital Mansoura University

Azza Mohamed El-Sayed Atwa
Assistant professor of Obstetrics and Gynecology Nursing, Faculty of Nursing, Sohag University, Egypt.

Nahed Mousa Saber
Assistant professor of maternal and Newborn, Faculty of Nursing, Beni-Suef University

***Abstract*---**Background: The most frequent post-cesarean consequences include pain and anxiety which is uncomfortable for women and has increased the use of natural remedies such as deep tissue massage. Aim: To investigate the effect of deep tissue massage on post-cesarean women's pain and anxiety. Design: A quasi-experimental design was utilized to accomplish this study. Setting: The study was conducted at the postpartum department at Sohag University Hospital. Subjects: Included 100 post-cesarean women of a convenient sample assigned into two equal groups study and control) were enrolled in the previously selected setting. Tools: I: Demographic and obstetric assessment sheet, II: Visual Analogue Scale, and III: State-Trait Anxiety Inventory. Results: a highly statistically significant difference was found in post-cesarean women's pain and anxiety between the two groups $p<0.01$. Conclusion: Deep tissue massage application has a vital role in reducing post-cesarean women's pain and anxiety. Recommendations: Deep tissue massage is recommended to be applied for post-cesarean women to reduce post-cesarean pain and anxiety.

***Keywords*---**Anxiety, Cesarean, Deep Tissue Massage & Pain

Introduction

To birth one or more babies, a mother must undergo a surgical operation called

a Caesarean section. When unusual circumstances make labor and delivery difficult to the point where the health or life of the mother or the infant is in danger, this treatment is used (**Farag et al., 2019**). Pain is the first thing women notice after cesarean delivery, even though many other social, physical, and emotional changes occur. However, because of the restriction on her movements at this time, a woman's comfort is also likely to worsen. In addition, because of the pain, lactation may not start as soon as it should **(Benton et al., 2019).**

According to new data from the World Health Organization (WHO), more than one in five (21%) deliveries worldwide are now cesarean sections due to an increase in the number of procedures conducted globally. By 2030, over a third (29%) of all infants are anticipated to be delivered by cesarean section, the study finds. For the next ten years, this figure is expected to increase. Although having a caesarean section can be a crucial and life-saving treatment, doing so if it is not medically essential might place women and children at an excessive risk of both short- and long-term health difficulties **(WHO 2021).**

Pain is commonly understood to be a bad feeling transmitted to the brain by sensory neurons. The ache suggests that the body has been damaged, either physically or potentially. Yet, pain encompasses both the impression of uncomfortable stimuli and the body's reaction to it. The Greek word "poine" (which signifies punishment) is where the word "pain" originates (**Cohen et al., 2018).**

Notwithstanding country-specific variations, the global cesarean birth rate is rising. In Egypt, more than half of all births occur via cesarean section (**Hussein et al., 2021**). Hence, it is crucial to relieve the discomfort and anxiety that women feel during this time to improve their comfort and safeguard the mother's health **(Farag et al., 2019).**

Moreover, muscle tone is increased by pain-induced anxiety which increases lactic acid generation and muscle oxygen demand. Lactic acid buildup in the muscles can result in cramping and discomfort in the muscles. When pain and anxiety are not appropriately treated immediately following surgery, healing takes longer and the likelihood of issues increases (**Youssef & Hassan, 2019**).

Together with pharmaceutical approaches, other non-pharmacological techniques have been used to treat and lessen pain, massage is one of these methods. Following the massage, general calmness, repose, deep breathing, and tiredness were noted **(Cluny et al, 2020).** A therapeutic massage technique known as deep tissue massage concentrates on the muscle, fascia, and connective tissue in the body's deep tissues. This method aims to relieve the discomfort by relaxing tight muscles in the neck, waist, or shoulder **(Gülbahar, & Metin, 2020).**

Although deep tissue massage uses all of the techniques used in a regular massage, its motions are slower and its attention is paid more to the sore and stiff areas (s). Together with pressure and massage treatments, stretching techniques are also employed. A variety of stances, punches, elbows, and finger joints are used in this technique. By increasing circulation, which promotes metabolite elimination and quickens recovery, massage helps to improve the flow

of nutrients to the tissue. Moreover, deep tissue massage is quite useful in treating strained and shortened muscles as well as the discomfort that goes along with them. **(Güney & Uçar, 2021).**

Maternity nurses offer physical care, emotional support, and education to expectant mothers and their families. It is crucial to this position that pain and anxiety are reduced to enhance the health of the mother and her child **(Simonelli et al., 2018)**.

Significant of the study:

Egypt has a particularly high rate of cesarean sections (**Farag et al., 2019)**. C-sections account for more than 50% of births in Egypt (**Hussein et al., 2021**). Few researchers have investigated the impact of deep tissue massage on post-cesarean pain and anxiety **(Güney & Uçar, 2021)**. Hence, the researchers decided to determine the effect of deep tissue massage on pain and anxiety among post-cesarean women.

Aim of the study:

To investigate the effect of deep tissue massage on post-cesarean women's pain and anxiety

Research hypothesis:

Deep tissue massage Implementation is expected to reduce post-cesarean women's pain and anxiety in the study group more than in the control group.

Subject and Methods:

Research Design:

A quasi-experimental design was utilized to accomplish this study

Setting:

The study was conducted at the postpartum department at Sohag University Hospital

Sample:

a convenient sample size of 100 post-cesarean women within six months assigned into two equal groups (study and control) were enrolled in the previously selected setting. In the study (who applied deep tissue massage after cesarean) and control (who received only routine hospital care), each group involved 50 post-cesarean women.

Randomization:

The study or control groups were initially assigned using a numerical system.

Whereas women in the control group received the oven number, women in the study group received the odd number.

Inclusion criteria:

All post-cesarean women who were present at the time of data collection in the previously selected setting, Egypt, with these criteria such as moderate or severe pain, willing to engage in this study and free from mental or chronic illness.

Tools of the study

In this study, four tools were employed:

Tool (I): Demographic and obstetric assessment sheet:

It included information related to age, occupation, educational level, residence, parity, and abortion were all covered.

Tool (II): Visual Analogue Scale (VAS):

The scale, which was created with a range of 0–10 mm, was intended to gauge the intensity of the pain. There is no pain when the score is 0, but there is mild pain between 1 and 3 mm, moderate pain between 5 and 7 mm, and severe pain between 8 and 10 mm (**Aitken, 1969).**

Tool (III): Tool (III):- State-Trait Anxiety Inventory

A self-assessment questionnaire made up of brief statements, the State-Trait Anxiety Inventory was created by **Spielberger (1972**) to assess the level of State-Trait Anxiety. Participants were asked to answer 20 questions in which they were asked to express how they felt about themselves in a particular position and under particular conditions, while also considering how they felt about the situation in which they were present.

Expressions are separated into direct and reverse expressions in this section. The SPSS program was used to perform the scoring in a computer environment. Two separate scales were initially developed for the direct and inverted expressions.

After being positive for direct expressions and negative for negative queries, the total weighted score for negative expressions is subtracted from the total weighted score for direct expressions.

Scoring system:

The scale items are scored as follows: "none" (1), "some" (2), "many" (3), and "totally" (which measures the level of state-trait anxiety) (4). 80 is the greatest score earned, and 20 is the lowest.

Validity of the tools:

Five experts, including one professor of psychiatric nursing, two professors of obstetrics and gynecologist medicine, and two professors of obstetric nursing, examined the tools' content validity, clarity, comprehensiveness, appropriateness, and relevance. To guarantee sentence clarity and content appropriateness, changes were made in accordance with the panel's assessment.

Reliability of the tools:

State-Trait Worry With a total score of Cronbach's alpha of 0.87 and a visual analogue scale of Cronbach's alpha of 0.814, the dependability of the inventory is regarded as good (VAS)**.**

Ethical considerations:

After describing the study's goals to each woman, their informed consent was obtained. The post-césarean women were spoken to in confidence as the researcher communicated the study's goal to them. The post-c-section women were informed of their right to leave the study at any time.

The procedure of data collection:

Preparatory phase:

From the director of Sohag Hospital, official approval was acquired. Before a post-c-section woman was enrolled in the trial, she gave her verbal informed consent. In the physiotherapy department at Sohag University Hospital, the researcher underwent a three-week long, two-hour per day training program on how to do deep tissue massage. Before enrolling in the trial, Tool (II) was used to gauge the degree of pain. Anxiety level measurement tool (III).

Pilot study

To test the study instruments' clarity, a pilot study involving 10% (16 women) of the study population was conducted. Since the tools were not altered, the women who took part in the pilot study were involved.

Fieldwork:

The study's data collection process, which lasted around 6 months, was finished by the end of August 2021, having begun at the beginning of March 2021. •After five hours postoperatively, both groups had assessments of their levels of pain and anxiety using Tools II and III (pre-intervention).

Intervention phase:

- **Administrative design** To get the information for the questionnaire, the researcher interviewed the post-césarean woman in the predetermined location. Following an explanation of the study's purpose and a request for a post-c-section woman's consent, the researcher began the trial.

- After two hours following CS, interviews were conducted with members of the study and control groups to gather data for the instrument (I).

- The control group (50 post-Cesarean women) adhered to standard hospital procedures (administration of pain medication).

- The study group was made up of 50 post-césarean women, on whom the researcher performed deep tissue massage. The massage was given twice, the first time 2-3 hours after the operation and the second time 5 hours later.

- The researcher performed a deep tissue massage on the study group's shoulders and upper back (trapezius, evator scapulae, rhomboideus major and minor). The patients' rooms were used to do deep tissue massage.

- the upper leg was such that it was 90 degrees bent from the hip and knee. A pillow served as support for the bowed leg. Every post-c-section woman was typically placed in a comfortable position. The post-Cesarean women in the study group received a 15-20 minute deep tissue massage. The post-cesarean women in both groups received standard postpartum care up until the study's conclusion.

- After five hours postoperatively, both groups had assessments of their levels of pain and anxiety using Tools II and III (post-intervention).

The director of Sohag University Hospital gave his official consent for this study to be conducted.

Statistical design:

The collected data were organized, categorized, coded, tabulated, and analyzed using the Statistical Package for Social Sciences (SPSS) V.26. In tables and charts, data were represented by numbers, percentages, averages, and standard deviations. Mean comparisons were made using the T-test. The statistical impact was assessed using the chi-square test. Statistical significance was set at a P value of <0.05.

Results:

Table 1.

Reveals that 56% of the post-cesarean women studied in the deep tissue massage group and 62% in the control group had mean age of 32.5±5.8 and 33.2±4.7, respectively. were 30 years of age or older. In terms of place of

residence, 70% of those who received deep tissue massage and 74% of those who received control treatment were from rural areas. Concerning education, 54% of the study group's post-cesarean women and 56.0% of those in the study group have a secondary education. There is no statistically significant difference between the study and control groups.

Figure 1: Shows that the deep tissue massage has no statistically significant differences and the control groups pre- deep tissue massage application regarding pain levels (p=0.715).

Figure 2 shows that statistically significant differences exist between the deep tissue massage and control groups in terms of the intensity of the pain following the deep tissue massage application (p=0.001**).

Table 2.

Shows that the mean and SD of pain level before deep tissue massage application were 7.2 ±2.4 in the deep tissue massage and 7.1 ±2.5 in the control group, whereas the mean and SD of pain level post deep tissue massage application were 2.8 ±1.4 in the study and 5.1 ±3.3in the control group.

Table 3.

Shows that the difference was significant and a decline in the mean anxiety score among the studied post-cesarean women who had deep tissue massage application at (P<0.001).

Table 4.

Demonstrates a statistically significant positive correlation between post-cesarean women's levels of pain and anxiety following deep tissue massage application (p <0.000).

Table 5.

Portrays the relationship between demographic characteristics, the obstetric history of the studied women in the study and control group, and the level of pain following the deep tissue massage application. It also demonstrates a correlation between age, place of residence, level of education, occupation, and parity in the study and control group and the degree of pain before the administration of deep tissue massage with a p-value of <0.05. There is no association between the level of pain before the deep tissue massage application and prior abortion in the study group and control group at p>0.05.

Table (1): The studied post-cesarean women's demographic characteristics and obstetric history distribution in both deep tissue massage and the control groups (N=100):

Variable	Deep tissue massage group		Control group		chi-square	
	N(50)	%	N(50)	%	X	P-value
Age/ years						
Less than 30 years	22	44.0	19	38.0	0.55	0.478
30 years or more	28	56.0	31	62.0		
Mean age± SD	**32.5±5.8**		**33.2±4.7**			
Residence						
Urban	25	30.0	18	26.0	1.93	0.159
Rural	55	70.0	62	74.0		
Educational level						
No education	5	10.0	5	12.0		
Basic education	8	16.0	9	18.0	2.04	0.563
Secondary education	27	54.0	28	56.0		
University or higher	10	20.0	7	14.0		
Occupation						
Housewife	42	84.0	44	88.0	0.28	0.595
Occupied	8	16.0	6	12.0		
Parity						
Primi para	11	22.0	10.0	20.0	0.43	0.517
Multipara	39	78.0	20.0	80.0		
Previous abortion:						
Yes	3	6.0	4	8.0	1.03	0.304
No	47	94.0	46	92.0		

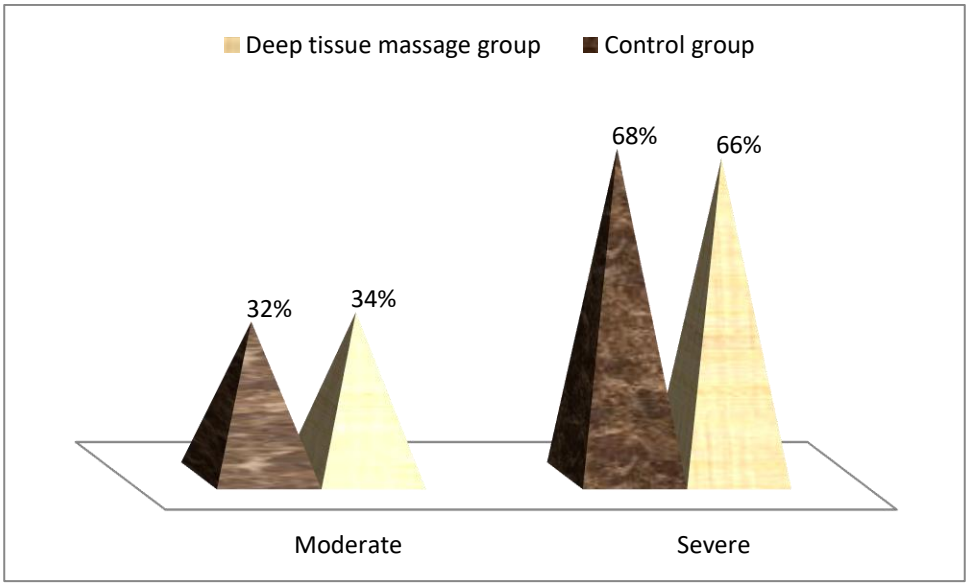
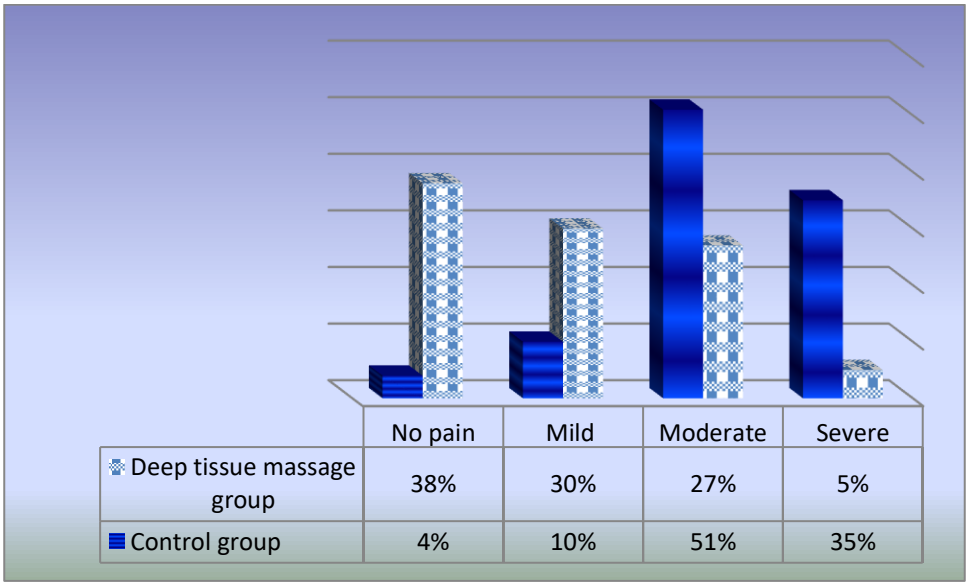


Figure (1): The study and the control groups' pain levels among the studied post-cesarean women before deep tissue massage application (N=100) (p=0.715).



	No pain	Mild	Moderate	Severe
Deep tissue massage group	38%	30%	27%	5%
Control group	4%	10%	51%	35%

(**) The highly statistically significant difference p=0.001

Figure (2): Pain levels among the studied post-cesarean women in the study and the control groups post deep tissue massage application (N=100)

Table (2): Pre- and post-pain mean and standard deviation deep tissue massage application in the study and the control groups among the studied post-cesarean women (N=100):

Items	Deep tissue massage group	Control group	T-test
	Mean ±SD	Mean ±SD	p-value
Before application	7.2 ±2.4	7.1 ±2.5	**0.745**
After application	2.8 ±1.4	5.1 ±3.3	**0.001****

(**) The highly statistically significant difference

Table (3): Differences in pain score before and after deep tissue massage application in the study and the control groups among the studied post-cesarean women (N=100):

Item	Deep tissue massage group	Control group	t-test	p-value
Anxiety level	40.78 ± 8.45	24.22 ± 2..34	16.67	<0.001**

Paired of samples, t-test

Statistically significant at p <0.001

Table (4): Correlation between pain and anxiety levels before and after deep tissue massage application in the study and the control groups among the studied post-cesarean women

Pain intensity	Anxiety levels
Pre-deep tissue massage application	r 0.121 p .123
Post-deep tissue massage application	r 0.564 p .000

*= significant at p<0.05 level

Table (5): Relationship between the intensity of pain, demographic data, and obstetric history of the post-cesarean women in the deep tissue massage and control groups pre-deep tissue massage application (N=100):

Items	Pain level pre-deep tissue massage application							
	The deep tissue massage group		Chi-square		Control group		Chi-square	
	Moderate (17) N (%)	Severe (33) N (%)	x^2	p-value	Moderate (16) N (%)	Severe (34) N (%)	x^2	p-value
Age/ years								
Less than 30 years	5(35.0)	17(52.0)	3.4	**0.053***	9(58.0)	12(34.0)	5.17	**0.021***
or more	12(65.0)	16(48.0)			7(42.0)	22(64.0)		
Residence								
Urban-	6(36.0)	8(24.0)	5.6	**0.036***	3(20.0)	11(32.0)	3.7	**0.047***
Rural	11(64.0)	25(76.0)			13(80.0)	23(68.0)		
Educational level								
No education	2(12.0)	2(7.0)		**0.001****	3(16.0)	3(10.0)		**0.001****
Basic education	2(12.0)	5(15.0)	17.9		2(14.0)	8(24.0)	17.8	
Secondary	11(64.0)	14(42.0)			10(60.0)	13(38.0)		
education	2(12.0)	12(36.0)			1(10.0)	10(28.0)		
University or higher								
Occupation								
Housewife	16(93.0)	25(76.0)	5.3	**0.022***	15(92.0)	28(82.0)	9.3	**0.003****
Occupied	1(7.0)	8(24.0)			1(8.0)	6(18.0)		
Parity								
Primi para	2(12.0)	14(42.0)	23.8	**0.001****	1(8.0)	15(44.0)	47.3	**0.001****
Multipara	15(88.0)	19(58.0)			15(92.0)	19(56.0)		
Previous abortion:								
Yes	1(7.0)	3(8.0)	1.04	0.305	2(12.0)	2(6.0)	0.79	0.356
No	16(93.0)	30(92.0)			14(88.0)	32(94.0)		

(*) Statistical significant difference (**) Highly statistical significant difference

Discussion:

A multimodal, integrative strategy is required for guys who underwent caesarean sections for postoperative pain management because the traditional pain management technique of taking analgesics harms these women **(Farag et al., 2019).** Therefore, the researchers aimed in this study to investigate the effect of deep tissue massage on post-cesarean women's pain and anxiety.

The current study discovered that there is no statistically significant difference between the investigated post-cesarean women's demographics, indicating that the two groups are comparable.

The current results of the study revealed that, while there was no statistically significant difference in pain levels between the deep tissue massage and control groups pre the application of deep tissue massage, there was a statistically

significant difference between the deep tissue massage and control groups in terms of the intensity of the pain after the application of deep tissue massage, with the deep tissue massage group having a lower mean and SD of pain level post-deep tissue massage application.

This is consistent with (**Basyouni et al., 2018**), who investigated the impact of reflexology on post-cesarean pain in Egypt and came to the conclusion that there was no statistically significant difference in post-CS pain intensity between the massage and control groups before intervention. Yet, following the intervention, the massage and control groups differed statistically significantly from one another. It demonstrated the advantages of applying deep tissue massage. The literature's findings on the potential physiological and psychological pain-relieving effects of massage can be used to explain these advancements in the current study's results. Among the many advantages include increased circulation, muscle relaxation, stimulation of the lymphatic system, accelerated waste product evacuation, aiding digestion, inducing sleep, improved mental and physical relaxation, promoting the release of emotional strain, and therefore promoting communication (**Ball et al, 2017**). This demonstrates how effectively deep tissue massage was applied, according to the researchers. This demonstrated the crucial need to understand deep tissue massage application's purpose of reducing pain levels after cesarean sections and also demonstrated the efficiency and positive effects of deep tissue massage application.

Also, according to **Lorentzen et al., (2018**) study on pain experience and pain treatment in surgical patients, which discovered a similar result, the majority of postoperative patients experienced a significant level of pain. This conclusion is supported by **Jayanthi et al., (2019**) observation that there was a significant difference in pain levels between pre-and post-test in both the experimental and control groups. This was consistent with the findings studied the effects of deep tissue massage (DTM) given by the midwife on pain and comfort following caesarean delivery were studied by **Güney & Uçar (2021)** in Turkey**.** While there was not a statistically significant difference in pain between the experimental and control groups pre the intervention, they discovered, there was a statistically significant difference between the two groups following the intervention.

The results of the current study showed a significant difference and a drop in the mean anxiety score among the post-césarean women who received deep tissue massage. This finding is corroborated by (**Zarei et al., 2020**), who investigated the effects of non-pharmacological self-care training techniques on pain management in female caesarean section patients, and (**Saatsaz et al., 2016**), who published "Massage as adjuvant therapy in the management of post-cesarean pain and anxiety," reporting that a significant reduction in pain intensity was observed right away after the massage. Similar findings were made by Iranian researchers (**Irani et al., 2020**), who investigated the effects of foot and hand massage on patients' pain, anxiety, and vital signs after caesarean surgery. To ascertain how foot and hand massage affected patients' discomfort, anxiety, and vital signs following a caesarean surgery, (**Abbaspoor et al., 2016**) also conducted their study in Iran. The significant changes in the pain levels of the women who were studied reflected that the deep tissue massage application was confirmed from the researchers' point of view by these findings. The

researchers believe that this result demonstrates the benefits of applying deep tissue massage to women's needs, helping to both decrease and increase their pain.

The current results demonstrate a correlation between age, place of residence, amount of education, job, and parity in both groups and the degree of pain pre-intervention when examining the relationships between demographic variables, obstetric history, and the study and control groups. This evidence suggests that factors including increasing age, a high level of education, living in a city, having a job, and parity can affect how much pain a person feels. This was consistent with the results of a study conducted in Malaysia to track the rate of caesarean deliveries, measure pain intensity, and identify preoperative demographic variables that might predict post-cesarean discomfort in women (**Jasim et al., 2017**), which discovered relationships between post-CS pain, age, and residence.

The results of the current study revealed a statistically significant relation between post-césarean women's levels of pain and anxiety after receiving deep tissue massage. According to the researchers, the connection between the two can be explained by the fact that anxiety and psychological status are both impacted by pain levels.

Conclusion:

The study findings revealed that deep tissue massage application has a crucial function in lowering post-cesarean women's discomfort and anxiety based on the findings and hypotheses of the current study. According to the study, there was a change in the mean scores for the investigated women's pain and anxiety levels before and after deep tissue massage application.

Recommendations:

The following suggestions are made based on the current study's findings:

- Deep tissue massage is recommended to be applied for post-cesarean women to reduce post-cesarean pain and anxiety.

- Obstetricians and nurses should routinely perform a comprehensive pain evaluation on post-cesarean women as part of their practice.

- To enhance their psychological status after a cesarean section, post-celebrity ladies should receive psychological support as part of standard medical care.

- A large sample size should be used to repeat the current study to establish generalizability.

References:

- **Abbaspoor, Z., Akbari, M., & Najar, S. (2016):** Effect of foot and hand massage in post-cesarean section pain control: A randomized control trial. Pain Management Nursing, 15(1), 132–136. https://doi.org/10.1016/j.pmn.2012.07.00.
- **Aitken R.C. (1969):** Measurement of Feelings Using Visual Analogue Scales, Proceedings of the Royal Society of Medicine, PMID: 4899510 PMCID: PMC1810824.
- **Ball A, Medforthy J, stables S, & walker (2017):** Oxford handbook of midwifery. 3rd edition. Congress library. Oxford University: 90-94.
- **Basyouni, N., Gohar, I., & Zaied, N. (2018):** Effect of Foot Reflexology on Post-Cesarean Pain. Journal of Nursing and Health Science (IOSR- JNHS), 7(4), 1–19. https://doi.org/10.9790/1959- 0704060119
- **Benton, M., Salter, A., Tape, N., Wilkinson, C., & Turnbull, D. (2019):** Women's psychosocial outcomes following an emergency cesarean section: A systematic literature review. BMC Pregnancy and Childbirth, 19(1). https://doi.org/10.1186/s12884-019-2687-7
- **Cluny Asha1 ID, Kumari Jayaram Manjini1* ID, B. (2020):** Effect of Foot Massage on Patients with Chemotherapy-Induced Nausea and Vomiting: A Randomized Clinical Trial. Journal of Caring Sciences A, 9(3), 120–124.https://doi.org/10.15171/jcvtr.2015.24
- **Cohen, M., Quintner, J., & Van Rysewyk, S. (2018):** Reconsidering the International Association for the study of pain definition of pain. Pain Reports, 3(2), 1–7. https://doi.org/10.1097/PR9.0000000000000634
- **Farag, W., Tayel, A., & Alam, T. (2019):** Effect of Foot and Hand Massage on Post-Cesarean Pain Intensity and Initiation of Breast Feeding. International Journal of Novel Research in Healthcare and Nursing, 6(2), 1255–1271.www.noveltyjournals.com.
- **Gülbahar, M. & Metin Z.G. (2020):** The Use of classical massage and relaxation exercise in the symptom management of heart failure, Journal of Traditional Medical Complementary Therapies 3(2),p. 273–279.
- **Güney, E., & Uçar, T. (2021):** Effects of deep tissue massage on pain and comfort after cesarean: A randomized controlled trial. Complementary Therapies in Clinical Practice, 43(August 2020), 101320. https://doi.org/10.1016/j.ctcp.2021.101320
- **Hussein, A., Ramzy, A., & Jauniaux, E. (2021):** Increasing cesarean delivery rates in Egypt: the impact of maternal request. BJOG: an international journal of obstetrics and gynecology, 128(5), 807. https://doi.org/10.1111/1471-0528.16494.
- **Irani, M., Kordi, M., Tara, F., Bahrami, H., & Nejad, K. (2020):** The effect of hand and foot massage on pain and anxiety. Avicenna Journal of Phytomedicine, 5 CC-C(January), 63.
- ***Jasim, H., Sulaiman, S., Khan, A., & Rajah, U. A. (2017):*** *Factors affecting post-cesarean pain intensity among women in the northern peninsular of Malaysia. Journal of Clinical and Diagnostic Research, 11(9), IC07-IC11.https://doi.org/10.7860/JCDR/2017/25364.10630*
- **Jayanthi Babu, Annie Annal M, Renuka K. (2019):** Effectiveness of Hand Massage vs Foot Massage for Pain in Incision Site among Post-cesarean

Mothers, Pondicherry Journal of Nursing, Volume 12 Issue 3 (July–September.

- **Lorentzen, V., Hermansen, I., & Botti, M. (2018):** A prospective analysis of pain experience, beliefs and attitudes, and pain management of a cohort of Danish surgical patients. European Journal of Pain (London, England), 16 (2), 278–288. https://doi.org/10.1016/J.EJPAIN.2011.06.004
- ***Saatsaz, S., Rezaei, R., Alipour, A., & Beheshti, Z. (2016):*** *Massage as adjuvant therapy in the management of post-cesarean pain and anxiety: A randomized clinical trial. Complementary Therapies in Clinical Practice, 24, 92–98. https://doi.org/10.1016/j.ctcp.2016.05.014*
- ***Simonelli, M., Doyle, L., Columbia, M., Wells, P., Benson, K., & Lee, C. (2018):*** *Effects of Connective Tissue Massage on Pain in Primiparous Women After Cesarean Birth. JOGNN - Journal of Obstetric, Gynecologic, and Neonatal Nursing, 47(5), 591–601.*
- **Spielberger CD. (1972):** Anxiety as an emotional state. Anxiety Current Trends and Theory. New York: Academic Press: 24-49.
- **WHO | WHO statement on cesarean section rates**. (**2021**): Retrieved November 7, from https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/cs-statement/en/
- **Youssef NFA, & Hassan ADA. (2019):** The Effect of hand and foot massage on alleviating pain and anxiety of abdominal postoperative patients at a University Hospital: A randomized control trial. IOSR Journal of Nursing and Health Science; 6 (3): 56-65.
- **Zarei, M., Mamashli, L., Khachian, A., Bozorgnajad, M., & Mohaddes Ardebili, F. (2020):** The Effect of Non-Pharmacological Self- Care Training on Pain Control in Cesarean Section Surgery. Journal of Health and Care, 22(1), 34–43. https://doi.org/10.29252/jhc.22.1.34