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Effectiveness of Deep Breathing Relaxation Combined with Guided Imagery with Music on Pain Scale in Patients After Caesarean Section

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ABSTRACT

Caesarean Section (CS) is a surgical procedure to remove the fetus through an incision in the abdominal wall and uterine wall. A common problem in post-CS patients is pain. Deep breathing, relaxation, and guided imagery are non-pharmacological techniques to reduce pain. The purpose of this study was to determine the effect of deep breathing relaxation techniques combined with guided imagery accompanied by music on the pain scale in post-CS patients. The methods of this study to reduce pain include slow breathing, holding inspiration to the maximum, exhaling slowly while closing the eyes, and emptying the mind while imagining a positive effect. This study used a pre-experimental, one-group, pre-test-post-test design. The sampling technique used was purposive sampling, yielding a sample of 32 respondents. The statistical methods used SPSS, a data analysis program, and a paired-samples t-test with a significance level of α=0.05. The results of this study indicate that the pain scale before the intervention showed moderate pain (56.3%) and severe pain (43.7%). Meanwhile, the pain scale after the intervention showed mild pain (40.6%), moderate pain (50%), and severe pain (9.4%), with a ρ value of $0.001 < \alpha = 0.05$. This study concludes that deep-breathing relaxation techniques, combined with guided imagery and music, can reduce pain intensity in post-CS patients. These techniques can be implemented in accordance with standard operating procedures (SOPs) so that nurses do not focus solely on pharmacological therapy.

Introduction

A cesarean delivery (C-section) is a surgical operation performed to bring a fetus into the world via cuts made in the abdominal and uterine walls. (Bjørnstad & Ræder, 2020). Caesarean sections are performed for various reasons, including an imbalance between the size of the baby's head and the mother's pelvis, a large fetus, an abnormal fetal position, placenta previa, preeclampsia, eclampsia, a previous CS, multiple births, advanced pregnancy, and certain medical conditions such as genital infections (Plaat et al., 2022).

The rate of caesarean sections continues to rise in many countries. According to 2021 RISKESDAS data, the CS rate in Indonesia was 17.6%, and in East Java, 22.36%. Based on medical records at Siti Khodijah Sepanjang Hospital, 318 patients underwent CS from December to May 2018. A preliminary study conducted by researchers in 5 patients after CS surgery found that 80% of them complained of pain in the surgical wound.

A common complaint after surgery is pain (Yimer & Woldie, 2019). Pain is an unpleasant feeling and emotional response that occurs when there is real or potential damage to body tissue (Hidayat et al., 2022). The pain response experienced by patients is a side effect that occurs after undergoing surgery. Pain caused by surgery usually makes patients feel uncomfortable and complain of pain (Ahmad & Taufik, 2021). Pain is subjective, and the level of pain experienced varies from person to person, depending on physiological and psychological conditions, as well as factors such as wound length and suturing process (Solehati et al., 2022).

Post-CS pain can limit early mobilization, reduce sleep quality, increase the risk of wound infection, disrupt parent-child bonding, interfere with lactation, and even cause psychological problems such as depression (Santoso et al., 2022). Untreated pain can also lead to decreased blood supply to cells, prolonging the recovery process, and stimulating pain mediators, exacerbating pain (Hidayat et al., 2022).

Pain, irrespective of its intensity, requires appropriate management because comfort is a fundamental human need. Therefore, nurses are responsible for identifying and implementing the most effective interventions to control pain. Postoperative pain management can be carried out using pharmacological and non-pharmacological techniques. Pharmacological techniques are carried out in collaboration with doctors to administer analgesics, while non-pharmacological techniques include providing relaxation techniques to post-operative patients (Solehati et al., 2022).

The intervention provided to respondents was a deep breathing relaxation technique combined with guided imagery and music. The procedure was structured, with the intervention given to patients post-cesarean section on day 1 to day 2 (24–48 hours postoperatively), with each intervention session lasting 15–20 minutes (Purnamasari et al., 2023). The intervention was administered twice a day, in the morning (approximately 8:00–10:00 AM) and in the afternoon (approximately 3:00–5:00 PM), for a total of 2 days, resulting in 4 intervention sessions (Cahyani et al., 2022). The music used was slow instrumental music without lyrics, namely natural music (the sound of flowing water, wind, or ocean waves) with a tempo of 60–80 beats per minute, adjusted to create a relaxing effect (Waluyo & Herlina, 2024).

Relaxation techniques consist of structured breathing exercises that help decrease oxygen consumption, respiratory rate, heart rate, and muscle tension (Issac et al., 2023). To achieve optimal pain reduction outcomes, these techniques should be taught through repeated, guided instruction. Relaxation methods commonly include slow, rhythmic diaphragmatic breathing, in which patients are encouraged to close their eyes and breathe slowly in a calm and controlled manner (Puspitaningdyah et al, 2021).

Deep breathing relaxation techniques are more effective when integrated with complementary approaches, such as guided imagery (Setiawan & Septia, 2023). Guided imagery is a therapeutic method that harnesses an individual's imagination to promote positive physiological and psychological responses. This intervention begins with a relaxation phase, during which patients are instructed to close their eyes gradually and focus on their breathing. Subsequently, patients are guided to clear their minds

and visualize calming, peaceful images (Smith et al., 2018). This technique can be complemented by listening to nature music to enhance self-imagination (Zimpel et al., 2020).

Previous studies have demonstrated the effectiveness of combined breathing relaxation and guided imagery interventions in reducing pain intensity. Cahyani (2022) reported a significant reduction in postoperative pain among patients undergoing caesarean section following the application of breathing relaxation techniques integrated with guided imagery based on Comfort Theory (Cahyani et al., 2022). Similarly, Purnamasari (2023) found that the combination of breathing relaxation, guided imagery, and music therapy was effective in decreasing pain levels in patients after extremity fracture surgery (Purnamasari et al., 2023).

A preliminary assessment involving nurses indicated that non-pharmacological interventions, including deep breathing, relaxation, and guided imagery, are infrequently used in pain management, as current practices remain predominantly pharmacological. Based on these findings, this study aimed to examine the effectiveness of deep breathing relaxation combined with guided imagery and music in reducing pain scores among post–caesarean section patients at Siti Khodijah Sepanjang Hospital.

Methods

This study used a pre-experimental, one-group, pre-test-post-test design. This study was conducted by administering a pre-test before the intervention, then the intervention, and finally a post-test (final observation). The study was conducted in the operating room of Siti Khodijah Hospital from March to May 2025. The population in this study was all 45 post-cesarean section patients in March–May 2025, from which 32 respondents were selected using a purposive sampling technique according to the research criteria. The inclusion criteria in this study were primiparous patients, post-cesarean section day one, patients who were willing to be respondents, and patients whose analgesic response had resolved or who had not received further analgesics 6 hours after analgesic administration. The exclusion criteria in this study were patients who had been given other relaxation techniques and post-cesarean section patients who experienced complications.

The instruments used in this study were observation sheets containing general data of respondents and pain questionnaires, which included number, initials, age, post-operative hours of cesarean section, time of pain onset, pain scale results before the procedure, duration and number of procedures, and pain scale results after the procedure, as well as a 10-point pain scale intensity sheet (NRS numeric rating scale), 0 (no pain); 1-3 (mild pain); 4-6 (moderate pain); 7-9 (severe pain); 10 (very severe pain), with an explanation of the breathing relaxation technique procedure in combination with guided imagery.

The implementation of breathing relaxation techniques combined with guided imagery, as outlined in the standard operating procedure, involves creating a calm environment and ensuring patient privacy. Patients are instructed to close their eyes and maintain focused attention while slowly inhaling through the nose, silently counting “inhale, one, two, three.” During this phase, patients are guided to visualize natural scenery while listening to nature-based music through a headset. Subsequently, patients exhale slowly through the mouth while silently counting “exhale, one, two, three.” This cycle is repeated

continuously for approximately 15 minutes. At the conclusion of the intervention, patients are instructed to open their eyes gradually, and their responses are observed and evaluated.

The intervention provided to respondents was a deep breathing relaxation technique combined with guided imagery and music. The procedure was structured, with the intervention given to patients post-cesarean section on days 1-2 (24–48 hours postoperatively), with each session lasting 15–20 minutes. The intervention was administered twice a day, in the morning (approximately 8:00–10:00 AM) and in the afternoon (approximately 3:00–5:00 PM), for a total of 2 days, resulting in 4 intervention sessions. The music used was slow instrumental music without lyrics, namely natural music (the sound of flowing water, wind, or ocean waves) with a tempo of 60–80 beats per minute, adjusted to create a relaxing effect. For pain evaluation, measurements were taken before the intervention (pre-test) and after all intervention sessions (post-test).

Data processing in this study involved coding, editing, tabulation, and data entry. Statistical analysis was performed using both univariate and bivariate approaches. Data normality was assessed using the Shapiro–Wilk test because the sample size was fewer than 50 participants. Hypothesis testing was conducted using a paired-samples t-test with $\alpha = 0.05$.

Fundamental principles, including respect for human dignity, protection of privacy and confidentiality, justice and inclusivity, and a balanced consideration of potential risks and benefits, guided ethical considerations in this research. Number of ethical clearance 022/KET/KEPK/10-2025.

Results

Table 1. Frequency Distribution of Respondents by Age

Age	N	%
17 – 25 years	11	34,4
26 – 35 years	18	56,2
36 – 45 years	3	9,4
Total	32	100

The results of the analysis of Table 1 show that the majority of respondents were aged 26-35 years, namely 18 respondents (56.2%).

Table 2. Frequency Distribution of Respondents by Education

Education	N	%
Elementary School	0	0
Junior High School	1	3,1
Senior High School	21	65,6
College	10	31,3
Total	32	100

The results of the analysis of Table 2 show that the majority of respondents had a senior high school education, namely 21 respondents (65.6%).

Table 3. Distribution of Respondents by Pre-test Pain Scale

Pain Scale	N	%
1-3 (Mild pain)	0	0
4-6 (Moderate pain)	18	56,3
7-9 (Severe pain)	14	43,7
10 (Very severe pain)	0	0
Total	32	100

The analysis of Table 3 shows that the majority of respondents had moderate pain on the pre-test pain scale (18 respondents, 56.3%).

Table 4. Distribution of Respondents by Post-test Pain Scale

Pain Scale	N	%
1-3 (Mild pain)	13	40,6
4-6 (Moderate pain)	16	50
7-9 (Severe pain)	3	9,4
10 (Very severe pain)	0	0
Total	32	100

The analysis of Table 4 shows that the majority of respondents had moderate pain on the post-test pain scale (16, 50%).

Table 5. The Effect of Deep Breathing Relaxation Combined with Guided Imagery with Music on Reducing the Pain Scale

	N	Mean ± SD	Normality Test (Shapiro-Wilk) p	Uji Beda	ρ-value	Effect Size (Cohen's d)	95% CI Selisih Rerata
Pain scale before intervention	32	6,4 ± 1,2	0,091				
Pain scale after intervention	32	4,3 ± 1,0	0,134	Paired t-test	0,001	d=1,10	2,1 (1,5-2,7)

The analysis results in Table 5 show that, based on the paired-samples t-test, the ρ value was $0.001 < \alpha$ ($\alpha = 0.05$). Effect Size results: Cohen's d shows the magnitude of the intervention effect. d $1.10 \geq 0.8$ means a significant effect, and the 95% Confidence Interval of the difference in mean pain before and after the intervention shows an estimated range of changes in pain of 2.1 (1.5 – 2.7), which indicates that the reduction in pain is clinically significant. Therefore, H_o is rejected, and H_a is accepted. Thus, it can be concluded that there is an effect of deep breathing relaxation techniques in combination with guided imagery and music on reducing the pain scale of post-cesarean section patients.

Discussion

This study, conducted at Siti Khodijah Hospital, involved 32 respondents. The majority of respondents were aged 26-35 (18 respondents, 56.2%). One factor influencing pain response is age. Age is an important variable that can affect pain response. Differences found between age groups can affect how respondents react and express pain (Lautenbacher et al., 2017). This aligns with research by Yusi Revi (2022), which shows that age can influence pain response. Younger individuals tend to lack emotional maturity, including in responding to pain, while older individuals tend to have more stable emotions and can control their pain response (Yusi Revi et al., 2022).

Based on educational level, the majority had a senior high school education (21 respondents, 65.6%). One factor influencing pain response is educational level. Research by Wijaya (2018) shows that a person's education level influences their knowledge. The higher their education level, the greater their ability to absorb information and prevent various diseases (Wijaya et al., 2018). In the nursing assessment process, education level is essential because it closely relates to the patient's knowledge of pain management. Education level is often associated with knowledge; a highly educated person is assumed to be more able to absorb information, thus, nursing care can be tailored to their level of

education. A patient's education level is one factor that determines their ability to understand and manage their pain (Zajacova et al., 2020).

The pain response experienced by each patient after a cesarean section varies, so exploration is necessary to determine the level of pain. According to Hadjam (2020), differences in pain levels perceived by each patient are due to their attitude in responding to the pain they experience (Hadjam et al., 2020). A person's attitude toward pain is influenced by factors that differ from person to person. Not all individuals who are exposed to the same stimulus experience the same pain intensity (Rompas & Mulyadi, 2017).

Body movements and facial expressions can indicate pain, such as clenched teeth, tightly closed eyes, grimacing, screaming, and immobilization. Individuals can respond to pain and seek physical interventions to manage it, such as analgesics, as well as cognitive and behavioral activities such as distraction, relaxation, and guided imagery (Álvarez-García & Yaban, 2020).

Postoperative pain management can be carried out in two ways: pharmacological and non-pharmacological techniques (Rompas & Mulyadi, 2017). Pharmacological techniques are carried out in collaboration with physicians to administer analgesics, while non-pharmacological techniques include providing relaxation techniques to postoperative patients (Smith et al., 2018).

Felix (2019) stated that deep breathing relaxation techniques are designed to enhance alveolar ventilation, support adequate gas exchange, prevent pulmonary atelectasis, improve cough effectiveness, and alleviate both physical and emotional stress by reducing pain intensity and anxiety (Felix et al., 2019).

Relaxation is defined as a condition in which individuals experience relief from stress and anxiety or a restoration of balance following physiological or psychological disturbances (Smith et al., 2018). The primary objective of relaxation techniques is to attain a comprehensive state of relaxation that includes physiological, cognitive, and behavioral components (Basco-López et al., 2025). From a physiological perspective, relaxation is associated with reductions in blood epinephrine and norepinephrine levels, heart rate, blood pressure, muscle tension, and metabolic rate, along with vasodilation and increased peripheral temperature (Aini & Reskita, 2017).

Deep breathing relaxation techniques are more effective when integrated with complementary interventions, such as guided imagery (Felix et al., 2019). Guided imagery is a therapeutic approach that utilizes an individual’s imagination to elicit positive psychological and physiological outcomes (Krau, 2020). This technique engages multiple sensory modalities, including visual, auditory, tactile, gustatory, and olfactory senses, with the purpose of inducing calmness and relaxation, as it stimulates the parasympathetic nervous system (Hoag et al., 2022). The intervention is initiated with a relaxation phase in which patients are instructed to close their eyes gradually and focus on their breathing, followed by guidance to clear distracting thoughts and replace them with calming, peaceful imagery (Manolaki et al., 2021). Positive imagery is believed to modulate psychoneuroimmunological responses associated with stress, consistent with the gate control theory, which posits that only one neural impulse can be transmitted from the spinal cord to the brain at a given time. When cognitive processing is dominated

by positive imagery, nociceptive signals are inhibited, thereby reducing pain perception (Warsini et al., 2023).

In the present study, following the administration of combined deep breathing relaxation, guided imagery, and music interventions, the majority of respondents (n = 16; 50%) reported moderate pain levels. The combination of these interventions contributed to increased calmness and relaxation among participants. During the intervention, respondents inhaled oxygen through the nasal passages while engaging in guided imagery accompanied by natural music, thereby diverting attention from pain toward soothing mental images. From a physiological perspective, the relaxation response is characterized by decreased blood levels of epinephrine and norepinephrine, reduced heart rate and blood pressure, diminished muscle tension and metabolic activity, vasodilation, and increased peripheral temperature (Smith et al., 2018). Through these mechanisms, positive imagery attenuates stress-related psychoneuroimmunological activity and limits pain signal transmission, which ultimately contributes to a reduction in pain intensity following the combined intervention (Zimpel et al., 2020). This is what caused the pain intensity experienced by patients to decrease after being given a breathing relaxation technique combined with guided imagery.

The change in pain scale before and after the intervention was demonstrated in the statistical test results using a paired sample t-test with a 95% significance level (α=0.05). The ρ value was $0.001 < \alpha$ ($\alpha = 0.05$). Therefore, H_o was rejected, and H_a was accepted. Therefore, it can be concluded that the breathing relaxation technique, combined with guided imagery and music, significantly reduced the pain scale in post-cesarean section patients.

These findings are consistent with previous research by Cahyani (2022), which demonstrated that the application of breathing relaxation techniques combined with guided imagery based on Comfort Theory resulted in a significant reduction in pain intensity among post–caesarean section patients following the intervention (Cahyani et al., 2022). However, what distinguishes this study from previous studies is the surgical procedure the patients underwent, the different study sites, and the addition of the guided imagery technique combined with nature music, delivered to the patients via headsets.

Based on the above research results, ward nurses can implement this intervention for post-CS patients, following the SOP developed by the researcher. The patient is comfortably positioned (lying or semi-sitting), the researcher explains the purpose and stages of the intervention to the patient, and the patient is asked to inhale slowly through the nose for 4 counts, hold their breath for 2 counts, and exhale slowly through the mouth for 6 counts. The deep breathing technique is repeated for approximately 5 minutes. Next, guided imagery is provided, in which the patient is directed to imagine a calm, pleasant setting (e.g., a beach or a park). During guided imagery, patients are exposed to relaxing music through earphones or speakers at a comfortable volume. The guided imagery and music combination lasts approximately 15–20 minutes.

Conclusions

This study concludes that the pain scale before the intervention of deep breathing relaxation techniques combined with guided imagery and music was moderate for 18 respondents (56.3%) and severe for 14 respondents (43.7%). Meanwhile, the pain scale after the intervention of deep breathing relaxation techniques combined with guided imagery and music was mild for 13 respondents (40.6%), moderate for 16 respondents (50%), and severe for 3 respondents (9.4%). The statistical test results yielded a ρ value of 0.001 < α (0.05); thus, it can be concluded that deep breathing relaxation techniques combined with guided imagery and music reduce pain levels in post-cesarean section patients. Effect size results (Cohen's d) indicate the magnitude of the intervention effect. d 1.10 ≥ 0.8 means a significant effect, and the 95% Confidence Interval of the difference in mean pain before and after the intervention shows an estimated range of changes in pain of 2.1 (1.5 – 2.7), which indicates that the reduction in pain is clinically significant.

Recommendation

The results of this study are expected to be used as scientific information, particularly in medical-surgical nursing and pain research, focusing on the use of deep breathing relaxation techniques and guided imagery with music. Nurses can apply this therapy as a non-pharmacological intervention to reduce pain intensity, but only as an adjunct to medical therapy, because the analysis results in Table 5 show that, based on the paired-samples t-test, the ρ value was 0.001 < α (α=0.05). Effect size results: Cohen's d shows the magnitude of the intervention effect; d 1.10 ≥ 0.8 means a significant effect, and the 95% Confidence Interval of the difference in mean pain before and after the intervention shows an estimated range of changes in pain of 2.1 (1.5 – 2.7), which indicates that the reduction in pain is clinically significant.

For future researchers, the breathing relaxation technique combined with guided imagery and music could be modified not only to reduce pain but also to improve anxiety, sleep quality, and stress. Limitations: This study did not place participants in the same room, which limited the specificity of the results. It also controlled for analgesic medication use, ensuring unbiased results.

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