ISSN No:-2456-2165

Combination of Finger Grip and Sweet Orange Aromatherapy on β-Endorphin Levels in Post-Laparotomy Patients

Widya Juniantina Nusantari[1*], Mardiyono[2], Sudirman[3]
Masters in Applied Nursing, Postgraduate Program
Polytechnic of the Ministry of Health Semarang
Kota Semarang, Jawa Tengah, Indonesia
*Corresponding: Widya Juniantina Nusantari[1]

Abstract:- Pain is a major problem for postoperative patients. Most post-laparotomy patients experience pain; as many as 86% are hospitalized, and 40% experience severe pain. Pain can cause the patient's fear of mobilization it slows down recovery. Finger hold and sweet oranges aromatherapy are known to control pain by triggering the emergence of endorphins. Endorphins are known as the body's natural analgesics by inhibiting the transmission of pain. The purpose of this research to analyze the effectiveness of the combination of finger gripping and sweet orange aromatherapy on the levels of β-endorphins in post-laparotomy patients. This study was a true experimental study with a randomized pretest-posttest control group design involving 40 respondents. The intervention group was given analgesics with a combination of finger gripping and sweet orange aromatherapy using a dose of 5 drops/50 ml of aromatherapy using a diffuser three times with a duration of 30 minutes for 24 hours, while the control group only received analgesic therapy. Data were analyzed using paired t-tests and independent t-tests. There were differences in the levels of -endorphins in the combination and control groups. There was an increase in the mean levels of β-endorphins in the combination group; before treatment, it was 271.5 pg/ml, and after treatment, it increased to 321.4 pg/ml (p=0.018). The difference in β-endorphin levels was 49.9 pg/ml (p=0.000). Conclusion, the combination of finger gripping and sweet orange aromatherapy effectively increases β-endorphin levels in post-laparotomy patients.

Keywords:- *Finger Grip; Sweet Orange; Aromatherapy; B-Endorphin; Post Laparotomy.*

I. INTRODUCTION

Laparotomy is a major surgical procedure in the form of an incision in the abdominal wall.[1] This procedure is performed with an incision in the abdominal wall to overcome problems in the abdominal wall organs. Laparotomy is also carried out for several digestive and uterine cases, for example, inguinal hernia, perforation, appendicitis, gastric cancer, colon and rectal cancer, intestinal obstruction, cholecystitis and peritonitis, chronic intestinal inflammation, and cases of sectio Caesarea.[2]

Based on data from the World Health Organization (WHO), laparotomy measures worldwide are increasing by 10% yearly. The prevalence of laparotomy patients is increasing drastically. In the past five years, 90 million laparotomy patients have been found in all hospitals worldwide.[3] Then four years ago, there was an increase of up to 98 million post-laparotomy patients. In Indonesia, in the same year, a total of 1.2 million surgical activities were recorded, and it is predicted that 42% of them were laparotomy operations. Meanwhile, based on data from the Tugurejo Hospital, from August to November 2021, there were 123 laparotomy operations.[4]

Laparotomy operations can cause problems such as acute postoperative pain, damaged skin integrity, immobilization, and risk of bleeding and infection. *Pain* is the main problem felt by patients after surgery. Postoperative pain usually lasts for 24 to 48 hours.[5] After surgery, 99% of patients feel pain.[6] Most post-laparotomy patients experience pain, as many as 86% of whom are hospitalized, of which 40% feel severe pain.[7] Pain after laparotomy is a symptom caused by surgery in the intra-abdominal region; about 60% of patients feel severe pain, 25% feel moderate pain, and 15% feel mild pain.[8] Severe pain causes discomfort, difficulty breathing, slow wound healing, and the patient's fear of mobilization. This pain can affect blood pressure as well as heart rate. It can be dangerous for the patient because the imbalanced hemodynamics triggers tissue ischemia and decreased consciousness resulting in death.[6] Pain can worsen the stress response, increasing tissue damage, coagulation, and fluid retention, which can delay the patient's healing and recovery.[9]

After the operation, the patient takes about 72.45 minutes to recover. Therefore, the patient experiences approximately severe pain during the first two postoperative hours because the anesthesia wears off and the patient leaves the room conscious. Pain sensations begin before the patient regains consciousness and increase when the anesthetic wears off.[10] Pain management in postoperative patients is done pharmacologically in the form of NSAIDs (non-steroidal anti-inflammatory drugs).[8] However, these drugs have side effects on the gastrointestinal system, such as nausea, dyspepsia, and nausea and vomiting.

ISSN No:-2456-2165

Postoperative care can be supported by non-pharmacological therapy. Non-pharmacological therapies can be applied, including relaxation, early mobilization, imaginary guides, aromatherapy, music therapy, and finger gripping. The advantage of giving non-pharmacological techniques is that it has a very low risk of allergies or complications due to therapy.[11,12] In addition, non-pharmacological techniques have a relatively more affordable cost. In addition, the body has a natural defense mechanism when pain occurs. One of the natural defense mechanisms is the production of β-endorphins. This hormone is produced by the pituitary gland and hypothalamus, which functions as the body's natural analgesic that binds to opioid receptors. This bond can block the release of a key protein in pain transmission, namely peptide substances, so the pain response is reduced.[13] Several non-pharmacological therapies can stimulate the β-endorphins hormone, including finger gripping and aromatherapy.

Research conducted by Astutik showed that holding fingers on patients after sectio Caesarea for 15 minutes significantly reduced pain.[14] A similar study conducted by Kurniati on finger grip showed significant results, but clinical effectiveness was still low.[15] Another study by Damayanti et al. compared the effectiveness of back massage with finger gripping and obtained results where pain intensity was lower in the finger gripping group but did not show a significant difference. The results from the clinical point of view of both groups were able to reduce moderate pain intensity to low pain intensity.[6]

Giving finger grip therapy can reduce anxiety, muscle tension, and distraction so that the pain you feel is reduced.[9] When holding the fingers, the body will activate the finger's reflection points. These stimuli will produce impulses sent through non-nociceptor afferent nerve fibers so that the pain stimulus is inhibited and reduced.[14] However, the population in the study was post-appendectomy patients, with pain intensity in the low to moderate range. Finger grip therapy is rarely applied in managing pain in hospitals and does not require expensive tools and costs. This gripping finger technique is done by controlling the breath and applying pressure to the fingers by holding the fingers alternately.

Research conducted by Rahmayati with lemon aromatherapy on laparotomy patients, this study produced significant results on pain intensity and had a moderate effect size.[16] Davood's research on sweet orange aromatherapy for limb fracture patients showed significant results in pain response.[17] Aromatherapy derived from citrus types has previously been studied and showed significant results in reducing pain scale. However, people have yet to research sweet orange aromatherapy.

Aromatherapy sweet orange contains limeone and linalool. Limeone is an important component in oranges that can work as a prostaglandin inhibitor, reducing aches and pains.[18] Sweet orange aromatherapy is useful as it decreases muscle tension, reducing pain levels.[19] Sweet orange is among the types of citrus with the highest lemon content. The limonene content in sweet orange peel ranges from 90-95% and contains 1-5% linalool. However, there have been no similar studies in postoperative patients. The previous study used a dose of 4 drops of sweet orange aromatherapy using a cotton swab at a distance of 20-30 cm from the patient for 30 minutes. Meanwhile, in this study, a diffuser will be used with the same dose of 4 drops but added with 50 ml of water at a distance of 30 cm from the patient and given within 30 minutes. The results of this study are significant in reducing pain intensity, but there has been no further research on its effect on β-endorphins hormone levels.

Previous research on acupressure,[20] and hand massage,[21,22] can affect the hormone β-endorphin. The hands have 12 acupressure points that can stimulate the meridians of nerves connected to various body organs. When doing acupressure, the emphasis is placed on the reflex points to release barriers to muscle relaxation and make energy flow freely.[21,23] In addition, massage can help trigger the release of the hormone β-endorphin by sending signals to the central nervous system and pituitary gland.[22] Research conducted by Intan by doing massage on the hands and feet got significant results on decreasing pain scale and increasing β-endorphin hormone.[24] Therefore, by having the same principle as finger-held acupressure, it also provides touch and grip on the fingers in the hope of reducing pain and stimulating the production of β-endorphin hormones. In addition, finger grip is easier for patients to do themselves, so it can improve patient self-care. However, no studies discuss the effect of finger grip on the β-endorphin hormone.

Giving finger grip intervention showed optimal results in reducing pain in appendectomy surgery. Pain management by doing finger grips can reduce pain but at low to moderate intensity. Therefore, researchers will combine it with aromatherapy therapy.[7] Aromatherapy therapy cannot be used as a primary intervention in overcoming pain. In addition, previous research was conducted with relatively few respondents. Assessment of pain levels in previous studies was carried out using a biased and subjective pain scale. So, to measure objectively, an appropriate biomarker is needed. The biomarker considered to have accuracy in pain is β-endorphin hormone.

According to previous data, the authors wanted to conduct a study on the effect of the combination of finger gripping and sweet orange aromatherapy with an aromatherapy dose of 5 drops/50 ml using a diffuser three times with a duration of 30 minutes for 24 hours on β-endorphin hormone levels in post-laparotomy patients.

ISSN No:-2456-2165

II. METHODS

A. Design

The design used is a True Experiment pre-test and post-test simple random. This study was divided into two parts: the intervention section, which was given analgesics with a combination of finger grip and sweet orange aromatherapy. Then, the control section only received analgesic therapy. The intervention was given with an aromatherapy dose of 5 drops/50 ml using a diffuser three times for 30 minutes for 24 hours in post-laparotomy patients.

B. Sample and sampling technique

The population was all post-laparotomy patients at the Tugurejo Regional General Hospital, Semarang. The population in this study were post-laparotomy patients at Tugurejo Hospital Semarang from May 2022 - July 2022, totaling 63 respondents. Determination of the number of samples using probability sampling method with simple random sampling and based on inclusion and exclusion criteria to 40 respondents who were divided into two groups, each of which was 20 respondents in the intervention section and 20 respondents in the control section.

C. Instrument

The instrument used in this study was to objectively measure -endorphin hormone levels, namely by conducting blood tests in the laboratory with ELISA reagents. The respondent's blood samples were taken using a syringe, tourniquet, alcohol swab, and blood tube. Meanwhile, the instrument for the intervention of a combination of finger gripping and sweet orange aromatherapy was based on standardized standard operating procedures (SOPs) containing procedures for implementing finger gripping and sweet orange aromatherapy. However, prior to intervention, patients were asked to sign an informed consent form, namely their willingness to be a respondent in this study from the first stage to the last stage.

D. Intervention

This research had a mechanism or stages in research. The first was the researcher conducting an initial assessment, filling out a questionnaire, and taking blood samples by asking respondents to fill out an informed consent form while explaining the research procedures. Then blood samples were taken using a syringe, tourniquet, alcohol swab, and blood tube. Pre-test blood sampling was carried out 6 hours after surgery when the anesthetic effect decreased to determine the level of β-endorphin hormone using β-endorphin ELISA reagent. Blood samples were sent to the GAKI laboratory at Diponegoro University for analysis of β -endorphin hormone levels. In the intervention group, they were given a combination of finger gripping and sweet orange aromatherapy with a dose of 5 drops/50 ml of aromatherapy using a diffuser three times with a duration of 30 minutes for 24 hours given 3 hours after giving the analgesic ketorolac 30 g/ml or tramadol 50 mg. Meanwhile, the control group received pharmacological therapy using the analgesic ketorolac 30 g/ml or tramadol 50 mg. Post-test examination, taking blood samples for ELISA lab tests after intervention for 24 hours. Sampling post-test at least 1 hour after the third intervention. After that, the sample will be sent to the GAKI laboratory at Diponegoro University again to analyze the levels of β -endorphin hormone.

E. Data Analysis

This study was conducted using data collection methods through observation, identification, interviews, and filling out questionnaires. The collected data were analyzed using the SPSS program, and a parametric analysis test (paired t-test and independent t-test) was performed. The data that has been prepared can be used as a basis for discussing the problem, which can then be tabulated and conclusions drawn.

F. Ethical considerations

In ethical considerations, researchers had to first take care of and obtain permits for research that has been carried out from the Postgraduate Poltekkes Kemenkes Semarang and carry out an ethical clearance test from the Health Research Ethics Commission Tugurejo Hospital Semarang, then submit a research permit to Tugurejo Hospital Training and Education Semarang to collect and collect data. Data collection carried out by researchers certainly paid attention to ethical aspects, including anonymity, confidentiality, and autonomy. The researcher asked for the respondent's informed consent before conducting the research.

ISSN No:-2456-2165

III. RESULT

Table 1. Frequency distribution of respondents by age, gender, type of surgery, history of surgery and analgesia based on demographic data

Characteristics	Intervention (n=20)		Control (n=20)		p
	N	%	N	%	
Age (Mean ±SD) (Min-Max)	37.50±8.133 (20-45)		34.1±6.789 (22-45)		0.276*
Gender					0.897*
Male	7	35.0	9	45.0	
Female	13	65.0	11	55.0	
Total	20	100	20	100	
Types of surgery					0.560*
Ileus Obstruction	3	15.0	2	10.0	
Herniotomy	8	40.0	10	50.0	
Peritonitis	6	30.0	5	25.0	
Splenectomy	3	15.0	3	15.0	
Total	20	100	20	100	
History of Surgery					0.408*
Yes	11	55.0	8	40.0	
No	9	45.0	12	60.0	
Total	20	100	20	100	
Analgesic					0.171*
Ketorolac	17	85.0	19	95.0	
Tramadol	3	15.0	1	05.0	
Total	20	100	20	100	

**Levene statistic homogeneity test*

Average age difference, gender, type of surgery, history of surgery, and analgesics in the intervention group and control group, which had the same significance value, p-value > 0.05, were homogeneous.

Table 2. Differences in β-endorphin hormone levels before and after treatment in the intervention and control groups

Groups	Variable	Mean	SD	*p*	Analysis
Intervention (β-endorphine)	Pre-test	271.5	75.90	0.20	Normal
	Post-test	321.4	71.47	0.07	Normal
Control (β-endorphine)	Pre-test	279.0	42.90	0.08	Normal
	Post-test	273.5	49.39	0.20	Normal

**Kolmogorov Smirnov test*

Kolmogorov-Smirnov test shows average β-endorphin hormone levels in the intervention group and control group before and after treatment were statistically homogeneous.

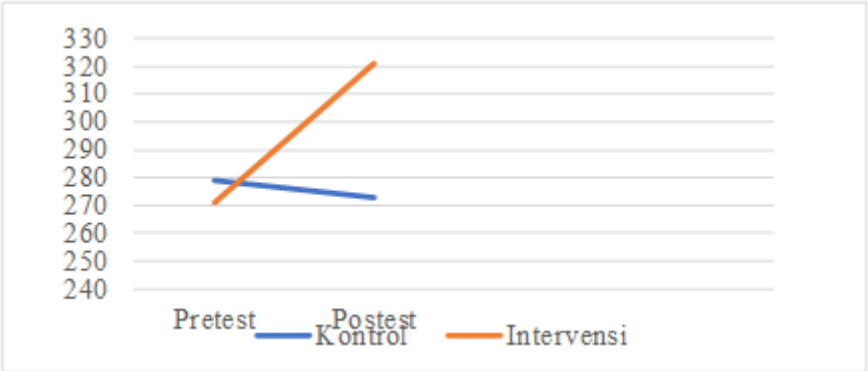

Fig 1. Levels of β-endorphin hormone in the intervention section and control section before and after treatment

ISSN No:-2456-2165

Differences in the average levels of β-endorphin hormone after treatment in the intervention and control sections. In the intervention section, there was an increase in the average β-endorphin hormone, which was greater than the average β-endorphin hormone level before treatment, from 271.5 pg/ml to 321.4 pg/ml. While in the control group, the average decreased, although not in large amounts, the level of β-endorphin hormone before treatment was 279.0 pg/ml to 273.5 pg/ml.

Table 3. Analysis of differences in β-endorphin hormone levels between the intervention and control groups

Variable		Intervention section (n=20)	Control Section (n=20)	t	p
		Mean±SD	***Mean±SD***		
β-endorphine level (pg/ml)	Pretest	271.5±75.9	279.0±42.9	2.465[b]	0.700[b]
	Posttest	321.4±71.4	273.5±49.4	-0.387[b]	0.018[b]
	(Δ)Selisih	49.9±27.8	5.5±28.8	6.179[b]	0.000[b]
	t	8.005[a]	0.860[a]		
	p	0.000[a]	0.401[a]		

[a]Paired t-test, [b]Independent t-test

The results of the paired t-test for β-endorphin hormone levels with a p-value = 0.000. Therefore, it can be summarized that there was a significant difference between β-endorphin hormone levels before and after the combination of finger gripping and sweet orange aromatherapy for 3x30 minutes for 24 hours. Then, the results of the independent t-test after giving a combination of finger gripping and sweet orange aromatherapy 3x30 minutes for 24 hours were more effective in increasing β-endorphin hormone levels, t=6.179, p=0.000. So, it can be said that the hypothesis is accepted.

IV. DISCUSSION

This study was conducted by using a combination of finger gripping and sweet orange aromatherapy with an aromatherapy dose of 5 drops/50 ml using a diffuser three times with a duration of 30 minutes for 24 hours with analgesia, where post-laparotomy patients will be examined for endorphin hormone levels before and after the intervention. The results showed significant differences in endorphin hormone levels before and after the intervention, p<0.05. Endorphin hormone levels in the control group were 279.0 pg/ml to 273 pg/ml; in the 271 pg/ml group, it was 321.4 pg/ml. Endorphin hormone levels in the control group tended to increase lower than in the intervention group, and some even decreased.

There was an increase in the mean β-endorphin hormone, 49.9 pg/ml higher, in the intervention group. The independent test showed differences in β-endorphin hormones between the intervention and control groups after being given a combination of finger grip and sweet orange aromatherapy, with the group that only received an analgesic in the form of ketorolac, with a p-value = 0.000. Giving a combination of finger gripping and sweet orange aromatherapy with an aromatherapy dose of 5 drops/50 ml using a diffuser three times for 30 minutes for 24 hours was more effective in increasing β-endorphin.

The intervention group's percentage increase in β-endorphin hormone levels was 18.50% with an effect size value of 0.67 (medium). It showed a moderate effect in increasing the hormone β-endorphin. Based on research conducted by Yohana on -endorphins in previous studies, that is >280 pg/ml, which is equivalent to a pain scale of 4.[25] This value is used as a cut-point value for β-endorphin hormone levels. The analysis results of the combination of finger gripping and sweet orange aromatherapy were 15 (75%) respondents reached the cut point in the intervention section. On the other hand, 12 (60%) respondents in the control section did not reach the cut point. These results supported the hypothesis that the combination of finger gripping and sweet orange aromatherapy is effective in increasing β-endorphin hormone levels.

Reduction (RRR) for the value of endorphin hormone levels that indicated pain in post-laparotomy patients. There were two groups who both received analgesic therapy. However, in the intervention group, a combination of finger grip and sweet orange aromatherapy could reduce therapy failure by 58%. In contrast, in patients who only received analgesic therapy in the form of ketorolac or tramadol, with an absolute risk reduction value (ARR) or the difference in failure to increase administration in the administration and control groups by 35%, the value of the number of needed (NNT) required three people to be given a combination of finger gripping therapy and sweet orange aromatherapy. Moreover, the number value needs to harm (NNH) as many as three additional respondents to get the results of unwanted effects.

Touching the hand or fingers stimulates pain neurotransmitters; two mechanisms can be passed to reduce pain. The opiate pathway is characterized by a receptor meeting in the brain consisting of descending spinal pathways from the thalamus, which pass through the brain and medulla, the spinal cord dormant, which conducts with nociceptor suppressive impulses. The suppressive impulse activates nociceptor stimulation which is transmitted by A and C fibers. The non-opiate pathway is an ascending pathway that does not respond to naloxone, whose mechanism is less well-known. The impulse comes from alpha fibers because the impulse is not conveyed perfectly to the brain can connote an uncomfortable and emotional response to pain.

ISSN No:-2456-2165

When finger gripping, the impulse will be transmitted through the A and C fibers. Then the stimulation will be processed to the spinal cord before being transmitted to the brain through the spinal cord. In the brain, the stimulation will be forwarded to the hypothalamus and limbic system, and then it will stimulate the release of β-endorphin hormone. β-endorphins work by binding to opioid receptors so that they can inhibit the pain stimulus so that it closes the gate control. Then it will stimulate the release of endorphin hormones that work as natural opioids.[26]

While aromatherapy is associated with stimulating steroids in the sweat glands, they are called *osmons*. *Osmon* works as a natural chemical sedative that stimulates brain neurochemistry. The pleasant aroma will stimulate the thalamus, and the content in aromatherapy which contains linalool and limonene can activate the cyclooxygenase 1 and 2, which will bind to GABA. GABA acts as one of the substances that can break down opioid receptors; when GABA is bound, dopamine and serotonin levels increase. So that it gives a feeling of calm and relaxation, improving the respiratory system. When emotionally in a good state, it can increase the release of β-endorphin by the hypothalamus and pituitary gland.[20] When finger gripping and sweet orange aromatherapy are combined, it is expected that β-endorphin hormone levels and pain intensity are reduced by inhibiting pain transmission and overcoming pain related to emotional factors.

The rise and fall of β-endorphin hormone levels can be caused by various factors, such as physiological responses, stressors, and the experience of feelings felt by the patient. The β-endorphin hormone in each individual will vary according to a person's sensitivity to receiving stimuli. The level of the β-endorphin hormone can be triggered by pain. It can suddenly arise when the body's response is experiencing pain, then stimulates the brain to affect the production of endorphins sent to the pain point.

Beta-endorphin is a neuropeptide that is produced when the body relaxes. Beta-endorphin is produced and stored in the anterior pituitary via proopiomelanocortin precursor (POMC) and then carried through Cerebral Spinal Liquor (CSL) and circulates in blood vessels to target organs. The pituitary gland releases Beta-endorphin in response to stress or pain. The thing that is very influential in the process of releasing endorphins is by giving a stretch to the tension of the muscles.

Complementary therapy to accompany drug therapy can provide better results in controlling pain, interpreted by increasing levels of endorphins in the intervention group. Sweet orange is among the types of citrus with the highest limonene content. The limonene content in sweet orange peel ranges from 90-95% and contains 1-5% linalool. Sweet orange aromatherapy has the highest content of linalool and limeone among other citrus aromatherapy such as lemon, bittersweet, etc.[19] Giving sweet orange aromatherapy will stimulate the olfactory nerves, which can improve mood/emotions, calm and relax, and deal with stress.[7] Because the content of linalool and limeone binds GABA, it can inhibit the release of substance P, increase dopamine levels, and activate the anxiolytic effect (reducing anxiety). When emotionally in a good state, it can cause the release of β-endorphin by the hypothalamus and pituitary gland.[20] Research conducted by Yolanda using lavender aromatherapy in post-section Caesarea patients can increase levels of endorphin hormones.[25]

The impulse will be transmitted through the A and C fibers when doing finger gripping. Then the stimulation will be processed to the spinal cord before being transmitted to the brain through the spinal cord. In the brain, the stimulation will be forwarded to the hypothalamus and limbic system; then, it will stimulate the release of the β-endorphin hormone. β-endorphins work by binding to opioid receptors so that they can inhibit the pain stimulus so that it closes the gate control. Then it will stimulate the release of endorphin hormones that work as natural opioids. When finger gripping and sweet orange aromatherapy are combined, it is expected that β-endorphin hormone levels and pain intensity are reduced by inhibiting pain transmission and overcoming pain related to emotional factors. This study follows Asni's study using finger grips in post-appendectomy patients to reduce postoperative pain.[27]

Research conducted by Aswat by holding fingers for 3x15 minutes can reduce the pain scale significantly with a p-value = 0.000, but it is still low clinically.[28] This study is in line with the study conducted by Asni by holding fingers for half an hour, significantly reducing the pain scale with a p-value = 0.000 effect size 0.1 (weak) and a delta level of 13.53%.[27] Research conducted by Masoomed showed that giving four drops of sweet orange aromatherapy for 30 minutes can reduce pain levels in post-laparotomy patients with p = 0.001.[29] A study of murotal cesarean section patients after 3x30 minutes of therapy obtained a significant result of endorphin hormone with p-value = 0.001, with an increase in the average endorphin hormone of 4.62% and a decrease in pain before treatment with an average of 6 down to 4.5 to moderate pain with an effect size of 0.4 or moderate.[30] This study's results align with Davood's study by giving orange aromatherapy with a dose of 4 drops and replaced every 4 hours for one day. Significant results were obtained on the average pain scale before and after administration; namely, from a pain scale of 8.3 to 5.6, it had not yet reached a mild pain value with a delta level of 20.41%. Meanwhile, in the study of the combination of finger gripping and sweet orange aromatherapy given 3x30 minutes for 24 hours, the results obtained were significant endorphins with a p-value = 0.000, effect size 0.67, with a delta level of 8.50% and most of them reached the normal value of endorphins, namely >280 pg/ml. It can be concluded that the combination is more effective in increasing endorphin hormones.

V. CONCLUSION

Based on data processing and analysis of the research on the combination of finger gripping and sweet orange aromatherapy on -endorphin levels in post-laparotomy patients, there is a difference in the average levels of β-endorphin hormones before and after giving a combination of finger gripping and sweet orange aromatherapy with an aromatherapy dose of 5 drops/50. ml using a diffuser three times with a duration of 30 minutes for 24 hours accompanied by the analgesic ketorolac 50 mg. Changes in the mean level of β-endorphin in post-laparotomy patients after the intervention, which was 271.5 pg/ml, increased to 321.4 pg/ml. With the difference in the mean levels of β-endorphin 49.9 pg/ml. In conclusion, the combination of finger gripping and sweet orange aromatherapy accompanied by the analgesic ketorolac 50 mg was effective in increasing β-endorphin levels in the intervention group by 49.9 pg/ml, with p=0.000, and effect size by 0.67 (medium) with a delta level of 8.50%. It is hoped that future research can pay attention to other confounding variables, for example, family support, anxiety levels, individual coping, and cultural factors. Patients with post-laparotomy are expected to receive counseling about the combination of finger gripping and sweet orange aromatherapy to provide information about complementary therapies to control pain.

REFERENCES

[1]. Sulung N, Rani SD. Teknik Relaksasi Genggam Jari Terhadap Intensitas Nyeri Pada Pasien Post Appendiktomi. Jurnal Endurance. 2017 Oct 13;2(3):397.
[2]. Kwapinska M. Postoperative Pain Investigation under the Protocol of Enhanced Recovery after Abdominal Surgery: Incidence and Risk Factors. European Journal of Pain (United Kingdom). 2016;21:1–6.
[3]. Suhadi, Ayu Pratiwi. Pengaruh Hipnosis Lima Jari Terhadap Tingkat Kecemasan Pasien Pre Operasi Di Ruang Perawatan Bedah Rsud Pakuhaji. Jurnal Health Sains. 2020 Nov 25;1(5):320–30.
[4]. Rekam medis RSUD Tugurejo. Data pasien post laparatomi. Semarang; 2021.
[5]. Hamarno R, Ciptaningtyas MD, H MH. Deep Breathing Exercise (DBE) dan Tingkat Intensitas Nyeri Pada Pasien Post Operasi Laparatomi. Journal of Applied Nursing (Jurnal Keperawatan Terapan). 2017 Oct 29;3(1):31.
[6]. Damayanti RT, Isnaeni, Wiyono J. Differences Pain Intensity Between Back Massage Therapy And Finger Hold Relaxation In Patien Post Laparatomy. Journal of Applied Nursing (Jurnal Keperawatan Terapan) [Internet]. 2019 Mar 28 [cited 2022 Dec 1];5(1):10. Available from: https://ojs.poltekkes-malang.ac.id/index.php/JKT/article/view/671
[7]. Tabatabaeichehr M, Mortazavi H. The Effectiveness of Aromatherapy in the Management of Labor Pain and Anxiety: A Systematic Review. Ethiop J Health Sci. 2020 May 1;30(3):449–58.
[8]. Ekawati K, Lalenoh D, Kumaat L. Profil Nyeri Dan Perubahan Hemodinamik Pasca Bedah Perut Bawah Dengan Ketorolak 30 mg Intravena. e-CliniC. 2015;3(1).
[9]. Ju W, Ren L, Chen J, Du Y. Efficacy of relaxation therapy as an effective nursing intervention for post-operative pain relief in patients undergoing abdominal surgery: A systematic review and meta-analysis. Exp Ther Med [Internet]. 2019 Aug 19 [cited 2022 Dec 1];18(4). Available from: https://pubmed.ncbi.nlm.nih.gov/31555379/
[10]. Rohmayani MS, Joko Suwito P. Intensitas Nyeri Klien Pasca Operasi Mayor Di Rumah Sakit Islam Jemursari Surabaya. E-Journal Keperawatan [Internet]. 2019 [cited 2022 Dec 1];12(1):23–9. Available from: http://journal.poltekkesdepkes-sby.ac.id/index.php/KEP/article/view/1486
[11]. Harley R dan PC. Farmakologi Ulasan Bergambar. Jakarta: EGC; 2009.
[12]. Lasander JC. Pengaruh Teknik Distraksi Terhadap Penurunan Intensitas Nyeri Pada Pasien Post Operasi Appendiksitis di RS Pancaran Kasih Manado | Lasander | E-Jurnal UNSRIT. E-Jurnal UNSRIT [Internet]. 2016 [cited 2022 Dec 1];3(2):1–6. Available from: http://jurnal.unsrittomohon.ac.id/index.php?journal=ejurnal&page=article&op=view&path%5B%5D=195
[13]. Feldreich A, Ernberg M, Rosén A. Reduction in maximum pain after surgery in temporomandibular joint patients is associated with decreased beta-endorphin levels – a pilot study. Int J Oral Maxillofac Surg. 2017 Jan 1;46(1):97–103.
[14]. Astutik P, Kurlinawati E. Pengaruh Relaksasi Genggam Jari Terhadap Penurunan Nyeri Pada Pasien Post Sectio Caesarea. Strada Jurnal Ilmiah Kesehatan. 2017 Nov 29;6(2):30–7.
[15]. Hayat A, Ernawati E, Ariyanti M. Pengaruh Tehnik Relaksasi Genggam Jari Terhadap Penurunan Skala Nyeri Pada Pasien Post Appendictomydi Ruang Irna III RSUD P3 Gerung Lombok Barat. Malahayati Nursing Journal [Internet]. 2020 Jan 12 [cited 2022 Dec 1];2(1):188–200. Available from: http://ejurnalmalahayati.ac.id/index.php/manuju/article/view/2364
[16]. Rahmayati E, Hardiansyah R, Nurhayati N. Pengaruh Aromaterapi Lemon terhadap Penurunan Skala Nyeri Pasien Post Operasi Laparatomi. Jurnal Kesehatan [Internet]. 2018 Dec 31 [cited 2022 Dec 1];9(3):427. Available from: https://ejurnal.poltekkes-tjk.ac.id/index.php/JK/article/view/1138
[17]. Hekmatpou D, Pourandish Y, Farahani PV, Parvizrad R. The Effect of Aromatherapy with Orange Essential Oil on Anxiety and Pain In Patients With Fractured Limbs Admitted to an Emergency Ward: A Randomized Clinical Trial. Central European Journal of Nursing and Midwifery [Internet]. 2017 Sep 30 [cited 2022 Dec 1];8(4):717–22. Available from: http://cejnm.osu.cz/doi/10.15452/CEJNM.2017.08.0024.html

[18]. Kaimoto T, Hatakeyama Y, Takahashi K, Imagawa T, Tominaga M, Ohta T. Involvement of transient receptor potential A1 channel in algesic and analgesic actions of the organic compound limonene. European Journal of Pain (United Kingdom) [Internet]. 2016 Aug 1 [cited 2022 Dec 1];20(7):1155–65. Available from: https://pubmed.ncbi.nlm.nih.gov/27030509/

[19]. Dosoky NS, Setzer WN. Biological activities and safety of citrus spp. Essential oils. Int J Mol Sci [Internet]. 2018 Jul 5 [cited 2022 Dec 1];19(7):1–25. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6073409/

[20]. Taheri H, Naseri-Salahshour V, Abedi A, Sajadi M. Comparing the effect of foot and hand reflexology on pain severity after appendectomy: A randomized clinical trial. Iran J Nurs Midwifery Res. 2019 Nov 1;24(6):451–6.

[21]. Boitor M, Martorella G, Laizner AM, Maheu C, Gélinas C. The effectiveness of hand massage on pain in critically ill patients after cardiac surgery: A randomized controlled trial protocol. JMIR Res Protoc. 2016 Oct 1;5(4).

[22]. Renuka K, Babu J, Annie Annal M. Effectiveness of Hand Massage vs Foot Massage on Pain in Incision Site among Post-cesarean Mothers Admitted in Obstetrical Care Units at Mahatma Gandhi Medical College and Research Institute, Puducherry. Pondicherry Journal of Nursing [Internet]. 2019 [cited 2022 Dec 2];12(3):70–3. Available from: https://www.researchgate.net/publication/341445927_Effectiveness_of_Hand_Massage_vs_Foot_Massage_on_Pain_in_Incision_Site_among_Post-cesarean_Mothers_Admitted_in_Obstetrical_Care_Units_at_Mahatma_Gandhi_Medical_College_and_Research_Institute_Puducherr

[23]. Kudo Y, Sasaki M. Effect of a hand massage with a warm hand bath on sleep and relaxation in elderly women with disturbance of sleep: A crossover trial. Japan Journal of Nursing Science. 2020 Jul 1;17(3).

[24]. Intan Putri Utami. Pengaruh Foot Hand Massage Terhadap Keluhan Rasa Nyeri Dan Kadar B-Endorphin Ibu Post Sectio Caesarea [Internet]. [Semarang]: Poltekkes Kemenkes Semarang; 2021 [cited 2022 Dec 2]. Available from: https://repository.poltekkes-smg.ac.id/index.php?p=show_detail&id=25032&keywords=

[25]. Apryanti YP. Pengaruh Pemberian Aromaterapi Lavender Terhadap Intensitas Nyeri Dan Kadar Hormon Beta-Endorphine Pada Ibu Post Sectio Caesarea [Internet]. [Semarang]: Poltekkes Kemenkes Semarang; 2017 [cited 2022 Dec 2]. Available from: http://repository.poltekkes-smg.ac.id//index.php?p=show_detail&id=12757

[26]. Musial F, Weiss T. The healing power of touch: The specificity of the “Unspecific” effects of massage. Forsch Komplementarmed [Internet]. 2014 Dec 2 [cited 2022 Dec 2];21(5):282–3. Available from: https://www.researchgate.net/publication/268879371_The_Healing_Power_of_Touch_The_Specificity_of_the_Unspecific%27_Effects_of_Massage

[27]. Hasaini A. Efektifitas Relaksasi Genggam Jari Terhadap Penurunan Nyeri Pada Pasien Post Op Appendiktomi di Ruang Bedah (Al-Muizz) RSUD Ratu Zalecha Martapura Tahun 2019. Dinamika Kesehatan Jurnal Kebidanan Dan Keperawatan [Internet]. 2020 Jan 2 [cited 2022 Dec 2];10(1):76–90. Available from: https://ojs.dinamikakesehatan.unism.ac.id/index.php/dksm/article/view/394

[28]. Aswad A. Relaksasi Finger Hold Untuk Penurunan Nyeri Pasien Post Operasi Appendektomi. Jambura Health and Sport Journal [Internet]. 2020 Feb 29 [cited 2022 Dec 2];2(1):1–6. Available from: https://ejurnal.ung.ac.id/index.php/jhsj/article/view/4555

[29]. Noruzi Zamenjani M, Farmahini Farahani M, Amirmohseni L, Pourandish Y, Shamsikhani S, Heydari A, et al. The Effects of Inhalation Aromatherapy on Postoperative Abdominal Pain: A Three-Arm Randomized Controlled Clinical Trial. Journal of Perianesthesia Nursing [Internet]. 2021 Apr 1 [cited 2022 Dec 2];36(2):147–52. Available from: https://pubmed.ncbi.nlm.nih.gov/33234419/

[30]. Anwar KK, Hadju V, Massi MN. Pengaruh Murottal Al-Quran Terhadap Peningkatan Kadar Beta-Endorphin Dan Penurunan Tingkat Nyeri Pasien Post Sectio Caesarea. Jurnal Kesehatan [Internet]. 2019 Aug 27 [cited 2022 Dec 2];10(2):58. Available from: http://ejurnal.stikesprimanusantara.ac.id/index.php/JKPN/article/view/394