Effect of Foot Massage on Incisional Pain and Sleep Pattern among Post Abdominal Surgery Patients

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Abstract

Background: abdominal surgery is a trans-abdominal incision. Persistent postoperative pain is a well-known consequence of this surgery. Foot massage appears to be effective in reducing incisional pain and improve sleep patterns among post abdominal surgery patients. **Aim:** To assess the effect of foot massage on incisional pain and sleep pattern among post abdominal surgery patients**. Subjects and Methods: Design**: A quasi-experimental pretest-posttest control group research design was used. **Setting:** The study was conducted in the surgical adult department at El Demerdash Hospital affiliated to Ain Shams University. **Subject**: Non-probability purposive sampling technique was used to select a sample of 200 post abdominal surgery patients and were randomly assigned into two groups, 100 for each the experimental and control groups. **Three tools were used:** (I) a structured interview questionnaire, (II) a numerical pain rating scale, and (III) a sleep quality index scale. **Findings**: The current study findings showed that during the posttest all post abdominal surgery patients had a mild level of pain in experimental compared to the majority in the control group had a mild level of pain. During the pretest majority of abdominal surgery patients had poor sleep patterns in both the experimental and control group. during the posttest, more than four fifth of the abdominal surgery patients had a good quality of sleep pattern in the experimental group and poor quality of sleep pattern in the control group was among all abdominal surgery patients. The study revealed that there was a difference between mean pretest and posttest scores were found statistically significant at $p < 0.05$ level in the experimental group regarding pain level and sleep pattern. **Conclusion:** Foot massage was found to be useful in reducing incisional pain and improving the quality of sleep patterns in post- abdominal surgery patients. **Recommendations**: Post abdominal surgery patients should be provided with a simple and applicable strategy to control pain and improve sleep patterns.

keywords: Foot Massage, Incisional Pain, Sleep Pattern, Post abdominal surgery patients.

Introduction

Surgery is an invasive process that involves an incision in the body and is often linked with bleeding, pain, and the risk of morbidity and mortality. As a result, the period leading up to surgery is stressful for surgical patients. Pain is considered a difficult problem to address in the operative care of adult patients. The majority of adult patients who were scheduled for surgery expressed pain and disturbance of sleep patterns (**Hisato and Umemoto, 2017).**

One of the most prevalent complaints of postoperative patients around the world is pain. Despite the

medications and anesthetic procedures available, postoperative discomfort is nevertheless prevalent. Despite the use of sedative medicines, about 41% of postoperative patients reported moderate to severe pain (**Kaur et al., 2019)**. According to a major survey, 86 percent of 300 patients had postoperative pain, with 75 percent having moderate/severe pain in the immediate postoperative period. Even though about 88 percent were given pain medications, 80 percent reported side effects and 39 percent had moderate/severe pain even after taking them (**Gan et al., 2017)**.

Furthermore, acute postoperative pain is frequently treated ineffectively. Poor postoperative pain management may raise the chance of patients developing physiological pain responses that have negative consequences for the body after surgery or possibly developing chronic pain disorders in some sensitive patients. For example, after being discharged from the hospital, 74% of 300 postoperative patients were still in excruciating agony (**Asadizaker et al., 2017)**.

Sleep is a behavioral condition in which the state of attentive consciousness is temporarily suspended. The particular subjective nature of sleep has always stimulated philosophical thought, but the actual behavior of the sleeping organism has also attracted wide interest across all cultures. Sleep is necessary for the human body to function normally and healthily. Sleep is a physiological phenomenon that is defined as a condition of unconsciousness from which a person can be awoken. The brain is more receptive to internal inputs than exterior stimuli while in this state (**Deumens et al., 2019)**.

There are a variety of pharmacological and non-pharmacological therapies available to help patients achieve optimal pain management; however, each patient's reaction is unique. The current gold standard treatment for acute postoperative pain management is pain medication. Alternative modalities and non-pharmacological techniques for pain and anxiety management, such as massage, are gaining popularity around the world as a way to avoid the negative side effects of medication (**Van et al., 2016)**.

In all alternative therapies, foot massage is one of the most common types of massage. The ability to help with pain relief it's a technique that can be a little uncomfortable at first, but it's usually pretty calming. The Foot Massage activates big primary afferents by stimulating cutaneous mechanoreceptors. They release GABA and endorphins, which block neurotransmitters released by primary nociceptive neurons and cause depressive reactions in the pain pathway's receptive area. Massage produces tactile stimulation that goes through big diameter fibers. These fibers also transmit data at a faster rate. Pain management must be both safe and effective, and it must not interfere with the patient's ability to function (**Chanif et al., 2019)**.

Medical-surgical nurses play a vital part in post-abdominal surgery patient counseling, education, and advice to ensure the technique's effectiveness. Also, play a vital part in offering support to help patients reduce their pain levels and improve their sleep quality. Pharmacological therapy, information, diversion, attention concentrating, and relaxation treatments are some of the non-pharmacological treatment strategies and interventions used to relieve pain (**Lilly and Dakshayani, 2018).**

Significance of the study:

For health care providers, pain management is a difficult but necessary task. Individuals who have undergone surgery require effective pain management to feel comfortable, avoid complications, and speed up their recovery. Massage is a stand-alone nursing intervention that can be used to help patients who are in pain. Massage is simple to do, inexpensive, and requires no special equipment. It might be incorporated into routine nursing tasks. However, whether foot and hand massage improves immediate postoperative pain in people who have had abdominal surgery is an important subject. It will need to be subjected to a critical analysis to see how effective it is at alleviating acute postoperative pain (**Bauer et al., 2018)**.

All nurses caring for patients after surgery are concerned about providing safe, effective pain management. Registered nurses, at all levels of practice, are primarily patient advocates who play an important role in correctly managing postoperative pain (**Ward, 2015).** Massage treatment was discovered to be an important part of the healing process for patients after surgery. Patients are more likely to experience discomfort as a result of surgical procedures. Non-pharmacological approaches, such as foot massage, and pharmacological methods can be used to treat pain and sleep disorders (**Bauer et al., 2018).**

Massage therapy was successful in post-operative patients; however, there is a lack of research about the effects of foot massage on post-operative abdominal surgery. In their clinical practice, the researchers noticed that postoperative pain levels and sleep patterns were high; especially in the days following surgery and that the painkillers recommended did not entirely ease the discomfort **(Chithra & D'Almeida, 2014**). As a result, it was worthwhile to assess the effect of foot massage on incisional pain and sleep patterns in patients who had undergone abdominal surgery

Aim of the study

This study aimed to assess the effect of foot massage on incisional pain and sleep pattern among post abdominal surgery patients through:

- Assessing pain level among post abdominal surgery patients.
- Assessing sleep patterns among post abdominal surgery patients.
- Evaluating the effect of foot massage on incisional pain and sleep pattern among post abdominal surgery patients

Research hypothesis:

H_1- There will be a statistically significant difference and reduction in the level of incisional pain among post abdominal surgery patients in the experimental group as compared to the control group at $p < 0.05$ level of significance.

H_2- There will be a statistically significant difference and improvement in quality of sleep pattern among post abdominal surgery patients in the experimental group as compared to the control group at $p < 0.05$ level of significance.

Subjects and Methods:

Research design:

To achieve the study's aim, a quasi-experimental pretest-posttest control group research design was

adopted. This design is important to the nature of the study issue, having one or more group subjects observed on pre and post manipulations (**Creswell, 2012)**.

Setting:

The study was conducted in the surgical adult department El Demerdash Hospital affiliated to Ain Shams University. The surgery department is located on the second floor and contains 6 rooms in each room 9 beds. This hospital is one of the largest public teaching hospitals in Egypt region, with a big number of patients from various socioeconomic and educational levels coming from all over regions to receive health care.

Subjects:

The non-probability purposive sampling technique was used to select a sample of 200 post abdominal surgery patients, were randomly assigned into two groups, 100 for each the experimental (who receive foot massage beside the routine care) and control group (who received the routine care only such as physical examination, drug administration, and laboratory tests). They were selected within six months, from the beginning of July 2020 till ~~to~~ the end of December 2020. They were divided into two equal groups, according to the hospitalization admission code number (even or odd)

Sample size calculation:

The sample size was calculated based on considering the level of significance of power analysis of 0.95(β=1-0.95=0.5) at alpha .05 (one-sided) with a large effect size (0.5) was used as the significance, 0.001 was used as the high significance, Where the total number during last year 413.

Inclusion criteria included:

- Adult patients their age more than 18 years.
- Free from another chronic disease
- Had abdominal surgery
- Agree to participate in the study

Exclusion criteria included:

- Patients are suffering from other chronic illnesses and mental diseases.
- Foot amputation
- History of chronic pain
- Injury in extremities

Tools of data collection:

Tool (I): A **structured interview questionnaire:** Was developed by the researchers after reviewing related literature **(Hisato and Umemoto, 2017)**; It was composed of two parts:

Part (1): It includes demographic data which consisted of 5 items related to age, gender, educational level, occupation, and residence.

Part (2): It includes the medical history of patients; it consisted of 4 items about previous hospitalization, previous surgery, type of surgery, and history of analgesic consumption.

Tool (II):- Numeric Rating Scale (NRS) for pain: **(Hawker et al., 2011)**:

The Pain Visual Analogue Scale (VAS) is a widely used standardized pain assessment scale that determines the severity of pain. However, test-retest reliability was (r = 0.94). The Numeric Rating Scale (NRS) is a segmented numeric version of the VAS with a single 11-point numeric scale on which respondents select a value between 0 and 10 to represent the intensity of their pain.

As a result, NRS was utilized to assess pain severity before and after each massage session in this study twice per day, the patients were asked to choose a number that represented their level of pain. The NRS has a 0–10 scale that can be used to describe pain severity as no pain (0), mild pain (1-3), moderate pain (4-6), and severe pain (7-8). (7-10).

Tool III: The Pittsburgh Sleep Quality Index Scale (PSQI) (Buysse et al., 1989).

Before and after the intervention, the PSQI was employed to assess sleep quality. Buysse and partners created the scale to assess sleep quality and distinguish between people who have a hard time sleeping and those who have a good night's sleep. Subjective sleep qualities sleep latency, sleep length, habitual sleep efficiency, sleep disruptions, usage of sleep medicine, and daytime dysfunction are among the domains covered by the measure. The scale is divided into two sections: 19 self-reported questions that are used to score the scale, and five questions that are scored by a bed partner.–The majority of the objects are arranged in groups of two or more.

The majority of the items are organized as multiple-choice questions, and they are brief and simple to grasp and respond to. The PSQI questions are graded on a range of 0 to 3, with 0 indicating no difficulty and 3 indicating significant difficulty, resulting in scores that correspond to the scale's domains. The values range from 0 to 21, with a score of 5 indicating a major sleep disturbance, according to the scientists. 5–10 minutes to finish the PSQI scale.

Validity of the tools:

The content validity of the tools and the instructional guideline, its clarity, comprehensiveness, appropriateness, and relevance were reviewed by three experts' professors; in the medical-surgical nursing field. Modifications were made according to the panel judgment to ensure sentence clarity and content appropriateness.

Reliability of the tools:

The Pain Visual Analogue Scale (VAS) reliability was (r = 0.94). The test-retest reliability is likewise good. PSQI's validity was good, with a sensitivity of 89.6% and a specificity of 86.5 percent of patients versus control subjects. With a Cronbach's alpha of 0.83 for the total score, the scale's dependability is rated good.

Methods of data collection:

The study included 200, patients with abdominal surgery. The researchers were visited the previously selected settings two days / a week from 9 am to 1 pm at the morning shift (Sunday and Monday). Data were collected within six months, from the beginning of July 2020 till to the end of December 2020. Approximately, 40-50 minutes were taken to complete each interview tool.

A pilot study

To assess the clarity and feasibility of the research method, a pilot study was conducted on 10% (20 patients) of the entire sample. To produce the final form of the tools, modifications were made. Patients involved in the pilot study were excluded from the study

Ethical considerations:

Before beginning the study, the researchers met with the medical and nursing directors of the chosen facilities to explain the study's aim and gain their agreement. Patients' written agreement was gained in exchange for their cooperation. To secure authorization for data collection, the purpose of the study was stated, as well as the expected outcomes from its implementation. The study's aim was presented to the participants. The patients were informed that participation in the study was entirely voluntary, and they were free to decline from the study at any time, without giving any reason. Patients were told that their information would be kept private and utilized for research purposes only.

Fieldwork:

The researchers met -abdominal surgery patients individually at previously selected settings and explain the aim of the study after introducing themself to patients. The researchers used face-to-face interviews and they read the questions and possible answers to the patients to help them filled their responses in the tools.

- The post abdominal surgery patients were met over three consecutive days to do the following:

- In the first time, in the first day of the surgery; the researchers complete the questionnaires (structured interview questionnaire, pain NRS, and PSQI), and do the first application of the foot massage, which is followed by the NRS.
- In the second time, two days post-surgery; the researchers re-complete the pain NRS questionnaire pre & post-application of the foot massage post-surgery.
- In the third time, the researchers re-complete the pain NRS pre & post-application of the foot massage, seven days post-surgery.

Intervention

Massage, often known as light or relaxation massage, is the most widely utilized type of massage therapy. Massage treatment improves circulation, allowing the body to feel more relaxed and invigorated while also reducing muscle tension and pain, resulting in improved overall health and well-being. Massage techniques include effleurage, petrissage, tapotement, and friction. Effleurage affects the superficial tissues and is used to add lubricant to the skin, distributing it evenly. Its goal is to warm the tissue's surface layer and induce relaxation before using other treatments. The kneading that follows effleurage is known as petrissage. Tapotement (beating percussion) is a rhythmic series of short taps performed with cupped hands, fingers, or the hand's edge. Friction is defined as deep and circular movements that try to rub tissue layers against each other to enhance blood flow **(Stone, 2010 and Salvo, 2015)**

To apply the massage technique stated above, these procedures were taken: 1. Effleurage was employed to spread the lubricant (olive oil) throughout the feet of the participants by rubbing from the toes to the ankle. 2. Squeeze, roll, feet, fingers, and toes with petrissage, a short, soft, and quick movement. 3. Short taps with the fingers were utilized as tapotement (i.e. thumping or percussion). 4. To improve blood flow, friction was utilized to rub the layers of tissues against each other. The intervention group received standard ward care as well as 10 minutes of foot

massage, 5 minutes of foot massage for each extremity, at a time for three days; while the control group followed the routine ward care, and received 10 minutes of rest time (to control for emotional reaction).

The Pittsburgh sleeps quality index scale (PSQI) was assessed only twice: at baseline at the first time (pre-massage) and posttest at the third time (post-massage). The intervention group received 10 minutes of foot massage per day for three consecutive days. Patients in the control group received routine hospital care only (physical examination, drug administration, and laboratory tests). The massage was initiated on the second day post-operatively.

Administrative design:

Administrative permission was obtained through an issued letter from Ain Shams University Directors of the previously selected department to achieve this study.

Statistical analysis:

SPSS statistical software version 20 was used to examine the data. For the three days, continuous data were collected before and after the massage and expressed as mean standard deviation (SD). Numbers and percentages were used to express categorical data. The independent t-test was used to look into the differences between the two groups, while the paired t-test was utilized to look into the differences in each group before and after a massage treatment. A one-way repeated-measures analysis of variance was used to analyze changes in the pain and anxiety scores (ANOVA). For variables that did not match the parametric assumptions, the Mann-Whitney test was applied. The chi-square test was employed to examine the relationship between the two variables. In the instance of noncontiguous data, the chi-square test was performed to examine the connection between two variables. Statistical significance was defined as a P value of less than 0.05.

Results:

Table (1): showed the demographic characteristics of the studied post abdominal surgery patients. It was observed that post abdominal surgery patients' mean age in the experimental group was 40.12 ± 13.45, whereas in the control group it was 40.10 ± 8.45 years, 53% and 58% of patients in both groups were females. Regarding the level of education, it was observed that more than half of them (59%) of the post abdominal surgery patients in the experimental group had secondary education compared to 52% in the control group. In the experimental group, the same table pointed out that (66%) of abdominal surgery patients were not working compared to 62% in the control group. Regarding residence, (73%) of patients in the experimental group were living in urban areas compared to 70% in the control group.

Table (2): it was cleared that majority of post abdominal surgery patients in both the experimental group and the control group were not previously hospitalized and had not had previous surgery. In both the experimental and the control groups (63% and 60%) not had a history of analgesic consumption and (42% and 40%) of them had a higher prevalence of hepato-biliary surgery.

Figure (1): Revealed that during pretest (80% and 85%) of the post abdominal surgery patients had a moderate level of pain in both

experimental and control groups respectively. But during the posttest all of the post abdominal surgery patients (100) had mild level of pain in experimental compared to 70% in the control group who had mild level of pain.

Figure (2): Revealed that during pretest all of the post abdominal surgery patients (100 and 100) had poor sleep patterns in both experimental and control groups respectively. Also, the same figure demonstrated that during posttest, (93%) of the post abdominal surgery patients had a good quality of sleep pattern in the experimental group and poor quality of sleep pattern in the control group was among all abdominal surgery patients.

Table (3): Illustrated that there was a difference between the mean pretest and posttest scores of post abdominal surgery patients regarding level of pain in the experimental group was statistically significant at $p<0.05$ level.

Table (4): Showed that a difference was detected between the mean pretest and posttest scores of post abdominal surgery patients regarding quality of sleep pattern in the experimental group was statistically significant at $p<0.05$ level.

Table (1): Percentage distribution of the studied post abdominal surgery patients according to their demographic characteristics (N=200).

Item	The experimental group (n=100)		Control group (n=100)		Df	^{2}
	No.	%	No.	%		
Patients' age						
- 18 < 40	112	56.0	120	60	4	0.5^{NS}
- 40 ≤ 60	88	44.0	80	40		
Mean ±Stander deviation	40.12 ± 13.45		40.10 ± 8.45			
Gender						
- Male	94	47	84	42	3	0.5^{NS}
- Female	106	53	116	58		
Patients ' education						
-Primary education	40	20.0	46	23	3	0.7^{NS}
-Secondary education	118	59.0	104	52		
-University education	42	21.0	50	25		
Occupation:						
-Working	68	34	76	38		
-Not working	132	66	124	62		
					3	4.28^{NS}
Residence:						
-Urban	146	73	140	70	2	1.7^{NS}
-Rural	54	27	60	30		

NS-non-significant

Table (2): Percentage distribution of the studied post abdominal surgery patients according to their medical history (N=200).

Medical history	Experimental group (n=100)		Control group (n=100)		X2	p- value
	No.	%	No.	%		
Previous hospitalization						
- Yes	54	27.0	62	31.0	1	0.07
- No	146	73.0	138	69.0		
Previous surgery						
- Yes	54	27.0	66	33	1	0.03
- No	146	73.0	134	67		
History of analgesic consumption						
- Yes	74	37.0	80	40		
- No	126	63.0	120	60	1	0.6
Type of surgery						
- Hernia	40	20.0	46	23		
- Gastrointestinal	36	18.0	30	15	2	2.5
- Hepato-biliary	84	42.0	80	40		
- others	40	20.0	44	22		

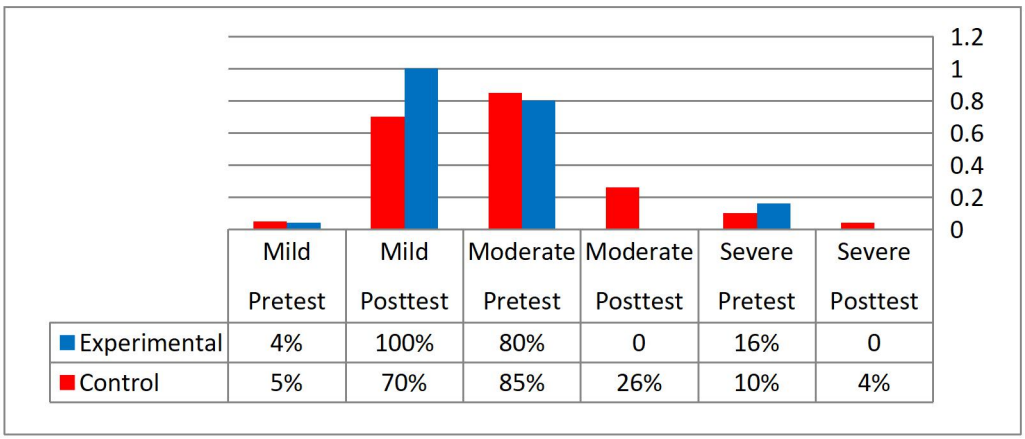

Figure (1): Distribution of post abdominal surgery patients in experimental and control group according to pretest and posttest level of incisional pain (N=200).

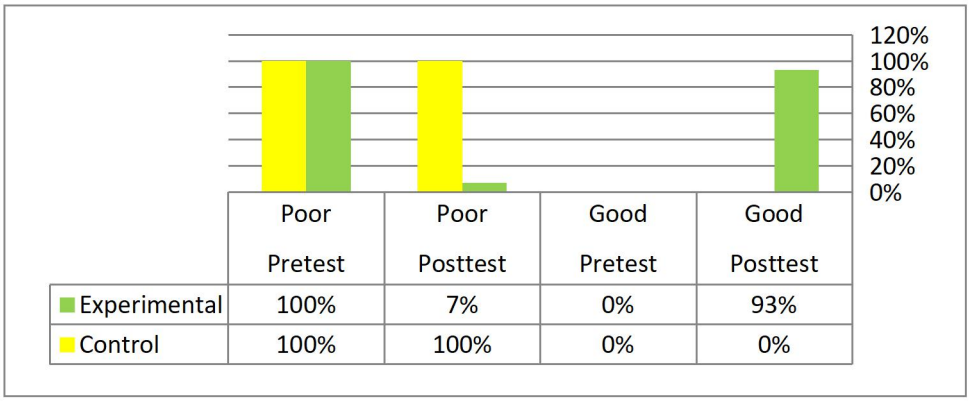

Figure (2): Frequency and percentage distribution of post abdominal surgery patients in experimental and control group according to pretest and posttest quality of sleep pattern (N=200).

Table (3): Comparison of pretest and posttest levels of incisional pain among post abdominal surgery patients in the experimental and control group (N=200).

Group	N	Incisional pain				X^2	p- value
		Pretest		Posttest			
		Mean Score	SD	Mean Score	SD		
Experimental Group	**100**	6.53	1.07	4.63	0.92	58	7.32*
Control Group	**100**	5.16	1.01	4.73	0.85	58	1.78^{NS}
		X^2=58	t=1.98^{NS}	X^2=58	t=7.5*		

NS=Non significant, *= significant at p<0.05 level

Table (4): Comparison of pretest and posttest quality of sleep pattern among post abdominal surgery patients in the experimental and control group (N=200.)

Group	N	Quality of sleep pattern				X^2	p- value
		Pretest		Posttest			
		Mean Score	SD	Mean Score	SD		
Experimental Group	**100**	**3.66**	1.07	2.66	1.09	58	3.58*
Control Group	**100**	2.80	1.01	2.45	0.61	58	1.62^{NS}
		X^2=58	t=0.99^{NS}	X^2=58	t=18.3*		

NS=Non-significant, *= significant at p<0.05 level

Discussion:

Pain is one of the most prevalent symptoms reported by individuals with acute and chronic illnesses. Nurses have a critical role in the management of postoperative pain. Pharmacologic and non-pharmacologic pain management are the two most frequent approaches. The pharmacological method, on the other hand, may not completely alleviate all aspects of postoperative pain. As a result, non-pharmacological techniques like massage may help to alleviate postoperative pain (**Chanif et al., 2019)**.

Foot massage, as one of the complementary therapies, was found to reduce pain in individuals with acute postoperative pain and improve sleep pattern that affects postoperative patients which might be actual or imagined. As a result, the current research study aimed to assess the effect of foot massage on incisional pain and sleep pattern among post abdominal surgery patients **(Kaur et al., 2019**).

More than half of the post-abdominal surgery patients in both the experimental and control groups were female, according to the findings of this study. This could be because men wake up slower than women following general anesthesia and have fewer postoperative gastrointestinal problems (Keogh et al., 2015). Males and females respond to pain differently, with females exhibiting stronger pain sensitivity. These differences appear to be linked to female sex hormones (Bartley & Fillingim, 2018). In addition, women felt discomfort in more anatomical locations, and for a longer period, than men (**Campesi et al., 2017).**

The finding of the present study indicated that there was no significant difference between the two groups in their demographic and medical data. From the researchers' point of view, this result reflects that the baseline of pain and sleep disturbances was the same in the two groups.

Such results are also reported in the study done by **Neeta, (2021)** who studied "A Quasi-Experimental Study to Evaluate the Effects of Foot Massage on Incisional Pain in Post-surgery patients Admitted to Selected Hospitals in Hoshiarpur, Punjab

The results of the current study revealed that during the pretest, the majority of the post abdominal surgery patients had a moderate level of pain in both the experimental and control group respectively. This result agreed with **Lorentzen et al., (2017)** who concluded in their study titled prospective analysis of pain experience. beliefs and attitudes, and pain management of a cohort of Danish surgical patients that majority of the post patients had a moderate level of pain in both experimental and control groups.

The results of the current study revealed that during the posttest all post abdominal surgery patients had a mild level of pain in experimental after foot massage application. From the researchers' point of view, this result reflects the positive effect of foot massage application, which meets the patients' needs and helps in reducing their pain and improving their sleep quality.

This result is similar to the study of **Wang & Keck, (2014)** who studied "Foot and hand massage as an intervention for postoperative pain" and found on the first postoperative day, 20 minutes of foot and hand massage

significantly reduced both pain intensity and pain distress in postoperative patients.

Also, **Chithra & D'Almeida, (2014)** who studied " The effect of hand and foot massage on pain in women who have had an abdominal hysterectomy at Mangalore's selected hospitals " and observed that There was a significant reduction in pain in the experimental group following a hand and foot massage compared to the control group in women who had a hysterectomy.

Additionally, the result is in the same line with **Kaur et al., (2017)** who studied " The effects of hand-foot massage on postoperative pain in patients who have had open-heart surgery " and reported that foot and hand massage was effective in decreasing postoperative pain in open-heart surgery patients.

The results of the current study revealed that during the pretest all of the post abdominal surgery patients (100 and 100) had poor sleep patterns in both experimental and control groups respectively. This result is matched with **Lorentzen et al., (2017)** who studied pain experience. beliefs and attitudes, and pain management of a cohort of Danish surgical patients and concluded that the majority of patients had poor quality of sleep patterns in both experimental and control groups. Similary, **Jenny, (2014)** conducted a study about "A complementary therapy in pain management; Nightingale Nursing Times" and found the same result.

The results of the present study illustrated that during the posttest, the majority of the post abdominal surgery patients had a good quality sleep pattern in the experimental group after foot massage application. From the researchers' point of view, it reflected the good impact of the foot massage on improving the quality of sleep**.**

This result is similar to the study of **Joy et al., (2016)** who studied and assessed the effect of foot massage on pain among post abdominal surgery patients in Delhi and observed that the mean score of pain intensity significantly decreased in the intervention group who received foot massage compared to the control group.

The present study results revealed that there was a difference between the mean pretest and posttest scores of post abdominal surgery patients regarding level of pain in the experimental group was statistically significant at $p<0.05$ level. From the researchers' point of view, it indicated the safe effects of foot massage application in the alleviation of pain and improving the sleep pattern.

These results are in the same line with **Bauer et al., (2020)** who investigated **"**the effect of foot massage versus relaxation on the postoperative back and shoulder pain, among cardiac surgery patients and reported that patients receiving massage therapy had a significant decrease in pain.

The results of the present study showed the significant effect of foot massage in decreasing pain level among the patients post abdominal surgery application which supported the aim and hypotheses of the present study. These results are in the same line with **Taylor et al., (2017)** who evaluate the effects of adjunctive Swedish massage and on postoperative patients and noticed that on a postoperative day 2, massage was more effective than the usual care (UC) for affective and sensory pain.

Another study conducted by Kim & Park, (2015) titled "The effect of foot massage on postoperative pain in patients following abdominal surgery" and showed the positive effect of foot massage among post-operative patients to minimize acute postoperative pain.

Similary, **Miozzo, et al., (2016)** reported that patients in the intensive care unit who applying massage therapy at least once a day for 20 min in the early days after cardiac surgery confirmed a remarkable reduction in the pain and improving the quality of sleep.

Conclusion:

Based on the results and hypotheses of the present study, the study findings concluded that pain and sleep disturbances are commonly experienced symptoms in the majority of postoperative patients. Foot massage as a non-pharmacological nursing intervention showed a significant impact on decreasing these symptoms. Foot massage was found to be useful in reducing incisional pain and improving the quality of sleep patterns in post-abdominal surgery patients. The study revealed that there was a difference between mean pretest and posttest scores were found statistically significant at $p < 0.05$ level in the experimental group regarding pain level and sleep pattern.

Recommendations:

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

- Patients who have had abdominal surgery should be given a simple, effective, and applicable strategy pain-control and sleep-improvement plan.
- Healthcare providers, particularly nurses, should examine the patient's discomfort and sleep pattern regularly and offer non-pharmacological techniques to treat it, such as massage
- Nurses can incorporate a systematic pain evaluation into their everyday routine.
- Nurses' awareness of pain and how to manage it with non-pharmacological approaches must be improved through the implementation of an educational program.

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