JURNAL ILMIAH ILMU KEPERAWATAN INDONESIA
Indonesian Nursing and Scientific Journal

Volume: 14
Issue: 04
Years: 2024

Research Article

The Influence of Lemon Aromatherapy on Pain Reduction in Post-Caesarean Section Patients at PMI Hospital Bogor

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OPEN ACCESS
Editor: KS
Received: 05/04/2024
Accepted: 22/01/2025
Published: 25/01/2025
Available Article: 10.33221/jiiki.v14i04.3225

Conflict of interest statement: No conflicts of interest in this study.

Funding: Self-funded.

Abstract

Background: The issue of pain experienced by post-cesarean section mothers can be managed pharmacologically through pain relief medications or non-pharmacologically through the administration of lemon aromatherapy, which helps mothers feel more relaxed and calm.
Objectives: This study aims to identify the influence of lemon aromatherapy on pain reduction in post-cesarean section patients.
Methods: The research design used in this study is experimental research, specifically a quasi-experimental design with a Non-Equivalent Control Group or Non-Randomized Control Group Pretest-Posttest Design. The sample was selected using purposive sampling. To determine the minimum sample size for statistical testing, G Power was used, resulting in a total sample of 20 participants. The research instruments include a respondent identity questionnaire and an observation sheet questionnaire. Data analysis was conducted using the Wilcoxon-W test.
Results: The results of the analysis using the Wilcoxon-W test showed a P-value of 0.388 > 0.05 with an effect size of -0.396.
Conclusion: There is an influence before and after administering lemon aromatherapy in both the intervention and control groups, although the difference is not highly significant. However, the intervention group demonstrated a more dominant reduction in pain levels compared to the control group.

Keywords: lemon aromatherapy, pain, post-cesarean section

Introduction

Cesarean Section (C-Section) is one of several procedural options to save both mother and fetus during critical labor caused by complications. In this procedure, the fetus is delivered through surgical incisions in the abdominal and uterine walls.[1] This is performed due to various factors, such as anterior, medial, and lateral placenta (posterior), narrow pelvis, herpes simplex virus type II (genital) infection, history of prior C-section, diabetes, heart disease, placenta previa (especially in primigravida), labor disorders (e.g., ovarian cysts, uterine fibroids), cephalopelvic disproportion, premature rupture of membranes, severe preeclampsia, and factors obstructing the birth canal.[2] These factors also include fetal distress, fetal malformations, malposition, umbilical cord prolapse with limited cervical dilation, and failure of vacuum or forceps extraction.[3] One positive impact of cesarean section is that it serves as an alternative when normal delivery is not possible, potentially reducing maternal and fetal morbidity and mortality rates.[4] However, alongside its benefits, C-section also has negative impacts, such as pain due to surgery, anxiety, fear, weakness, loss of skin integrity, poor nutrition, risk of infection, and sleep disturbances.[5] The incidence rate of cesarean sections has been increasing globally.

The World Health Organization (WHO) reports that 1 in 5 deliveries is conducted through cesarean section, with a prevalence of 21%. This figure is expected to rise to nearly 29% by 2023. Globally, according to WHO, the rate of cesarean deliveries has increased from approximately 7% in 1990 to 21% and is projected to continue increasing in 2023. The prevalence varies significantly across regions, with rates reported as follows: East Asia (63%), Latin America and the Caribbean (54%), West Asia (50%), North Africa (48%), Southern Europe (47%), and Australia and New Zealand (45%).[6] In Indonesia, the 2018 Basic Health Research (Riskesdas) recorded that 17.6% of deliveries were performed via cesarean section. By province, the highest prevalence of cesarean section deliveries was in DKI Jakarta (31.1%), while the lowest was in Papua (6.7%). Other regional prevalences include Aceh (22.2%), North Sumatra (23.9%), Bengkulu (14.9%), Riau (20.3%), Jambi (14.3%), Lampung (13.3%), North Kalimantan (17.4%), Banten (19.3%), West Java (15.5%), and DKI Jakarta (31.1%).[7] According to Riskesdas 2018, cesarean deliveries among adolescents aged 10-19 years in Indonesia reached 27.8%, with associated complications including diarrhea (21.1%), high fever (3.4%), hypertension (1.9%), decreased fetal movement (0.5%), vaginal bleeding (1.4%), ruptured membranes (2.6%), swelling of the legs accompanied by seizures (2.5%), prolonged coughing (1.9%), and palpitations (1.8%).[7] A common manifestation experienced by patients undergoing cesarean section is pain.

During a surgical procedure such as a cesarean section, an incision is made in the abdominal wall, which results in injury (incision) and causes pain due to the damage to the abdominal wall. This occurs because of disruptions to tissues, blood vessels, and nerves around the incision area, which stimulate the release of neurotransmitters such as histamine and prostaglandin. These neurotransmitters convey pain signals from the spinal cord to the brain, where they are perceived as pain. Post-cesarean section patients tend to experience pain as a result of the loss of the anesthetic effect following the procedure.[8]

Pain from cesarean delivery is a condition caused by incisions in the abdominal and uterine walls to deliver the baby and placenta. This pain arises due to severed nerve pressure and sutures in the abdominal area, resulting in tissue continuity disruption from the surgery. Cesarean section procedures cause severe pain and require a longer recovery time compared to vaginal delivery.[9] According to the 2018 Indonesia Demographic and Health Survey (SDKI), acute pain is defined as a sensory or emotional experience associated with actual or delayed tissue damage, ranging from mild to severe intensity, and lasting less than three months.[10] The most intense pain is typically experienced on the first and second days after surgery. Nearly all postpartum mothers undergo psychological adjustments through the stages of acceptance, holding, and letting go.[11] During this period, mothers require significant assistance to engage in activities, primarily resting, sleeping, and meeting

nutritional needs. Pain has a complex impact on postpartum care, including delays in early mobilization, breastfeeding initiation, bonding, and feelings of fatigue, anxiety, and frustration caused by discomfort. It can also lead to long-term sleep disturbances and, if the pain persists, increase the risk of postpartum blues. If these negative effects are not addressed promptly, they can hinder the mother's postpartum recovery.[12] Pain relief for postpartum mothers can be achieved through pharmacological and non-pharmacological methods.[13]

Pharmacological methods are the most straightforward way to alleviate pain, especially severe and prolonged pain that can last for days.[14] Common pain relief medications such as paracetamol, mefenamic acid, and ibuprofen are often used to reduce pain. Pain relief is sometimes achieved using sedatives, but excessive consumption can lead to addictive side effects and overdose, posing risks to the user.[15] Non-pharmacological methods do not replace medications but are necessary to alleviate short-duration pain lasting only seconds or minutes. In cases of severe, prolonged, or multi-day pain, combining non-pharmacological methods with medication may be the most effective way to manage pain. Non-drug pain management is simpler, more effective, and does not pose harmful side effects.[13] Non-pharmacological pain relief methods include skin massage stimulation, cold and heat compresses, transcutaneous electrical nerve stimulation (TENS), distraction, relaxation techniques, guided imagery, and hypnosis.[13] One non-pharmacological therapy that can be used is aromatherapy.[16]

The mechanism of action of aromatherapy in the human body occurs through two physiological systems: the circulatory system and the olfactory system. Aromatherapy can influence a person's psychological state, memory, and emotions. Lemon aromatherapy can be used to reduce anxiety and pain.[16] One of the compounds found in lemon is linalool, which is beneficial for stabilizing the nervous system, providing a calming effect for anyone who inhales it.[16]

Based on previous research by Niasti Lasmy Zaen (2021) on The Effect of Lemon Aromatherapy on Reducing the Pain Intensity in Post-Sectio Caesarea Patients at Malahayati Islamic Hospital, Medan, in 2020, which used a pre-experimental design with a one-group pretest-posttest approach, it was concluded that after administering lemon aromatherapy, 27 respondents reported a reduction in pain intensity compared to those who did not use lemon aromatherapy.[17] Further research conducted by Ririn Rianti, Rukmainin, and Andi Julia Rifiana (2020) on The Effect of Lemon Aromatherapy on Decreasing Perineum Pain among Postpartum Women at Noah Arofah Medika Clinic, Bekasi District, in 2020, used a quasi-experimental design with a non-equivalent control group. This involved a pretest for both the experimental and control groups. The results of the Independent T-test showed that the experimental group, which received lemon aromatherapy, had an average pain score of 4.30 with a standard deviation of 1.337, while the control group, which did not receive lemon aromatherapy, had an average pain score of 5.90 with a standard deviation of 0.994.[18]

Based on the results of previous research conducted by the researcher over the past year, from January to December 2022, it was found that 546 patients underwent cesarean sections. In the last two months, specifically in June, 32 patients underwent the procedure, and in July, 41 patients had cesarean sections in the Gardenia Ward of PMI Hospital, Bogor. Several patients who underwent cesarean sections experienced moderate to severe pain, while one experienced mild pain. Patients reported continuing to feel pain while in the ward and experiencing significant activity intolerance. Pain intensity, especially at the surgical site, increased as the effects of anesthesia wore off following the operation. This was evident from the patients' expressions of wincing in pain when attempting to move their bodies. From these previous study findings, the researcher became interested in conducting a study on the application of lemon aromatherapy to help reduce pain intensity in post-cesarean section patients at PMI Hospital, Bogor.

Methods

This study uses a quasi-experimental design with a non-equivalent control group or non-randomized control group pretest-posttest design. The non-equivalent control group pretest-posttest design is a method that compares the results of the intervention group with a similar control group, but not an identical group.

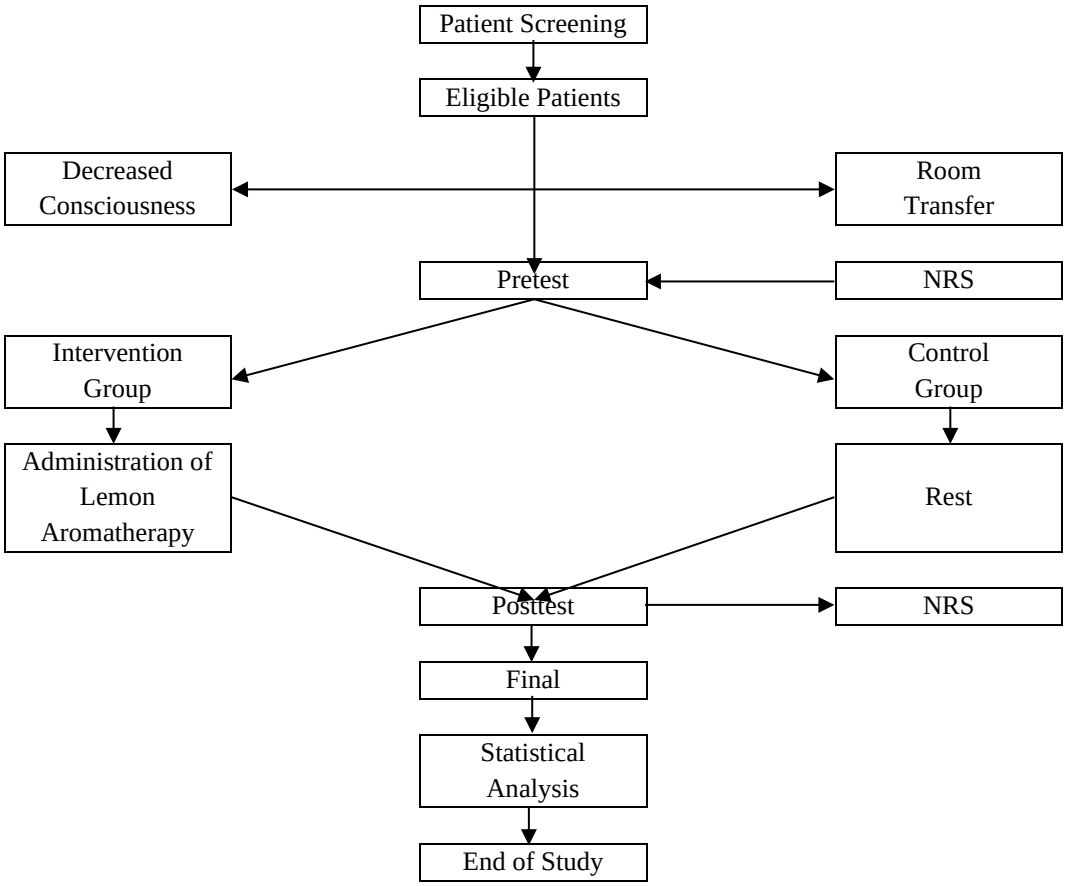
Experiment Group : O1 → O2 → O3
Control Group : → O4 → O5

Explanation :
Experiment Group : The group that receives both pharmacological therapy and non-Pharmacological therapy, which in this case is lemon aromatherapy.
Control Group : The group that only receives pharmacological therapy.

O1: Pre-test (Initial test before administering lemon aromatherapy intervention to the experimental group)
O4: Pre-test (Initial test for the control group)
O2: Administration of non-pharmacological therapy, lemon aromatherapy
O3: Post-test for the intervention group that received non-pharmacological therapy, lemon aromatherapy
O5: Post-test for the control group

The population in this study consists of post-cesarean section patients at PMI Hospital Bogor. The total population, based on the number of women who gave birth through cesarean section in the past year, from January 2022 to December 2022, was 546 patients. In the last two months, specifically in June, there were 32 patients, and in July, 42 patients. Sampling was conducted using purposive sampling, which is based on specific considerations made by the researcher. Ethical number: 002/SKEPK.RSPMI/1/20241. The measuring tool that I used in this research is NRS (Numeric Rating Scale). In the intervention group, patients had their pain scale measured using NRS, then they were given non-pharmacological therapy with lemon aromatherapy using a diffuser, then after they had finished giving aromatherapy, patients had their pain scale measured using NRS, in the control group, patients had their pain measured using NRS, then rested. Depending on the known characteristics or attributes of the population.[19] The inclusion criteria for the sample are as follows: mothers or clients who are post-cesarean section and are being treated in the Gardenia Ward, pain scale, ability to communicate well both orally and in writing, willingness to be respondents, and patients who are given analgesic medications (ketoprofen sup 100mg or tramadol HCL sup 100mg). To determine the minimum sample size for statistical testing, G Power was used. The total sample size obtained from the G Power calculation was 20 participants.

Figure 1. Technical Procedure for Respondent Data Collection



Results

Table 1. Characteristics of Respondents

Characteristic	Category	Mean (SD)/ n (%)
Gender	Female	20 (100.0)
Age	Age	27,9 (5,24)
Education	Elementary School	2 (10.0)
	Middle School	7 (35.0)
	High School	11 (55.0)
Occupation	Employed	8 (40.0)
	Unemployed	12 (60.0)
History of Cesarean Section	None	12 (60.0)
	Once	6 (30.0)
	Twice	2 (10.0)

Based on Table 1, the total number of respondents was 20. The average age of respondents undergoing cesarean section was 27.9 years. The most dominant education level was high school, with 11 respondents (55.0%). In terms of occupation, the majority of respondents were unemployed, with 12 individuals (60.0%) undergoing cesarean section at the hospital where the study was conducted. Regarding the history of cesarean sections, 12 respondents (60.0%) had no prior history of cesarean sections.

Table 2. Pain Level in Control and Intervention Groups Before and After

Group	Pretest			Posttest		
	N	Mean	SD	N	Mean	SD
Control	10	6.30	0.483	10	5.70	0.483
Intervention	10	6.40	0.516	10	5.50	0.527

Based on Table 2, in the control group, the pre-test pain scale had a mean of 6.30 with a standard deviation of 0.483, while the post-test pain scale showed a mean of 5.70 with the same standard deviation of 0.483. In the intervention group, the pre-test mean pain scale was 6.40 with a standard deviation of 0.516, and the post-test mean was 5.50 with a standard deviation of 0.527.

Normality Test

Before conducting bivariate analysis, normality and homogeneity tests were performed. The Shapiro-Wilk test was used to assess normality since the sample size in this study is <50. Data is considered normally distributed if the Shapiro-Wilk value is >0.05. If the data is normally distributed, the analysis uses an independent t-test; if not, the Mann-Whitney test is used. To determine homogeneity, Levene's test is applied, where data is considered homogeneous if the p-value is >0.05.

Tabel 3. Uji Normalitas Data

	Statistic	P
Pre Post	*Shapiro-Wilk* 0.366	0.003
Pre Post	*Shapiro-Wilk* 0.640	0.005

Based on Table 3, the Shapiro-Wilk test results for the intervention group show a p-value of 0.003, which is <0.05, indicating that the data is not normally distributed. Similarly, the control group's Shapiro-Wilk test results show a p-value of 0.005, which is also <0.05, indicating that the data is not normally distributed. Therefore, the analysis method used is the Wilcoxon-W test.

Table 4. Homogeneity Test Results

	F	df	df2	P
Levene's	1.71	1	18	0.207

Based on Table 4, the homogeneity test results indicate a p-value of 0.207, which is >0.05. This means the data is homogeneously distributed.

Bivariate Analysis

Table 5. Pain Level Comparison in the Intervention and Control Groups

	Pre			Post			P Value	Effect Size
	N	Mean	SD	N	Mean	SD		
Control	10	6.30	0.483	10	5.70	0.483	0.020	1.00
Intervention	10	6.40	0.516	10	5.50	0.527	0.003	1.00

Based on Table 5, the results of the analysis for the intervention group using the Wilcoxon-W test to evaluate the effect of lemon aromatherapy show a p-value of 0.003,

which is <0.05. This indicates that H0 is rejected and Ha is accepted, meaning there is a significant effect of lemon aromatherapy on pain reduction in the intervention group, with an effect size of 1.00, indicating a strong effect.

For the control group, which did not receive lemon aromatherapy, the analysis also shows a p-value of 0.020, which is <0.05, indicating a significant change in pain levels with an effect size of 1.00.

The difference between the intervention and control groups is seen in the mean pain levels. In the intervention group, the mean pain score decreased from 6.40 pre-test to 5.50 post-test. Meanwhile, in the control group, the mean pain score decreased from 6.30 pre-test to 5.70 post-test.

Table 6. Pain Level Comparison Between Intervention and Control Groups

	N	Mean (SD)	P Value	Effect Size
Difference Between Two Groups	20	-0.200 (0.226)	0.388	-0.396

Based on Table 6, the comparison of pain levels between the intervention and control groups shows a p-value of 0.388, which is >0.05. This indicates that there is no significant difference in pain levels before and after administering lemon aromatherapy, with an effect size of -0.396, indicating a small effect.

Discussion

Characteristics of Research Respondents Based on Age, Education, Occupation, and History of Cesarean Section

The research findings indicate that the average age of respondents is 27.9 years. The reproductive age range for women typically spans from 20 to 35 years. Women within this age range possess high fertility levels because their reproductive organs function optimally. The condition and function of the uterus tend to decline with increasing age, leading to reduced fertility due to the aging of uterine tissues.[20] Pregnancy in women under 20 years old can affect organ health, including the uterus, and may result in preterm birth or low birth weight. This occurs because younger women may lack knowledge about adequate nutritional support for the fetus.[21] Conversely, pregnancies in women over 35 years old may induce anxiety due to aging reproductive organs, which could affect their ability to carry a healthy pregnancy. Thus, the mother's age significantly impacts her preparedness to assume the responsibilities of motherhood, ensuring the birth of a healthy and high-quality life.[22] According to Prihartini & Iryadi (2019), women aged 20–30 represent the developmental and reproductive peak. This is the maturation phase for both the mother and fetus. However, after age 35, metabolic function, uterine strength, ovarian activity, and estrogen hormone levels decline.[2] Pregnancy under the age of 20 is biologically suboptimal. Women at this age are often emotionally and mentally unstable, making them more prone to shock and less attentive to preparing their reproductive organs.[2] On the other hand, pregnancies above 35 years are associated with reduced physical strength and stamina, as well as the onset of age-related diseases. These conditions pose risks to pregnancy and labor, including complications such as bleeding, pregnancy-induced hypertension, prolonged labor, and delivery difficulties.[2]

In Table 1, the data shows that high school (SMA) education represents the dominant level among respondents undergoing cesarean section (C-section) procedures. Higher levels of education generally correlate with better access to information. Educated mothers are more capable of managing birth intervals, determining the ideal number of children, and utilizing healthcare facilities for prenatal care.[23] Education significantly influences an individual's ability to perceive and act, as it facilitates informed decision-

making.[23] Additionally, a person's education level impacts their ability to receive and process information, shaping behavior positively or negatively, which in turn affects health status.[23] A previous study by Haq & Falah (2023) on the effect of knowledge levels among preoperative C-section patients before and after receiving health education about early mobilization at Mitra Husada Hospital, Tangerang, in 2022, found that most respondents (55.2%) had a high school education.[24] The study revealed a significant influence of health education on patients' understanding of early mobilization. The researchers conclude that education is a fundamental foundation for processing information, especially in today's era, where information is easily accessible through various media. Education determines how well individuals evaluate and act on this information.

In terms of occupation, Table 1 shows that non-working mothers represent the majority. This study finds that non-working mothers have more time to dedicate to postpartum recovery than working mothers. Non-working mothers can focus entirely on caring for their newborns, whereas working mothers must balance job responsibilities, potentially reducing the time available for infant care.[25] Non-working mothers are better positioned to monitor and fulfill their babies' nutritional needs. Conversely, working mothers, especially those working over five hours daily, are at greater risk of antepartum bleeding due to increased workloads.[25]

Regarding C-section history, Table 1 indicates that respondents without a prior history of C-section are the majority. C-sections involve delivering a baby through an incision in the uterine wall and abdominal wall.[2] This procedure is primarily performed to ensure the safety of the mother and baby, preventing potentially dangerous complications. Factors influencing the need for a C-section include a previous C-section history, stalled labor, narrow pelvis, diabetes, fetal abnormalities, prolonged labor, hypertension, transverse fetal position, abnormal fetal presentations, placental issues, and infections such as herpes.[2]

In conclusion, the researchers assume that complications during labor are a leading cause of maternal mortality, making C-sections essential in life-threatening situations. Conditions such as prolonged labor, fetal distress, oversized babies, maternal hypertension, and risks of severe bleeding are key indicators for performing a cesarean section.

The Effect of Lemon Aromatherapy on Pain Reduction in the Intervention and Control Groups

The study results showed that before the administration of lemon aromatherapy in post-C-section patients, both the intervention and control groups reported severe pain levels. After the therapy, the intervention group experienced a significant reduction in pain, reaching a mild pain level. Meanwhile, the control group, which did not receive lemon aromatherapy, also experienced a reduction in pain, albeit to a moderate level. These findings indicate a measurable effect of lemon aromatherapy before and after its administration, as evidenced by the mean values showing greater improvement in the intervention group compared to the control group. Aromatherapy is a non-pharmacological therapy that utilizes essential oils derived from plants, spices, trees and leaves to promote harmony in the body, mind, and spirit.[26] When inhaled, aromatherapy is transmitted to the olfactory center at the base of the brain, where neurons interpret the scent and relay it to the limbic system. Subsequently, signals are transmitted from the limbic system to the hypothalamus, where the essential oil is transported throughout the body via the circulatory system and delivered to the areas requiring it.[27] Lemon aromatherapy, in particular, can effectively alleviate pain and anxiety.

Lemon aromatherapy serves as an alternative for individuals experiencing stress and can reduce pain intensity due to its analgesic properties and relaxing effects on anyone

who inhales it. Aromatherapy options effective in relieving pain include lemon, lavender, clove, and peppermint. In addition to reducing pain intensity, aromatherapy also positively impacts mental and physical health.[28] Lemon aromatherapy is a non-pharmacological therapy that is widely accessible and contains limonene (66-80%), geranyl, nerol, acetate, terpene (6-14%), alpha-pinene (1-4%), and myrcene.[29] Limonene, the primary component, can inhibit the prostaglandin system, thereby alleviating pain. It regulates cyclooxygenase I and II, prevents prostaglandin activity, and reduces pain.[30] Aromatherapy also aids in muscle relaxation, which further helps alleviate pain. Most pain relievers and anti-inflammatory drugs achieve pain and inflammation reduction by targeting these enzymes. Thus, limonene is concluded to effectively control prostaglandin activity and decrease pain levels.[30]

A study conducted by Nasiri, Torkaman, Feizi, & Bigdeli Shamloo (2021) titled Effect of Aromatherapy with Damask Rose on Alleviating Adults' Acute Pain Severity: A Systematic Review and Meta-Analysis of Randomized Controlled Trials found that both inhalation aromatherapy and massage aromatherapy had a significant effect on pain reduction, while aromatherapy with steam diffusion had a less significant effect on pain severity. The study involved individuals who had experienced various types of pain, including menstrual pain, burn injuries, labor pain, pelvic pain due to kidney colic, and postoperative pain.[31] Additionally, research by Zaen (2021), titled The Effect of Lemon Aromatherapy on Reducing the Pain Intensity in Post-Sectio Caesarea Patients at Malahayati Islamic Hospital Medan in 2020, used a Pre-Experimental Design with a One-Group Pretest-Posttest approach and concluded that after the administration of lemon aromatherapy, 27 respondents reported a reduction in pain intensity compared to those who did not receive lemon aromatherapy.[17] Furthermore, a study by Chen et al. (2016) on cancer patients found that aromatherapy and massage did not have a sufficiently effective impact on pain reduction in cancer patients. This research used the Randomized Controlled Trials (RCT) method.[17]

The researcher assumes that after administering non-pharmacological therapy to both the intervention and control groups, it can be concluded that the intervention group had a more dominant reduction in pain levels. This is because, in addition to receiving the same analgesic therapy as the control group, the intervention group was also given lemon aromatherapy, which further enhanced the reduction in pain. This is because, while inhaling the lemon aromatherapy, the patients were relaxed and calm, making the pain less perceptible. Before the intervention, the mean pain level in the intervention group was 6.40 with a standard deviation of 0.516. After the intervention using lemon aromatherapy, the mean pain level was reduced to 5.50 with a standard deviation of 0.527. The results of the study indicate a significant reduction in pain scale among post-C-section patients after receiving lemon aromatherapy. In the control group, before the intervention, the mean pain level was 6.30 with a standard deviation of 0.483, and after the intervention, the mean pain level was 5.70 with a standard deviation of 0.483. The control group serves as a variable that did not receive the therapy and is used as a comparison to the intervention group to assess the extent of pain reduction in both groups. The results show a reduction in pain levels before and after the intervention in the control group. The reduction in pain in the control group was influenced by pharmacological analgesic therapy. Analgesic drugs are medications used to relieve pain without blocking the conduction of nerve impulses, so they do not alter sensory perception or consciousness. The factor that influenced the reduction in pain in the control group was the administration of analgesics.

In this study, the non-pharmacological therapy in the form of lemon aromatherapy was administered 1 hour after taking the analgesic medication. This is because the effects of analgesic medication in relieving pain are typically noticeable 2-4 hours after consumption, once the active ingredients are absorbed into the digestive system and reach peak concentration in the body.[32] In this study, lemon aromatherapy was administered for 5 minutes through a diffuser, and the respondents inhaled it. This method is similar to the

study by (Bargi et al., 2023), titled The Effect of Aromatherapy with Citrus aurantium Aroma on Pain after Orthopedic Surgery: A Randomized Clinical Trial, where essential oil was dropped onto a cotton ball and directly inhaled by the patient for 5 minutes at a distance of 20 cm. Following the lemon aromatherapy, the patient's pain level was immediately measured using the Numerical Rating Scale (NRS).[33] This approach aligns with the study by (Ali & Rochmawati, 2023), where lavender aromatherapy was applied by adding 5 drops of liquid essential oil to a cotton ball and administering it gradually. Patients were asked to relax while breathing deeply through their noses for 3-4 seconds, with their eyes closed. The breath was held for 3-4 seconds, then exhaled. After the lavender aromatherapy, pain intensity was measured using the Numerical Rating Scale (NRS)[34]

One of the controls is analgesic medication, which is a pain reliever that affects the reduction of pain in postoperative patients. Pain will resurface once the effects of the analgesic wear off. Therefore, it can be concluded that analgesic medication only provides temporary relief from postoperative pain.[35] Analgesic medications are classified into non-opioid categories. The reduction in thromboxane production occurs when consuming NSAIDs such as aspirin because this type of medication inhibits COX-I and typically contributes to its antiplatelet effects.[35] The difference in pain levels between the intervention and control groups showed a P value of 0.388 > 0.05 with an effect size of -0.396 (small effect). There was a difference between the two groups before and after the administration of lemon aromatherapy. The results of this study also showed a reduction in pain levels in both groups, but the reduction was more prominent in the intervention group that received lemon aromatherapy. It can be concluded that the administration of lemon aromatherapy in this study affected the reduction in pain levels in the intervention group, even though the control group, which did not receive lemon aromatherapy, also experienced a reduction. However, the reduction in pain levels was more dominant in the intervention group that received lemon aromatherapy.

From the results of this study, the researcher acknowledges the weaknesses that still exist, such as the lack of preparation for the research setting, including insufficient space and inadequate patient privacy during the administration of lemon aromatherapy. The impact of the therapy could have been greater if patients were provided with a private room, which would better support the therapy sessions, as a quieter room free from the movement of the patient's family would help patients focus more during the therapy. Additionally, the researcher acknowledges the need to explore more variables that could affect pain in postoperative patients. It is assumed that many factors need further investigation, particularly regarding the research variables, which in this study were limited to female patients only.

Conclusion

The study concludes that lemon aromatherapy effectively reduces pain levels in post-cesarean section patients. The intervention group demonstrated a significant decrease in pain levels compared to the control group, underscoring the potential of lemon aromatherapy as a complementary approach for managing post-operative pain. This finding highlights the importance of exploring non-pharmacological therapies to enhance patient comfort and recovery.

Conflict of Interest Declaration

No conflicts of interest in this study.

Acknowledge

Thank you to all parties involved in this study.

Funding
Self-funded.

References

1. Fanny F. Sectio Caesarea Sebagai Faktor Risiko Kejadian Asfiksia Neonatorum. Majority. 2015;4(3):57–61. Available from: https://typeset.io/pdf/sectio-caesarea-sebagai-faktor-risiko-kejadian-asfiksia-1qz4oc71lp.pdf
2. Prihartini AR, Iryadi R. Faktor-Faktor yang Mempengaruhi Persalinan dengan Tindakan Sectio Caesaria (SC) pada Ibu Bersalin. Jurnal Kesehatan Pertiwi. 2019 Dec 19;1(1):13–20. Available from: https://journals.poltekesbph.ac.id/index.php/pertiwi/article/view/4
3. Juliathi NLP, Marhaeni GA, Mahayati NMD. Gambaran Persalinan dengan Sectio Caesarea di Instalasi Gawat Darurat Kebidanan Rumah Sakit Umum Pusat Sanglah Denpasar Tahun 2020. Jurnal Ilmiah Kebidanan (The Journal Of Midwifery). 2021 Jul 18;9(1):19–27. Available from: https://ejournal.poltekkes-denpasar.ac.id/index.php/JIK/article/view/1475
4. Karjatin A. Keperawatan Maternitas. Jakarta: Kementerian Kesehatan Republik Indonesia; 2016.
5. Solehati T, Kosasih CE. Konsep dan Aplikasi Relaksasi Dalam Keperawatan Maternitas. Bandung: PT. Refika Aditama; 2015.
6. World Health Organization. Caesarean Section Rates Continue to Rise, Amid Growing Inequalities in Access. 2021. Available from: https://www.who.int/news/item/16-06-2021-caesarean-section-rates-continue-to-rise-amid-growing-inequalities-in-access
7. Badan Penelitian dan Pengembangan Kesehatan. Laporan Nasional Riskesdas 2018. Jakarta: Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan; 2020. 628 p. Available from: https://repository.badankebijakan.kemkes.go.id/id/eprint/3514/
8. Agustina, Sri. Literature Review :Asuhan Keperawatan Pada Ibu Post Operasi Sectio Caesarea Yang Mengalami Nyeri Dengan penerapan Biologic Nurturing Baby Led Feeding Di Rumah Sakit Umum Daerah Pandan Kabupaten Tapanuli Tengah. 2020; Available from: http://ecampus.poltekkesmedan.ac.id/jspui/bitstream/12345
9. Morita KM, Amelia R, Putri D. Pengaruh Teknik Relaksasi Benson Terhadap Penurunan Nyeri Pada Pasien Post Operasi Sectio Caesarea di RSUD Dr. Achmad Mochtar Bukittinggi. Jurnal Riset Hesti Medan Akper Kesdam I/BB Medan. 2020 Dec 31;5(2):106–15. Available from: https://jurnal.kesdammedan.ac.id/index.php/jurhesti/article/view/197
10. Rulino L. Nyeri Akut [SDKI D.0077]. perawat.org. 2021. Available from: https://perawat.org/nyeri-akut/
11. Bahiyatun. Buku Ajar Asuhan Kebidanan Nifas Normal. Jakarta: Penerbit Buku Kedokteran EGC; 2009.
12. Rohmah N. Manajemen Nyeri Non Invasive pada Ibu Post Partum Dengan Pendekatan Evidence Based Practice. Jurnal Ners. 2011;6(2):201. Available from: https://doi.org/10.20473/jn.v6i2.3992
13. Perry Potter. Fundamental of Nursing = Fundamental Keperawatan Buku 2. Jakarta: Salemba Medika;
14. Smeltzer SC, Bare BG. Keperawatan Medikal Bedah Brunner & Suddarth. Jakarta: Penerbit Buku Kedokteran EGC; 2013.
15. Pinandita I, Purwanti E, Utoyo B. Pengaruh Teknik Relaksasi Genggam Jari Terhadap Penurunan Intensitas Nyeri pada Pasien Post Operasi Laparatomi. Jurnal Ilmiah Kesehatan Keperawatan. 2012 Feb 1;8(1). Available from: https://ejournal.unimugo.ac.id/JIKK/article/view/66
16. Rahmawati I, Rohmayanti R. Efektivitas Aromaterapi Lavender dan Aromaterapi Lemon Terhadap Intensitas Nyeri Post Sectio Caesarea (SC) Di Rumah Sakit Budi Rahayu Kota Magelang. Journal of Holistic Nursing Science. 2015 Jul 1;2(2):10–6. Available from: https://journal.unimma.ac.id/index.php/nursing/article/view/1807
17. Zaen NL. The Effect of Lemon Aromatherapy on Reducing the Pain Intensity on Post Sectio Caesarea Patients at Malahayati Islamic Hospital Medan in 2020. 1. 2021 May 31;9(2):466–9. Available from: https://midwifery.iocspublisher.org/index.php/midwifery/article/view/140
18. Rianti R, Rukmaini, Rifiana AJ. The Effect of Lemon Aromatherapy on Decreasing Perineum Pain among Postpartum Women at Noah Arofah Medika Clinic Bekasi District in 2020.

Journal of Global Research in Public Health. 2020 Dec 28;5(2):84–90. Available from: https://www.jgrph.org/index.php/JGRPH/article/view/288
19. Notoatmodjo S. Metodologi Penelitian Kesehatan. 2018;
20. Putra IBGS, Wandia IM, Harkitasari S. Indikasi Tindakan Sectio Caesarea di RSUD Sanjiwani Gianyar Tahun 2017-2019. Aesculapius Medical Journal. 2021 Oct 30;1(1):63–9. Available from: https://www.ejournal.warmadewa.ac.id/index.php/amj/article/view/4088
21. Marmi RK. Asuhan Neonatus, Bayi, Balita, dan Anak Prasekolah. Vol. 45. Yogyakarta: Pustaka Pelajar; 2012.
22. Prawirohardjo S. Ilmu Kandungan. Jakarta: PT Bina Pustaka Sarwono Prawirohardjo; 2011.
23. Puspita AD, Warsiti W. Analisis Faktor-Faktor yang Mempengaruhi Nyeri Persalinan pada Ibu Bersalin Kala I Fase Aktif di Puskesmas Mergangsang Tahun 2013. STIKES 'Aisyiyah Yogyakarta; 2013. Available from: http://lib.unisayogya.ac.id
24. Haq YE, Lestari P, Falah ESN. Pengaruh Tingkat Pengetahuan Pasien Pra Operasi SC Sebelum dan Sesudah diberikan Pendidikan Kesehatan Tentang Mobilisasi Dini di Rumah Sakit Mitra Husada Tangerang Tahun 2022. Jurnal Kesehatan STIKes IMC Bintaro. 2023 Apr 3;6(1):47–55. Available from: https://jurnal.stikesimcbintaro.ac.id/index.php/djs/article/view/181
25. Ropika H, Meliati L. Pengaruh Aromatherapi Lavender Terhadap Kualitas Tidur Ibu Postparum Seksio Sesarea: Window of Health: Jurnal Kesehatan. 2021 Oct 25;326–36. Available from: https://jurnal.fkmumi.ac.id/index.php/woh/article/view/203
26. Maesaroh S, Putri M. Inhalasi Aromaterapi Lemon Menurunkan Frekuensi Mual Muntah pada Ibu Hamil. Jurnal Kesehatan Metro Sai Wawai. 2019 Jun 30;12(1):30–5. Available from: https://ejurnal.poltekkes-tjk.ac.id/index.php/JKM/article/view/1741
27. Setyoadi K. Terapi Modalitas Keperawatan pada Klien Psikogeriatrik. Vol. 145. Jakarta: Salemba Medika; 2011.
28. Koensoemardiyah. A-Z Aromaterapi untuk Kesehatan, Kebugaran, dan Kecantikan. Yogyakarta: Lily Publisher; 2019.
29. Young G. Essencial Oil Pocket Reference. Amazon: Life Science Pubhlising; 2011.
30. Namazi M, Amir Ali Akbari S, Mojab F, Talebi A, Alavi Majd H, Jannesari S. Effects of Citrus Aurantium (Bitter Orange) on the Severity of First-Stage Labor Pain. Iran J Pharm Res. 2014;13(3):1011–8. Available from: https://pubmed.ncbi.nlm.nih.gov/25276203/
31. Nasiri M, Torkaman M, Feizi S, Bigdeli Shamloo MB. Effect of Aromatherapy with Damask Rose on Alleviating Adults' Acute Pain Severity: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Complement Ther Med. 2021 Jan;56:102596. Available from: https://doi.org/10.1016/j.ctim.2020.102596
32. Alodokter. Berapa Lama Obat Asam Mefenamat Dapat Bekerja Maksimal Setelah Dikonsumsi?. Alodokter. 2022. Available from: https://www.alodokter.com/komunitas/topic/berapa-lama-obat-asam-mefenamat-dapat-bekerja-maksimal-setelah-dikonsumsi-
33. Bargi S, Bahraminejad N, Jafari S, Fallah R. The Effect of Aromatherapy with Citrus aurantium Aroma on Pain after Orthopedic Surgery: A Randomized Clinical Trial. J Caring Sci. 2023 Jun;12(2):116–22. Available from: https://doi.org/10.34172/jcs.2023.30120
34. Pengaruh Pemberian Aromaterapi Lavender Terhadap Penurunan Skala Nyeri Pada Pasien Post Op Bedah Mayor (studi Kasus). Universitas Muhammadiyah Yogyakarta; 2023. Available from: https://etd.umy.ac.id/id/eprint/41825/
35. Mita SR, Husni P. Pemberian Pemahaman Mengenai Penggunaan Obat Analgesik Secara Rasional Pada Masyarakat Di Arjasari Kabupaten Bandung. Dharmakarya. 2017;6(3). Available from: http://jurnal.unpad.ac.id/dharmakarya/article/view/14873