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Research Article

The Implementation of Lavender Aromatherapy in Maternity Nursing Care to Reduce Pain in Postpartum Mothers After Cesarean Section at Siti Khadijah Mother and Child Hospital

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Abstract: Background: Cesarean section (CS) is a surgical procedure involving an incision in the abdomen and uterus that often causes postoperative pain. Pain may inhibit early mobilization, lactation, and delay maternal recovery. Lavender aromatherapy is a non-pharmacological therapy with relaxation and analgesic effects through stimulation of the limbic system and endorphin release. Objective: To determine the implementation of lavender aromatherapy in reducing pain among postpartum mothers after cesarean section. Methods: This study used a descriptive method with a case study approach through the nursing process, including assessment, diagnosis, planning, implementation, and evaluation. Pain intensity was measured using the Numeric Rating Scale (NRS) before and after the intervention. Subjects were postpartum mothers on days 1–3 with stable conditions, experiencing moderate to severe pain (scale 6–8), conscious, able to communicate, and willing to participate. Patients with postoperative complications, lavender allergy, or severe respiratory or olfactory disorders were excluded. Results: Lavender aromatherapy administered for ±15–20 minutes reduced pain within the first 30 minutes and the effect lasted up to 8 hours. Pain scores decreased gradually from 6 to 3. Patients reported reduced pain, appeared calmer, and demonstrated improved light mobilization. Conclusion: Lavender aromatherapy can be a safe and practical non-pharmacological intervention to help reduce postoperative pain in postpartum mothers after cesarean section.

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1. Introduction

Childbirth is a physiological process in which the fetus and placenta are expelled from the uterus after reaching an adequate gestational age. The process begins with cervical dilation and effacement, followed by the delivery of the baby and the separation of the placenta. Therefore, childbirth is not merely a mechanical event but a complex biological sequence involving physical and psychological changes in the mother (Yuanita & Lilis, 2020). Psychological responses during labor, such as anxiety and tension, may influence the overall childbirth experience, demonstrating that labor requires a comprehensive approach in clinical management. Based on the mechanism of delivery, childbirth is classified into two main categories. Spontaneous labor refers to natural childbirth through the birth canal using the mother's own expulsive efforts without medical instruments or surgical intervention. In

contrast, assisted or operative delivery includes procedures such as cesarean section, which requires external medical intervention (Rakman, 2021). This distinction is important for determining appropriate obstetric management strategies according to maternal and fetal conditions.

Cesarean section is a surgical procedure performed to deliver the fetus through an incision in the abdominal wall and uterus. The procedure is indicated for medical reasons aimed at ensuring the safety of both mother and child, such as placenta previa, abnormal fetal presentation, or other obstetric emergencies (Wahyu Utami et al., 2023). Clinically, cesarean section is generally performed when gestational age exceeds 28 weeks or fetal weight surpasses 1000 grams, particularly in situations where vaginal delivery is contraindicated or poses significant risks (Oktapia et al., 2022). Although the procedure contributes to reducing maternal and neonatal morbidity in high-risk conditions, it remains a major surgical intervention associated with postoperative complications, including pain, infection, and delayed mobility.

The decision to perform a cesarean section is influenced by multiple maternal and fetal factors. Maternal indications frequently include preeclampsia, cephalopelvic disproportion (CPD), a history of previous cesarean delivery, and post-term pregnancy. Fetal indications encompass fetal distress, abnormal presentation, and malposition. Additional risk factors, such as maternal age above 30 years, high parity, prolonged labor, premature rupture of membranes, and socioeconomic conditions, may further increase the likelihood of surgical delivery (Adesy Asta et al., 2023). Understanding these factors is essential for planning appropriate obstetric and nursing interventions to minimize potential complications and optimize maternal outcomes.

National data indicate that cesarean section rates in Indonesia remain relatively high. According to the Basic Health Research Survey, the proportion of deliveries by cesarean section reached 17.6% of all births, exceeding the World Health Organization recommendation of 10–15% as the ideal threshold for surgical deliveries (Kemenkes RI, 2018). The increasing trend in cesarean deliveries is largely attributed to obstetric complications, including maternal complications (23.2%), premature rupture of membranes (5.6%), prolonged labor (4.3%), abnormal fetal position (3.1%), umbilical cord complications (2.9%), hypertension (2.7%), hemorrhage (2.4%), placenta previa (0.7%), retained placenta (0.8%), eclampsia (0.2%), and other causes (4.6%) (Kemenkes RI, 2021). These statistics highlight the clinical necessity of cesarean section in specific circumstances while emphasizing the importance of postoperative care to address associated risks.

Global data also reflect a rising trend in cesarean deliveries. The World Health Organization reported that approximately 46.1% of births worldwide are performed via cesarean section (WHO, 2019). This indicates that surgical delivery has become increasingly prevalent, particularly in developed healthcare systems where advanced medical interventions are readily available. In Indonesia, regional variations in cesarean rates exist, with the highest prevalence reported in Jakarta at 40.8%, followed by several provinces in Java and Sumatra (Kemenkes RI, 2023). In Sulawesi, cesarean rates also vary, with South Sulawesi reporting approximately 23.4%, reflecting differences in healthcare accessibility, socioeconomic conditions, and obstetric referral systems (Betrán et al., 2021). Such

disparities underscore the need for equitable healthcare services and standardized obstetric care across regions.

The high prevalence of cesarean deliveries is associated with various maternal and neonatal risk factors. One of the most significant postoperative challenges is pain, which can interfere with maternal mobility and recovery. Effective pain management is therefore essential to enhance maternal comfort and support early postpartum care. Pain control strategies include pharmacological and non-pharmacological approaches (Fatmawati & Fauziah, 2018). Pharmacological interventions, while effective, may be associated with adverse effects such as nausea and dizziness. Consequently, non-pharmacological methods have gained increasing attention as complementary strategies for pain management.

Non-pharmacological approaches are considered beneficial because they are safe, cost-effective, and free from significant side effects. Moreover, these interventions empower patients to actively participate in pain control and recovery (Wahyu Utami et al., 2023). Common non-pharmacological techniques include hydrotherapy, massage therapy, and aromatherapy (Fatmawati & Fauziah, 2018). Hydrotherapy utilizes water-based relaxation techniques, while massage therapy enhances circulation and reduces muscle tension. Aromatherapy, on the other hand, employs essential oils to stimulate the olfactory system and promote psychological and physiological relaxation.

Aromatherapy is a complementary therapeutic approach that uses essential oils to influence emotional and physical well-being through olfactory stimulation. This therapy promotes relaxation, enhances comfort, and supports overall recovery. Essential oils are extracted from plant materials such as flowers, leaves, and bark, and their therapeutic effects have been widely studied (Wahyu Utami et al., 2023). Among various essential oils, lavender is one of the most commonly used due to its calming properties and safety profile. Lavender aromatherapy is believed to reduce anxiety and pain perception by modulating nervous system activity (Wahyu Utami et al., 2023). Its application in postpartum care has gained interest as a supportive intervention for pain management.

Lavender is a flowering plant characterized by its distinctive aroma and soothing properties. The essential oil derived from lavender contains bioactive compounds such as linalool and linalyl acetate, which exert analgesic and anxiolytic effects. These compounds stimulate the parasympathetic nervous system, promoting relaxation and reducing pain perception. Consequently, lavender aromatherapy has been recommended as a complementary intervention for postpartum pain and psychological distress (Mahesi et al., 2023). Its non-invasive nature and minimal risk of adverse effects make it a promising option in maternity care.

Several studies have demonstrated the effectiveness of lavender aromatherapy in reducing postoperative pain following cesarean delivery. Research by Musmundiroh et al. (2025) reported that lavender aromatherapy significantly decreased pain intensity in postpartum mothers, particularly those experiencing moderate to severe pain. The analgesic effects of lavender are attributed to the release of endorphins and the relaxation of the nervous system, which collectively enhance maternal comfort. These findings support the integration of aromatherapy into nursing interventions as part of holistic pain management strategies.

Similar results were reported by Kumalasari et al. (2025), who found that lavender aromatherapy significantly reduced pain intensity in mothers following cesarean delivery compared to those who did not receive the intervention. Additionally, studies combining aromatherapy with other non-pharmacological methods, such as acupressure, demonstrated further reductions in pain scores, with average pain levels decreasing from a score of 6 to 3–2 after intervention (Sugito et al., 2025). These findings reinforce the potential of lavender aromatherapy as an effective complementary therapy in postpartum pain management. The evidence suggests that non-pharmacological interventions can enhance maternal recovery and improve the overall quality of maternity care.

2. Preliminaries or Related Work or Literature Review

Cesarean section originates from the Latin word caedere, meaning "to cut." It is an operative delivery procedure performed when normal vaginal delivery is not possible or may endanger the safety of the mother and fetus, making it an alternative method based on specific medical indications (Selung et al., 2022). In general, cesarean section is defined as the process of delivering the fetus through an incision in the abdominal wall (laparotomy) and uterus (hysterotomy) (Sumantri & Fitri, 2022). This procedure is usually performed when the fetus weighs more than 500 grams and when physiological labor cannot be carried out, playing an important role in preventing complications and ensuring the safety of both mother and baby (Asriani & Sartika, 2023).

Cesarean section is performed based on medical indications that may originate from maternal or fetal factors. According to Ansori (2022), maternal indications include fetal malposition, pelvic disproportion, preeclampsia, placenta previa, and underlying medical conditions that hinder normal labor. Fetal factors include fetal distress, abnormal positioning, umbilical cord prolapse, multiple pregnancies, and macrosomia (birth weight >4,000 grams), which may complicate vaginal delivery (Marcillo, 2022). All of these conditions serve as medical justifications for cesarean delivery when normal labor is not feasible.

Cesarean section is classified into three types based on surgical technique (Setiyadi et al., 2023). First, transperitoneal lower segment cesarean section is the most commonly performed method, involving an incision in the lower uterine segment. This technique is considered safer, allows faster fetal extraction, and has a relatively lower risk of complications, although there remains a possibility of infection spreading to the abdominal cavity and the risk of uterine rupture in subsequent pregnancies. Second, classical (corporal) cesarean section involves a vertical incision in the uterine corpus and is usually performed in specific conditions. Its advantages include easier wound suturing and a lower risk of uterine rupture in future pregnancies, but the surgical wound may extend, increasing the risk of hemorrhage and bladder injury. Third, extraperitoneal cesarean section is performed without opening the peritoneal cavity, aiming to reduce the risk of postpartum infection.

From a pathophysiological perspective, cesarean section involves an incision in the abdominal wall and uterus to deliver the fetus when vaginal delivery is not possible (Yadhy et al., 2023). The procedure requires regional anesthesia so that the patient remains conscious but does not experience pain in the surgical area (Syaiful, 2020). After surgery, the incision undergoes a staged healing process consisting of inflammatory, proliferative, and maturation

phases. Early mobilization is recommended to accelerate wound healing, prevent complications, and reduce pain. Postpartum hormonal changes may also affect recovery, making proper monitoring and nursing care essential (Eva, 2022).

Despite its benefits, cesarean section carries risks of complications such as infection, hemorrhage, thromboembolism, and impaired wound healing (Sirait, 2022). Puerperal infections, organ injuries, and postpartum hemorrhage are complications that require vigilance (Sinaga, 2022). Additionally, unmanaged pain can hinder mobilization and recovery, making pain management a crucial component of postoperative nursing care. Post-cesarean management includes catheter removal, gradual dietary adjustments, wound care, urinary monitoring, and lactation support. Pharmacological therapy is used to control pain and prevent infection, while non-pharmacological interventions such as lavender aromatherapy can serve as complementary pain management strategies. Lavender aromatherapy works by stimulating the limbic system, promoting endorphin release, and reducing pain perception while enhancing patient comfort (Musmundiroh et al., 2025). This approach supports holistic recovery and improves the quality of nursing care for postpartum women.

Postoperative pain is a sensory and emotional response resulting from tissue damage that affects nerves and causes discomfort (Anggoro et al., 2022). The International Association for the Study of Pain (IASP, 2020) states that pain is subjective and influenced by both physical and psychological factors. After cesarean section, pain arises due to abdominal and uterine incisions that trigger inflammatory responses (Lowdermilk et al., 2020). Pain typically appears within 12–36 hours after surgery and gradually decreases by the third postoperative day. Pain responses can be identified through increased blood pressure, heart rate, and facial expressions such as grimacing or crying. If left untreated, pain may impede mobilization and recovery (WHO, 2019).

Post-cesarean pain occurs due to tissue injury that triggers the release of inflammatory mediators such as histamine and prostaglandins, activating nociceptors and transmitting pain signals to the central nervous system (Smeltzer & Bare, 2018). These impulses are processed in the thalamus and cerebral cortex, leading to pain perception. Pain management can be achieved through pharmacological and non-pharmacological approaches, including relaxation techniques that stimulate endorphin release as a natural analgesic (Kozier et al., 2018). Pain perception is also influenced by age, gender, prior experiences, psychological conditions, cultural background, and social support (Dewi et al., 2025). Younger individuals tend to have lower pain thresholds, while family support can help reduce stress and improve coping mechanisms.

Pain is classified into acute and chronic types (Dewi et al., 2025). Acute pain arises suddenly due to tissue injury and typically resolves with healing, whereas chronic pain persists for extended periods and may continue despite the resolution of the initial cause. Pain assessment can be performed using Numeric Rating Scale (NRS), Faces Analog Scale, Verbal Rating Scale (VRS), and Visual Analog Scale (VAS) (Afra et al., 2026). These tools help evaluate pain intensity, enabling healthcare providers to determine appropriate interventions.

Lavender aromatherapy is a complementary therapy that utilizes essential oils to promote relaxation and analgesia. Its mechanism begins with olfactory stimulation, which influences the limbic system—the center of emotional regulation and pain perception

(Harnita et al., 2021). Activation of this system promotes the release of endorphins, serotonin, and relaxation-related hormones, thereby reducing pain and anxiety. The goal of lavender aromatherapy is to alleviate pain and stress through central nervous system stimulation (Ayudia et al., 2022). The active compounds linalool and linalyl acetate exert sedative and analgesic effects, promoting a sense of comfort. Lavender aromatherapy is also used in maternity nursing care due to its safety and effectiveness as a complementary pain management intervention (Muhartiningrum et al., 2025). Overall, pain management and lavender aromatherapy are interconnected in post-cesarean care, where non-pharmacological approaches complement pharmacological therapy to enhance patient comfort and support recovery.

3. Materials and Method

This study used a descriptive method with a case study approach on postpartum mothers after cesarean section who experienced acute pain at the Mother and Child Hospital Siti Khadijah. The study was conducted through the application of the nursing care process, which included assessment, nursing diagnosis, planning, implementation, and evaluation. The research subjects were postpartum mothers on the first to third day after cesarean section with stable general conditions, experiencing moderate to severe pain (pain scale 8–6), conscious, able to communicate well, and willing to participate as respondents. Patients with postoperative complications, a history of allergy to lavender aromatherapy, severe respiratory or olfactory disorders, and impaired consciousness were excluded from the study. Data were collected through interviews, observations, physical examinations, and medical records. The intervention was applied based on Evidence-Based Nursing (EBN), and evaluation was conducted using the SOAP format to assess changes in pain intensity after the administration of lavender aromatherapy.

This study describes the systematic application of lavender aromatherapy as a non-pharmacological intervention to reduce pain in postpartum mothers after cesarean section. The procedure follows aromatherapy application guidelines developed by Lubis (2023) and the Health Polytechnic of the Ministry of Health Tanjung Karang (2023), starting with the preparation of materials such as lavender essential oil and tissue or cotton. The orientation phase follows, in which the patient is informed about the purpose and procedure of the intervention, consent is obtained, and an environment that ensures privacy and comfort is provided. During the implementation phase, hand hygiene is performed, pain intensity is measured before the intervention, and the patient is positioned comfortably. Lavender essential oil, two to three drops, is applied to tissue or cotton, and the patient is instructed to inhale the aroma slowly from a distance of approximately 10 cm for about 15 minutes. This intervention can be performed twice during treatment depending on the patient's condition. After the procedure, the termination phase includes evaluating the patient's response and documenting the intervention results. Documentation includes recording the patient's condition, response to aromatherapy, and pain assessment results after the intervention. This standardized procedure aims to ensure that aromatherapy is applied systematically so that its effectiveness in pain management can be evaluated objectively and in accordance with nursing care principles

4. Results and Discussion

Based on the results of nursing care implementation for postpartum mothers after cesarean section over three days at Mother and Child Hospital Siti Khadijah, changes in pain intensity were observed, indicating a positive response to the lavender aromatherapy intervention. On the first day before the intervention, the patient reported pain at the surgical wound site with a scale of 6 (moderate pain), which increased during movement and coughing. The patient also appeared to grimace and limit activity. After the administration of lavender aromatherapy, evaluation at 09:30 WITA showed a reduction in pain to scale 5, which remained at 5 at 10:00 WITA and decreased to 4 at 11:00 WITA. Further evaluation at 13:00 WITA showed the pain scale remained stable at 4, and between 14:00–16:00 WITA, it decreased to 3, indicating a gradual relaxation effect and reduction in pain perception.

On the second day, the intervention was repeated at 09:00 WITA with an initial pain scale of 5 experienced during light mobilization. Evaluation at 09:30 WITA showed a reduction to 4, which remained at 4 at 10:00 WITA and decreased to 3 between 11:00–12:00 WITA. At 13:00–14:00 WITA, the pain scale remained stable at 3, and between 15:00–16:00 WITA, it further decreased to 2, accompanied by increased comfort and improved mobility.

On the third day, the intervention was again administered at 09:00 WITA with an initial pain scale of 4. Evaluation at 09:30 WITA showed a reduction to 2, and between 10:00–12:00 WITA, it remained stable at 2. At 13:00 WITA, the pain decreased to 1 and remained at this level until the final evaluation at 16:00 WITA. The patient reported feeling comfortable and was able to mobilize without significant complaints. The gradual reduction in pain from the first to the third day indicates the effectiveness of lavender aromatherapy as a complementary therapy in managing post-cesarean section pain and supporting the patient's recovery process.

The results of this study demonstrate that the application of lavender aromatherapy was effective in gradually reducing pain intensity in postpartum mothers after cesarean section. The intervention led to a reduction in pain scores from 6/10 to 3/10 within eight hours of monitoring, accompanied by clinical improvements such as a calmer facial expression, reduced grimacing, increased comfort, and better mobility. These findings reinforce evidence that lavender aromatherapy can function as an effective complementary therapy in pain management, as reported by Musmundiroh (2025), who stated that linalool and linalyl acetate in lavender provide sedative and relaxation effects through stimulation of the limbic system, thereby reducing pain perception and improving patient comfort after surgery. This relaxation effect occurs due to activation of olfactory pathways that influence the central nervous system, reduce sympathetic nervous system activity, and stimulate the release of endorphins as natural analgesics, allowing patients to experience less intense and more tolerable pain.

A study by Pitaloka (2024) also supports these findings, reporting that lavender inhalation in postpartum mothers improves comfort, reduces anxiety, and helps stabilize psychological conditions, which indirectly contributes to reduced pain perception. Better psychological well-being enables patients to be more cooperative in early mobilization and self-care, thereby supporting a more optimal recovery process. Additionally, a study by Ren (2025) reported that pain reduction effects could be observed within 30 minutes of aromatherapy administration, with significant decreases in pain scores during this period.

These findings support the mechanism that lavender aroma stimulation modulates neurophysiological responses and pain perception, allowing patients to experience improved comfort shortly after the intervention.

In the case of Mrs. S, a positive therapeutic response was demonstrated by a gradual reduction in pain scores, decreased muscle tension, and improved early mobilization, which is an essential component of postoperative recovery. Early mobilization not only helps prevent complications such as thrombosis but also supports wound healing and improves blood circulation at the incision site, thereby accelerating patient recovery. Furthermore, the non-invasive and safe nature of lavender aromatherapy makes it a suitable complementary therapy that can be used alongside pharmacological pain management to achieve more optimal pain control. However, therapeutic effectiveness is influenced by individual factors such as pain threshold, psychological condition, and environmental support; therefore, pain management should adopt a holistic approach integrated with comprehensive nursing care.

Overall, the results of this case study support the concept that combining pharmacological and non-pharmacological approaches is more effective in improving comfort in post-cesarean section patients. Lavender aromatherapy can be used as part of evidence-based nursing interventions to help reduce pain, enhance relaxation, and support patient recovery. With proper application and continuous monitoring, this complementary therapy has the potential to become an important component of maternal nursing care focused on improving quality of life and patient comfort during the recovery period.

5. Comparison

To evaluate the effectiveness of the intervention, a comparative analysis was conducted between the results of this study and previous research findings on non-pharmacological pain management in post-cesarean section mothers. The comparison focused on pain intensity reduction after lavender aromatherapy administration, as this parameter provides an objective measure of therapeutic effectiveness. A study by Musmundiroh (2025) reported that lavender aromatherapy reduced postoperative pain from an average score of 6 to 3, indicating a moderate analgesic effect as a complementary therapy. Another study by Kumalasari (2025) also found significant pain reductions, although most participants still reported pain scores above 2 after the intervention. In contrast, this study observed a reduction in pain scores from 6 to 1 over three days of intervention at RSIA Siti Khadijah, indicating a greater degree of pain reduction compared to previous findings.

Based on this comparison, the results of this study align with the state-of-the-art literature, which suggests that lavender aromatherapy has potential as a non-pharmacological intervention for reducing post-cesarean section pain. However, this study provides additional contributions by demonstrating a stronger analgesic effect through standardized intervention protocols and consistent monitoring. Differences in outcomes compared to previous studies may be attributed to variations in therapy duration, individual patient conditions, and the integration of aromatherapy within comprehensive nursing care. These findings reinforce evidence that complementary therapies, when applied systematically, can enhance pain management effectiveness and patient comfort. Consequently, this study contributes to the development of evidence-based nursing practices that integrate both pharmacological and non-pharmacological approaches. Future research is recommended to

explore variations in dosage, administration methods, and intervention duration to optimize the benefits of aromatherapy across different clinical settings.

6. Conclusion

Based on the results of lavender aromatherapy application in maternity nursing care for postpartum mothers after cesarean section at Mother and Child Hospital Siti Khadijah, it can be concluded that lavender aromatherapy administered through inhalation for three consecutive days was effective in reducing acute pain intensity and improving patient comfort and relaxation. Thus, the objective of the study to apply complementary therapy for pain reduction was achieved. The observed reduction in pain indicates that lavender aromatherapy can be used as a non-pharmacological supportive intervention in postoperative pain management. Based on these findings, it is recommended that this study enhance the knowledge and awareness of postpartum mothers after cesarean section regarding the importance of pain management through non-pharmacological methods, such as lavender aromatherapy, which is safe, easy to apply, and helps reduce pain, improve comfort, and support the recovery process. Family support is also recommended to create a comfortable environment during the recovery period. For future researchers, it is suggested that studies be developed with larger sample sizes, more varied research designs, optimal intervention durations, more comprehensive pain measurement methods, and exploration of other complementary therapies or combinations of non-pharmacological interventions to improve result validity and the quality of maternity nursing care.

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