

THE EFFECT OF LAVENDER ESSENTIAL OIL AS A PAIN RELIEF POST DEBRIDEMENT PATIENT

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ABSTRACT

Pain is a multidimensional individual experience that can cause disruption to quality of life and chronic stress. Lavender aromatherapy combined with deep breathing is a form of non-pharmacological pain relief technique. The purpose of the study was to determine the effectiveness of lavender aromatherapy combined with deep breathing on reducing the pain scale of post-debridement patients. The method used in the study was a case study which raised a single topic with 1 subject used and had been in accordance with the predetermined criteria, and the analysis used the one group pre-test and post-test method, with pain measurement using the Numerical Rating Scale. The results of the study that had been conducted were found to show changes on the first day with a score of 8 to 7, on the 2nd day the score was 7 to 5 and on the 3rd day showed a decrease in the score from 5 to 3. The conclusion of the study that had been conducted was that lavender aromatherapy combined with deep breathing was effective in reducing pain in patients with post-scrotal debridement.

Keywords: aromatherapy; deridement; distraction; lavender; pain

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INTRODUCTION

The debridement procedure is a surgical procedure performed to clean the wound area by removing necrotic tissue (Hayati & Hartiti, 2021). Post-debridement pain is the result of trauma in the inflammatory process or tissue damage that can affect sensory experience and is multidimensional, which results in differences in the perception of each individual (Cahyaningtyas et al., 2020). The pain process experienced by each individual is a sensation that arises and has a cognitive and emotional component, which can be described as a form of feeling of discomfort. which can be assessed based on intensity (mild, moderate and severe), quality of pain (dull, hot or burning, sharp or stabbing), duration of pain (transient (brief), intermittent (occurring) and persistent (continuous)), and the spread of pain (superficial (deep), localized (diffuse)) (Hayati & Hartiti, 2021). Pain is one of the most common problems but it is often ignored by health workers, so that non-pharmacological therapy is often not given. Patients consider pain to be the worst part involved in decreasing quality of life and have an impact on chronic stress based on the experience of pain, responses, behavior, and emotional stress caused by pain (Surya et al., 2020). Providing management in reducing pain can shorten the time of treatment so that it is important to choose the right pain management in patients is very important to improve the health status of patients (Badriah et al., 2023).

Uncontrolled pain will result in clinical and psychological changes that place patients at higher risk of postoperative morbidity and mortality, and can also interfere with quality of life (Othow et al., 2022). According to data obtained from the World Health Organization (WHO), it shows that the prevalence of cases with surgical procedures has increased significantly from

year to year, which is found that every year 140 million people require surgery or surgery. In Indonesia itself, surgical procedures have also increased 1.2 million people each year. Several studies conducted in developing countries show that postoperative pain is still a common problem among patients who have undergone surgery (Azizah, 2023). It is estimated that 30% to 80% of patients who have undergone surgical procedures experience pain. Postoperative pain is a form of acute pain due to surgical trauma with inflammatory reactions and initiation of afferent neuron attacks. The presence of pain is the result of a collection or combination of several unpleasant sensory, emotional, and mental experiences triggered by surgical trauma and other related things (Othow et al., 2022).

Untreated pain has side effects on the length of hospitalization, chronic pain, respiratory infections, myocardial infarction, atelectasis, and death, and impaired quality of life, increased medical costs, prolonged use of opioids (Othow et al., 2022). Not only that, prolonged pain experience also affects anxiety and sleep quality which can cause immune system disorders, delayed wound healing, increased blood pressure, insulin resistance, arrhythmias, and decreased pain tolerance (Toprak et al., 2024). Considering the side effects that will arise, the need to provide caring in nursing care is part of the basic form of helping patients in the recovery stage from the pain (Afifah et al., 2019). So that in overcoming problems that arise due to pain can be overcome by providing pharmacological therapy or non-pharmacological therapy (Afriani & Fitriana, 2020). In the management of pharmacological therapy applied, health workers will use a collaborative approach with doctors to determine the type of drug to be used based on patient indications (Surya et al., 2020). In patients who experience pain, the use of non-pharmacological therapy combined with pharmacological therapy is three times less likely to experience pain than patients who do not undergo non-pharmacological therapy. So non-pharmacological methods can be used as pain management, in which case non-pharmacological therapy does not replace pharmacological treatment and can be used simultaneously with pharmacological therapy as a pain reliever, in this case the use of non-pharmacological therapy has not found any side effects, it can be used as needed, and easy to teach to patients (Yıldız et al., 2024)

Meanwhile, one of the non-pharmacological therapies that can be used as a pain reliever is by providing pain management in the form of relaxation measures (Afriani & Fitriana, 2020). Relaxation is a technique used to overcome pain stressors, improve cognitive function, reduce anxiety and improve patient sleep quality (Can et al., 2024). So relaxation can be interpreted as a technique to reduce tension caused by pain by relaxing the muscles (Hayati & Hartiti, 2021). Aromatherapy, touch therapy, hypnosis, mind diversion, biofeedback, meditation, progressive muscle relaxation (PMR), and Benson relaxation are some examples of non-pharmacological interventions that can be given to patients according to the conditions and indications of the patient, so that the non-pharmacological therapy given can provide maximum effect (Amini et al., 2024). Aromatherapy is an aroma derived from essential oils from an extraction process that can be used in relaxation techniques (Herawati et al., 2023).

Aromatherapy as a complementary therapy is expected to be able to reduce health problems and improve the quality of life effectively in reducing pain and improving sleep quality and eliminating patient anxiety through the olfactory system (Yaman et al., 2024). One of the essential oils that can be used as aromatherapy is lavender (*Lavandula angustifolia*), where lavender flower aromatherapy is the most frequently used aromatherapy and contains components, namely linalool and linalyl acetate which have benefits in increasing alpha waves in the brain, so that it has side effects in encouraging or stimulating the release of endocrine

hormones which cause users to feel more relaxed or calm, and lavender aromatherapy also overcomes sleep pattern disorders and reduces stress or depression (Afriani & Fitriana, 2020).

Reed diffuser is one of the media or tools that can be used as aromatherapy, which can be used to spread essential oils into the surrounding air by absorbing aromatherapy liquid into rattan stems and then spreading the aroma throughout the room (Grabnar et al., 2021). To maximize the sense of smell, deep breathing therapy is needed, so that deep breathing therapy can increase alveolar ventilation, maintain or preserving gas exchange, improving sleep quality, preventing pulmonary atelectasis, increasing cough efficiency, reducing physical and emotional stress including reducing pain intensity or quality, reducing anxiety and can reduce systolic and diastolic blood pressure (Anisah & Maliya, 2021). So that giving aromatherapy lavender with a reed diffuser is suitable to be combined with deep breathing, where deep breathing can maximize the sense of smell so that giving aromatherapy can reduce pain more optimally (Azizah, 2023). Based on the above explanation, to prevent the risk of prolonged treatment, chronic pain, impaired quality of life and even the risk of stress, it is necessary to manage the recovery of patients with pain disorders. Lavender aromatherapy is one of the therapies that is considered easy to apply, affordable, easy to obtain and has no side effects. So the aim of this study is to determine the effectiveness of providing essential Lavender oil combined with deep breathing to reduce the pain scale of post-operative patients debridement.

METHOD

This study uses a case study research method with the analysis used being one group pretest and post-test. Case studies are a type of method that examines a single problem. In this study, there was 1 research subject who had met the inclusion criteria (subjects who complained of pain, had undergone debridement procedures, had not received non-pharmacological therapy) and exclusion (subjects who experienced decreased consciousness and experienced disturbances in the sense of smell). Before the preparation and administration of therapy, the researcher conducted an assessment and review of the research subjects and the preparation was carried out on nursing diagnoses that arise and design appropriate interventions according to the patient's clinical condition. Therapy was carried out for 3 consecutive days in the inpatient room of the Anggrek 2 surgical ward, Dr. Moewardi Hospital in February 2024. Therapy was given for 30 minutes at 10.00 WIB (2 hours before drug administration), with the application of therapy using a lavender essential oil reed diffuser and placed not far from the research subject (50 CM), then the research subject was given instructions to take a deep breath by exhaling slowly through the mouth, then an evaluation was carried out after each therapy was given every day. During the study, the research subjects were given a comfortable and low-stimulus environment (avoiding noise and limiting the number of visits) so that in the process of providing therapy the research subjects could focus on feelings of calm and comfortable.

The case study uses the Numerical Rating Scale (NRS) where the use of a pain scale is based on the level seen from the pain score, with a score of 0 indicating no pain, a score of 1-3 indicating mild pain, a score of 4-6 moderate pain, a score of 7-9 severe pain and a score of 10 for unbearable pain or severe pain (Syurrahmi et al., 2023). To assess the level of pain in the subject, measurements were taken before and after implementation. The interventions carried out were based on the consent of the research subjects and their families, and under the guidance and direction of clinical and academic supervisors.

RESULT

Based on the results of the study obtained, it was found that the characteristics of the research subjects were male, 48 years old, had an elementary school education, javanese and worked as private employees. The patient had previously been hospitalized in December 2023 for indications of scrotal cancer and received treatment again in February 2024. When receiving treatment at the hospital, the patient often complained of pain, the patient said that the patient had never received non-pharmacological therapy to treat pain, so if the effect If the medication is lost, the patient will feel pain and find it difficult to rest. The research subjects had undergone post-operative measures. Scrotal debridement, with a general condition that appears weak, composmentis consciousness, there are post-operative scars, the subject appears to be grimacing, has cold sweats, is restless, complains of pain, the subject is on bed rest during the treatment process because irrigation is installed on the genitals and the subject's inability to move the extremities after post-operatively, because of the severe pain when used for movement, and the subject complains of disturbed rest due to the pain felt and the crowded atmosphere. Based on the data focused on the problem of pain in the subject, the data obtained were P = pain due to post-scrotal debridement, Q = pain like being stabbed and feels hot, R = pain in the surgical wound (scrotum) and spreading to the groin, S = pain scale 8, T = pain felt continuously, vital signs when the subject was assessed were BP (Blood Pressure) = 117/70 mmHg, Pulse = 85x/min, RR (Respiration Rate) = 20x/min, SpO2 (Oxygen saturation) = 99%, T (Temperature) = 35.8C. In the process of providing nursing care, it is found that the diagnosis that arises is acute pain related to physical injury agents (invasive procedures), risk of infection, sleep pattern disorders, and activity intolerance. So to relieve the pain that. often felt, given intervention in the form of pain management by conducting observation actions in the form of identifying the type of pain (location of pain, duration of pain, characteristics of pain felt, and pain scale), identifying things that can worsen and alleviate the pain felt. Then therapeutic actions are carried out on the subject to relieve pain by facilitating rest and sleep by controlling the environment that can relieve pain, and providing non-pharmacological pain relief strategies in the form of lavender aromatherapy and deep breathing. Subjects who underwent intervention were also given education in the form of causes of pain and procedures that can control pain. The subject has been given pharmacological therapy of 0.9% NaCl infusion (20tpm), metamizole (1g/8 hours), Ranitidine (2ml/8 hours), ketorolac (30mg/8 hours), Ampicillin Sulbactam (1g/8 hours), Tranexamic Acid (50mg/8 hours). Implementation in relieving pain by administering lavender aromatherapy was carried out 2 hours before administering the drug, which was implemented at 10:00 WIB and drug administration at 12:30 WIB. Implementation was carried out for 3 consecutive days and each implementation was carried out for 30 minutes, and was evaluated after each implementation was carried out.

Table 1.

Pain Scale Before and After Implementation

	1		2		3	
	Pre	Post	Pre	Post	Pre	Post
P	Pain post scrotum debridement	Pain post scrotum debridement	Pain post scrotum debridement	Pain post scrotum debridement	Pain post scrotum debridement	Pain post scrotum debridement
Q	Stabbed and feel hot	Stabbed and feel hot	Stabbed and feel hot	Stabbed	Stabbed	Stabbed
R	Scrotum	Scrotum	Scrotum	Scrotum	Scrotum	Scrotum
	8	7	7	5	5	3
S	Severe Pain	Severe Pain	Severe Pain	Painful Currently	Painful Currently	Painful Light
T	Continously	Continously	Continously	Disappearing	Disappearing	Disappearing

After the implementation of the subject, an evaluation of the action was carried out to determine the effectiveness of the action in accordance with the predetermined output. So based on Table 1 on the results of the research that has been done, the administration of lavender aromatherapy combined with deep breathing is able to reduce the intensity of pain in post-debridement patients. Which was found when the subject admitted that the pain was getting less and less and the subject admitted that he was more relaxed so that the rest pattern was getting better, then reviewed on the results on the first day of implementation, a decrease was found, evidenced by before the implementation of the pain scale with a score of 8 and after it was done it became a score of 7, but in this case the pain scale was still at the limit of severe pain. On the 2nd day of implementation of lavender aromatherapy and deep breathing, a decrease was found, evidenced by a decrease in the pain scale. before being given the implementation of the scale score of 7 (severe pain) and after the implementation of the pain scale score became 5 (moderate pain) and on the 3rd day there was also a decrease in the level of pain, where before being given the implementation of the pain scale score of 5 (moderate) became 3 (mild pain). So based on the decrease in the score After the procedure, lavender aromatherapy and deep breathing were effective in relieving pain.

DISCUSSION

The pain felt by patients can decrease the quality of life and affect the presence of chronic stress based on the experience of pain, response, behavior, and emotional stress caused by pain (Surya et al., 2020). The symptoms that arise due to pain influence each other, where the level of pain causes the patient to experience anxiety, which can cause decreased sleep quality. This situation has negative consequences that will have a negative impact on immune function, prolong wound healing, cause physical, mental, social, and economic problems, so that non-pharmacological therapy is another alternative in controlling and preventing symptoms that arise due to pain (Akkaya et al., 2024). In the nursing care process, nurses have an important role in patient recovery, where nurses help patients in alleviating symptoms or complaints felt by patients. One of the symptoms that is often felt by post-debridement patients is pain, anxiety, and sleep quality disorders. Based on the research that has been done, it was found that every lavender aromatherapy intervention combined with deep breathing techniques can reduce the quality of pain, this can be proven by comparing the initial and final pain scales of the intervention. If reviewed from the changes in pain, it was found that every implementation has an effect on reducing pain and psychological changes in patients, causing a sense of calm and comfortable (relaxed). This can be proven by the change in score in each implementation which was found on day 1 with pain before implementation with a score of 8 (severe pain) to a score of 7 (severe pain), on the implementation of the 2nd day there was a decrease with a score of 5 (moderate pain) and on the last day, namely day 3 it was found that the score became 3 (mild pain).

Based on the presentation and results of the implementation, it was found that this is in line with the research conducted by Grabnar et al., 2021, with the title " Impact of Lavender on Pain and Anxiety Levels Associated With Spine Procedures" which found that giving lavender aromatherapy to patients with lumbar epidural steroid injection procedures and nerve blocks can reduce pain and anxiety levels. Lavender aromatherapy has been reported to have several therapeutic effects including anti-anxiety, mood stabilization, and analgesia (Grabnar et al., 2021). Not only does it affect pain levels in post-debridement patients, but giving aromatherapy also affects pain in the first stage of labor with the active phase. Based on a study conducted by Gustirini et al., 2023 it was found that giving lavender aromatherapy for 30 minutes can reduce pain in mothers in labor. So based on this, the presence of olfactory stimulation related to aromatherapy can directly reduce pain and change physiological

parameters such as pulse rate, blood pressure, skin temperature, and brain activity (Lakhan et al., 2016).

Based on research conducted by Silva et al., 2024, it was found that giving lavender aromatherapy inhalation therapy can control blood pressure to remain stable, stabilize the respiratory rate and can improve sleep quality in patients with post cardiac surgery. This is done because anxiety and emotional stress can worsen the autonomic nervous system, which is responsible for regular heart rhythm and normal blood pressure (Silva et al., 2024). The administration of lavender aromatherapy combined with deep breathing is a combination that can optimize the performance of aromatherapy as a pain reliever, where the application of deep breathing relaxation techniques can provide a sense of calm and harmony, this can happen because the body involves the transmission of signals from the olfactory system to the brain providing a response in fighting mass discharge (release of large impulses) so that it releases stress, regulates anxiety, depression, and mood disorders in the sympathetic nervous system by releasing neurotransmitters such as serotonin and dopamine so that it will cause stimulation in the olfactory cortex then stimulates the brain and impulses will reach the limbic system so that it affects mood and causes relaxation which makes the pain scale in patients tend to decrease (Azizah, 2023).

Lavender aromatherapy can be collaborated with other therapy techniques such as dhikr therapy, benson, or music therapy. This is done to maximize the relaxation process in patients, where the administration of aromatherapy combined with the administration of benson and dhikr therapy can reduce anxiety levels (Kuling et al., 2024). Benson's relaxation technique combined with lavender aromatherapy relaxation techniques can be used to reduce depression, anxiety and stress, by focusing on creating a relaxation response such as meditation and repeating certain words, phrases, prayers or movements that are considered positive with the collaboration of providing calming aromatherapy to maximize the reduction of anxiety, pain and stress (Mousavi et al., 2024). Not only that, if aromatherapy is combined with music therapy in pediatric patients during dental treatment, it can also overcome anxiety, in which case the use of relaxation arising from lavender aromatherapy and the music played also stimulates memory, and brings back good feelings with songs that the patient likes (Abdalthai et al., 2024). By providing nursing care in the form of relaxation, it causes the condition to feel calm and relaxed, this is due to the slowing of brain waves which results in feelings of calm and more relaxed (Faruq et al., 2020). So that relaxation techniques with lavender aromatherapy is one of the effective therapies for hospitalized patients because of its relaxing effect by optimizing the production of endorphin and serotonin hormones in the body (Lutfian et al., 2022).

CONCLUSION

Based on the results of the study, it can be concluded that the administration of lavender is effective in reducing pain intensity in patients who have undergone debridement procedures, as evidenced by a decrease in pain scores using the Numerical Rating Scale (NRS). With changes in pain levels, the administration of lavender therapy is very suitable as one of the non-pharmacological therapy options that can be applied in hospitals or health services for post-operative patients by considering affordable and easily obtained materials

REFERENCES

Abdalthai, R., Kouchaji, C., & Alkhatib, R. (2024). The effect Of Aromatherapy With Lavender-Neroli Oil And Music In Management Of Pediatric Dental Anxiety: A

- Randomized Control Trial. *BDJ Open*, 10(1). <https://doi.org/10.1038/s41405-024-00186-8>
- Afifah, N., Yulia, S., & Mulyadi. (2019). Hubungan Caring Perawat Terhadap Loyalitas Pasien di Rumah Sakit. *Jurnal Berita Ilmu Keperawatan*, 12(1), 23–30. <https://doi.org/https://doi.org/10.23917/bik.v12i1.4468>
- Afriani, E., & Fitriana, V. (2020). Penerapan Teknik Distraksi Relaksasi Aromaterapi Lavender untuk Menurunkan Nyeri Pasien Post Operasi Apendiktomi Di RSUD RA Kartini Jepara. *Jurnal Profesi Keperawatan*, 7(2).
- Akkaya, A., Kocasli, S., & Akin, M. (2024). The Effects Of Inhalation Aromatherapy On Pain, Anxiety, And Sleep Quality In Burn Patients: A Randomized Controlled Study. *Journal Of The International Society For Burn Injuries*, 50(9).
- Amini, N., Omidvar, S., Zamenjani, M. N., Harorani, M., & Modir, H. (2024). Effectiveness Of Aromatherapy With Lavender Compared To Progressive Muscle Relaxation On Anxiety And Vital Signs In Patients Under Spinal Anesthesia: A Randomized Clinical Trial. *Journal of Integrative Nursing*, 6(2), 90–95. https://doi.org/10.4103/jin.jin_25_24
- Anisah, I. N., & Maliya, A. (2021). Efektivitas Relaksasi Benson Terhadap Kecemasan Pasien Yang Menjalani Hemodialisa. *Jurnal Berita Ilmu Keperawatan*, 14(1), 57–64. <https://doi.org/https://doi.org/10.23917/bik.v14i1.12226>
- Azizah, A. N. (2023). Teknik Relaksasi Napas Dalam Dan Aroma Teapi Lavender Terhadap Nyeri Post Oprasi Dengan Anestesi Umum. *Indonesian Journal for Health Sciences*, 7(1), 29–33.
- Badriah, L., Ligita, T., & Sukarni. (2023). Pengalaman Nyeri Saat Dilakukan Debridement Pada Penderita Dengan Luka Diabetikum. *Jurnal Gawat Darurat*, 5(1). <https://doi.org/https://doi.org/10.32583/jgd.v5i1.1080>
- Cahyaningtyas, P. Y., Purwanti, O. S., & Purnama, A. P. (2020). Efek Terapi Akupresur Point Hugo untuk Mengurangi Nyeri Tusukan Arteriovenous Fistula pada Pasien yang Menjalani Hemodialisa di RS PKU Aisyiyah Boyolali. *Indonesian Journal of Nursing Health Science ISSN*, 5(1), 75–84.
- Can, S., Yildirim Usta, Y., Yildiz, S., & Tayfun, K. (2024). The Effect Of Lavender And Rosemary Aromatherapy Application On Cognitive Functions, Anxiety, And Sleep Quality In The Elderly With Diabetes. *EXPLORE*, 20(6), 103033. <https://doi.org/10.1016/j.explore.2024.103033>
- Faruq, M. H., Purwanti, O. S., & Purnama, A. P. (2020). Efek Relaksasi Benson Dalam Menurunkan Kecemasan Pasien Yang Menjalani Hemodialisis. *Jurnal Ilmiah Keperawatan Sai Betik*, 16(1), 24–29.
- Grabnar, M., Roach, M. J., Abd-Elsayed, A., & Chong, K. (2021). Impact of Lavender on Pain and Anxiety Levels Associated With Spine Procedures. *Ochsner Journal*, 21(4), 358–363. <https://doi.org/10.31486/toj.21.0013>
- Gustirini, R., Susanti, L., & Andriani, R. (2023). Pemberian Aromaterapi Lavender Untuk Mengurangi Nyeri Persalinan Kala 1 Fase Aktif. *Jurnal Inspirasi Kesehatan*, 1(1), 29–33. <https://doi.org/https://doi.org/10.52523/jika.v1i1.8>
- Hayati, N. A., & Hartiti, T. (2021). Pemberian Aromaterapi Lavender Menurunkan Intensitas Nyeri Post Op Debridement Pada Pasien Ulkus Granulosum. *Ners Muda*, 2(1), 49. <https://doi.org/10.26714/nm.v2i1.6233>

- Herawati, I., Sari, P. N., & Ermanto, B. (2023). Effectiveness Of Lavender Aromatherapy On Reducing Pain Intensity After 24 Hours Post Sectio Caesarea. *Jurnal Keperawatan Konprehensif*, 9, 120–126. <https://doi.org/10.33755/jkk>
- Lakhan, S. E., Sheafer, H., & Tepper, D. (2016). The Effectiveness of Aromatherapy in Reducing Pain: A Systematic Review and Meta-Analysis. *Pain Research and Treatment*, 1–13. <https://doi.org/10.1155/2016/8158693>
- Lutfian, L., Rizanti, A. P., & Chandra, I. N. (2022). Efektivitas Aromatherapy Lemon Balm dan Terapi Musik untuk Mengatasi Ansietas Pasien COVID-19. *Jurnal Berita Ilmu Keperawatan*, 15(1), 120–130.
- Mousavi, N., Imani, B., Khazaei, S., & Shams, A. (2024). The Effect of Benson Relaxation Technique and Lavender Aromatherapy on Anxiety and Hemodynamic Indices of Patients Undergoing Coronary Artery Bypass Grafting: A Randomized Clinical Trial. *Journal of Holistic Nursing and Midwifery*, 34(2), 167–176. <https://doi.org/10.32598/jhnm.34.2.2609>
- Othow, C. O., Ferede, Y. A., Tawuye, H. Y., & Aytolign, H. A. (2022). The Magnitude And Associated Factors Of Post Operative Pain Among Adult Patients. *Annals of Medicine and Surgery*, 81. <https://doi.org/10.1016/j.amsu.2022.104406>
- Silva, L. C. de M. A., dos Santos, K. V. G., dos Santos, J. J. de S., Camara, R. P. de P. O. A., Bezerra e Silva, S. Y., Silva, H. M. M. D., Ribeiro, K. R. B., Dantas, D. V., & Dantas, R. A. N. (2024). Efficacy Of Aromatherapy With Lavandula Angustifolia Oil On Postoperative Pain After Cardiac Surgery: A randomized Clinical Trial. *Explore*, 20(6). <https://doi.org/10.1016/j.explore.2024.103034>
- Surya, M., Zuriati, Z., Zahlimar, & Poddar, S. (2020). Nursing Aromatherapy Using Lavender With Rose Essence Oil For Post Surgery Pain Management. *Enfermería Clínica*, 30(5), 171–174.
- Syurrahmi, Rahmanti, A., & Azizah, M. N. (2023). Penerapan Mobilisasi Dini Terhadap Penurunan Tingkat Nyeri Pada Pasien Pasca Operasi Di Rumkit TK.III 04.06.02 Bhakti Wira Tamtama Semarang. *Jurnal Fisioterapi Dan Ilmu Kesehatan Sisthana*, 5(1), 45–53.
- Toprak, Ç., Ergin Ozcan, P., Demirbolat, İ., Kalaycioglu, A., & Akyuz, N. (2024). The Effect Of Lavender And Bergamot Oil Applied Via Inhalation On The Anxiety Level And Sleep Quality Of Surgical Intensive Care Unit Patients. *EXPLORE*, 20(5). <https://doi.org/10.1016/j.explore.2024.02.009>
- Yaman, O., Aygin, D., Altintoprak, F., & Guclu, E. (2024). The Effects Of Aromatherapy Massage Given To Patients After Colorectal Cancer Surgery On Symptom Management: A Randomized Controlled Study. *Complementary Therapies in Clinical Practice*, 57. <https://doi.org/10.1016/j.ctcp.2024.101900>
- Yıldız, T., Oyuktaş, M., & Avcu, Ç. (2024). The Effect Of Non-Pharmacological Methods On Pain In Patients Undergoing Open Heart Surgery: A Systematic Review And Meta-Analysis. *Turkish Journal Of Thoracic And Cardiovascular Surgery*, 32(3), 291–306. <https://doi.org/10.5606/tgkdc.dergisi.2024.2560>