Open Access
Check for updates
International Journal of Medical Science and Dental Health (ISSN: 2454-4191)
Volume 11, Issue 11, November 2025
Doi: https://doi.org/10.55640/ijmsdh-11-11-14

The Effectiveness of Progressive Muscle Relaxation Technique and Acupressure on Pain Intensity in Post-Laparatomy Surgery Patients

Yolanda Woria
Postgraduate Program in Applied Master of Nursing, Poltekkes Kemenkes Semarang, Indonesia

Ta'adi
Postgraduate Program in Applied Master of Nursing, Poltekkes Kemenkes Semarang, Indonesia

Mardiyono
Postgraduate Program in Applied Master of Nursing, Poltekkes Kemenkes Semarang, Indonesia

Received: 19 October 2025, **accepted:** 23 October 2025, **Published Date:** 18 November 2025

Abstract

Pain intensity is an overview of how severe the pain felt individual surgical procedure laparatomy will cause post-operative pain laparatomy. Discomfort and trauma of post-operative Laparatomi patiens are mandatory special concerns for health workers, especially nurses. Pain management of progressive and acupressure muscle relaxation techniques, which is one of postoperative pain management for Laparatomy.

Objective: This study analyzed the differences in the effectiveness of postoperative pain in Laparatomi progressive muscle relaxation techniques and acupressure in the intervention and control groups.

Method: Using permeted block random sampling method the population in this study was Laparatomi patients who were in Sorong Besar District Hospital The sample consisted of 32 respondents, each group consisted of 16 respondents. The intervention group was given progressive muscle relaxation and acupressure tecniques while the control group 16 received acupressure and observation pain scores using a numerical rating scale (NRS) instrument.

Results: Anaysis of the data used by Mann Whitney in the Progressive muscle relaxation and accupressure intervention group can reduce postoperative pain 9.19 to 3.25 while the acupressure control group can reduce pain to 9.13 to 4.50. Combination intervention is more effective in reducing postoperative Pain in Laparatomi than acupressure Li 4 (p-0,00). **Conclution:** The influence of progressive and acupressure muscle relaxation techniques can reduce pain.

Keywords: Postoperative pain in laparatomy, acupressure relaxation, progressve muscle

1. Introduction

Surgery is a form of invasive treatment used to diagnose diseases, injuries, and deformities. A laparotomy is a major surgical procedure performed to open the abdomen. Cases of inguinal hernia, gastric cancer, appendicitis, perforation, colon and rectal cancer, intestinal obstruction, chronic bowel inflammation, peritonitis, and cholecystitis are all considered laparotomy.[1]

Tissue trauma caused by surgery or incisions can cause various complaints and symptoms, with pain often being the primary concern. Post-laparotomy patient discomfort and trauma are key concerns that require

special attention from healthcare workers, particularly nurses.[2]

Pain is a defense mechanism that occurs when tissue damage occurs, creating an unpleasant sensory and emotional experience. The sensation of pain typically occurs after the effects of anesthesia wear off. In laparotomy cases, the pain experienced is usually moderate to severe, caused by damage to the integument, muscle tissue, and vasculature. Pain management is the appropriate action taken by post-laparotomy patients to improve patient comfort. Pain management is divided into two categories: pharmacological and non-pharmacological. Pharmacological management consists of collaboration between doctors and nurses in administering analgesic and sedative medications that can stimulate the central nervous system, thereby reducing the pain response. Non-pharmacological management includes progressive muscle relaxation.[2, 3]

The incidence of abdominal surgery increases annually. According to World Health Organization (WHO) data, the number of laparotomy patients increases annually by 15%. It is estimated that by 2012, this number had increased to 148 million. According to tabulations from the Ministry of Health in 2011, surgical procedures ranked 10th out of a total of 50 diseases in Indonesia, with 15.7% of surgical cases, 45% of which were laparotomies. An estimated 11% of the global burden of disease comes from diseases/conditions that can actually be treated surgically.[4]

After laparotomy surgery, patients will experience severe pain and have an unpleasant experience due to inadequate pain management.[5] The presence of a wound that causes pain makes the patient feel anxious about early mobilization so that the patient tends to lie down. Acute pain after major surgery at least has a positive physiological function that plays a role as special care must be done to prevent tissue trauma. Pain management is one method used in the health sector to overcome pain experienced by patients. Nurses provide nursing care to patients by providing interventions to increase comfort is a basic need of the client. Analgesics are usually given to reduce pain which is the goal of nursing care. Pain management will be effective if combined with non-pharmacological therapy, one of which is progressive muscle relaxation techniques and acupressure which reduces pain with a pain scale of 1-3, namely mild pain in patients.

Progressive muscle relaxation is a body relaxation technique that facilitates stretching and releasing muscle groups, resulting in different sensations. Relaxation techniques promote mental and physical freedom from tension and stress. Relaxation techniques help individuals control discomfort, pain, physical stress, and emotional responses to pain. This technique can be used on both healthy and sick individuals. The procedure takes approximately 10 minutes and can be performed in 15 movements, with each muscle tensed for 15-20 seconds and then relaxed for 15-20 seconds. The patient focuses on the body and experiences a response to tension, which is then replaced by a feeling of warmth and relaxation. This progressive muscle relaxation exercise consists of a combination of breathing exercises and a series of contractions and relaxations of muscle groups.[3, 6]\l "

Acupressure is a development of acupuncture techniques, both of which are used to stimulate points on the body, pressing until they enter the nervous system. 7 One of the benefits of acupressure is that the body feels fresher and can overcome pain, because the effect of pressing acupressure points can increase endorphin levels which are useful as pain relievers produced by the body in the blood and endogenous opioid peptides in the central nervous system. Pressure and massage on point Li 4 (He ku) 30 times for 10 minutes is given to post-laparotomy patients.[7]

The results of the calculation of the effect size in previous studies, the intervention of progressive muscle relaxation techniques has an effect size that reduces pain levels and acupressure point Li4 has an effect size that reduces pain. From this study, it is combined progressive muscle relaxation and acupressure in managing pain after laparotomy surgery. It is recommended that the results of this study can provide input on the importance of independent interventions carried out in reducing symptoms of disorders in post-surgical patients such as pain, anxiety and changes in vital signs. In improving the quality of nursing services, it is hoped that the provision of progressive muscle relaxation therapy and acupressure point Li4 can reduce pain in post-surgical patients.

2. Metode Penelitian

This type of research uses a true experimental study with a Randomized Pre-Post Test Control Design. This study consists of two groups, namely the intervention group and the control group. Measurement of post-laparotomy pain using the Numeric Rating Scale (NRS) instrument. The population in this study were post-laparotomy patients. The research population in the control group of respondents was given medication and treatment was given progressive relaxation technique training and acupressure at the Li 4 point. The clients were undergoing laparotomy surgery carried out at the Sorong Regency General Hospital.

The minimum sample determination technique in this study was 32 respondents, with 16 respondents as the intervention group and 16 as the control group. The sampling technique in this study was random sampling, which is a sampling method that provides an equal opportunity or chance to be selected for each individual in the population to become a research sample. 8 The sampling technique in this study was permuted block random sampling, which is a method for randomly allocating participants to treatment groups while maintaining balance between the two groups. The number of respondents was 32 divided into randomization blocks.

Respondent selection began with identifying clients on the third day post-laparotomy in the treatment room. Next, an assessment was conducted, and clients were given an explanation of the research, its purpose, uses, benefits, and impacts of participating. Once the clients understood the explanation, they were asked to sign a consent form and agree to participate. The research then commenced.

This study aims to determine the relationship between variables and test whether there is an influence of the dependent and independent variables. To determine the effectiveness of progressive muscle relaxation techniques and acupressure point Li4 on post-laparotomy patients. In this study, the number of samples used was 32 samples. The data in this study were not normally distributed, so non-parametric tests were used for paired groups using the Friendman test and to compare the two groups (Wilcolxon test Mann Whitney test). The processed data were used as a basis for the discussion of the data presented descriptively in the form of a table summary. So that conclusions can be drawn.

3. Results

Table 1. Distribution of Respondent Characteristics in the Intervention and Control Groups Based on Gender, Age, Education, Type of Surgery, Type of Anesthesia, Type of Medication

Characteristics	Intervention Groups		Control Groups		*P*	
	(n)	(%)	(n)	(%)		
Gender						
Man	8	50,0	4	25,0	0,144	
Women	8	50,0	12	75,0		
Age	16	100	16	100	0,805	
Education						
Elementary School	-	-	2	12,5	0,422	
Middle School	-	-	-	-		
High school	11	68,8	8	50,0		
Diploma	4	25,0	4	25,5		
Bachelor's	1	6,3	2	12,5		
Type of surgery						
Tumor ileus	4	25,0	6	31,3		

Hernia inguenalis	2	12,5	1	37,5	0,931	
Sectio caesarea	4	25,0	2	12,5		
Peritonitis	6	37,5	7	43,8		
Type of anesthesia						
General anesthesia	5	31,3	10	62,5	0,710	
Regional anesthesia	11	68,8	6	37,5		
Types of drugs						
Keterolac	16	100%	16	100%		

Based on table 1 shows that the results of the statistical test of gender p value = 0.144 means there is no significant difference between the intervention group and the control group seen from the gender variable with the number of respondents in the male intervention group 50.0% and female respondents 75.0%. p = 0.805 which means there is no significant difference between the intervention group and the control group seen from the age. Education p value = 4.22 means there is a significant difference between the intervention group and the control group seen from the education variable with 68.8% high school respondents. Type of surgery p value = 0.422 means there is no significant difference between the intervention group and the control group seen from the type of surgery variable of respondents 31.3 all types of surgery are the same. Type of anesthesia p value = 865 means there is a significant difference between the intervention group and the control group seen from the type of anesthesia variable with 100% general anesthesia respondents. Analgesic means there is no significant difference between the intervention group and the control group seen from the analgesic variable 100% meaning the intervention group and the control group used the type of ketorolac drug.

Table 2. Normality Test of Post-Laparotomy Pain Measurements with Three Measurements: Pre-test, Post-test 1, Post-test 2 in the Treatment Group and Control Group.

Variabel	Intervensi	Kontrol
	p-value	p-value
Pre	0.000	0.000
Post 1	0.002	0.000
Post 2	0.000	0.000
Difference *Pre*	0.000	0.000
Difference *post* 1	0.002	0.006
Difference *post* 2	0.004	0.001

Based on table 2, the statistical results of the data normality test obtained p<0.05 (pretest intervention group p=0.000, post test 1 p=0.000, post test 2 p=0.000, Pre p=0.000, Post 1 p=0.002, Post 3 p=0.004, Control group pretest p=0.000, Post test 1 p=0.000, Post test 2 p=0.000, Pre p=0.000, Post 1 p=0.006, Post 3 p=0.001) which means the data is not normally distributed so that the Parametric test cannot be used, so the Friedman alternative test is carried out for each group and Mann Whitney to determine the difference in pain between the two groups in three measurements.

Table 3. Analysis of the Differences between the Two Groups in the Pre-Test and Post-Test in the Intervention and Control Groups. The test used was the Friedman test

Measurement Time		Mean	SD	Mean Rank	*p*
Intervention Groups	*Pre test*	9,19	0,403	3,00	0,000
	Post test 1	5,44	1,209	1,19	
	Post test 2	3,25	0,447	1,09	
Control Groups	*Pre test*	9,31	0,479	3,00	0,000
	Post test 1	6,69	0,479	1,94	
	Post test 2	4,50	0,894	1,06	

Based on table 3, the results of the Firedman test are used to analyze the influence of independent variables between two groups, namely the intervention group, the dependent variable is pain, showing significant results with three measurements (pre-test, post-test 1, post-test 2) scores from the three measurements, the mean value of the pre-test 9.19, post-test 1 = 5.44, post-test 2 = 3.25, P = 0.000 10 minutes after the treatment of progressive muscle relaxation and acupressure effectively reduced pain. While the control group showed significant results with pain scores of the three measurements (pre-test, post-test 1, post-test 2) with the results of the three measurements, the mean value of the pre-test = 9.31, post-test 1 = 6.69, post-test 2 = 450, p = 0.000 10 minutes of acupressure treatment effectively reduced pain.

Table 4. Effectiveness Test of Post-Laparotomy Pain Measurement with Three Measurements in the Treatment Group and Control Group (n=32)

Group	Measurement	Median	Z	*P*
Intervention	Pre	9	-3,601	0,000
	Post 1	6		
	Post 1	6	-3,327	0,001
	Post 2	3		
	Pre	9	-3,753	0,000
	Post 2	3		
Control	Pre	9	-5,039	0,000
	Post 1	7		
	Post 1	7	-4,685	0,000
	Post 2	4		
	Pre	9	-5,037	0,000
	Post 2	4		

Based on the Wilcoxon test, Table 4 shows a decrease in pain intensity before and after treatment. In the progressive muscle relaxation technique intervention group and the acupressure control group, there was a significant difference between the measurement time and the value (p=0.000) from pre- to day 3.

Table 5 Analysis of the Differences Between Two Groups, Pre-Test and Post-Test in the Intervention and Control Groups

Measurement Time		Mean	SD	Mean Rank	*p*
Intervention	*Pre test*	9,19	0,403	3,00	0,000
	Post test 1	5,44	1,209	1,19	
	Post test 2	3,25	0,447	1,09	
Control	*Pre test*	9,31	0,479	3,00	0,000
	Post test 1	6,69	0,479	1,94	
	Post test 2	4,50	0,894	1,06	

Based on table 5 of the results of the Mann Whitney statistical test, the difference between the two groups in the average difference value for 3 days shows that the results of the pre to post 1 value are not significant with a p value of 0.442, pre to post 2 day there is a significant difference with a p value of 0.001 and post 1 to post 2 there is a significant difference with a p value of 0.000 while the analysis uses the difference value in the pre test difference to the post 1 difference there is a significant difference with a p value of 0.004, the pre test difference to the post 2 difference there is a significant difference with a p value of 0.000 and the difference from post 1 to the post 2 difference there is no significant difference with a p value of 0.742

4. Discussion

The data shows that administering the analgesic ketorolac 2x30 mg IV, progressive muscle relaxation, and acupressure at point Li 4 for 3 days can reduce post-laparotomy pain levels (p=0.000). This is consistent with the reduction in pain intensity before and after treatment, as demonstrated by the Friedman test in the intervention group with progressive muscle relaxation and acupressure techniques. Pain intensity decreased significantly from 9.19 to 3.25 in the intervention group (p=0.000).

Based on the Friedman test results in the control group with Li 4 acupressure, there was a significant difference between measurement times (p=0.000), indicating that administering ketorolac 2x30 mg IV, along with acupressure at point Li 4 for 3 days, reduced pain intensity from 9.31 to 4.50 in the control group (p=0.000).

Ketorolac tromethamine is rapidly and completely absorbed after intramuscular administration, with a mean peak plasma concentration of 2.2 mg/ml 50 minutes after a single 30 mg dose. Oral bioavailability is approximately 80%, and the drug is excreted within 4 to 6 hours. More than 99% of ketorolac tromethamine is protein-bound, and most is metabolized in the liver. Its primary metabolite is hydroxylation. The unmetabolized drug is excreted in the urine.[9] Intramuscular administration of ketorolac as a post-operative analgesic demonstrates comparable effectiveness to that of conventional doses of morphine/meperidine. Its duration of action is longer and its side effects are less severe. It can also be administered orally. Both oral and intramuscular absorption is rapid, reaching peak absorption within 30–50 minutes. Oral bioavailability is 80%, and it is almost completely bound to plasma proteins.

Progressive muscle relaxation exercises involve conscious breathing techniques that utilize the diaphragm, allowing the abdomen to slowly rise and the chest to expand fully. This breathing technique massages the heart, resulting in the rise and fall of the diaphragm, opening blockages, improving blood flow to the heart, and increasing blood flow throughout the body. Pain intensity decreased in post-laparotomy patients after

progressive muscle relaxation exercises, as relaxation exercises, using controlled breathing and a series of contractions and relaxations of muscle groups, stimulate both physical and psychological relaxation responses. This response is due to the stimulation of the parasympathetic autonomic nervous system, located in the lower half of the pons and medulla, resulting in decreased metabolism, heart rate, blood pressure, and respiratory rate, as well as increased serotonin secretion.[10]

Li 4 acupressure is performed once daily for 3 days by massaging the acupuncture points (acupoints) on the human body with your fingers. Acupuncture points are electrically active cells with low electrical resistance and high electrical conductivity, allowing them to conduct electricity more quickly than other cells. Some acupuncture points, commonly referred to as general points, such as Li 4 (Hegu), have been shown to induce the release of endorphins in the body.[11] The acupressure points used in previous research related to the effects of acupressure on laparotomy are points that are also commonly used to treat gynecological problems, including: Point LI 4, this point is located around the acupuncture point which is usually called the general point, namely point LI 4 (Hegu), which has been proven to be able to cause the release of endorphins in the body.[7] LI 4 (Hegu), located between the 1st and 2nd metacarpal bones, in the middle of the 2nd metacarpal bone. Pressure on this point has been shown to reduce post-cesarean section pain.[12]

The results of this study are consistent with a similar study conducted by Kurniawan (2016). In this study, acupressure therapy at the LI 4 and HT 6 points was effective in reducing pain intensity in post-cesarean section patients. A p-value of 0.001 was obtained, indicating that acupressure at the Li 4 point was more effective. This study analyzed the effectiveness of progressive muscle relaxation techniques and Li 4 acupressure on pain in post-laparotomy patients. The results of the statistical analysis showed a significant difference.[7] Research conducted by Aprina with the title progressive relaxation on post-operative pain intensity of BPH (Benign Prostate Hyperplasia) can be concluded that the average pain intensity in post-operative BPH patients before being given progressive relaxation therapy is 5.20 after being given progressive relaxation therapy is 3.60 there is a difference in pain intensity before and after being given progressive relaxation therapy significant p = 0.000 progressive relaxation can effectively reduce pain in post-operative patients with benign prostate hyperplasia.[3]

The research conducted with the research title The influence of finger grip relaxation technique on reducing pain intensity in post-laparotomy patients stated that from the average results of pain intensity measurements carried out in the intervention group, the pre-test pain intensity mean was 6.64 and the post-test pain intensity had a significant 4.88 p = 0.000, the finger grip relaxation technique was effective in reducing pain in post-laparotomy patients.[13]

The decrease in pain intensity before and after treatment in the progressive muscle relaxation technique intervention group from pre to day 3 was significant between the measurement time and the value (p = 0.000). It can be concluded that the average value of the intervention group was 9.19 in the pre-test to 3.25 in the post-test, indicating that there was a difference in pain in the initial measurement. A significant difference between before and after the intervention in the progressive muscle relaxation technique and acupressure intervention group was a decrease in the average pain before the intervention. Respondents experienced severe pain and after the intervention, there was mild pain, so it can be concluded that the progressive muscle relaxation technique and acupressure can influence the decrease in post-laparotomy pain.

The research conducted with the title the effectiveness of progressive relaxation techniques on pain intensity after laparotomy surgery can be concluded that the results of the comparison before and after progressive relaxation were stated to be significant (p = 0.000) with the presence of progressive muscle relaxation there was a decrease in the average pain scale of 2.00. Meanwhile, to determine the strength of the relationship or influence between variables, it can be stated that it has a strong influence with an effect size of 0.76, progressive relaxation techniques can effectively reduce pain in post-laparotomy patients (p <0.05).

The research conducted stated that from the average results of pain intensity measurements carried out, the effectiveness of deep breathing relaxation and distraction with 5 finger exercises on post-laparotomy patients was obtained with p = 0.000, the results showed

that deep breathing relaxation and distraction with 5 finger exercises were effective in reducing post-laparotomy pain.[2]

5. Conclusion

Based on the results above, it can be concluded that the progressive muscle relaxation technique and acupressure at point Li 4, administering ketolorac 2x30 mg for 3 days, are effective in reducing the intensity of mild pain in post-laparotomy patients with a significant value of p = 0.000. The acupressure technique at point Li 4 and administering ketolorac 2x30 mg for 3 days are also effective in reducing the intensity of moderate pain in post-laparotomy patients with a significant value of p = 0.000.

References

1 Cemy Nur Fitria, And Riska Diana Ambarwati, 'Efektifitas Tehnik Relaksasi Progresif Terhadap Intensitas Nyeri Pasca Operasi Laparatomi', *Jurnal Keperawatan Gsh,* 4 (2015).

2 Sri Utami, 'Efektifitas Relaksasi Napas Dalam Dan Distraksi Dengan Latihan 5 Jari Terhadap Nyeri Post Laparatomi', *Jurnal Keperawatan Jiwa,* 4 (2016), 61-73.

3 Aprina Aprina, Noven Ilham Yowanda, And Sunarsih Sunarsih, 'Relaksasi Progresif Terhadap Intensitas Nyeri Post Operasi BPH (Benigna Prostat Hyperplasia)', *Jurnal Kesehatan,* 8 (2017), 289-95.

4 Kpsjkk R., *Kpsjkk R. Pembedahan Tanggulangi 11% Penyakit Di Dunia. Www. Depkes.Goid.* (2015.).

5 Argi Virgona Bangun, And Susi Nur'aeni, 'Pengaruh Aromaterapi Lavender Terhadap Intensitas Nyeri Pada Pasien Pasca Operasi Di Rumah Sakit Dustira Cimahi', *Jurnal Keperawatan Soedirman,* 8 (2013).

6 Simamora Lesta Livolina Simamora Friska Sinaga Claudia Olivia, 'Pengaruh Teknik Relaksasi Otot Progresif Terhadap Nyeri Menstruasi Pada Remaja Di Asrama Putri Stikes Santo Borromeu', *Jurnal Kesehatan "Caring And Enthusiasm,* 3 (2014).

7 Dian Aulia Kurniawati Heni Setyowati Esti Rahayu Kartika Wijayanti, 'Akupresur Efektif Mengatasi Intensitas Nyeri Post Sectiocaesarea', *The 4 Th Univesity Research Coloquium* (2016), 104-13.

8 I Ketut Swarjana, And Mph Skm, *Metodologi Penelitian Kesehatan*penerbit Andi, 2012).

9 Sigit Nian Prasetyo, 'Konsep Dan Proses Keperawatan Nyeri', *Yogyakarta: Graha Ilmu* (2010).

10 Rolly Rondonuwu Stania F.Y Rampengan, Franly Onibala, 'Pengaruh Teknik Relaksasi Dan Teknik Distraksi Terhadap Perubahan Intensitas Nyeri Pada Pasien Post Operasi Di Ruang Irina A Atas Rsup Prof. Dr. R. D. Kandou Manado', *Jurnal Keperawatan* 2(2014).

11 Radyanto Iwan Widya Hartono, *Akupresur Untuk Berbagai Penyakit* (Jakarta: Penerbit Andi, 2012).

12 Sukanto, *Pijat Akupresur Untuk Kesehatan* (Jakarta: Penebar Plus, 2008).

13 Iin Pinandita, Ery Purwanti, And Bambang Utoyo, 'Pengaruh Teknik Relaksasi Genggam Jari Terhadap Penurunan Intensitas Nyeri Pada Pasien Post Operasi Laparatomi', *Jurnal Ilmiah Kesehatan Keperawatan,* 8 (2012).