

## Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations

Amira A. El-Naser<sup>1</sup>, Aida A. El-Razek<sup>2</sup>, Jamila G. Ayoob<sup>3</sup>

<sup>1</sup>Assistant Lecturer of Maternal and Newborn Health Nursing, <sup>2</sup>Professor of Maternal and Newborn Health Nursing, <sup>3</sup>Assistant Professor of Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University

**Abstract: Background:** Laparoscopy as a minimal tool can accurately and quickly confirm the diagnosis and reduce both delay in diagnosis and non-therapeutic laparotomy rate. Shoulder pain is a common complaint following gynecological laparoscopic surgery. **The purpose of the study** was to investigate the efficacy of heat pad versus effleurage massage in reducing shoulder pain after gynecological laparoscopic operations **Design:** A quasi-experimental design (non-equivalent group design) (case & control) was utilized Sampling: a convenience sample of 90 women after gynecological laparoscopic operation were enrolled. **Setting:** The current study was conducted at obstetrics and Gynecology departments of two settings in Menoufia governorate: University Hospital and Shebin El-Koom Teaching Hospital. **Results:** The study finding revealed women who used heat pads after gynecological laparoscopic operations had less shoulder pain intensity than those who don't. Women who used effleurage massage had less shoulder pain intensity than those who don't Facial expressions that show pain were reduced after using heat pads, effleurage massage in comparison with the control groups' were decreased from 46.7%, 26.7% and 26.7% respectively on pre-intervention to 36.7%, 16.7%, and 43.4% post-intervention. **Conclusion:** Effleurage Massage revealed a higher efficacy than both heat pads in reducing shoulder pain after laparoscopic operation. **Recommendation:** Nursing education curriculum should be updated to include non-pharmacological management of shoulder pain after laparoscopic operation.

**Keyword:** Effleurage massage, Gynecological laparoscopic operation, Heat pad, Shoulder pain.

### Introduction

Li & Li (2021) stated that the pain after laparoscopic surgery has not disappeared. Many patients may feel shoulder pain, which is more uncomfortable than abdominal incision and visceral pain and is rarely seen in traditional laparotomy. Because most patients think shoulder pain has nothing to do with surgery, it makes them more anxious. This may lead to

discomfort and a poor quality of life after laparoscopic surgery and significantly reduce patient satisfaction.

Shoulder pain is a common complaint following gynecological laparoscopic surgery. This type of pain is known as gas pain. The pain is felt initially underneath the abdomen, and then it moves up to the shoulder. Although the

## *Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

pain is transient in most cases, it usually lasts about two or three days (Jasim et al., 2017).

Pain management is recognized as an important indicator of standards of accreditation in health and quality of health care. For this reason, it one cannot neglect the importance of pain management quality in postoperative care. Quality development includes an assessment of the quality of care at regular intervals (Köse Tamer & Sucu Dağ, 2020).

Nurses' experiences with practical knowledge affect the nursing process. Expert nurses with practical knowledge have more positive attitudes toward patients than less experienced nurses. The nurse's role is to assess the patients' physical and emotional status and health practices. The nurse is responsible for providing effective patient care, including pain management using non-pharmacological techniques. Non-pharmacological pain management methods include heat pads and massage (Sinha, 2019).

Heating therapy involves the use of heat to relax the muscles, facilitate blood circulation, and promote metabolism, thus relieving pain. It is inexpensive, saves time, and requires no special training or skill. Furthermore, heating therapy elicits a sympathetic reaction that increases blood circulation in areas other than those directly in contact with heat. Heating therapy can also relieve pain by increasing the threshold of pain delivery fibers (Suk et al., 2022).

The heating pad has become an established complementary modality in some invasive procedures and an effective tool for decreasing pain and anxiety. Therefore, we sought to assess the impact of using a heating pad on patients' perceptions of anxiety, distress, and pain (Kim et al., 2019).

Massage influences the soft tissues of the body. It is used to relax muscles and to help calm people. There are different massage techniques that may help to reduce pain such as lower back massage, smooth strokes, also called effleurage, counter pressure, and hip squeezes. Massage stimulates our body to release endorphins, the natural pain-killing, mood-lifting chemicals produced in the brain (Choudhary et al., 2021).

Effleurage should be performed at regular and continuous intervals, as the pain tends to increase when the massage is stopped because the nervous system is already accustomed to the stimulus. Hence, repetition of slow, steady speed and comfortable pressure are the keys that make effleurage massage more effective in pain management. Moreover, effleurage is appropriate to be used by an effleurage maternity nurse because it is a simple and easy procedure to be applied (Youssef, 2018).

### **Significance of the study**

A gynecological laparoscopic operation is a typical method to diagnose and treat various gynecological conditions. (Yucel & Eyup, 2018). Shoulder-tip pain (STP) is the most painful side effect after a gynecological laparoscopic operation. It occurs in up to 80% of women worldwide, with the potential for significant morbidity, delayed discharge, and readmission (Philip Kaloo et al., 2019). In Egypt, 35%-70% of patients feel this pain after an operation. Although opioids are helpful in masking pain, they may lead to adverse effects such as sedation, nausea, vomiting, and gastrointestinal ileus (Sallama & Ali, 2018). Consequently, the researcher was motivated to investigate the Comparison between efficacy of heat pads and effleurage massage in

## *Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

reducing shoulder pain after gynecological laparoscopic operations.

### **Purpose of the Study**

**The purpose of the study is to:**

Investigate the efficacy of heat pads versus effleurage massage in reducing shoulder pain after gynecological laparoscopic operations.

### **Hypotheses of the Study**

- 1) Women who use heat pads after gynecological laparoscopic operations will experience less shoulder pain than those who do not.
- 2) Women who receive effleurage massage after gynecological laparoscopic operations will experience less shoulder pain than those who do not.
- 3) Women who use effleurage massage after the gynecological laparoscopic operation will report less shoulder pain than women who use heat pads.

### **Method**

#### **Research Design:**

A quasi-experimental design (case & control) was utilized in implementing this study.

#### **Research Settings:**

The current study was conducted in the Obstetrics and Gynecology departments of two settings in the Menoufia governorate: University Hospital and Shebin El-Koom Teaching Hospital.

#### **Sample Type:**

A convenience sample of 90 women after a gynecological laparoscopic operation fulfilled the following criteria.

#### **Inclusion criteria for the sample:**

Women's age should range from 25-55 years, immediately within 24 hours (after gynecological laparoscopic

operations); women should have no medical disorders.

### **Sample Size:**

Reviewing the previous study (Ibrahim & Kamal, 2020), that examined the same outcomes and found higher efficacy of effleurage massage than others. The average sample size was 30 per group. The sample size was calculated using the Epi-Info program at a 95% level of confidence, with an expected frequency = of 50%. Accepted error is = 5%. So, a convince sample of 90 women was recruited in the study and randomly assigned to cases (G1 & G2) and control (G3) as G1: which comprised 30 women upon whom heat pad was applied by the researcher; G2: which comprised 30 women who received effleurage massage and G3: contained 30 women who received routine pain management in the hospital. Each of the 90 women was asked to pick a piece of paper containing a number (1, 2, or 3), those who selected number 1 were assigned to G1, those who selected number 2 were assigned to G2, and those who selected number 3 were assigned to G3. This technique was used to avoid sample contamination and bias.

### **Instruments for data collection:**

Two instruments were used for data collection

#### **Instrument one: A semi-structured interviewing questionnaire.**

It was developed by the researcher after reviewing of related literature (Ibrahim & Kamal, 2020). It included the following parts:

Social characteristics (e.g. age, residence, occupation, and level of education), Menstrual history (e.g Age, frequency, amount, duration, and interval), Obstetrics history (e.g gravidity, parity, and abortion), basal characteristic of current Gynecological laparoscopic operation (e.g purpose

**Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations**

and duration), basal characteristics of shoulder pain (e.g site of pain, factors that aggravate pain, and factors that decrease pain) (a=.....).

**Instrument two: Physiologic and behavioral response to pain sheet (PBRPS).** It was adapted by Deborah (1984) and Walsh (2001) to measure physiological and behavioral pain responses (a=.....).

It included two parts:

- Part 1- Physiological response: - It was used to measure the physiological response to pain. It consists of two parts: 1) vital signs (blood pressure, temperature, and pulse); and 2) gastrointestinal tract responses like nausea and vomiting. 3) Skin reactions like flushing, rash, and diaphoresis.
- Part 2-Behavioral response: It was used to measure the behavioral response to pain. It includes four dimensions: posture, gross motor activity, facial expression, and verbalization.

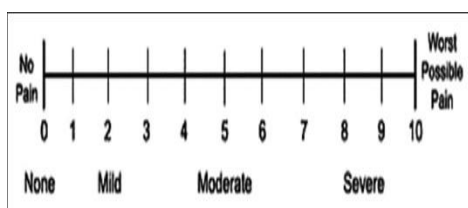
**The scoring system:**

Scoring system for each item ranged from 0 to 2. Absent (0), Mild (1) and sever (3)

Instrument three: Numerical pain rating scale: It was adopted from Williamson & Hoggart (2005). It was used to assess pain intensity.

**The scoring system of the scale:**

Women were instructed to choose a number from 1 to 10 that best describes their pain. A score of on the scale is as follows: There is no pain (0), mild pain (1-3), moderate (4-7), and sever pain (8-10)



**Validity of Instrument one:**

The validity of the instrument was established by five qualified experts (three professors of Maternal and Newborn Health Nursing department at the Faculty of Nursing and two professors Obstetrics and Gynecology department at the Faculty of Medicine). They reviewed the instrument for content accuracy and internal validity. Also, they were asked to judge the items for completeness and clarity (content validity). Suggestions were incorporated into the instrument, and modifications were made.

**Ethical considerations:**

Approval of the faculty of Nursing Ethical Research Committee was obtained. Approaches to ensure the ethical issues were considered in the study regarding confidentiality and informed consent. Confidentiality was achieved using locked sheets with the names of the participating women replaced by numbers. All participating women were informed that the information they provided during the study would be kept confidential and used only for statistical purposes. After finishing the study, the findings would be presented as a group data with no personal participants' information remaining. After explanations prior to enrollment in the study, a written informed consent was obtained from all women. Each woman was informed that participation in the study was voluntary and that she could withdraw from the study whenever she decided to do so. Each woman was given the opportunity to freely refuse participation. They were free to ask any questions about the study details.

**Pilot study:**

A pilot study was conducted to test the applicability of the instruments, the feasibility of the study, and estimate

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

the time needed for data collection. It was conducted on 10% of the total sample (n 9 women). Based on the pilot study results; the researcher rephrased some questions and sentences (e.g. what are the factors that decrease pain? & what are the factors that increase pain?) The sample of the pilot study was excluded from the main sample size based on the changes done.

**Procedure:**

An official letter was submitted from the Dean of the Faculty of Nursing to the directors of the study settings explaining the purpose and methods of data collection. Official permission was obtained from the directors of the above-mentioned settings to carry out the study.

The data was collected in the obstetric ward over a 6-month period, beginning in September 2021 and ending in February 2022. Data collection was done daily except Fridays from 1.30 AM or 10.30 AM to 4.30 PM according to the availability of participants in both hospitals (University Hospital and Teaching Hospital) and (1 or 2) women per day according to availability of women who met the inclusion criteria).

During the initial interview phase, the researcher greeted participants, introduced herself, and explained the purpose of the research in order to obtain their acceptance and recruit them in this research as well as to gain their cooperation. After taking verbal and written agreement from the women who met the inclusion criteria, each woman was interviewed to collect data related to social characteristics Obstetric history, basal characteristics of current gynecological laparoscopic operation basal characteristics of shoulder pain

The interview lasted about 30 minutes for each woman; the women were

asked in Arabic and documented their answers with the instruments utilized. Assessment of post-operation shoulder pain of the studied groups using a numerical pain rating scale was done in the first hours after the operation before intervention (1St time). Assessment of current pain, including was also performed. This took about 10 minutes.

Immediately after assessment (pre-intervention) in the first 4 hrs after the operation. The researcher informed women about definition of shoulder pain, types and benefits of heat pads, preparation of heat pads, technique of their application for 15-20 minutes Every 2 hours heat pads were utilized for 24-48 hours or until completely relieved.

The wrapped compress is applied to the skin. Be sure to give the skin a break from the heat every ten minutes, and do not leave the compress on for longer than 20 minutes.



The instructions were done using visual pictures for the two techniques A demonstration was done by the researcher, which took 20 minutes; and women were instructed women to redemonstrate

The researcher evaluated shoulder pain before and after the intervention and measures physiological and behavioral pain responses using instrument three. For effleurage massage, the researcher explained the benefits of effleurage massage and how to do to relieve pain. The woman should lie in supine as this

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

is a comfortable position for the woman, maintain a good posture. The researcher alternated hands to massage the affected shoulder. The researcher poured oil onto two hands, never directly onto the woman. The researcher warms the oil and hands before applying it to the naked skin a light touch was done at the start of the session. Then, deeper pressure is done with slower movements for increased circulation and stretching of the tissues. Pressure is always toward the heart to encourage venous return. The researcher should massage the shoulder for 30 minutes.

The instructions were done using visual pictures of techniques of effleurage massage. A demonstration was done by the researcher which took 30 minutes and family members were encouraged to massage at home as a method for relieving shoulder pain. This session took about 30 minutes.

At the end of the sessions, each woman was given a booklet and trained on how to assess shoulder pain after the intervention.



For the control group, women were interviewed in the first 4 hours after the laparoscopic operation. The researcher provided information to the women about the definition of laparoscopic operation and its indications, advantages, and complications, especially shoulder pain. All participants in the control group received the routine hospital intervention for relieving pain.

- Evaluation of the implementation phase was accomplished by determining the pain score before and after intervention (heat pad and effleurage massage). It started four days after the laparoscopic operation and continues every two hours.
- The effectiveness of the intervention on the reduction of pain intensity was evaluated and consumed about 15-20 min for each woman.

**Statistical Analysis:**

Data was entered and analyzed by using the SPSS (Statistical Package for Social Science) statistical package version 26. The graphics were done using the Excel program. Mean (X) and standard deviation (SD) were used for quantitative data. Student t test were used for comparison between two means and the ANOVA (F) test for comparison between more than two means.

The qualitative data was presented as frequency distribution tables, numbers, and percentages. It was analyzed by the chi-square ( $\chi^2$ ) test. However, if the expected value of any cell in the table was less than 5, the Fisher Exact test was used, or the Likelihood Ratio (LR) tests (if the table had more than 4 cells). The level of significance was set as a P value  $<0.05$  for all significant tests.

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

**Results**

**Table 1** showed that there were no significant differences between the three studied groups regarding all items of sociodemographic characteristics ( $P > 0.05$  for each), 40% of the women in the heat pad group were between the ages of 35 and 40; 50% of the women in the Effleurage massage group were between the ages of 26 and 34; and nearly half (43.3%) of the women in the control groups were between the ages of 26 and 34 years. The mean age among the three groups was:  $32.3 \pm 3.1$  Y,  $31.2 \pm 2.4$  years, and  $33.7 \pm 2.9$  years, respectively. No statistical significant difference was found ( $P=0.08$ ).

**Table 2** revealed that shoulder pain following a laparoscopic gynecological procedure was common among the three studied groups. More than two-thirds of the heat pad and control group had pain in both shoulders (66.7% and 76.7%) respectively. The majority of effleurage massage group (80%) had pain in the left shoulder. Concerning to recurrence of pain half of the heat pad group has intermediate pain. The majority of the effleurage massage and control groups (76.7 % and 73.3%) respectively have permanent pain. Regarding to factors increasing pain, cough was among more than half of the heat pad, effleurage massage, and control groups (62%, 63.4 %, and 66.7%) respectively.

**Table 3** highlights the efficacy of the heat pad on the physiological responses to shoulder pain pre and post intervention. The post-intervention program revealed a highly significant improvement ( $p < 0.0001$ ) in each of the physiological responses among the heat pads. The post-heat pad program's temperature range of 37-37.5 was decreased from 73.3% pre-intervention to 20% post-intervention and the

difference was highly significant ( $P < 0.0001$ ). The post control program's temperature 37-37.5 was decreased from 46.7% pre intervention to 40% post intervention and the difference was highly significant ( $P < 0.0001$ ).

**Table 4** clarified the efficacy of the heat pad on the behavioral responses to shoulder pain pre and post intervention. The post-intervention program revealed a highly significant improvement ( $p < 0.0001$ ) in each of the behavioral items either among the heat pad or control groups. The post heat pad and control groups' verbalization (groans or moans) was 86.7%, 23.3%, and 36.7 % respectively, pre intervention, post intervention and the difference was highly significant ( $P < 0.0001$ ).

**Table 5** showed that the intensity of shoulder pain after 8 hours of gynecological laparoscopic operations among the heat pad and control groups demonstrated moderate shoulder pain (3.3 %, 20%, respectively) before intervention and 0%, 20% respectively after intervention, and the difference was highly significant statistically ( $P < 0.0001$ ). This result supported the first hypothesis of this study which stated women who used heat pads after gynecological laparoscopic operations will have less shoulder pain than those who don't.

**Table 6** highlights the efficacy of effleurage massage on the physiological responses to shoulder pain pre and post intervention. The post-intervention program revealed a highly significant improvement ( $p < 0.0001$ ) in each item of the physiological responses among the effleurage massage groups and control. The post effleurage massage & control group GIT symptoms were decreased from 23.3%, 23.3% respectively pre intervention to 10 %, 20%, respectively post intervention and the

***Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations***

difference was highly significant ( $P < 0.0001$ ).

**Table 7** highlights the efficacy of the Effleurage massage on the behavioral responses to shoulder pain pre and post intervention. The post-intervention program revealed a highly significant improvement ( $p < 0.0001$ ) in each of the behavioral items among the effleurage massage and control groups. The post-effleurage massage and control groups' posture (tense posture) decreased from 73.3%, 3.3%, respectively, pre-intervention to 0% and 3.3% post-intervention, and the difference was highly significant ( $P < 0.0001$ ).

**Table 8** showed that among the effleurage massage and control groups, the intensity of shoulder pain after 8 hours of gynecological laparoscopic operations, demonstrated moderate shoulder pain with 16.7%, and 20%, respectively, pre-intervention and 0%, and 20%, respectively, post-intervention. This result supported the second hypothesis of this study, which stated women who used effleurage massage after gynecological laparoscopic operations will have less shoulder pain than those who don't.

**Table 9** highlights the efficacy of the heat pad, as well as effleurage

massage, on the behavioral responses to shoulder pain pre and post intervention. The post-intervention program revealed a highly significant improvement ( $p < 0.0001$ ) in each item of the behavioral responses, either among the heat pad, effleurage massage, or control groups. The post-heat pad, effleurage massage and control groups' facial expression (some frowning) decreased from 46.7%, 26.7% and 26.7%, respectively, pre-intervention to 36.7%, 16.7%, and 43.4% post-intervention and the difference was highly significant ( $P < 0.0001$ ).

**Figure (1)** showed that women who used Effleurage Massage revealed a higher efficacy than both heat pad and control groups in post intervention (76.7% vs. both 46.7% (heat pad group) and 30% (control group) respectively), and the difference was highly significant statistically ( $P < 0.0001$ ). This finding supported the study's third hypothesis, which stated that women who use effleurage massage after gynecological laparoscopic surgery will have less shoulder pain than women who use heat pa



*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

**Results**

**Table (1):** Social characteristics of the studied women in the three studied groups  
(cases and controls) (N = 90)

Social characteristics	Heat pad Group (No=30)		Effleurage massage group (No= 30)		Control group (No= 30)		P value
	N0.	%	N0.	%	N0.	%	
<b><u>Age (Years):</u></b>							
<25 years	1	3.3	1	3.3	0	0	LR =4.6 P=0.59
26-34 years	9	30	15	50	13	43.3	
35 – 40 Y	12	40	10	33.3	13	43.3	
> 40 years	8	26.7	4	13.3	4	13.4	
<b>Mean ± SD</b>	<b>32.3 ± 3.1 Y</b>		<b>31.2 ± 2.4 Y</b>		<b>33.7± 2.9Y</b>		<b>F=1.4,p=0.08</b>
<b><u>Educational Level</u></b>							
Illiterate/Read & Write	9	30	6	20	13	43.3	LR =4.1, P=0.26
2ry school or technical diploma	10	33.3	16	53.3	12	40	
University	11	36.7	8	26.7	5	16.7	
<b><u>Occupation:</u></b>							
Employee	9	30	5	16.7	5	16.7	X <sup>2</sup> =3.4, P=0.69
Housewife	21	70	25	83.3	25	83.3	
<b><u>Residence:</u></b>							
Rural	20	66.7	24	80	25	83.3	X <sup>2</sup> =.08, P=0.77
Urban	10	33.3	6	20	5	16.7	
<b>Total</b>	30	100	30	100	30	100	

**Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations**

**Table (2):** The studied women's shoulder pain after laparoscopic gynecological operations in the three studied groups (N=90)

Feeling shoulder pain after laparoscopic gynecological operation	Heat pad Group (No= 30)		Effleurage massage group (No= 30)		Control Group (No= 30)		P value
	N0.	%	N0.	%	N0.	%	
<b>Do you feel pain after laparoscopic gynecological operation?</b>							
Yes	29	96.7	30	100	30	100	LR =2.2 P=0.33
No	1	3.3	0	0	0	0	
<b>If yes, where do you feel? (N= 59)</b>							
1- Right shoulder	0	0	6	20	3	10	LR=4.2, P=0.38 NS
2- Left shoulder	9	30	24	80	4	13.3	
3- Both	20	66.7	0	0	23	76.7	
<b>Subtotal</b>	29	100	30	100	30	100	
<b>Q3 How many minutes do you feel pain?</b>							
10 minutes	4	13.8	0	0	1	3.3	LR=8.3, P= 0.08 NS
15 minutes	18	62.1	22	73.3	25	83.4	
20 minutes & more	7	24.1	8	26.7	4	13.3	
<b>Q4 Recurrence pain?</b>							
Permanent	13	44.8	23	76.7	22	73.3	X <sup>2</sup> =7.2, P=0.03 S
Intermediate	16	55.2	7	23.3	8	26.7	
<b>Factors decrease pain?</b>							
No	25	86.2	29	96.7	28	93.4	LR=4.5, P=0.34 NS
Warm compressors	1	3.4	1	3.3	1	3.3	
Walking	3	10.4	0	0	1	3.3	
<b>Factors increase pain?</b>							
No	3	10.4	3	10	3	10	LR=4.2, P=0.65 NS
Walking	4	13.8	3	10	6	20	
Movement	4	13.8	5	16.6	1	3.3	
Cough	18	62	19	63.4	20	66.7	
<b>What does the doctor describe for relieving the pain?</b>							
Analgesic	30	100	30	100	30	100	NA
<b>Total</b>	30	100	30	100	30	100	

NS= Not significant, S= Significant, LR=Likelihood Ratio, NA= Not Applicable

**Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations**

**Table (3):** Physiological responses to shoulder pain pre and post intervention among heat pad and control groups (N=90)

Physiological responses	Pre- intervention				Post- intervention				* $\chi^2$ /LR P value
	Heat pad group (No= 30)		Control group (No= 30)		Heat pad group (No= 30)		Control group (No= 30)		
	N0	%	N0	%	N0	%	N0	%	
<b>Temperature:</b>									$\chi^2= 19.7$ P<0.0001
< 36.5°C	0	0	0	0	0	0	0	0	
36.5-37 °C	8	26.7	16	53.3	24	80	18	60	
37 – 37.5°C	22	73.3	14	46.7	6	20	12	40	
<b>BP:</b>									$\chi^2= 17.6$ P<0.0001
<100/70	0	0	0	0	0	0	0	0	
100/70 – 110/80	6	20	16	53.3	24	80	23	76.7	
120/80 – 130/90	24	80	14	46.7	6	20	7	23.3	
<b>Pulse:</b>									$\chi^2= 23.5$ P<0.0001
< 60pm	0	0	0	0	0	0	0	0	
60 – 80 pm	14	46.7	16	53.3	26	86.7	26	86.7	
81 - 100 pm	16	53.3	14	46.7	4	13.3	4	13.3	
<b>GIT symptoms:</b>									$\chi^2=15.7$ p<0.0001
<b>Yes</b>	9	30	7	23.3	4	13.3	6	20	
<b>No</b>	21	70	23	76.7	26	86.7	24	80	
<b>Skin response</b>									NA
<b>No</b>	30	100	30	100	30	100	30	100	
<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	

NA=Not Applicable

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

**Table (4):** Pre and post intervention behavioral responses in heat pad and control groups (N=90)

Behavioral responses	Pre- intervention				Post- intervention				* $\chi^2$ /LR P value
	Heat pad Group (No= 30)		Control Group (No= 30)		Heat pad Group (No= 30)		Control Group (No= 30)		
	N0	%	N0	%	N0	%	N0	%	
<b>Posture:</b>									
Relaxed	0	0	20	66.7	0	0	14	46.7	$\chi^2=23.1$ P<0.0001
Guarded	13	43.3	9	30	10	33.3	15	15	
Tense posture	17	56.7	1	3.3	20	66.7	1	3.3	
<b>Gross motor activities</b>									
Quiet	1	33	22	73.3	0	0	11	36.7	$\chi^2=39.4$ P<0.0001
Slightly restless	12	40	8	26.7	4	13.3	18	60	
Restless	17	56.7	0	0	26	86.7	1	3.3	
<b>Facial expression:</b>									
No frowning	0	0	22	73.3			16	53.3	$\chi^2=51.3$ P<0.0001
Some frowning	14	46.7	8	26.7	11	36.7	13	43.4	
Grimacing	16	53.3	0	0	19	63.3	1	3.3	
<b>Verbalization:</b>									
Normal(no sound)	0	0	23	76.7	1	3.3	19	63.3	$\chi^2=24.6$ P<0.0001
Groans or moans	26	86.7	7	23.3	20	66.7	11	36.7	
Cries	4	13.3	0	0	9	30	0	0	
<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	

P value= Post intervention comparison in heat pad and control groups

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

**Table (5):** Shoulder pain rating scale, pre and post intervention among the heat pad and control groups (N = 90)

Shoulder numerical pain rating scale	Pre- intervention				Post- intervention				* $\chi^2$ /LR P value
	Heat pad Group (No= 30)		Control Group (No= 30)		Heat pad Group (No= 30)		Control Group (No= 30)		
	N0	%	N0	%	N0	%	N0	%	
<b>Intensity of shoulder pain after 4 hours:</b>									
No	0	0	0	0	5	16.7	0	0	<b>LR=57.8</b> P<0.0001
Mild	4	13.3	2	6.7	13	43.3	3	10	
Moderate	12	40	7	23.3	11	36.7	7	23.3	
Sever	14	46.7	21	70	1	3.3	20	66.7	
<b>Intensity of shoulder pain after 6 hours:</b>									
No	1	3.3	7	23.3	12	40	7	23.3	<b>LR=14.9</b> P<0.02
Mild	19	63.4	15	50	16	53.3	15	50	
Moderate	9	30	6	20	2	6.7	6	20	
Sever	1	3.3	2	6.7	0	0	2	6.7	
<b>Intensity of shoulder pain after 8 hours:</b>									
No	11	36.7	9	30	14	46.7	9	30	$\chi^2 = 23.9$ P<0.0001
Mild	18	60	15	50	16	53.3	15	50	
Moderate	1	3.3	6	20	0	0	6	20	
<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	

**Answer to Research hypothesis No 2 (tables 6-8)**

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

**Table (6): Physiological responses to shoulder pain pre and post intervention among Effleurage massage and control groups (N=90)**

Physiological responses	Pre intervention				Post- intervention				* $\chi^2$ /LR P value
	Effleurage massage group (No= 30)		Control Group (No= 30)		Effleurage massage group (No= 30)		Control Group (No= 30)		
	N0	%	N0	%	N0	%	N0	%	
<b>Temperature:</b>									
< 36.5°C	1	3.3	0	0	0	0	0	0	$\chi^2= 19.7$ P<0.0001
36.5-37 °C	14	46.7	16	53.3	29	96.7	18	60	
37 – 37.5°C	15	50	14	46.7	1	3.3	12	40	
<b>BP:</b>									
<100/70	1	3.3	0	0	0	0	0	0	$\chi^2= 17.6$ P<0.0001
100/70 – 110/80	14	46.7	16	53.3	29	96.7	23	76.7	
120/80 – 130/90	15	50	14	46.7	1	3.3	7	23.3	
<b>Pulse:</b>									
< 60 pm	1	3.3	0	0	0	0	0	0	$\chi^2= 23.5$ P<0.0001
60 – 80 pm	18	60	16	53.3	30	100	26	86.7	
81 - 100 pm	11	36.7	14	46.7	0	0	4	13.3	
<b>GIT symptoms:</b>									
Yes	7	23.3	7	23.3	3	10	6	20	$\chi^2=15.7$ P<0.0001
No	23	76.7	23	76.7	27	90	24	80	
<b>Skin response</b>									
No	30	100	30	100	30	100	30	100	NA
<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

**Table (7): Pre and post-intervention behavioral responses in the effleurage massage and control groups (N = 90).**

Behavioral responses	Pre- intervention				Post- intervention				* $\chi^2$ /LR P value
	Effleurage massage group (No= 30)		Control Group (No= 30)		Effleurage massage group (No= 30)		Control Group (No= 30)		
	N0	%	N0	%	N0	%	N0	%	
<b>Posture:</b>									
Relaxed	0	0	20	66.7	24	80	14	46.7	$\chi^2=23.1$ P<0.0001
Guarded	08	26.7	9	30	6	20	15	15	
Tense posture	22	73.3	1	3.3	0	0	1	3.3	
<b>Gross motor activities</b>									
Quiet	0	0	22	73.3	24	80	11	36.7	$\chi^2=39.4$ P<0.0001
Slightly restless	3	10	8	26.7	6	20	18	60	
Restless	27	90	0	0	0	0	1	3.3	
<b>Facial expression: NoFrowning</b>	0	0	22	73.3	25	83.3	16	53.3	$\chi^2 =51.3$ P<0.0001
Some frowning	8	26.7	8	26.7	5	16.7	13	43.4	
Grimacing	22	73.3	0	0	0	0	1	3.3	
<b>Verbalization:</b>									
Normal(no sound)	1	3.3	23	76.7	28	93.3	19	63.3	$\chi^2 =24.6$ P<0.0001
Groans or moans	22	73.3	7	23.3	2	6.7	11	36.7	
Cries	7	23.4	0	0	0	0	0	0	
<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	

P value= Post intervention Comparison of effleurage massage and control groups

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

**Table (8): Shoulder pain rating scale pre and post intervention in the effleurage massage and control groups (N = 90)**

Shoulder numerical pain rating scale	Pre intervention				Post- intervention				* $\chi^2$ /LR P value
	Effleurage massage group (No= 30)		Control Group (No= 30)		Effleurage massage group (No= 30)		Control Group (No= 30)		
	N0	%	N0	%	N0	%	N0	%	
<b>Intensity of shoulder pain after 4 hours:</b>									
No	0	0	0	0	8	26.7	0	0	<b>LR=57.8</b> P<0.0001
Mild	1	3.3	2	6.7	10	33.3	3	10	
Moderate	9	30	7	23.3	12	40	7	23.3	
Sever	20	66.7	21	70	0	0	20	66.7	
<b>Intensity of shoulder pain after 6 hours:</b>									
No	9	30	7	23.3	18	60	7	23.3	<b>LR=14.9</b> P<0.02
Mild	14	46.7	15	50	11	36.7	15	50	
Moderate	7	23.3	6	20	1	3.3	6	20	
Sever	0	0	2	6.7	0	0	2	6.7	
<b>Intensity of shoulder pain after 8 hours:</b>									
No	14	46.7	9	30	23	76.7	9	30	$\chi^2 =23.9$ P<0.0001
Mild	11	36.6	15	50	7	23.3	15	50	
Moderate	5	16.7	6	20	0	0	6	20	
<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	

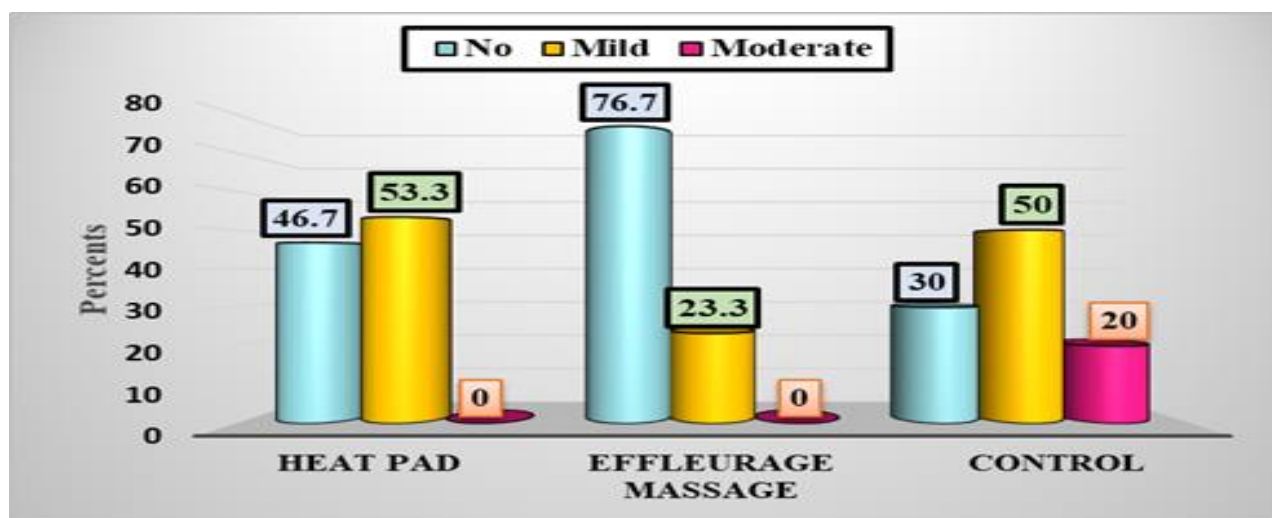
**Answer to Research hypothesis No 3 (Table 9, Figure 1)**



*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

**Table (9): Behavioral responses of the studied women before and after intervention (N=90)**

Behavioral responses	Pre- intervention						Post- intervention						* $\chi^2$ /LR P value
	Heat pad Group (No= 30)		Effleurage massage group (No= 30)		Control Group (No= 30)		Heat pad Group (No= 30)		Effleurage massage group (No= 30)		Control Group (No= 30)		
	N0	%	N0	%	N0	%	N0	%	N0	%	N0	%	
<b>Posture:</b>													
Relaxed	0	0	0	0	20	66.7	0	0	24	80	14	46.7	$\chi^2=23.1$ P<0.0001
Guarded	13	43.3	08	26.7	9	30	10	33.3	6	20	15	15	
Tense posture	17	56.7	22	73.3	1	3.3	20	66.7	0	0	1	3.3	
<b>Gross motor activities</b>													
Quiet	1	33	0	0	22	73.3	0	0	24	80	11	36.7	$\chi^2=39.4$ P<0.0001
Slightly restless	12	40	3	10	8	26.7	4	13.3	6	20	18	60	
Restless	17	56.7	27	90	0	0	26	86.7	0	0	1	3.3	
<b>Facial expression:</b>													
No Frowning	0	0	0	0	22	73.3			25	83.3	16	53.3	$\chi^2 =51.3$ P<0.0001
Some frowning	14	46.7	8	26.7	8	26.7	11	36.7	5	16.7	13	43.4	
Grimacing	16	53.3	22	73.3	0	0	19	63.3	0	0	1	3.3	
<b>Verbalization:</b>													
Normal(no sound)	0	0	1	3.3	23	76.7	1	3.3	28	93.3	19	63.3	$\chi^2 =24.6$ P<0.0001
Groans or moans	26	86.7	22	73.3	7	23.3	20	66.7	2	6.7	11	36.7	
Cries	4	13.3	7	23.4	0	0	9	30	0	0	0	0	
<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	



**Figure (1):** Effect of the heat pad, effleurage massage, and control group on the post-intervention total score of shoulder pain after 8 hours of gynecological laparoscopic operations (N=90)

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

## DISCUSSION

Laparoscopic operation is quickly shifting into the gold standard for treatment of uncomplicated symptomatic abdominal pathologies. Gynecological laparoscopic surgeries are associated with shoulder pain that may be more discomfort to women than pain at site of incision (Ibrahim & Kamal, 2020). Relieving of shoulder pain is a vital role of a gynecological nurse. Among non-pharmacological pain management are use of heat pad and effleurage massage.

The present study revealed that nearly half of the studied group had pain in both shoulders after a laparoscopic operation. The findings of the present study were similar to those of a study conducted in Egypt by Ibrahim & Mohammed (2016) who conducted a study to investigate the effects of heating pads and early mobilization for reducing postoperative shoulder pain and enhancing recovery of women undergoing gynecological laparoscopic surgery, which revealed that studied women reported pain in both shoulders. Also it was similar to the study conducted by Ibrahim and Kamal (2020), who revealed that the site of pain was in both shoulders.

Also, this matches with the study of Li & Li (2021) in China, who investigated whether the risk of shoulder pain after laparoscopic surgery for infertility is higher in thin patients and found that half of the patients (92/186, 49.4%) had bilateral shoulder pain.

This may be attributed to an irritative effect of carbonic acid on the peritoneum and diaphragm that results in tearing of blood vessels, traction of nerves (phrenic nerve), which is a bilateral nerve. It arises in the neck and descends vertically through the thorax to end in the diaphragm.

For physiological responses to pain, the findings of the present study

represented a highly significant improvement in each item of physiological responses among heat pad groups. The post-heat pad program's blood pressure 120/80-130/90 was decreased from 80% pre-intervention to 20% post-intervention and the difference was highly significant ( $P < 0.0001$ ) as both pain intensity and its physiological parameters are two sides of one coin. This could be due to the stimulation of the central nervous system due to pain is accompanied by physiological changes.

Kim et al. (2018) examined the effects of a heating pad on anxiety, pain, and distress during a urodynamic study in female patients with stress urinary incontinence and reported that heating treatments improve psychological and physiologic parameters.

Also, this finding is similar to that of Sukkwon (2022) in Asia, who conducted a study of Effects of Heating Therapy on Pain, Anxiety, Physiologic Measures, and Satisfaction in Patients Undergoing Cystoscopy and the results revealed that decreased systolic and diastolic blood pressure (BP) and pulse rate after the procedure were significantly higher in the experimental group than in the control group.

This matches with the study of Brunt et al. (2016), who conducted a study of passive heat therapy improves endothelial function, arterial stiffness, and blood pressure in sedentary humans and found that it reduced or improved aortic pulse wave velocity from  $7.1 \pm 0.3$  to  $6.1 \pm 0.3$  m s<sup>-1</sup> ( $P = 0.03$ ), and mean arterial blood pressure from  $83 \pm 1$  to  $78 \pm 2$  mmHg ( $P = 0.02$ ).

Heating therapy could reduce the resting heart rate and noradrenaline release and also decrease the BP by

***Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations***

improving the endothelium-dependent dilatation, arterial stiffness, and intima media thickness. In addition, heating therapy showed positive effects on the cardiovascular system (Brunt et al., 2016).

In contrast, Kim et al. (2019), who examined the use of a heating pad to reduce anxiety, pain, and distress during cystoscopy in female patients at Korea University Guro Hospital, reported that no significant differences were noted between the two groups regarding pre-procedural parameters, including systolic and diastolic BP, and pulse rate.

In relation to behavioral response to shoulder pain, the findings of the present study represented highly significant improvement in each item of behavioral responses among the heat pad groups as the post-heat pad and control groups' verbalization (groans or moans) was 86.7%, and 23.3% respectively pre-intervention to 66.7%, 36.7% post-intervention, and the difference was highly significant. This study was supported by Sukkwon (2022), who carried out a study in Asia revealing that heating therapy during cystoscopy is a convenient and effective nursing intervention that decreases pain and anxiety and enhances patient satisfaction.

Also, these results agreed with Ibrahim & Mohammed (2016), who observed that postoperative quality of recovery, including emotional state, was higher among heat pad groups compared with control, with a highly statistically significant difference and consequently behavioral state.

From the investigator's point of view, it may be that a noxious stimulus induces a behavioral response, but a heat pad induces blood supply and promotes relaxation and so feels comfortable that and improves behavioral response.

For the intensity of shoulder pain after using a heat pad, The present study revealed that the difference between the intensity of pain before and after intervention was highly significant between heat pad and control groups. This finding is similar to a study conducted in Egypt by Ibrahim & Mohammed, (2016) to investigate the use of heating pads and early mobilization for reducing postoperative shoulder pain and enhancing recovery of women undergoing gynecological laparoscopic surgery

Results were supported by a similar study conducted in Europe by Ron Clijsen et al. (2022) who investigated Local Heat Applications as a Treatment of Physical and Functional Parameters in Acute and Chronic Musculoskeletal Disorders or Pain. Their findings revealed that local heat application (LHA) had a pain relieving effect immediately after the intervention compared with pharmacologic therapy in acute and chronic conditions.

Also, Kaur et al. (2020) in India evaluated the effectiveness of warm compression on the lumbo-sacral region in terms of labor pain intensity and labor outcomes among nulliparous women: an interventional study. Their findings revealed that after 30 minutes of second and third time warm compression, the experimental group's mean labor pain intensity score (6.34, 8.30) was lower than the control group's (7.20, 8.89) These results signify that warm compression was effective to reduce labor pain. Further, both groups did not differ in terms of the duration of the first stage of labor (P=0.51)

This matches with a study of the use of a heating pad to reduce anxiety, pain, and distress during rigid cystoscopy in female patients by Kim et al. (2019),

***Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations***

who found that the mean pain scores for the experimental group ( $3.8 \pm 1.6$ ) were significantly lower than those for the control group ( $6.4 \pm 1.9$ ,  $p < 0.001$ ). This was due to the sedative effect of warm application has a sedative effect. It causes vasodilatation of the blood vessels, increasing blood flow, promoting relaxation and consequently reducing pain intensity. Also, the physiological effects of heat application increase metabolism and elasticity of connective tissue (Palazzo et al., 2016).

For the efficacy of effleurage on shoulder pain, the study showed that effleurage massage reduced shoulder pain

The current study is in harmony with the study of Nourian et al. (2016). Their findings revealed that massage reduced hospitalization anxiety, pulse rate, and blood pressure. They recommended that nurses can use massage to reduce anxiety in school-age children at the hospital as it has no side-effects and can be done easily.

Also, it is similar to a study conducted by Aslani et al. (2019) who investigated the effects of a hand massage on the physiological changes induced by intravenous line insertion in children, whose revealed that the increase in heart rate in response to the pain is significantly lower in the massage group.

Kamalifard et al. (2016) found that the mean (SD) of systolic blood pressure at 6 cm dilatation in the M2 (who received massage) and M1 (who did not receive massage) groups were 104.68 (8.8) and 115.00 (10.8), respectively. The difference between the two groups was significant ( $t = 2.63$ ;  $df = 15$ ;  $p = 0.01$ ). Therefore, massage reduced systolic blood pressure at 6 cm of dilatation.

Such findings may provide evidence for the possible effect of massage on

the reduction of shoulder pain. The rational for this is based on the physiological link between pain and the blood pressure. Whereas pain stimulates the sympathetic nervous system, resulting in an increase in the secretion of catecholamine. Such stimulation causes vasoconstriction and a subsequent rise in blood pressure. Accordingly, when the pain decreases, blood pressure also decreases. Furthermore, massage provides relaxation and therefore is able to reduce blood pressure through decreasing sympathetic activity and increasing parasympathetic activity.

These results may provide evidence for the possible effect of massage on the reduction of shoulder pain. The rational is based on the physiological link between pain and blood pressure. Whereas pain stimulates the sympathetic nervous system, resulting in an increase in the secretion of catecholamine. The stimulation causes vasoconstriction and a rise in blood pressure. When the pain decreases, blood pressure also decreases. So, massage provides relaxation and is able to reduce blood pressure through decreasing sympathetic activity and increasing parasympathetic activity (Ibrahim & Kamal, 2020).

The finding represented the efficacy of effleurage massage on the behavioral response to shoulder pain, and the difference was found before and after intervention. Effleurage massage and control groups. The post effleurage massage, and control groups' posture (tense posture) was decreased from 73.3%, and 3.3% respectively, pre intervention to 0%, and 3.3% post-intervention, and the difference was highly significant ( $P < 0.0001$ ).

This is in line with a study conducted by Wu et al. (2017) who investigated the effectiveness of massage and touch on behavioral and psychological

***Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations***

symptoms of dementia. Their findings revealed that massage and touch intervention are positively associated with the improvement of behavior in patients.

Crawford et al. (2016) also evaluate The Impact of Massage Therapy on Function in Pain Populations—A Systematic Review and Meta-Analysis of Randomized Controlled Trials: Part I, Patients Experiencing Pain in the General Population. Their finding revealed massage therapy was also beneficial for treating anxiety (SMD = 0.57) and health-related quality of life (SMD = 0.14) as anxiety due to pain, so massage enhanced behavioral response.

For the intensity of pain following effleurage massage, the present study revealed that the difference in intensity of pain before and after intervention was significantly reduced. The current study is in harmony with the study of the effectiveness of lavender oil treatment using effleurage massage technique towards dysmenorrhea intensity of female students at the Midwifery Academy of Kartini Bali, which was conducted by Adiputri et al. (2018), in this research result, it was proven that lavender oil therapy using effleurage massage technique effectively decreases the intensity of dysmenorrhea.

The present study agrees with Maru & Deepak (2020), who evaluated the effectiveness of lavender oil massage on labor pain reduction and level of satisfaction among parturient in selected hospitals in Udaipur, Rajasthan. It is reported that there is a significant relationship between the effect of lavender oil massage, on labor pain & and level of satisfaction, and that lavender oil massage was effective on labor pain reduction and increased the level of satisfaction.

Youssef, (2018) in Egypt, who evaluate effect of effleurage massage on labor pain intensity in parturient women, reported a statistically significant decrease in pain intensity after massage, The study findings revealed that the pain level in the intervention group was lower than that in the control group two hours after massage ( $p > 0.003$ ).

This matches with the study of Choudhary et al. (2021), who conducted a study about the effect of back massage on relieving pain during labor and found that there was a statistically highly significant ( $p < 0.05$ ) difference in the level of pain in the experimental and control group.

This is rationalized as effleurage massage causes improvement of circulation, relaxation of muscles, stimulation of the lymphatic system, helps digestion, improves sleep, enhances mental, and physical relaxation, and encourages the release of emotional tension that encourages communication and enhances a woman's ability to cope with pain.

Concerning the intensity of shoulder pain after heat pad and effleurage the present study revealed that women who used Effleurage Massage had significantly fewer pain intensity than women in heat heat pad and control groups on post intervention. The present study is in agreement with Ibrahim & Kamal (2020), who reported that massage had reduced pain intensity among women (70%) compared to only 25% of the warm application group.

It could be due to effleurage reduces pain by affecting the central nervous system. It causes the release of endorphins, which abolishes pain sensations in the brain. Stimulation of the mechanical receptors by massage and heat pads enhance relaxation and reduce pain (Kozak et al., 2017).

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

## Conclusion

**According to the study findings, it was concluded that:**

Women who used heat pads after gynecological laparoscopic operations experienced less shoulder pain than those who did not. Women who received effleurage massage after gynecological laparoscopic operations experienced less shoulder pain than those who did not. Women who used effleurage massage after the gynecological laparoscopic operation reported less shoulder pain than women who used heat pads.

## Recommendations

**Based on the findings of the present study, the following recommendations were suggested:**

The nursing education curriculum should be updated to include non-pharmacological management methods for shoulder pain after laparoscopic surgery. Women should be encouraged to implement effleurage massage regularly after discharge to promote more comfort. Effleurage massage and heat pads are recommended hospital routine.

Training programs should be provided to maternity nurses regarding the implementation and benefits of effleurage massage. Further research is needed to assess women's satisfaction regarding the use of effleurage massage for relieving shoulder pain after a laparoscopic operation. Replication of the current study in other setting and on a larger different sample to generalize the results

## References

Adiputri Ari N. W. Darmiyanti N. M. , and Candra I. W.,(2018): The effectiveness of lavender oil treatment using effleurage massage technique towards dysmenorrhea intensity of female students at Midwifery academy

of Kartini Bali , Int J Res Med Sci. 2018 Jun;6(6):1886-1889 [www.msjonline.org](http://www.msjonline.org) pISSN 2320-6071 | eISSN 2320-6012  
Original Research Article

Aslani Kafiyeh, Jamshidi Massoud, Mousavi Mitra and Neshat Hanie,(2019): The Effect of a Hand Massage on the Physiological Changes Induced by Intravenous Line Insertion in Children Aged Three to Six: A Clinical Trial, Medical - Surgical Nursing Journal: Vol.8, issue 2; e90276, DOI: 10.5812/msnj.90276.

Brunt VE, Howard MJ, Francisco MA, Ely BR, and Minson CT. (2016): Passive heat therapy improves endothelial function, arterial stiffness and blood pressure in sedentary humans. *Physiol.*; 594(18):5329e42.

Choudhary S., Jelly P., Mahala P, and Mery A,(2021): Effect of back massage on relieving pain during labour: a systematic review, 10(6):2466-2472.

Crawford C., Boyd C., Charmagne F Paat., Ashley Price., Lea Xenakis., EunMee Yang, and Weimin Zhang, (2016): The Impact of Massage Therapy on Function in Pain Populations—A Systematic Review and Meta-Analysis of Randomized Controlled Trials: Part I, Patients Experiencing Pain in the General Population, 17(7): 1353–1375. doi: 10.1093/pm/pnw099

Deborah B.,(1984) : the measurement of clinical pain. *Journal of Nursing Research.* ; 33(3): 152-56. <https://doi.org/10.1097/0006199-198405000-0000>

Ibrahim A. Mohamed, Mohammed R. and Abd Elhady,(2016): Heating Pads and Early Mobilization for

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

- reducing Postoperative Shoulder Pain and enhancing Recovery of Women undergoing Gynecological Laparoscopic Surgery, IOSR Journal of Nursing and Health Science (IOSR-JNHS) e-ISSN: 2320–1959.
- Ibrahim H, and Kamal W.,(2020): Effect of effleurage massage versus warm application on shoulder pain among postoperative women with gynecological laparoscopic surgery Vol. 10, No. 4
- Jasim M S., Issam M., & Salam NA., (2017): The efficacy of active gas suctioning to decrease the residual co2for preventing post laparoscopic cholecystectomy shoulder pain.
- Kamalifard, M, Shahnazi, M, Sayyah M. Melli, Allahverdzadeh S, and Toraby, S,(2012): The Efficacy of Massage Therapy and Breathing Techniques on Pain Intensity and Physiological Responses to Labor pain doi: 10.1093/pm/pnw099,1(2): 73–79.
- Kaur Jasvir , Sheoran Poonam, Kaur Simarjeet and Jyoti Sarin,(2020): Effectiveness of Warm Compression on Lumbo-Sacral Region in Terms of Labour Pain Intensity and Labour Outcomes among Nulliparous: an Interventional Study 9(1):9-12. doi: 10.34172/jcs.2020.002. eCollecti on 2020 Mar
- Kim JW, Kim HJ, Park YJ, Kang SG, Park JY, and Bae JH, (2018): The effects of a heating pad on anxiety, pain, and distress during urodynamic study in the female patients with stress urinary incontinence. *NeuroUrol Urodyn.*;37(3): 997e1001.
- Kim, H. J., Kim, J. W., Park, H. S., Moon, D. G., Lee, J. G., & Oh, M. M. (2019). The use of a heating pad to reduce anxiety, pain, and distress during cystoscopy in female patients. *International urogynecology journal*, 30(10), 1705-1710.
- Köse Tamer, L., & Sucu Dağ, G. (2020). The assessment of pain and the quality of postoperative pain management in surgical patients. *Sage Open*, 10(2), 2158244020924377.
- Kozak A, Klauesk L, and Beata D.,(2017): Non- pharmacological of pain relief in labor in the openion puerperal.,. Non-pharmacological of painrelief in labor in the openion puerperal. 2017; 1(1):1-4
- Li, X., and Li, K. (2021). Time characteristics of shoulder pain after laparoscopic surgery. *JLS: Journal of the Society of Laparoscopic & Robotic Surgeons*, 25(2).
- Maru Neetu and Deepak Yashaswini ,(2020): A study to evaluate the effectiveness of lavender oil massage on labour pain reduction & level of satisfaction among parturient in selected hospitals at Udaipur, IOSR Journal of Nursing and Health Science (IOSR-JNHS) e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 9, Issue 4 Ser. IX (Jul. – Aug. 2020), PP 35-42 [www.iosrjournals.org](http://www.iosrjournals.org) DOI: 10.9790/1959-0904093542
- Nourian M, Jalalodini A, and Saatchi K, (2016) The effectiveness ofslow stroke back massage on hospitalization nxiety and physiological parameter in school age.

*Comparison between efficacy of Heat Pads and Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations*

- 18(11).  
PMid:[28210499https://doi.org/10.5812/ircmj.36567](https://doi.org/10.5812/ircmj.36567)
- Palazzo E, Rossi F ,and Maione S.(2016); Role of TRPV1 receptors in descending modulation of pain. *Mol Cell Endocrinol*;286: S79–83
- Philip Kaloo, Sarah Armstrong, Claire Kaloo and Vanessa Jordan .,(2019) :Interventions to reduce shoulder pain following gynaecological laparoscopic procedures, Issue 1. Art. No.: CD011101
- RonClijnsen,RahelStoop,DirkAerenhout s,PeterClarys,CarlinaDeflorin, and JanTaeymans,(2022): Local Heat Applications as a Treatment of Physical and Functional Parameters in Acute and Chronic Musculoskeletal Disorders or Pain, Volume 17, Issue 5,, Pages 438-445
- Sallama H and Ali SH.,(2018) : Effect of intraperitoneal and incisional port site lidocaine on pain relief after gynecological laparoscopic surgery: A randomized controlled study.,101 ,pp .5-22
- Sinha A.,(2019): principle and practice of therapeutic massage. New Delhi. Jypee.; 108-9
- Suk O Kwon, Kwon B, Kim J, Hwan B.Kim,(2022): Effects of Heating Therapy on Pain, Anxiety, Physiologic Measures, and Satisfaction in Patients Undergoing Cystoscopy, 16(73-79)
- SukKwon O. BokyeongKwon, JihyeKim, and HwanKim B.,(2022): Effects of Heating Therapy on Pain, Anxiety, Physiologic Measures, and Satisfaction in Patients Undergoing Cystoscopy<https://doi.org/10.1016/j.anr.2022.02.002>[Get rights and content](#)
- Williamson ,A and Hoggart ,B.,(2005) : Pain : a review of three commonly used pain rating scale . *J Clin Nurs* 14(7): 798-804
- Wu Jie , and Wang Yi,(2017): The effectiveness of massage and touch on behavioural and psychological symptoms of dementia: A quantitative systematic review and meta-analysis *Global Leading Nursing Research* ,vol.)73),Issue (10), 17<https://doi.org/10.1111/jan.13311>.
- Youssef N. Abd-Ella,(2018): Effect of Effleurage Massage on Labor Pain Intensity in Parturient Women,*Egyptian Journal of Health Care, EJHC* Vol.9 No.2 331.
- Yucel K & Eyup K ., (2018) : Post-laparscopic cholecystectomy pain, effects of preincisional infiltration and intraperitoneal levobupivacaine 0.25%o pain control –arandimised prospective double blinded placebo-controlled trial., 42,pp.80-85