Effect of Warm Pads and Early Movement on Shoulder Pain and Healing Process for Women Recovering from Gynecological Laparoscopic Surgery

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Abstract

Background: Improving and facilitating women recovery from shoulder discomfort following gynecological laparoscopic surgery is a crucial objective for successfully conducting gynecological laparoscopic surgery. **The study aim** was to evaluate the effect of warm pads and early movement on shoulder pain and healing process for women recovering from gynecological laparoscopic surgery. A randomized controlled trial (RCT) as **a design** was used**. Setting**: This study was conducted at the gynecological units affiliated to Maternity and Children's hospital, Minia University, Egypt. **Sample:** A systematic random sample consisted of 186 women. **Tools:** Data collected for this study using three tools. Tool 1: Structured Interviewing Questionnaire, Visual Analogue Pain Scale tool (II), and Postoperative Quality of Recovery Score tool (III). **The study Results** revealed that shoulder pain in the warm pads and early movement group was markedly lower than in the control group at various assessment times, specifically at 4 hours post-surgery and at 6, 12, and 24 hours. Also. mean scores of women qualities of recovery domains were significantly higher in the intervention group and there is significant negative correlation between presence of pain and women quality of recovery in the intervention group than in the control group. **Conclusion**: The application of warm pads combined with early movement acts as a successful non-drug approach for minimizing postoperatively shoulder pain and boosting healing in women undertaking gynecological laparoscopic surgical procedures **Recommendations**: warm pads and early movement should be incorporated into the hospital protocol as a non-pharmacological modality for improving shoulder pain and the quality of recovery post-gynecological laparoscopy.

Keywords: Warm Pads Application, Early Movement, Shoulder Pain, Healing process, Quality of Recovery, Gynecological Laparoscopic Operations.

Introduction

Laparoscopy is a widely used procedure that provides a clear view of the abdominal cavity by inserting tubes through small incisions and inflating the abdomen with gas which allows for the insertion of a laparoscope and other tools for examining and performing surgery. Nowadays, this technique is used for many complicated operations. Gynecological laparoscopy is a surgical procedure that allows doctors to see the uterus, ovaries, and the outside part of the fallopian tubes. To do this, carbon dioxide gas is pumped into the abdomen. This gas can then cause pain in the shoulder, diaphragm, and other areas of the body due to its connection to the phrenic nerve **(Afzal et al., 2021).**

Laparoscopic surgery is becoming more and more popular because it has many advantages over open surgery. Patients recover faster and can get back to their normal routines sooner, it lessens the hospital time spent and has better cosmetic results. However, even though laparoscopic surgery has these benefits, Pain is still endured by several patients in their upper abdomen and shoulders after the procedure **(Vigneswaran, et al., 2020).**

Regretfully, shoulder pain is a prevalent issue. after gynecological laparoscopic surgery, affecting between 35 and 80 percent of patients. This pain, often called gas pain, usually starts in the lower abdomen and spreads up to the shoulder **(**The exact pain in the shoulder following laparoscopic surgery is not known, but it may be due to the movement of tissues during the surgery, pressure on the diaphragm from the gas used, and the formation of carbonic acid **(Sao, et al., 2019), (Kaloo, et al., 2019) and (Li, et al., 2021).**

Shoulder pain after laparoscopic surgery is often more bothersome than pain from the abdominal incision or internal organs. This is unlike traditional open surgery, where shoulder pain is rare. Many patients don't realize that shoulder pain is related to the surgery, which can make them more worried. This can lead to discomfort, feeling less satisfied with the procedure, and a lower life quality following surgery **(Li & Li, 2021)**. The same authors added that patients often need to take pain medication to manage shoulder pain, which can increase their discomfort. Most patients start to get shoulder pain post-operatively rather than on the actual day of the surgical procedure. Twenty-six studies looked at the intensity of pain in the shoulder after laparoscopic surgery at distinct times. Seventeen of these studies found that the pain was most intense between twelve and twenty-four hours or the day following surgery. Using more pain medication can also make it take longer for women to recover**.**

On the other hand, if pain medication doesn't work or can't be used, there are other non-medication methods that can help manage pain. These include stimulating nerves through the skin, using hot or cold compresses, doing specific exercises, positioning the body correctly, and getting massages **(Zeeni, et al., 2020).** Warm therapy uses warmth to relax muscles, improve blood flow, and speed up metabolism, which can help relieve pain. It's affordable, quick, and doesn't require any special training or skills. Warm therapy also triggers a body response that increases blood flow in areas that aren't directly warm. It can also reduce pain by making it harder for pain signals to reach the brain **(Kwon, et al., 2022).**

The usage of warm therapy has been applied for a long time to eliminate pain and improve health. Today, it's used in many ways, like warm pads, hot baths, and warm lamps. These methods work at different depths to relax muscles, increase blood flow, and reduce pain. Using warm continuously at a low level is a good, easy, and affordable way to manage pain. It can be a helpful part of a combined pain management approach and is something patients can do themselves without any special help **(Freiwald, et al., 2021).** Many studies have shown how warm pads can help with minor muscle tension. Short periods of warm therapy, like 15-20 minutes, might be enough. But for more severe pain, longer sessions of warm therapy, like 30 minutes to 2 hours, might be necessary **(Bowman, et al., 2022)**.

Further, early movement is a key part of Enhanced Recovery After Surgery (ERAS) programs which helps prevent the negative effects of surgery and being unable to move. Early movement can reduce the risk of complications after surgery, help patients regain their ability to walk normally faster, improve how patients feel about their recovery, and shorten their hospital stay, this can also save money on healthcare costs **(Tazreean, et al., 2022).** Early movement can involve activities like sitting up straight, moving from bed to chair, standing up from a chair, doing exercises in or out of bed, and walking in the room or hallway. First, these activities are done with the help of a physical therapist or nurse. The goal is for patients to be able to do these activities on their own by the time they leave the hospital **(Tazreean, et al., 2022).**

Nurses' experiences and knowledge can influence how they provide care. Experienced nurses who have a lot of practical knowledge often have more positive feelings towards their patients compared to less experienced nurses. Nurses are responsible for evaluating patients' physical and emotional health and their daily habits. They must also provide effective care, including managing pain without using medication. This can involve using things like warm pads and massages **(Sinha, 2018).**

Significance of the study

Gynecologists often perform laparoscopic gynecological surgeries, which have become a common surgical procedure. Although laparoscopy has been found to be better than open surgery in reducing pain after surgery, following laparoscopic surgery, shoulder pain remains a major issue **(Zeeni, et al., 2020).** Pain in the shoulders is usual after laparoscopic surgery, affecting between 35% and 80% of patients. While the pain can be quite strong, it usually goes away within 2-3 days and rarely lasts longer than 3 days **(Chaichian, et al., 2018).** In Egypt, between 35% and 70% of patients experience this pain after surgery. Opioids can help reduce pain, but they can also cause side effects like sleepiness, nausea, vomiting, and problems with digestion **(Shady et al., 2018).**

Warm pads are a non-medication method for pain control that don't have any negative side effects and can be used when pain medication isn't

enough or can't be applied **(Sinha, 2018).** Minimizing pain to the point where narcotic pain medication isn't needed is a crucial step in performing laparoscopic surgery and helping women recover better. This motivated the researchers to study how warm pads, and early movement can affect the degree of shoulder pain and the process of rehabilitation following laparoscopic gynecological surgery.

Aim of the study:

The aim of the present research was to assess the effect that the warm pads and early movement have on shoulder pain and healing process in women recovering from gynecological laparoscopic surgery.

Research Hypotheses:

H1: Women who apply warm pads following gynecological laparoscopic surgeries suffer from less shoulder pain than those who don't.

H2: Women who initiate physical activity soon after surgery feel less pain in their shoulders than women who don't.

H3: There is a significant improvement in post-surgical recovery outcomes for warm pad users' women who initiate physical activity soon after surgery.

Subjects and Methods:

Research Design: A randomized controlled trial (RCT) was used to conduct the current study. It is often considered the gold standard for assessing the impact of new interventions. Subjects were randomly assigned whether to receive the intervention or to be in a control group. The effectiveness of the intervention was assessed by comparing the results of the two groups.

Research Setting: The current research was carried out at the gynecological clinics connected to Maternity and Children's hospital, Minia University, Egypt. This hospital provides maternity and gynecological care to all women in the Minia region. It's a major hospital in north Upper Egypt that serves the city of Minia and eight nearby towns. On the first floor, there's a pediatric clinic, a clinic for pregnant women, an infertility clinic, and a center for imaging and diagnostics. Gynecology services are on the second floor, and the prenatal, high-risk pregnancy, labor, and postpartum wards are on the third floor. The fourth floor has a department of pediatric unit and a critical care unit. The inpatient ward is always open, but the outpatient clinics are only open from 9 AM to 1 PM, Saturday to Thursday.

Sampling:

Sample Type: A systematic random sample: women recruited for this study were chosen from the list of operational laparoscopic procedures using a systematic random method. Women of odd numbers were included in the study group, while those with even numbers were placed in the control group until the needed sample size was reached.

Sample Size: Sample size was computed using the census information from the prior year of the Maternity and children's hospital at Minia University. The overall count of females underwent gynecological abdominal laparoscopic surgery was 349 women **(Minia University Hospital Census, 2023).**

Sample size was calculated utilizing the following equation **(Yamane, T. 1967)**:

$$n = \frac{N}{1 + N\,(e)\,2}$$

n= sample size; N= total population number (349); e= margin error (0.05).

For the current study, 186 women who have had gynecological abdominal laparoscopic surgery were enrolled. Two groups were randomly assigned to them: group (1), which consisted of 93 women who underwent gynecological abdominal laparoscopic surgery and used warm pads and early movement techniques to lessen shoulder pain. Group (2), on the other hand, consisted of ninety-three women who received standard hospital pain care.

Criteria:

Inclusion Criteria:

- Women's age should range from 20-60 years.
- Women who are free from medical disorders.
- Women who have shoulder pain rated more than 4 on Visual Analogue Scale following laparoscopy.

- Women who are wishing to take part in the research.

Exclusion Criteria:

- Women who are morbidly obese and possess a body mass index above 30 kg/m2.
- Women whose mobility is limited following surgery .

Data Collection Tools:

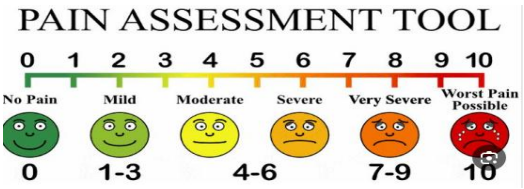
Data was gathered using instruments created by the researchers in the current study, reviewed by knowledgeable specialists, and then examined for validity and reliability. In order to collect data for this study, three tools were used .

Tool (1): The three-part Structured Interviewing Questionnaire which was created by the researchers after they reviewed relevant literatures in order to gather the information they needed about participants.

Part 1: Personal characteristics of women like; age, educational level, residence, occupational status, and body mass index (BMI). **Part 2:** Fundamental features of contemporary surgical procedural of gynecological laparoscopic include indications, purpose, and duration of surgery. **Part 3:** Basal characteristics of shoulder pain including: location of shoulder discomfort, duration of pain in minutes, recurrence of pain, Factors that increase and diminish pain, if pain interfere with activities of daily living, if women observed any reduction in shoulder pain after using warm pads and/or early movement, and when they observed this.

Tool (II): Visual Analogue Pain Scale: It was constructed by Wasiamson & Hoggart (2005).

This tool is a self-assessment method for determining how severe pain is. It was adapted and translated into Arabic to reflect Egyptian culture. It features a horizontal line that patients use to subjectively score their level of pain. The scale ranges from zero to ten, where zero denotes no pain and 10 the most excruciating suffering. Along the line between these two extremes words like "mild," "moderate," "severe," and "unbearable" are positioned at certain points. It was applied to gauge the extent of the pain at 4, 6, 12, & 24 hours postoperative; Women were given the choice of choosing a score that best matched their level of discomfort at the momment, ranging from zero to ten.



Scoring system for Visual Analogue Pain Scale: It is scored as no pain at all (zero), minor pain (one to three), pain that is moderate (four to seven), and intense pain (eight to ten).

Tool (III): Postoperative Quality of Recovery Score (PQRS-40): Adopted from (Myles et al., 2000), it was used to assess the quality of recovery for women following a 24-hour post-gynecological laparoscopic procedure. The 40 items are arranged in different categories based on different aspects of recovery: psychological support (seven elements), physical autonomy (five elements), emotional mood (nine elements), physical comfort (12 elements), and pain (seven elements).

Scoring system of Postoperative Quality of Recovery Score (PQRS-40):

To assess positive things, a Likert-5 point scale was used, with (one) denoting never, (two) some of the time, (three) usually, (four) most of the time, and (five) always. Scores for negative elements were inverted. The recovery's overall quality score falls between 40 and 200.

Classification	Score
Poor QOR	40–80
Average QOR	81–120
Good QOR	121–160
Better QOR	161–200

Tools Validity:

To assess the applied tools' validity, a panel of five maternity nursing specialists examined the instruments. Changes were made in accordance with the panel's assessment of the study's purpose, comprehensiveness, understanding, applicability, relative importance, and sentence clarity.

Reliability of the tools:

Employing the Cronbach's Alpha statistic test, the tools' inner consistency was checked out.

Pilot study:

A pilot study was conducted on ten percent (18 women) of the entire sample to be examine the present study tools for clarity, validity, and the duration needed to be applied.

Methods of data collection:

Operational design:

The present study's operational design consists of three distinct phases: the planning phase, the execution phase, and the evaluation phase. The purpose of this study is to evaluate effect of warm pads and early movement on shoulder pain and healing process for women recovering from gynecological laparoscopic surgery.

Preparatory phase:

To understand the topic better, the researchers reviewed existing studies from both inside and outside the country. This helped them see the full scope of the issue and design the right tools to collect data. They tested these tools by having experts review them to make sure the questions are clear, accurate, and relevant.

Ethical Considerations:

The Minia University Faculty of Nursing Ethical Committee gave its approval for this research to be carried out code No (REC202477). Before conducting the pilot study and the main study, officially consent was acquired from the nursing faculty dean and from the Minia University Hospital's director for Maternity and Children. Written agreement was gained from women who volunteered to take part in the research after being aware of its target and nature. whatever moment during the study, women were free to discontinue engagement or leave without providing any justification. Their privacy was protected during data collection, and there was no health risks involved. Women was promised that their details were secure, and being anonymous was respected by assigning a number to each participant.

Implementation phase:

After receiving approval from the hospital director and the study's ethical committee, the researchers were able to start the study. The research was conducted over a 6-month period from October 2024 to March 2025.The researchers visited the previously mentioned setting every day excluding Friday from 1.30 PM to 4.30 PM based on the participants' availability in the hospital who met the included criteria. The mentioned process was executed until the exact number needed was gathered. The researchers were assured that all women participating in the study were undergone the same surgical procedure, received the same doses of anesthesia, and had the same measures taken to remove CO2 gas from their abdomen during surgery.

During the initial contact, which was taken place within four hours of the laparoscopic surgery in the gynecology ward and at the starting point of the interview, the researchers greeted each woman, explained the study's purpose, nature, activities and sessions' duration. Following verbal and written consent from the women who satisfied the inclusion criteria, each woman was interviewed to gather information about her personal characteristics (age, residence, occupational position, education level, and BMI), the purpose and duration of the current gynecological laparoscopic surgery, and the fundamental features of her shoulder pain (location, duration in a matter of minutes recurrence, and factors that exacerbate and lessen pain). The researchers assessed the post-operative shoulder pain of the study groups using the visual analog pain scale 4 hours after surgery and before the intervention (first time) which assessed current discomfort, including its frequency, location, triggers, and what relieve it.

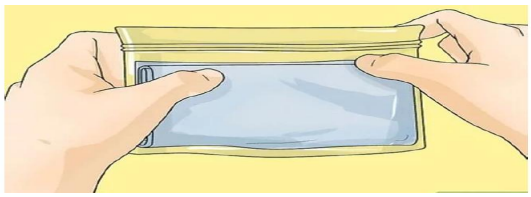
Two groups of women were distinguished:

Study Group (G1): This group included 93 women who were having a warm pad (38-40 degrees Celsius) applied to their shoulders four hours after surgery for 15-20 minutes. These women were asked to use the warm pad every two hours for 24-48 hours or until the pain completely go away. They were also encouraged to start

moving around as soon as they could in bed or by walking. This included changing their body posture, bringing their legs towards their body, and walking early. The interventions started instantly following evaluation (pre-intervention) within the first four hours following the surgical procedure.

Preparation of the warm pad:

Soak a clean towel in a bath of water till it's thoroughly wet to get the heating pad ready after warming this water using a kettle. Put the towel in a tightly closed sack of plastic with a holder. Place the sack on an item of cloth that's been sewn into a pillow shape. The bag shouldn't be too hot to touch the skin, so there should be a layer between the warm and the skin. If it's too hot, let it cool down slightly. Put the bundled compress against the skin. Avoid leaving the pad on for longer than 20 minutes and stand away from the heat every 10 minutes.



The women were told by the researchers to perform this technique every two hours until the shoulder ache was totally gone. Instructions on how to produce a warm pad at home were provided, along with visual photos of the procedure and a 20-minute demonstration by the researchers. To make a heated pad, cut the fabric to the proper size and fold it in two, to ensure all the ends line up. Leave one side open and sew the other side's edges. Add a few drops of essential oil to a bowl of rice. Combine them. Add enough rice to fill three-quarters of the fabric pillow using a funnel. Sew the other side. To use it, either wrap it in aluminum foil and preheat the oven to 180 degrees Fahrenheit or use the microwave for one or two minutes.

The cushion should remain warm for 30 to 45 minutes at a pleasant temperature. A woman can place the pillow in a bowl and then in the oven if she doesn't have a microwave. For 15 to 20 minutes, place the cushion on the shoulder, which is the sore location, and tighten it with a tie. A pamphlet containing graphics regarding laparoscopic surgery, its potential risks (particularly shoulder pain), kinds, the advantages of warm pads, and how to use them at home was given to each lady at the conclusion of the sessions. Both prior to and following the intervention, the researchers assessed the shoulder pain.

Control Group (G2): This group included 93 women who were interviewed as well within the 1st four hours post their laparoscopic surgery. The researchers gave them information about laparoscopic surgery, including its definition, reasons for performing it, benefits, and potential risks, in particular shoulder pain. The researchers didn't provide any additional treatment to those women. They received the usual pain relief treatment given at the hospital.

The Supportive Material (Handout Arabic booklet):

The researchers developed and used it to guide women to become more knowledgeable and efficiently practice self-care steps after gynecological laparoscopy, it contained (grounds for laparoscopic surgery; consequences from the procedure, particularly shoulder discomfort; varieties of warm pads; advantages of using them at home; and how to use them).

Evaluation phase:

To evaluate the effectiveness of the interventions, the researchers measured pain scores before and after using warm pads and early movement techniques. Pain scores were assessed at 4, 6, 12, and 24 hours after laparoscopic surgery. The baseline level of shoulder pain was evaluated 4 hours after surgery (before the intervention) to ensure that the anesthesia had worn off. The Visual Analogue Pain Scale was utilized to quantify the degree of pain. In addition, the Postoperative Quality of Recovery Score-forty(QQRS-40) tool was used to assess the quality of recovery 24 hours after laparoscopic surgery.

Results:

Every statistical analysis was conducted using SPSS version 20.0. The continuous data had a normal distribution and were shown as mean ± standard deviation (SD). Numbers and percentages were used to express categorical data. Variables with categorical data were compared using the chi-square test (or Fisher's exact test, if

appropriate). To ascertain whether there is a significant difference between the means of two groups, an inferential statistic called a t-test is employed. Two variables with continuous data were tested for relationships using a correlation coefficient test. The threshold for statistical significance was $p \leq 0.05$.

Table (1) demonstrates the personal characteristics of women under study which clarifies that 37.6% and 31.2% of the study and control groups, respectively, are between the ages of 40 and 50 and that 26.9% of the study group and 25.8% of the control group completed secondary school. Of the research and control groups, 52.7% and 59.1%, respectively, reside in rural areas. Additionally, 52.7% and 61.3% of them are housewives and 47.3% and 38.7% of the study and control groups, respectively, have normal body weights with no statistically significant difference found.

Table (2) reveals that 32.3% and 37.6% of the study and control groups, respectively, have poly cystic ovarian disease and that 68.8% of the study group and 66.7% of the control group have therapeutic laparoscopic surgery. Additionally, 39.8% of both groups have duration of surgery between 31 to 45 minutes with no statistically significant difference found

Table (3) documented that 31.2% & 32.3% of study and control group respectively have no shoulder pain after gynecological laparoscopic surgery while 14% & 8.6% of them have pain in both shoulders and that 59.3% & 46% of women experienced pain last for 15 minutes and 57.8% & 44.4% have permanent recurrence of pain. In addition, 29% and 37.6% of study and control group feel that walking was a cause of increasing pain while 30% and 34.4% of them feel that warm compressors are a cause of decreasing pain. Furthermore, 68.8% and 67.7% of both groups respectively, experience pain that interfere with their activities of daily living. Regarding management of pain, 100% of the study group women observe a reduction in shoulder pain after using warming pads and/or early movement and 43.8% of them have a reduction of pain within 30 to 60 minutes with no statistically significant difference found

Table (4) cleared that 39.1% and 39.7% of the study and control groups, respectively, have a moderate pain and that 0% of both groups have no pain pre intervention. After 6 hours of intervention 1.6% of study group versus 0% of control group have no pain and that percentage increases significantly to 37.5% & 22.2% of study and control group respectively have no pain after 12 hours of intervention while 98.4% & 30.2% of them have no pain after 24 hours of intervention with a statistical significant differences found between the two groups in all observations after intervention

Figure (1) Demonstrates that 65.5% of the women in the intervention group have a good quality of recovery compared to a small proportion of the studied women (12.9%) in the control group. There was a highly statistically significant improvement in the patient quality of recovery total score in the intervention group at 24 hours ($p < 0.003$).

Table (5) Reveals that the mean scores of women quality of recovery domains were significantly higher in the intervention group than in the control group, with a highly statistically significant difference noted between the studied groups at 24 hours of intervention ($p < 0.001$).

Table (6) shows a statistically significant negative correlation between presence of pain and women quality of recovery in the intervention group ($p < 0.05$) while there is a non statistical significant negative correlation between presence of pain and women quality of recovery in the control group ($p > 0.05$) after 24 hours of intervention

Table (1): Percentage Distribution of Personal characteristics of studied women (n=186)

Characteristics	Study Group (n=93)		Control Group (n=93)		X^2	p-value
	No	%	No	%		
Age						
- 20 – <30	23	24.7	25	26.9	4.36	0.225
- 30 – <40	25	26.9	22	23.7		
- 40 – <50	35	37.6	29	31.2		
- 50 – 60	10	10.8	17	18.2		
Educational Level						
- Illiterate	7	7.5	6	6.5	5.02	0.413
- Read and write	6	6.5	8	8.6		
- Primary	21	22.6	12	12.9		
- Preparatory	20	21.5	20	21.5		
- Secondary	25	26.9	24	25.8		
- University	14	15.1	23	24.7		
Place of Residence						
- Urban	44	47.3	38	40.9	0.785	0.460
- Rural	49	52.7	55	59.1		
Occupation						
- House wife	49	52.7	57	61.3	1.40	0.236
- Employee	44	47.3	36	38.7		
Body mass index (kg/m2)						
- Underweight (less than 18.5)	7	7.5	8	8.6	3.39	0.335
- Normal Weight (18.5-24.9)	44	47.3	36	38.7		
- Overweight (25-29.9)	30	32.3	28	30.1		
- Obese (30 or higher)	12	12.9	21	22.6		

* Statistical significant ($P \leq 0.05$)

Table (2): Percentage Distribution of Studied women regarding Characteristics of the current gynecological laparoscopic surgery (n=186)

Characteristics	Study Group (n=93)		Control Group (n=93)		X^2	p-value
	No	%	No	%		
Indications of the current gynecological laparoscopic surgery						
• Uterine fibroid	28	30.1	31	33.3	6.36	0.174
• Uterine polyps	17	18.3	9	9.7		
• Laparoscopic hysterectomy	15	16.1	18	19.4		
• Poly cystic ovarian disease	30	32.3	35	37.6		
• Infertility	3	3.2	0	0		
Purpose of the current gynecological laparoscopic surgery						
• Diagnostic	29	31.2	31	33.3	0.098	0.754
• Therapeutic	64	68.8	62	66.7		
Duration of the surgery in minutes						
• 15-30	29	31.2	30	32.3	3.50	0.174
• 31-45	37	39.8	37	39.8		
• 46-60	27	29	26	28		

* Statistical significant ($P \leq 0.05$)

Table (3): Percentage Distribution of Studied Women Regarding Characteristics of Shoulder Pain (N=186)

Characteristics	Study Group (n=93) No (%)	Control Group (n=93) No (%)	X^2	p-value
1. Do you feel shoulder pain after gynecological laparoscopic surgery?				
- No	29 (31.2)	30 (32.3)	4.39	(0.11)
- Right shoulder	30 (32.3)	23 (24.7)		
- Left shoulder	21 (22.6)	32 (34.4)		
- Both shoulder	13 (14)	8 (8.6)		
2. How many minutes do you feel pain?				
- 10 minutes	12 (18.8)	14 (22.2)	2.41	0.299
- 15 minutes	38 (59.3)	29 (46)		
- 20 minutes & more	14 (21.9)	20 (31.8)		
3. What is the recurrence of pain?				
- Permanent	27 (42.2)	35 (55.6)	2.27	0.157
- Intermediate	37 (57.8)	28 (44.4)		
4. Factors aggravate pain				
- Nothing	29 (31.2)	30 (32.3)	2.33	0.505
- Walking or movement	27 (29)	35 (37.6)		
- Eating & Drinking	11 (11.8)	9 (9.7)		
- Cough	26 (18)	19 (20.4)		
5. Factors decrease pain				
- Nothing	29 (31.2)	30 (32.3)	2.12	0.546
- Analgesic	26 (28)	18 (19.4)		
- Early ambulation & Walking	10 (10.8)	13 (14)		
- Warm compressors	28 (30)	32 (34.4)		
6. Does pain interfere with activities of daily living (ADLs)?				
- Yes	64 (68.8)	63 (67.7)	0.025	0.875
- No	29 (31.2)	30 (32.3)		
7. Do you observed any reduction in shoulder pain after using warming pads and/or early movement?				
- Yes	**64 (100)**	-----	------	-----
- No	**0 (0)**			
8. If yes, when did you notice the reduction				
- At 15-30 minutes	16 (25)	-----	-----	-----
- At 30-60 minutes	28 (43.8)	-----		
- At 1-2 hrs.	20 (31.2)	-----		

* Statistical significant ($P \leq 0.05$)

Table (4): Percentage Distribution of Studied Women Regarding their Total Pain Score (N=186)

Characteristics	Study Group (n=64) No (%)	Control Group (n=63) No (%)	X^2	p-value
1. Intensity of shoulder pain after 4 hours (pre intervention):				
- No pain (0)	0 (0)	0 (0)	0.335	0.846
- Mild pain (1-3)	19 (29.7)	21 (33.3)		
- Moderate pain (4-7)	25 (39.1)	25 (39.7)		
- Severe (8-10)	20 (31.2)	17 (27)		
2. Intensity of shoulder pain after 6 hours:				
- No pain (0)	1 (1.6)	0 (0)	9.34	0.025*
- Mild pain (1-3)	23 (35.9)	22 (34.9)		
- Moderate pain (4-7)	31 (48.4)	19 (30.2)		
- Severe (8-10)	9 (14.1)	22 (34.9)		
3. Intensity of shoulder pain after 12 hours:				
- No pain (0)	24 (37.5)	14 (22.2)	10.4	0.005**
- Mild pain (1-3)	31 (48.4)	40 (63.5)		
- Moderate pain (4-7)	9 (14.1)	9 (14.3)		
- Severe (8-10)	0 (0)	0 (0)		
4. Intensity of shoulder pain after 24 hours:				
- No pain (0)	63 (98.4)	19 (30.2)	9.84	0.001**
- Mild pain (1-3)	1 (1.6)	44 (69.8)		
- Moderate pain (4-7)	0 (0)	0 (0)		
- Severe (8-10)	0 (0)	0 (0)		

* Statistical significant ($P \leq 0.05$)

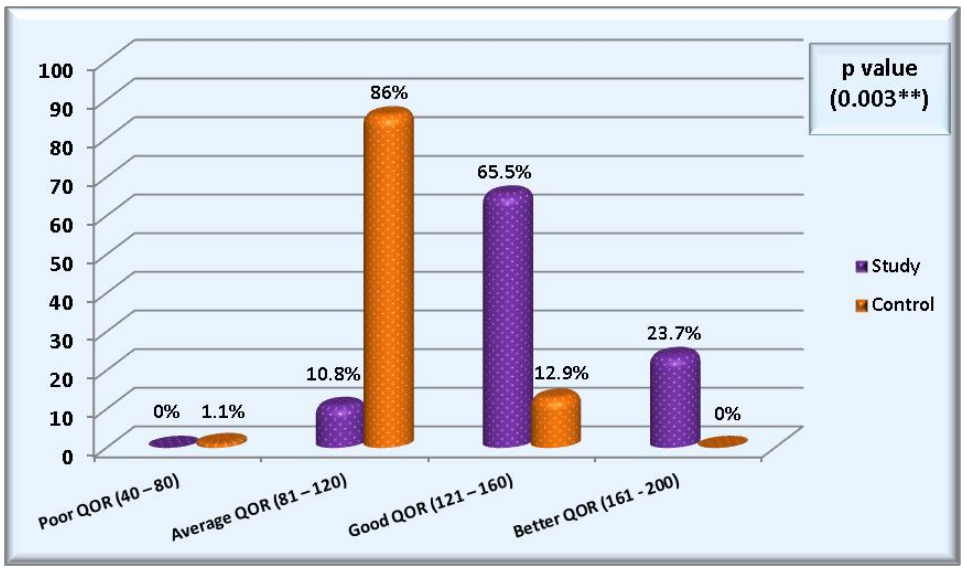


Figure (1): Percentage Distribution of Studied Women Regarding their Postoperative Quality of Recovery Score (QoR-40) (N=186)

Table (5): Percentage Distribution of Studied Women Regarding their Postoperative Quality of Recovery Score (QoR-40) (N=186)

Characteristics	Study Group (n=93)	Control Group (n=93)	t	P value
	Mean ± SD	Mean ± SD		
- Emotional state	33.4 ± 5.21	25.1 ± 2.95	12.9	0.001**
- Physical comfort	39.5 ± 7.71	35.9 ± 3.96	3.43	0.002**
- Psychological support	27.4 ± 4.33	15.7 ± 4.91	16.6	0.001**
- Physical independence	20.7 ± 3.68	9.56 ± 3.87	20.1	0.001**
- Pain	15.1 ± 5.74	29.2 ± 4.12	12.1	0.001**
Total Score	145.6 ± 17.5	104.1 ± 12.3	18.6	0.001**

** Highly Statistical significant difference (P ≤ 0.01)

Table (6): Correlation between Shoulder Pain and Postoperative Quality of Recovery Score (QoR-40) (N=186)

	Pain			
	Study Group (n=93)		Control Group (n=93)	
	R	*p*	*r*	*p*
QOR	**- 0.248**	**0.049***	**- 0.55**	**0.224**

*Statistically significant difference (P ≤ 0.05)

Discussion:

Improving and facilitating the healing of women suffering shoulder discomfort after gynecological laparoscopic surgery is a crucial objective for successfully conducting gynecological laparoscopic surgery. For women, shoulder pain following this kind of surgery may be more uncomfortable than the site of incision **(Ibrahim & Kamal, 2020).**

Regarding the personal characteristics of the women under study. As examining the two groups, similarity was observed between both, with no statistically significant differences concerning age, residence, education level, occupation status, and BMI. The results of this research aligned with a comparable study conducted by **El-Naser et al ., (2022),** who conducted research to examine the effectiveness of warm pads compared to effleurage massage in alleviating shoulder pain following gynecological laparoscopic procedures. It demonstrated that there were no notable differences between both groups analyzed concerning all socio-demographic characteristics such as age, educational level, place of residence, and job status (p>0.05 for each). Additionally, these findings aligned with **Soliman & Ragab., (2022),** who noted that there were no significant differences among the analyzed groups concerning all demographic featuers (with P > 0.05 for each).

Regarding the features of contemporary gynecological laparoscopic surgery, this study discovered that there are no statistically significant differences in the fundamental laparoscopic procedure characteristics, including indications, duration, and objectives. These findings were as the work of **El-Naser et al ., (2022),** who reported no significant difference between the study and control groups in relation to the purpose and timing of laparoscopic surgical procedure. Additionally, a study performed in Auckland **by Kaloo et al. (2019),** which implemented interventions aimed at alleviating shoulder pain after gynecological laparoscopic surgeries. Their results showed that the reasons for gynecological laparoscopy vary, with certain laparoscopies being solely for diagnostic purposes, without any surgical intervention occurring.

Conversely, these findings contradicted those of **Leonardo Vieira et al. (2019)** from Brazil, who conducted a study which found that laparoscopy helped diagnose 59.6% of cases of

infertility (P > 0.05), 93.7% of patients of chronic pelvic discomfort with an uncertain cause (P<0.01), and definitively diagnosed acute abdomen while ruling out tube-ovarian abscess (P<0.05).

Regarding characteristics of shoulder pain, the current study documented that nearly one third of the study and control group had no shoulder pain after gynecological laparoscopic surgery, the result was in contrast with **Ibrahim and Kamal (2020)** which revealed that women in the study complained of pain on both sides of the shoulder. Furthermore, according to the current study, about one-third of them felt that warm compressors caused decreasing pain, 100% of the study group women observed a reduction in shoulder pain after using warming pads and/or early movement. Results were supported by a similar study conducted in Europe by **Ron Clijsen et al. (2022),** who explored that local warm application (LWA) provided immediate pain relief post-intervention, in contrast to pharmacologic treatment for both cases that are either acute or chronic.

Also, **Kaur et al. (2020)** conducted research in India, and their results showed that following a half-hour of warm massage during the second and third trials, compared to the control group (7.20, 8.89), the childbirth pain severity index (6.34, 8.30) was lower in the experimental group. These findings suggested that labor pain was effectively reduced by warm compression. The calming impact of the heated treatment was the cause of this. It results in blood vessel vasodilation which increases blood flow, encourages relaxation, and hence lessens pain severity.

Concerning the total pain score of the current study, it was illustrated that there was a statistically significant difference between the two groups in all observations at 6,12 and 24 hours after intervention. The current study findings were congruent with **Hassan et al., (2023)** who reported a significant reduction in pain scores at 12 and 24 hours. This could be attributed to the soothing effect of superficial warming that reduces sympathetic nerve drive, dilates local blood vessels, and increases circulation and tissue oxygenation. In this context, **Sukkwon, (2022)** conducted research in Asia showing that w Warming treatment during a cystoscopy is a useful and successful nursing intervention that boosts satisfaction among patients while lowering unease and tension. Moreover, in the same line, a study **by Soliman & Ragab, (2022)** which reported that those females who used Trendelenburg Position, effleurage massage, or warm pads experienced less shoulder pain this because similarity of socio demographic characteristics.

Regarding the (PQRS), the present research indicated that the average scores for women's recovery quality domains were significantly higher in the treated group than in the control group, showing a highly statistically significant difference (p <0.001). This result agreed with a study carried out in Egypt by **Ibrahim & Mohammed (2016)**, which noted that the postoperative recovery quality score was elevated in the group using warm pads and early movement than the control group, demonstrating a very statistically significant difference (p<0.001). It is widely acknowledged that laparoscopic shoulder pain after surgery impacts a woman's recovery. This might be due to the woman's performance after laparoscopy being affected by shoulder pain.

Moreover, a statistically significant negative correlation was observed between presence of pain and women quality of recovery in the intervention group (p < 0.05). These findings aligned with the study by **Fathy et al (2024),** which demonstrated a strong negative correlation between the severity of shoulder pain and the quality of postoperative recovery. Furthermore, effective nursing care for post-laparoscopic shoulder pain can enhance recovery after surgery, as postoperative pain impacts a woman's performance following laparoscopy.

Conclusion:

The outcomes of this examination brought to the assumption that the application of warm pads combined with early movement acts as a successful non-drug approach for minimizing postoperatively shoulder pain and boosting healing in women undertaking gynecological laparoscopic surgical procedures, which confirms and reinforces the study hypothesis.

Recommendations:

According to the results of the current study, the following suggestions were proposed:

- warm pads and early movement should be integrated into the hospital protocol as an alternative to drugs modality for

improving shoulder pain and the quality of recovery post-gynecological laparoscopy

- Alternative therapies techniques for controlling shoulder pain following laparoscopic surgery ought to be incorporated into the nursing program's coursework.
- Maternity nurses should receive training programs on the use and benefits of warm pads.
- Additional studies are required to investigate
- Evaluate satisfaction among women with using warm pads to alleviate shoulder pain following a laparoscopic procedure.

References: -

- **Afzal, Changazi, , Hyidar , Siddique, , Rehman, Bhatti, & Farooka, (2021):** Role of laparoscopy in diagnosing and treating acute nonspecific abdominal pain. Cureus, 13(10).
- **Bowman, Sharon, Sullivan, & Santamarina, (2022):** How to make homemade Warm pad. Available at https://www.healthline.com/health/pain-relief/how-to-make-a-homemade-warm-pad
- **Chaichian, Moazzami, Haghgoo, & Sheibani, K. (2018):** A new approach to an old concept for reducing shoulder pain caused by gynecological laparoscopy. Journal of Reproduction & Infertility, 19(1), 56.
- **El-Naser , El-Razek ,** & **Ayoob , (2022).** Efficacy of Heat Pads versus Effleurage Massage in Reducing Shoulder Pain after Gynecological Laparoscopic Operations. International Journal of Novel Research in Healthcare and Nursing Vol. 9, Issue 2, pp: (205-225), Month: May - August 2022, Available at: www.noveltyjournals.com.
- **Fathy Elbeltagy, Abdelglil, & ElShora, (2024).** Effect of Massage on Shoulder Pain Intensity and Quality of Recovery Post-Gynecological Laparoscopy. Assiut Scientific Nursing Journal, 12(43), 108-117.
- **Freiwald, Magni, Fanlo-Mazas, Paulino, Sequeira de Medeiros, Moretti, & Solarino, (2021):** A role for superficial warm therapy in the management of non-specific, mild-to-moderate low back pain in current clinical practice: A narrative review. *Life*, *11*(8), 780.
- **Hassan Ahmed, Fathy Fathalla, , Mohamed Mahmoud, Ibrahim Rashwan, & Hassan Shamekh Taman (2023)**. Effect of the Trendelenburg position, Deep Breathing Exercise, and Warm Water Application on Shoulder Pain and Post-gynecologic Laparoscopic Recovery. Egyptian Journal of Health Care, 14(3), 195-209
- **Ibrahim and Kamal ,2020)**. Effect of effleurage massage versus warm application on shoulder pain among postoperative women with gynecological laparoscopic surgery Vol. 10, No. 4.
- **Ibrahim Mohamed and Mohammed, Abd Elhady,(2016):** Heating Pads and Early Mobilization for 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.
- **Kaloo, Armstrong, Kaloo, & Jordan,. (2019):** Interventions to reduce shoulder pain following gynaecological laparoscopic procedures. *Cochrane Database of Systematic Reviews*, (1).
- **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. eCollection 2020 Mar
- **Kwon, Kwon, Kim, (2022):** Effects of warm therapy on pain, anxiety, physiologic measures, and satisfaction in patients undergoing cystoscopy. *Asian Nursing Research*, *16*(2), 73-79.
- **Leonardo Vieira Elias, Vitória Cristina Bortolani, Carlos Roberto Padovani, Daniel Spadoto-Dias, and Rogério Dias., (2019)**: The role of laparoscopy in the propaedeutics of gynecological diagnosis14(4):463–469

- **Li, & Li (2021):** Time characteristics of shoulder pain after laparoscopic surgery. JSLS: Journal of the Society of Laparoscopic & Robotic Surgeons, 25(2).
- **Li, Tian, Li, Han, & Li (2021):** The risk of shoulder pain after laparoscopic surgery for infertility is higher in thin patients. Scientific Reports, 11(1), 1-8.
- **Minia University Hospital Statistical Census Center (2023):** Obstetrics and gynecological department census report.
- **Myles, Weitkamp, Jones, Meilk, and Hensen,. (2000):** Validity and reliability of postoperative quality of recovery score: the QoR-40, British journal of anaesthesia, 84(1):11-15.
- **RonClijsen,RahelStoop**,DirkAerenhouts, 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
- **Sao, ,Chan-Tiopianco, Chung, Chen, Horng, Lee, & Wang,. (2019):** Pain after laparoscopic surgery: Focus on shoulder-tip pain after gynecological laparoscopic surgery. Journal of the Chinese Medical Association, 82(11), 819-826.
- **Shady, Sallam, Ali, & Abbas, (2018):** Effect of intraperitoneal and incisional port site lidocaine on pain relief after gynecological laparoscopic surgery: A randomized controlled study. *Middle East Fertility Society Journal*, *23*(1), 63-67.
- **Sinha, (2018):** Principles and practice of therapeutic massage. New Delhi Jaypee Brothers Medical Publishers. 108-9.
- **Soliman Ahmed, & Ragab Mohamed Ragab, (2022).** Effect of Warm Pads, Effleurage Massage or Trendelenburg Position in Reducing Shoulder Pain after Gynecological Laparoscopic Operations. Egyptian Journal of Health Care, 13(4), 626-640
- **SukKwon ,BokyeongKwon, JihyeKim, and HwanKim.,(2022):** Effects of Heating Therapy on Pain, Anxiety, Physiologic Measures, and Satisfaction in Patients Undergoing Cystoscopyhttps://doi.org/10.1016/j.anr.2022.02.002Get rights and content
- **Tazreean, Nelson, & Twomey, (2021):** Early movement in enhanced recovery after surgery pathways: current evidence and recent advancements. *Journal of comparative effectiveness research*, *11*(2), 121-129.
- **Vigneswaran, Prachand, Posner, Matthews, & Hussain, M. (2020):** What is the appropriate use of laparoscopy over open procedures in the current COVID-19 climate? Journal of Gastrointestinal Surgery, 24, 1686-1691.
- **Wasiamson,. and Hoggart, (2005):** "Pain: a review of three commonly used pain rating scales." J Clin Nurs 14(7): 798-804.
- **Yamane, (1967):** Statistics an Introductory Analysis, 2nd Edition, New York Harper and Row CO.USA, 213.
- **Zeeni, Chamsy, Khalil, Abu Musa, Al Hassanieh, Shebbo & Nassif, (2020):** Effect of postoperative Trendelenburg position on shoulder pain after gynecological laparoscopic procedures: a randomized clinical trial. BMC anesthesiology, 20(1), 1-7.