

Effect of Effleurage Massage Versus Heat Patch on Afterpain Level among Multipara Postnatal Women

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Abstract:

Following childbirth, women may endure a variety of physical discomforts. Among these is after pain which is a sign of uterine involution, the process through which the reproductive organs return to their state before pregnancy. Following childbirth, non-pharmacological methods should be prioritized for pain relief. **Aim of the Study:** To determine the effect of effleurage massage versus heat patch on afterpain level among multipara postnatal women. **Subjects and method:** A quasi-experimental study design was used, 90 women complained from afterpain were chosen by purposive sampling from Damanhour Medical National Institute obstetrics and gynecological department. **Tools:** Three tools were used for collecting data. **Tool I:** Structured interview sheet, **Tool II:** Visual analog pain scale and **Tool III:** A modified version of Chamber Price pain rating scale. **Results:** The result of the study showed that pain intensity was statistically significant among both study groups before and after intervention ($p = .000$). Tables demonstrated that effleurage massage was more effective in controlling after pain than heat patch application ($p=0.000^{**}$). **Conclusion:** According to the current study, effleurage massage causes less pain severity afterward than heat patches. **Recommendations:** Hospital protocols should recommend the use of effleurage massage and heat patches for managing afterpain.

Keywords: Afterpain , Effleurage massage, Heat patch & Postnatal women

Introduction

For mothers and their families, the first few weeks after giving birth are crucial and significant times. It is also the most difficult time since they have to take care of themselves, their newborn, and adjust to the physical and mental changes. As the uterus contracts return to its size before pregnancy, mothers experience a variety of postpartum issues such as hemorrhoids, cramping, engorgement of the breast, nipple expansion, tearing and laceration in the perineum and episiotomy. Lotfy (2021).

In order to facilitate the narrowing of the mother's blood arteries on the uterine wall at the placental region, the uterus continues to contract after the baby is born and the placenta is delivered. When the uterus returns to its original size and position before pregnancy, the lower abdomen experiences after-pain, which is usually spasmodic in nature. Panda et al. (2021) Namboothiri & Viswanath (2021) In addition, the start of breastfeeding causes the posterior pituitary gland to release oxytocin, which increases uterine contractions. As a result, after-pain especially in multipara make the mother uncomfortable. Vasava et al. (2021)

Afterpains are a group of symptoms that usually appear within 48 hours of delivery and last for one to four days. They are generally described as dull or strong cramps that cause lower back and stomach

pain. Both mother's quality of life and their relationship with caring for babies are badly impacted. It can cause mental distress, sadness, appetite loss, and the mother's inability to perform her daily activities. Rahmayanti & Yolanda (2019)

There are two kinds of afterpain management interventions: pharmaceutical and nonpharmacological. Pharmacological therapies, such as non-steroidal anti-inflammatory drugs and ingestible opioids are used to treat moderate to severe postpartum pain. These activities, however, have a number of unfavorable effects that could harm the infant and reduce the quality of breast milk. Therefore, alternative pain-relieving therapies are usually prioritized. Motakef et al. (2022)

Non-pharmacological methods like homeopathy, acupuncture, yoga, waterbirth, hypnobirthing, relaxation, massage, or massage with effleurage and Thermoherapy can effectively manage pain due to their simple nature, non-invasiveness, ability to increase patient confidence and involvement, lack of negative effects on mothers and newborns, and absence of problems related to breastfeeding. Hu et al. (2021) & Putri et al. (2023)

Thermal therapy or using a heat patch is commonly employed to alleviate pain issues. Heat treatment can be combined with other therapeutic techniques and usually requires applying direct heat to the skin. Due

to the increased temperature; heat therapy enhances blood flow and circulation to specific areas. Raising the temperature of the affected area can reduce pain, improve muscle flexibility, and potentially expedite the healing of damaged tissue. It can also regulate hormonal changes associated with the discomfort experienced during postpartum contractions. **Rizki et al. (2023)**

Effleurage is another non-pharmacological therapy that should be used on a regular and continuous basis since, the nervous system becomes acclimated to the stimulation, stopping the massage tends to make the pain worse. Therefore, gradual, steady repetition and gentle pressure are the keys to increase the successful use of effleurage massage in diminishing pain **El-Naser et al. (2022)**

Painful uterine contractions are diminished by massage effleurage because, at that time, the A Delta fiber's gate close, preventing the cortex and brain from receiving pain signals after they had already been suppressed by massage counter stimulation. This is done in order to change how pain feels **Ibrahim & Ali (2020)**

Effleurage massage is a very beneficial method that encourages relaxation, lessens anxiety, and restores body equilibrium, hence reducing pain. Additionally, because effleurage is a straightforward, simple treatment that may be administered during pain and is well-tolerated by women, it is ideal to be utilized by an effleurage maternity nurse. **Hadiningsih & Khotimah (2023)**

Afterpain management is crucial for providing effective obstetric nursing care to support postpartum recovery, reducing anxiety, and helping a woman adjust to her new life and family. **Xiao et al. (2020)** In addition to the high prevalence of postpartum discomfort, pharmaceutical analgesics can have negative consequences on both mother and newborn health. Furthermore, little study has been done in Egypt to determine whether effleurage and heat patches are useful non-invasive ways to reduce the intensity of postpartum afterpain. Thus, the purpose of this study was to ascertain how effleurage and heat patches affected the degree of postpartum afterpain in women who were multiparous.

Significant of the study

Afterpain is characterized as a woman who has different sorts of pain and discomfort following delivery, involving spasmodic symptoms linked with uterine involution, while the uterus contracts to limit loss of blood and returns to its pre-pregnancy size. **Deussen (2020)** For a woman to engage in her regular activities, bond with and care for her infant, and to avoid disruptions to breastfeeding, proper postpartum pain management plays a crucial role in providing

obstetric nursing care. **Sharifi et al. (2022)**. Unfortunately, studies related to the use of heat therapy, such as heat patches and effleurage on the puerperium, are still very limited. Therefore, the purpose of this study was to examine the efficacy of effleurage and heat patches on the afterpain level in multiparous Postnatal Women.

Aim of the Study

To determine the effect of effleurage massage versus heat patch on afterpain level among multipara postnatal women

Research hypothesis:

H1: Postnatal Mothers who apply Effleurage massage expected to have less pain intensity than those who apply Heat Patch.

H2: Postnatal Mothers who apply Heat Patch expected to have less pain intensity than those who apply Effleurage massage.

Subjects and method

Setting:

The study was carried out at Damanhour Medical National Institute obstetrics and gynecological department in Damanhour.

Study sample:

A quasi- experimental research design was used in this study. The independent variable of this study was postnatal women with afterpain treated by effleurage massage and heat patch for three days. The dependent variable was the intensity of the pain level.

Inclusion criteria:

The study population consisted of all multiparous postpartum women who experienced afterpains, delivered normal vaginal delivery for no more than three days and don't receive any analgesia.

Sample size

The sample size was estimated using Epi info 7 statistical program using the following parameters; Population Size =1500 /3 months, expected frequency 50%, confidence level 95% and with 10% acceptable error. The minimum sample size estimated to be 80 women. A purposive sample of 90 postnatal women with afterpain were be chosen from the previously mentioned setting. Flow rate of women every year is about 6000 women.

The study participants were similarly allocated to the two-study groups with 45 women receiving effleurage massage and 45 receiving a heat patch.

Data collection

Following a clarification of the study's objectives, the permission to undertake the study was given by the dean of the faculty of nursing and directed to hospital administrator. The study was conducted in four main phases. These phases were implemented from the beginning of September 2023 until the end of January 2024.

Tools of data collection:

Three tools were used by researchers to collect the necessary data

Tool I: A structured interview schedule:

This tool was created by the researchers after extensive literature review. (Ibrahim & Kamal, 2020). It included three parts:

Part (I): Personal data such as age, education level, occupation, current residence and family income/month.

Part (II): Reproductive history, encompassing gravidity, parity, number of abortions, stillbirths, and live births and length of hospital stay for postpartum mother.

Part (III): Clinical assessment sheet, which included baseline data such as vital signs, uterine consistency.

Tool II: Visual analog scale (VAS)

The visual analog scale was developed by Melzack & Katz (1994). The researcher adopted it and put it to use. The VAS is a self-report tool that uses a horizontal line to represent a patient's subjective pain level. It uses a 10-point numerical scale to indicate pain, with zero denoting no pain and 10 denoting the highest level of discomfort. Words like mild, moderate, and severe are allocated to each 3 cm gap between these two opposite ends, respectively. Women were instructed to mark the line at the exact location where their pain was the greatest. (Kersten, et al., 2014; Alghadir, et al., 2018).

Scoring system:

The total score was ranged from 0-10 as follows: • No pain (0) • Mild pain (1-3) • Moderate pain (4-6) • Severe pain (7-9) • Unbearable pain (10)

Tool III: A modified version of Chamber Price pain rating scale (CPPRS).

Chambers and Price were the original creators Basyouni et al. (2018). Was then improved for validity and reliability Haefeli & Elfering (2006). This instrument was modified to assess four behavioral aspects of pain response: gross motor activity, posture, verbalization, and facial expression. The researcher is to elicit one of three choices (0, 1, 2) for each dimension. For posture, the choices are: very relaxed, guarded and tense posture. For gross motor activity, the choices are: very restless, slightly restless and quiet. For facial expression, choices are: no frowning, some frowning and constant frowning or grimacing. Lastly, women's verbalization differs between normal, no sound, groans/moans, and cries/sobs.

Scoring system:

The total score of the 4 dimensions varies between 0-8 and categorized as follows: no pain (0) mild pain (1-2), moderate pain (3-4), severe pain (5-6), and intolerable pain (7- 8).

Procedures: All samples were divided into two intervention groups. The researcher carry out the application of heat patch and the doing of effleurage massage at the same day of delivery only and educate her relative to do these procedures at home for two consecutive days after the first delivery day then the researcher complete data by contacting with woman through calling phone and whatsapp , 45 subjects were required to wear a heat patch on their abdomens for eight hours a day while under observation. The pain level assessment was done by a Visual analog scale (VAS) before and after the treatment, 45women in this study is giving effleurage massage, being observed for two consecutive for 30 minutes within three days by calling.

Preparatory phase: The Dean of the Faculty of Nursing submitted an official letter to the director of the study setting, clarifying the purpose and methods of data collection. The director of the mentioned setting granted official permission to conduct the study.

Validity &Reliability: The validity and reliability of the tool were done by five qualified expertise (three professors of Obstetrics and Gynecology Nursing department at Faculty of Nursing and two professors of Obstetrics and Gynecology department at Faculty of Medicine). The tool was evaluated for the accuracy of its content and its internal validity. Additionally, they were asked for assessing the items clarity and comprehensiveness (content validity). Any suggestions provided were integrated into the instrument and necessary adjustments were carried out.

Pilot study: It was carried out to assess the suitability of the tools, the feasibility of the study and to estimate the time required for data collection. This preliminary study involved 10% of the total sample, which consisted of 9 women. Following the results of the pilot study, the researcher modified certain questions and statements (for example, factors that decrease pain and those that increase pain). The participants from the pilot study were excluded from the overall sample size due to the adjustments made.

Assessment phase

Interviews were used to get information about the obstetric and demographic characteristics. Using a modified visual analogue pain scale and a modified Chamber Price pain rating scale, the researcher evaluated the degree of after pain that mothers self-reported before and after conducting the procedures actually by the researcher for the first time and by calling for the other times.

Planning phase

The researcher went to the postpartum ward from 10 a.m. to 2 p.m. on the three days after delivery that were set aside for gathering the study sample. During

this time, woman was given an explanation of the anatomical and physiological changes that take place in the female reproductive system and explained to her the cause of pain that uterus contracts and relaxes as it shrinks back to normal size.

Ethical Considerations

Before collecting data, women were provided with an explanation of the study's aim and asked to provide written informed consent. The privacy of the study participants was ensured. Each woman was informed of her right to withdraw from the study at any time and that her participation was entirely voluntary.

Implementation phase:

Before the procedure, 45 mothers were advised by the researcher to empty their bladders. They were told to apply a heat patch to their abdomens for eight hours a day and observations taken after 30 minutes for the first time when woman is still in the hospital and being observed through her relative and the researcher take data by calling in case of woman discharge for 3 consecutive days morning and evening, Also, 45 mothers given in this study were giving effleurage massage for two consecutive for 30 minutes within three days. Data also taken by calling woman and her relative.

Evaluation phase

The researcher evaluated postpartum woman afterpain intensity for the two-study group seven times; before the first session (pre-test), after the first session (post-test) at the postnatal in the morning and evening, after the second session (post-test) through phone call or what's app at morning and evening, the seventh time was on the 3rd day postpartum (posttest) through phone call or what's app at morning and evening. The researcher carried out the evaluation of afterpains intensity for both groups on the 3rd day postpartum. After completing the data collection, a comparison between the 2 groups were done to assess the effectiveness of effleurage massage and heating patch procedure on the intensity of the afterpain.

Technique of effleurage

Effleurage involves using long, gentle strokes with light pressure over specific areas of the body and is commonly employed to start the massage treatment. Effleurage is typically applied to the arm, back, thigh, and calf.

Technique of heat patch

The patch is a 12*18 cm plaster with a skin color cloth base which contain Camphor, Menthol and Vanillyl butylether which are effective in relieving pain and act as mild analgesic. Must only be used on skin that is dry, clean, undamaged and free of ointment. Remove it from the packing film and apply on abdomen and press with a palm of the hand until it is flat and adheres firmly to the skin. The patch

should be warm until its pleasant heat effect ceases . A reassuring, steady heat level appears after 30 minutes. After using the pad, it should be taken off after no more than eight hours of wear.



Statistical analysis

Data were collected, coded, revised and entered into the Statistical Package for Social Science (IBM SPSS) version 20. The data were presented as numbers, percentages, mean & standard deviations. The chi-square test, Student' T-Test and Wilcoxon rank-sum Test were used to compare the variables between the two groups. Also, Pearson correlation between variables was employed.

Results:

Table (1): Distribution of the studied women according to sociodemographic data

Variable	Effleurage group (N=45)		Heat patch group (N=45)		p-value
	No.	%	No.	%	
Age					
≤20	3	6.7	3	6.7	0.907
21-34	41	91.1	42	93.3	
≥35	1	2.2	0	0	
Mean ± SD	25.1 ±3.5		25.02±3.7		
Residency					
▪ Urban	18	40	14	31.1	.199
▪ Rural	27	60	31	68.9	
Education					
▪ Read and write	3	6.7	6	13.3	.279
▪ Basic education	12	26.7	14	31.1	
▪ Secondary	25	55.6	24	53.3	
▪ University	5	11.1	1	2.2	
Working status					
▪ Employed	9	20	6	13.3	.517
▪ Unemployed	36	80	39	86.7	
Economic status					
▪ More than enough	4	8.9	4	8.9	.925
▪ Just enough	37	82.2	38	84.4	
▪ Not enough	4	8.9	3	6.7	

Chi-square test

Table (2): Distribution of the studied women according to obstetrical history

Variable	Effleurage group (N=45)		Heat patch group (N=45)		p-value
	No.	%	No.	%	
Gravidity					
▪ 1-3	40	88.8	42	93.3	0.464
▪ More than 3	5	11.1	3	6.7	
Abortion					
▪ None	37	82.2	40	88.9	.484
▪ One time	7	15.6	5	11.1	
▪ Twice or more	1	2.2	0	0	
Living children					
▪ Less than 3	39	86.7	33	73.3	.124
▪ More than or equal 3	6	13.3	12	26.7	

Table (3): Distribution of the studied women according to clinical data

Variable	Effleurage group (N=45)		Heat patch group (N=45)		p-value
	No.	%	No.	%	
Hospital stay					
▪ One days	42	93.3	41	91.1	.694
▪ Two days	3	6.7	4	8.9	
Uterus consistency					
▪ Firm	42	93.3	38	84.4	.180
▪ Soft	3	6.7	7	15.6	
Respiration (mean± SD)	13.5±1.23		13.46±1.4		.874
Pulse (mean± std)	71.1±4.9		68.7±5.08		.025
Systolic blood pressure (mean± SD)	118.7±9.89		119.1±11.44		.883
Diastolic blood pressure (mean± std)	73.3±8.11		73.0±8.75		.852
Temperature (mean± SD)	37.05±.425		37.11±.548		.521

Chi-square test - Student' T-Test

Table (4): Pain levels according Visual analogue pain Scale of both groups in pre and post – intervention (N=90)

Variable	Pain effleurage (N=45)				Heat patch (N=45)				p-value pre	p-value post
	Pre		Post		Pre		Post			
	No	%	No	%	No	%	No	%		
No pain	0	0	23	51.1	0	0	0	0	.828	.000**
Mild	0	0	20	44.4	0	0	4	8.9		
Moderate	4	8.9	2	4.4	6	13.3	10	22.2		
Severe	35	77.8	0	0	34	75.6	27	60.0		
In tolerable pain	6	13.3	0	0	5	11.1	4	8.9		
p-value	.000**				.016					

Chi- square test and Wilcoxon rank-sum Test (***) highly statistical significant difference

Table (5): Behavioural responses of Chamber price pain rating Scale of both groups in pre and post intervention (N=90):

Variable	Effleurage group (N=45)				Heat patch group (N=45)				p-value pre	p-value post
	Pre		Post		Pre		Post			
	No	%	No	%	No	%	No	%		
Posture									.500	.000*
Very relaxed	0	0	28	62.2	0	0	14	31.1		
Guarded	16	35.6	17	37.8	15	33.3	21	46.7		
Tense	29	64.4	0	0	30	66.7	10	22.2		
Gross motor									.592	.000**
Quiet	0	0	29	64.4	0	0	9	20		
Slightly restless	13	28.9	16	35.6	13	28.9	24	53.3		
Very restless	32	71.1	0	0	32	71.1	12	26.7		
Verbalization									.159	.000**
Normal no sound	0	0	35	77.8	0	0	12	26.7		
Groans moans	13	28.9	10	22.2	8	17.8	16	35.5		
Cries sobs	32	71.1	0	0	37	82.2	17	37.8		
Face expression									.055	.000**
No frowning	0	0	35	77.8	0	0	9	20		
Some frowning	18	40	10	22.2	10	22.2	24	53.3		
Constant frowning	27	60	0	0	35	77.8	12	26.7		

Chi-square test (***) highly statistically significant difference

Table (6): Pain levels according to Chamber price pain rating Scale of both groups in pre and post - intervention (N=90)

Variable	Effleurage group (N=45)				Heat patch group (N=45)				p-value pre	p-value post
	Pre		Post		Pre		Post			
	No	%	No	%	No	%	No	%		
No pain(0)	0	0	11	24.4	0	0	1	2.2	.526	.000**
Mild (1-2)	0	0	29	64.4	0	0	7	15.6		
Moderate (3-4)	1	2.2	5	11.1	5	11.1	23	51.1		
Severe (5-6)	17	37.8	0	0	15	33.3	9	20.0		
In tolerable pain(7-8)	27	60	0	0	25	55.6	5	11.1		
p-value	.000**				.000**					

Wilcoxon rank-sum Test (***) highly statistical significant difference

Table (1): According to Table-1, no statistically significant differences are found between effleurage and heat patch groups in their socio-demographic data. Where about age majority (91.1 & 93.3) of effleurage and Heat patch groups respectively ranged between 21-34 with the mean age 25.1 ±3.5 & 25.02±3.7 of them respectively. More than one-half (60% & 68.9%) of effleurage and Heat patch groups respectively, were rural residents. Around more than half (55.6%, 53.3%) of effleurage and heat patch

groups, respectively had secondary education. Furthermore, more than three- quarter (80%, 86.7% respectively) of women were unemployed and have just enough economic status.

Table (2): Clarifies that there was no statistically significant difference between two study groups in their obstetric history. It was observed that the majority (88.8%, 93.3%) respectively of effleurage group& patch group had pregnant between one to three times. When abortion was considered, it was

cleared that (82.2&88.9) respectively of effleurage group& patch group had no abortion. In relation to number of living children, it was observed that the majority(86.7%& 73.3%) of effleurage group& patch group have less than 3 children .

Table (3): Illustrates the division of the studied women_in relation to their clinical data. Clarifies that the majority of women (93.3%, 91.1) respectively had one day hospital stay, uterine consistency was hard between most of them (93.3%, 84.4%) respectively. It was observed that the mean respiration was 13.5 ± 1.23 breaths/m & 13.46 ± 1.4 breaths/m for the effleurage and heat patch groups respectively; the mean of pulse was 71.1 ± 4.9 b/m & 68.7 ± 5.08 b/m for the two groups respectively; the mean of systolic blood pressure was 118.7 ± 9.89 mm Hg & 119.1 ± 11.44 mm Hg for them respectively; the mean of diastolic blood pressure was 73.3 ± 8.11 mm Hg & 73.0 ± 8.75 mm Hg respectively and mean temperature was $37.05\pm .425$ °C & $37.11\pm .548$ °C for the effleurage and heat patch groups respectively.

Table (4): Exhibits the study subjects distribution in relation to their intensity of after-pain using visual analog scale before and after the intervention. Study found that the intensity of after pain was statistically significantly decreased between the effleurage group after the intervention ($P = 0 .000$). On the other side, it was slightly declined between the heat patch group after the intervention ($P = 0.016$). The variance between these two groups in this aspect after the intervention was highly statistically significant ($P = 0 .000$). Specially, about three-quarters (77.8%) of the effleurage group complained of severe level of pain before the intervention, however none of them stated such pain response after the intervention. This is contrasted to 75.6% and 60% of the heat patch group who reported severe pain before and after the intervention respectively. Moreover, (13.3%) of the effleurage group had intolerable pain before the intervention, although no one of them had this intensity of pain after the intervention. This is compared with 11.1% and 8.9% of the heat patch group who were complained this an intolerable pain before and after the intervention, respectively.

Table (5): Demonstrated the effectiveness of the effleurage and heat patch on the behavioral responses to after pain pre and post intervention. The post-intervention results showed a highly significant improvement ($p < 0.000$) in each of the behavioral responses among the effleurage group more than heat patch group.

Table (6): Demonstrates that pain levels according to Chamber price pain rating Scale had a highly statistically significant differences between pre and post implementation of effleurage and heat patch to control the after pain ($p = 0.000^{**}$), moreover table

clarifies that effleurage group was more effective in controlling the after pain than heat patch group ($p = 0.000^{**}$)

Discussion

After giving birth, the mother often experiences discomfort known as after pain, which is a result of the uterus undergoing constant contractions and relaxation, and is an important factor in the process of uterine involution. This discomfort typically lasts for 2-4 days after childbirth **Asih. (2016)**. The persistence of pain can activate a neuro-hormonal stress reaction that can worsen feelings of anxiety, insomnia, and fatigue. afterpain is a common problem that affects the physical and emotional well-being of mothers and should be dealt with by healthcare providers. **Namboothiri & Viswanath., (2016)** Non-pharmacological methods for managing pain, like transcutaneous nerve stimulation, applying exercise, adjusting positioning, using cold or hot compresses, and performing effleurage massage, can improve the efficacy of pain relievers. **Smith et al. (2020)**.

The findings from the present research indicated that both effleurage and heat patch groups exhibited similarities. In most of their socio-demographic data, obstetrical and clinical data. No significant difference was observed among them. This study aligns with the **Ahmed et al. (2022)** who conducted a study on the effectiveness of warm pads application, effleurage massage or Trendelenburg position in reducing shoulder pain after gynecological laparoscopic operations and the study revealed no notable disparities among the three groups in terms of age, level of education, place of residence or occupation. This was to some degree expected as the study participants who attended Damnhour Medical National Institute were mainly from the same socio-demographic level also, these findings elaborate that randomization resulted in equal distribution across groups.

The current study exhibits that intensity of pain which measured by a visual analog scale was statistically significantly different before and after the interventions among the effleurage and heat patch application groups. This uniformity can be explained by the fact that effleurage and heat patch have the possible useful physiological and psychological effects to reduce pain intensity. It improves circulation, eases muscle tension, stimulates the lymphatic system, and induces sleep, all of which help women manage pain more effectively overall. **Ball et al. (2017)**

On the other side, when paralleling between effleurage massage and heat patch application it can be noticed that effleurage massage is more effective

than heat patch in reducing the after pain and these study results are in accordance with **El-Naser, El-Razek & Ayoob. (2022)** who showed that application of effleurage massage is more effective than heat patch in reduction of postoperative shoulder pain after the laparoscopy.

Furthermore, the result of the present study is in harmony with the study of **Ibrahim & Kamal (2020)**, who said that effleurage massage appear to has more effect than warm bag application as a non-pharmacological approach for pain relieving. Three reasons can explain this. First, massage improves venous and lymphatic flow, relaxes the entire body, stimulates the motor, neurological, and cardiovascular systems, and depresses the intensity of pain by activating the skin's and subcutaneous tissue's sensory receptors. The gate control theory of pain served as the foundation for the analgesic effect of massage, which is another explanation. Last but not least, massage functions by relaxing tense muscles, which raises the body's natural painkiller endogenous endorphin production. **Sri et al. (2017), Murtiningsih & Shintya (2018)**

Moreover, the findings of this study is in consistent with an European study done by **Ron Clijsen et al. (2022)**, who studied the application of local heat in correction of physical and functional parameters in cases who complain of acute and chronic musculoskeletal disorders or pain. They found that application of local heat was effective in reducing pain immediately after the intervention compared with pharmacologic therapy in acute and chronic conditions. Moreover, the current results is in accordance with a study done by **Nourian et al. (2016)** who said that the effleurage massage has a role in reduction of hospitalization anxiety, heart rate, and blood pressure. The researchers suggests that nurses can reduce pain and anxiety use massage to among school-age children at the hospital and among women after gynecological laparoscopic surgery, because it has no side effects and can be done easily. **El-Naser, El-Razek & Ayoob (2022)**

As for behavioral responses to after pain, the results of the current study showed highly significant improvement in all items of behavioral responses among the heat pad group, as verbalization (cries and sobs) decreased from 82.2%, pre-intervention to 37.8% post-intervention, and the difference was highly significant. This study was in the same line with **Sukkwon (2022)**, whose study which was in Asia showed that heating therapy during cystoscopy is an effective nursing intervention that alleviating pain and anxiety and supports patient satisfaction. This was due to the sedation effect of warm application. It causes vasodilatation, increasing blood

flow, enhancing relaxation and reducing pain intensity.

As well as, the findings showed the effectiveness of effleurage massage on the behavioral response to after pain as the post effleurage massage posture (tense posture) decreased from 64.4% pre-intervention to 0% post-intervention, and the difference was highly significant ($P < 0.0001$).

These results are in accordance with a study done by **Wu et al. (2017)** who tested the effect of touch and massage on psychological and behavioral symptoms of dementia. Their results showed that non pharmacological intervention such as massage and touch cause positive improvement of behavior in patients.

Compared to the after-pain intensity post application of heat patch and effleurage, the current study revealed that women who had effleurage massage had significantly less intensity of pain than women in heat patch. The current study is in agreement with **Ibrahim & Kamal (2020)** who said that massage reduced pain intensity among women (70%) compared to only 25% of the warm application group. It is explained by ability of effleurage to reduce pain by stimulating of central nervous system to release of endorphins, which decreases pain sensations in the brain. Activation of the mechanical receptors by massage and heat pads help in relaxation and reduction of pain **Kozak et al. (2017)**.

The findings of the current study revealed that pain intensity which is determined by Chamber Price pain rating scale was, statistically significant before and after management between the effleurage and heat patch groups ($p = .000$). Where nearly one quarter of the effleurage group (24.4%) had no pain, on the other side only 2.2% of the heat patch group and nearly two thirds of the effleurage group (64.4 %) experienced mild pain. compared to only 15.6% of the heat patch application group. These results are in the same line with the study done by **Sadat et al. (2016)** who studied the effect of manual massage on intensity and duration of pain during the first phase of labor pain in primigravida women. They concluded that circular manual massage at the lumbo-sacral region during the active phase of labor reduced labor pain efficiently.

The Chamber Price pain rating scale as determined by sensory and affective responses in the current study advocate the previous findings. Effleurage massage was more effective in reduction of pain intensity than heat patch. The current results are in accordance with the study done by **Sethi et al. (2017)** who said that the back massage decreases pain level. So, it was concluded that effleurage massage was effective in reducing pain level.

Conclusion

According to the results of the current study, it can be concluded that the hypothesis (1) is accepted and hypothesis (2) is rejected because the effleurage and Heat patch application lead to reduction of after pain. However, the effleurage massage was more effective than heat patch application as a non-pharmacological approach of pain relief.

Recommendation

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

1. Provide nurses with in-service training, with a focus on non-pharmacological pain management techniques.
2. Hospital protocols for the therapy of after pain should recommend the use of effleurage massage and heat patches.
3. The non-pharmacological management of after pain should be covered in both basic and continuing nursing education curricula.
4. Further researchers are needed to investigate:
 - The impact of using heat patches and effleurage on different pains experienced during the maternal cycle.
 - Reapplication of the current study with various samples and in various environments.

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