

Original Articles: Quantitative Research

THE IMPACT OF DEEP BREATHING COMBINED WITH AROMATHERAPY ON ANXIETY LEVELS IN PRE-CAESAREAN SECTION PATIENTS AT KERTHA USADA HOSPITAL

Ni Putu Diah Ayu Rusmeni ^{1*}, I Dewa Gede Agus Ardana Putra ², Nurul Imam ³

¹ Sekolah Tinggi Ilmu Kesehatan Buleleng

² Rumah Sakit Umum Kertha Usada

³ Sekolah Tinggi Ilmu Kesehatan William Booth

Article history:

Received: July 15, 2025

Accepted: February 04, 2026

Correspondence:

Ni Putu Diah Ayu Rusmeni
Sekolah Tinggi Ilmu Kesehatan
Buleleng

Email:

Diahayurusmeniniputu@gmail.com

Keywords:

Deep Breathing, Aromatherapy, Section Caesarea (SC), Pre-Operation.

Page Number: 315-323.

Abstract

Background: Preoperative anxiety is commonly experienced by women undergoing caesarean section and may negatively affect physiological stability during surgery. Non-pharmacological interventions such as deep breathing, relaxation, and aromatherapy are considered effective strategies to reduce anxiety.

Objective: This study aimed to examine the effect of a combination of deep breathing relaxation and aromatherapy on anxiety levels in patients undergoing preoperative caesarean section.

Methods: This pre-experimental study employed a one-group pretest–posttest design and was conducted at Kertha Usada General Hospital, Buleleng, Indonesia, from April to May 2025. A total of 67 patients scheduled for caesarean section were recruited using consecutive sampling. Anxiety levels were assessed before and after the intervention using a standardized anxiety questionnaire. The intervention consisted of deep breathing relaxation combined with aromatherapy. Data were analyzed using the Wilcoxon signed-rank test.

Result: The results showed a statistically significant reduction in anxiety levels after the intervention ($p = 0.001$; $p < 0.05$).

Conclusion: The combination of deep breathing relaxation and aromatherapy effectively reduced preoperative anxiety in patients undergoing caesarean section and may serve as a complementary nursing intervention to enhance preoperative care.

INTRODUCTION

Childbirth is a physiological event that marks the end of pregnancy; however, certain maternal or fetal conditions require delivery by caesarean section (C-Section). Caesarean section is often performed due to various pregnancy complications (Rahayu & Puspita, 2022). Globally, the rate of caesarean deliveries continues to increase. According to the World Health Organization (WHO), the global caesarean section rate has exceeded the recommended threshold of 10–15% (Sari, Yuliastuti, Widyastuti, et al., 2023).

In Indonesia, caesarean section deliveries have become increasingly common in both public and private healthcare facilities. Data from the 2018 Basic Health Research (Riskesdas) showed that 17.6% of deliveries were performed by caesarean section. Bali Province recorded the highest rate at 30.2%, while Papua Province had the lowest rate at 6.7%. In Central Java Province, the caesarean section rate was 17.1%. Compared to 2013, these data indicate an approximate 10% increase in caesarean section deliveries between 2013 and 2018 (Sari, Yuliastuti, Widyastuti, et al., 2023).

A caesarean section is a surgical procedure in which the fetus is delivered through an incision in the mother's abdomen and uterus. This procedure can reduce maternal and neonatal mortality as well as pregnancy-related complications. Caesarean sections are generally classified into two types: elective and emergency procedures (Yuliani et al., 2024). Despite its benefits, patients preparing for a caesarean section often experience anxiety related to anesthesia, surgical procedures, personal safety, fetal well-being, postoperative pain, and other discomforts. Anxiety is a subjective emotional response that causes discomfort and, when prolonged, may negatively affect health outcomes (Isnaini et al., 2020).

According to the Indonesian Ministry of Health (2020), approximately 29.0% of women experience anxiety prior to childbirth. Preoperative anxiety in patients undergoing caesarean section may lead to physiological instability that can interfere with surgical procedures. These responses include increased blood pressure, heart rate, respiratory rate, nausea, vomiting, and restlessness. Therefore, maternal anxiety should be appropriately managed using effective interventions (Angesti & Febriyana, 2021). Physiologically, anxiety activates the hypothalamus, leading to increased hormone secretion, elevated pulse and respiratory rates, palpitations, excessive sweating, and vasoconstriction, all of which may intensify the stress response (Octavia et al., 2022).

Anxiety management may involve both pharmacological and non-pharmacological approaches. Non-pharmacological interventions are often preferred due to their safety and minimal side effects. Aromatherapy is one such intervention that uses essential oils to promote relaxation, improve emotional well-being, and calm the body and mind (Astuti et al., 2019). In addition, deep breathing relaxation techniques can reduce anxiety by increasing tidal volume and activating the Hering–Breuer reflex, which enhances baroreflex sensitivity (Sepdianto et al., 2010 in Pamungkas, 2020). Relaxation techniques have also been shown to be effective in reducing anxiety and pain in patients (Saputri et al., 2022).

The combination of aromatherapy and deep breathing relaxation offers several advantages, including ease of application and the absence of chemical side effects (İnci & Çetinkaya, 2023). Previous research by Moghadam et al. (2022) demonstrated that lavender aromatherapy and deep breathing relaxation were both effective in reducing anxiety levels among patients undergoing electroconvulsive therapy. These findings suggest that the combined use of aromatherapy and deep breathing relaxation may be beneficial in managing anxiety in preoperative caesarean section patients.

METHODS

Study Design

This study employed a quasi-experimental design using a one-group pretest–posttest approach. In this design, anxiety levels were measured before and after the intervention without the inclusion of a control group (Geni et al., 2024)

Settings

The study was conducted at Kertha Usada General Hospital, Buleleng, Indonesia, from April 15 to May 20, 2025.

Research subject

The population of this study consisted of patients scheduled to undergo caesarean section surgery at Kertha Usada General Hospital, Buleleng. In 2024, a total of 1,168 caesarean section procedures were recorded at the hospital, with an average of approximately 80 patients per month. A non-probability sampling technique, namely consecutive sampling, was used. This method involves recruiting all eligible patients who meet the inclusion criteria within a specified period until the required sample size is achieved (Nursalam, 2020). The inclusion criteria were patients aged 17–50 years who were scheduled for caesarean section surgery. The sample size was calculated using the Slovin formula. The calculation yielded a minimum sample size of 66.66, which was rounded up to 67 respondents.

Instruments

Data were collected using a structured questionnaire to measure anxiety levels.

Data Collection

Before data collection, ethical and administrative approval was obtained from the Director of Kertha Usada General Hospital. Eligible patients were selected based on the inclusion and exclusion criteria.

The researcher introduced herself to the respondents and explained the objectives and benefits of the study. Written informed consent was obtained from all participants before data collection. Anxiety levels were assessed using a questionnaire before the intervention (pretest). Subsequently, respondents received the intervention consisting of deep breathing relaxation combined with aromatherapy. After the intervention, anxiety levels were reassessed using the same questionnaire (posttest). All procedures were conducted in accordance with ethical research principles.

Data Analysis

Data analysis was performed using SPSS version 25. Univariate analysis was conducted to describe respondent characteristics and preoperative anxiety levels, presented as frequency distributions and percentages. For numerical variables, mean, median, and standard deviation values were calculated. Bivariate analysis was used to evaluate the effect of the intervention on anxiety levels. The Wilcoxon signed-rank test was applied to compare pretest and posttest anxiety scores.

Ethical Consideration

This study adhered to ethical principles governing research involving human subjects. Ethical approval was obtained from the Health Research Ethics Committee (Komisi Etik Penelitian Kesehatan/KEPK) of Sekolah Tinggi Ilmu Kesehatan Buleleng. The study protocol was approved under ethical clearance number 940/EC-KEPK-SB/V/2025.

RESULTS

The results of this study describe the characteristics of respondents based on age, education level, receipt of information regarding caesarean section, and anxiety levels before and after the intervention. A total of 67 respondents were included in the analysis.

Table 1. Characteristics of Respondents (n = 67).

Variable	Respondents (n=67)	
	f	%
Age		
17 – 25	25	37.3
26 – 35	39	58.2
36 – 50	3	4.5
Education level		
Elementary school	4	6.0
Junior high school	28	41.8
Senior high/ vocational school	27	40.3
Bachelor's/Master's degree	8	11.9
Received information about CS		
Yes	27	40.3
No	40	59.7

Sources: Primary Data of Questionnaire, 2025.

Based on age distribution, most respondents were aged 26–35 years (58.2%), followed by those aged 17–25 years (37.3%) and 36–50 years (4.5%). The youngest respondent was 19 years old, and the oldest was 40 years old, with a mean age of 27 years. Regarding education level, the majority of respondents had a junior high school education (41.8%) or senior high/vocational school education (40.3%). A smaller proportion had completed elementary school (6.0%), while 11.9% held a bachelor's or master's degree. In terms of information receipt, 27 respondents (40.3%) reported having received information related to caesarean section procedures, whereas the majority, 40 respondents (59.7%), had not received such information.

Table 2. Anxiety Levels Before and After the Intervention (n = 67).

Anxiety Level	Before Intervention	After Intervention	<i>p-value</i>
	n (%)	n (%)	
No anxiety (<14)	0 (0.0)	0 (0.0)	0.001
Mild (14–20)	0 (0.0)	66 (98.5)	
Moderate (21–27)	60 (89.6)	1 (1.5)	
Severe (28–41)	7 (10.4)	0 (0.0)	
Panic attack (42–56)	0 (0.0)	0 (0.0)	

Sources: Primary Data of Questionnaire, 2025.

Before the intervention, most respondents experienced moderate anxiety (89.6%), while 10.4% experienced severe anxiety. After the intervention, anxiety levels decreased substantially, with 98.5% of respondents reporting mild anxiety and only one respondent (1.5%) remaining in the moderate anxiety category. The Wilcoxon signed-rank test demonstrated a statistically significant reduction in anxiety scores following the intervention ($p = 0.001$; $p < 0.05$). All respondents showed lower post-intervention anxiety scores compared to baseline, with no increases or unchanged scores observed, indicating a consistent reduction in anxiety across participants.

DISCUSSION

Respondent Characteristics Based on Age

The findings of this study indicate that most respondents were aged 26–35 years. Age is an important factor that may influence anxiety levels in patients undergoing caesarean section. Previous studies have reported a relationship between maternal age and preoperative anxiety, with younger women tending to experience higher levels of anxiety (Abdurahman Anwar et al., 2024). Women aged 20–35 years often experience moderate to severe anxiety before caesarean section, which may be related to limited prior experience, insufficient understanding of the surgical procedure, and inadequate emotional support.

However, anxiety is not limited to younger patients. Older women may experience similar or even higher levels of anxiety, particularly those with a history of previous surgeries. Negative experiences from prior caesarean sections, concerns regarding surgical complications, and awareness of potential medical risks may contribute to increased anxiety before repeat procedures (Baagil et al., 2023). These findings suggest that age-related anxiety is multifactorial and influenced by both psychological and experiential factors.

Respondent Characteristics Based on Education Level

Educational level also plays a significant role in influencing preoperative anxiety among caesarean section patients. Patients with lower educational attainment tend to experience higher levels

of anxiety compared to those with higher education. This may be attributed to differences in health literacy, as individuals with higher education levels are generally better able to understand information related to surgical procedures, associated risks, and postoperative recovery, thereby feeling more prepared and less anxious (Astuti et al., 2021).

Previous research has demonstrated a significant association between educational level and anxiety among pre-caesarean section patients. A study conducted at Handayani Hospital in Kotabumi reported that patients with high school or vocational education experienced milder anxiety compared to those with lower educational backgrounds (Astuti et al., 2021). Furthermore, adequate preoperative education and access to clear, relevant information have been shown to reduce anxiety by enhancing patient preparedness and confidence. Providing tailored education using appropriate communication media may help reduce anxiety and improve psychological readiness before surgery (Istianah et al., 2023).

Physiological Mechanisms of Aromatherapy and Deep Breathing on Anxiety

The results of this study demonstrate a significant reduction in anxiety levels following the combined intervention of aromatherapy and deep breathing relaxation. Aromatherapy is known to promote relaxation and reduce psychological tension, while deep breathing exercises help regulate physiological responses associated with anxiety. Aromatherapy stimulates the limbic system, which plays a central role in emotional regulation, thereby promoting a calming effect on both the body and mind. Meanwhile, deep breathing activates the parasympathetic nervous system, leading to reductions in heart rate, blood pressure, and muscle tension.

Deep breathing techniques increase tidal volume and stimulate the vagus nerve, a key component of the parasympathetic nervous system. Activation of the vagus nerve signals a state of safety to the brain, reducing the stress response and alleviating anxiety symptoms. Additionally, deep breathing may help decrease cortisol levels, further contributing to anxiety reduction (Sari, Yuliastuti, & Widyastuti, 2023).

The statistical analysis in this study showed a significant effect of the combined intervention on anxiety levels, as indicated by an Asymp. Sig. (2-tailed) value of 0.001. This finding supports the hypothesis that combining aromatherapy with deep breathing relaxation is effective in reducing anxiety among patients undergoing preoperative caesarean section.

Aromatherapy may further enhance the effects of deep breathing by stimulating the release of neurotransmitters such as serotonin, which plays a role in mood regulation and anxiety reduction. Essential oils, particularly lavender, have been shown to stimulate the limbic system, promoting relaxation and emotional stability. In addition, certain essential oils may stimulate the release of enkephalins, which possess analgesic and calming properties (Abdul Azis et al., 2020).

Moreover, aromatherapy can further activate the parasympathetic nervous system, resulting in decreased heart rate and blood pressure, and alleviating physical symptoms of anxiety such as muscle

tension, restlessness, and sleep disturbances. Previous studies have consistently reported that the combined use of aromatherapy and deep breathing relaxation improves relaxation, reduces anxiety and discomfort, and enhances overall well-being in various patient populations, including those undergoing caesarean section (Sari, Yulastuti, & Widyastuti, 2023).

LIMITATION

This study has several limitations. First, the study population consisted solely of patients undergoing preoperative caesarean section, which may limit the generalizability of the findings to patients with other surgical or clinical conditions. Second, because aromatherapy and deep breathing relaxation involve psychological processes, a placebo effect may have influenced the outcomes, as participants' expectations and beliefs could have affected their perceived anxiety levels. Third, the relatively small sample size may introduce potential bias and limit external validity. Future studies are recommended to include larger sample sizes and more diverse sampling techniques to enhance the generalizability of the findings. Fourth, the absence of a control or comparison group limits the ability to attribute the observed reduction in anxiety exclusively to the intervention. Finally, anxiety measurement in this study was subjective, as it relied on self-reported data, which may be influenced by individual perceptions and experiences.

CONCLUSION

This study demonstrated that the combination of aromatherapy and deep breathing relaxation effectively reduced anxiety levels among patients undergoing preoperative caesarean section. The mean anxiety score decreased from 24, indicating a moderate level of anxiety, to 19, corresponding to a mild level of anxiety, representing a reduction of 20.83%. These findings suggest that aromatherapy combined with deep breathing relaxation may be considered an effective complementary intervention to reduce preoperative anxiety in caesarean section patients.

AUTHOR CONTRIBUTION

Ni Putuh Diah Ayu Rusmeni: Conceptualized the idea, collected data, and wrote the manuscript.

I Dewa Gede Agus Ardana: Assisted in guiding the research design, data collection, and manuscript writing stages.

Nurul Imam: Assisted in guiding the research design, data collection, and manuscript writing stages.

ORCHID

Ni Putu Diah Ayu Rusmeni : None.

I Dewa Gede Agus Ardana Putra : None.

Nurul Imam : <https://orcid.org/0000-0002-7851-3709>

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENT

The researcher would like to thank the director of Kertha Usada Hospital, the respondents, and all those involved in this research process.

REFERENCE

- Abdul Azis, H., Retnaningtyas, E., & Maria Shindharti, G. (2020). The Effect Of Deep Breathing Exercise On The Level Of Answer In Pre Operation Sectio Caesarea Patients In Lavalette Hospital, Malang City. In *OKTOBER* (Vol. 9, Issue 2).
- Abdurahman Anwar, H., Mixrova Sebayang, S., & Burhan, A. (2024). Hubungan Usia dengan Tingkat Kecemasan pada Pasien Bedah Elektif Dewasa The Relationship Between Age and Anxiety Level in Adult Elective Surgery Patients. *Jurnal Keperawatan Malang (JKM)*, 09(01), 28–36. <https://doi.org/10.36916/jkm>
- Angesti, E. P. W., & Febriyana, N. (2021). the Relation of Anxiety and Knowledge With Labor Readiness in Covid-19 Pandemic. *Indonesian Midwifery and Health Sciences Journal*, 5(4), 349–358. <https://doi.org/10.20473/imhsj.v5i4.2021.349-358>
- Astuti, Aries Abiyoga, & Kiki Hardiansyah Safitri. (2021). *Gambaran Karakteristik, Pengetahuan, Dan Tingkat Kecemasan Pasien Pre Operasi Sectio Caesarea Di Instalasi Bedah Sentral*.
- Astuti, D., Hartinah, D., & Permana, D. R. A. (2019). Pengaruh Pemberian Terapi Dzikir Terhadap Penurunan Tingkat Kecemasan Pada Pasien Post Sc. *Jurnal Ilmu Keperawatan Dan Kebidanan*, 10(2), 307. <https://doi.org/10.26751/jikk.v10i2.687>
- Baagil, H., Baagil, H., & Gerbershagen, M. U. (2023). Preoperative Anxiety Impact on Anesthetic and Analgesic Use. In *Medicina (Lithuania)* (Vol. 59, Issue 12). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/medicina59122069>
- İnci, S., & Çetinkaya, F. (2023). Effect of Aromatherapy on the Anxiety of Patients before Coronary angiography. *Explore*, 19(2), 203–208. <https://doi.org/10.1016/j.explore.2022.04.006>
- Isnaini, I., Hayati, E. N., & Bashori, K. (2020). Identifikasi Faktor Risiko, Dampak dan Intervensi Kecemasan Menghadapi Persalinan pada Ibu Hamil Trimester Ketiga. *Analitika*, 12(2), 112–122. <https://doi.org/10.31289/analitika.v12i2.3382>
- Istianah, I., Lutfianti, L., & Tohri, T. (2023). Pengaruh Pemberian Informasi Prabedah Terhadap Kecemasan Pasien Prabedah Terencana di Ruang Bedah RSUD R. Syamsudin SH Kota Sukabumi. *Jurnal Kesehatan Rajawali*, 12(2), 25–27. <https://doi.org/10.54350/jkr.v12i2.141>
- Moghadam, Z. E., Delmoradi, F., Aemmi, S. Z., Vaghee, S., & Vashani, H. B. (2022). Effectiveness of aromatherapy with inhaled lavender essential oil and breathing exercises on ECT-related anxiety in depressed patients. *Explore*, 18(6), 683–687. <https://doi.org/10.1016/j.explore.2021.12.006>

- Octavia, L., Jamiatun, J., Ifadah, E., & Abdurrochim, A. (2022). Efektivitas Dzikir Dalam Mengurangi Tingkat Kecemasan Pasien Pre Operasi Sectio Caesarea di Ruang Instalasi Bedah Sentral RSUD Pasar Rebo. *Jurnal Bidang Ilmu Kesehatan*, 12(3), 270–280. <https://doi.org/10.52643/jbik.v12i3.2405>
- Putri Lenggo Geni, Bambang Suryadi, & Susaldi Susaldi. (2024). Pengaruh Teknik Relaksasi Nafas Dalam Dengan Aroma Terapi Lavender Terhadap Tingkat Nyeri Post Operasi Phacoemulifikasi Menggunakan Anestesi Lokal Kamar Operasi RSUD Cilincing Tahun 2023. *An-Najat*, 2(2), 50–57. <https://doi.org/10.59841/an-najat.v2i2.1128>
- Rahayu, N. K., & Puspita, R. (2022). Pengaruh Aromaterapi Lavender terhadap Perubahan Tingkat Ansietas pada Ibu Hamil Pre Operasi Sectio Caesarea. *Jurnal Gawat Darurat*, 4(2), 169–180. <https://doi.org/10.32583/jgd.v4i2.596>
- Saputri, I. R. D., Yuswanto, T. J. A., & Widodo, D. (2022). Efektivitas Guided Imagery, Slow Deep Breathing dan Aromaterapi Mawar Terhadap Kecemasan Pasien Pre Operasi. *Jurnal Vokasi Kesehatan*, 8(2), 51. <https://doi.org/10.30602/jvk.v8i1.1023>
- Sari, M., Yuliasuti, E., & Widyastuti, Y. (2023). *Pengaruh Aromaterapi Lavender terhadap Kecemasan pada Pasien Pra-Operasi Sectio Caesarea dengan Anestesi Spinal* (Vol. 12, Issue 2).
- Sari, M., Yuliasuti, E., Widyastuti, Y., & Handoyo, D. (2023). Pengaruh Aromaterapi Lavender terhadap Kecemasan pada Pasien Pra-Operasi Sectio Caesarea dengan Anestesi Spinal. *Jurnal Kesehatan*, 12(2), 290–296. <https://doi.org/10.46815/jk.v12i2.172>
- Yuliani, S., Yuliani Prodi Keperawatan, S., Ilmu Kesehatan, F., Ainul Shifa Prodi Keperawatan, N., Afrina Prodi Keperawatan, R., Harapan No, J., Agung, L., & Selatan, J. (2024). Pengaruh Aromaterapi Lavender Terhadap Tingkat Kecemasan Ibu Pre Operasi Sectio Caesarea. *Jurnal Kesehatan Dan Kedokteran*, 1(2).