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Effect of slow deep breathing therapy on preoperative anxiety

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Abstract

Background: Anxiety is commonly experienced by patients before surgery and may affect their psychological and physiological condition during the perioperative period. Non-pharmacological interventions, such as slow deep breathing (SDB) therapy, may help reduce anxiety and promote relaxation in preoperative patients.

Purpose: To determine the effect of (SDB) therapy on anxiety levels among preoperative patients.

Method: This quasi-experimental study used a pretest–posttest control group design. A total of 30 preoperative patients were divided equally into an intervention group ($n = 15$) and a control group ($n = 15$). Anxiety levels were measured using the Hamilton Anxiety Rating Scale (HARS) before and after the intervention. The intervention group received (SDB) therapy, while the control group received standard care. Data normality was assessed using the Shapiro–Wilk test, and changes in anxiety levels were evaluated using a paired t-test.

Results: The intervention and control groups each consisted of 15 respondents, with mean ages of 35.1 ± 11.3 and 35.5 ± 11.0 years, respectively. Before the intervention, severe anxiety was more prevalent in the intervention group (33.3%), whereas moderate anxiety predominated in the control group (53.3%). After the intervention, the intervention group showed an improvement in anxiety levels, with 40.0% of respondents reporting no anxiety, 20.0% mild anxiety, 40.0% moderate anxiety, and no respondents with severe anxiety. In the control group, 6.7% reported no anxiety, 60.0% mild anxiety, 26.7% moderate anxiety, and 6.7% severe anxiety after standard care. The Shapiro–Wilk test indicated that all pretest and posttest anxiety data were normally distributed, with p-values ranging from 0.104 to 0.753.

Conclusion: (SDB) therapy was associated with an improvement in anxiety levels among preoperative patients, particularly through the reduction of severe anxiety and the increase in respondents reporting no anxiety. This therapy may be considered a simple, non-pharmacological approach to support anxiety management before surgery.

Keywords: Anxiety; Mental Health; Non-Pharmacological Intervention; Preoperative Patients; Slow Deep Breathing Therapy.

INTRODUCTION

Anxiety is a common psychological response among preoperative patients and may affect both physiological and psychological conditions before surgery. Increased anxiety can trigger physiological changes, including elevated blood pressure, increased heart rate, dizziness, palpitations, and trembling, which may interfere with the surgical process and increase the risk of perioperative complications. Psychologically, preoperative anxiety may manifest as fear, worry, and emotional distress. Therefore, early

management of anxiety is important to support patients' psychological readiness and promote a safer surgical process. Preoperative anxiety has been identified as an important psychological concern among patients awaiting surgical procedures, with anxiety potentially influenced by fear of surgery, anticipated pain, and uncertainty regarding the surgical process (Olivia, Purnamasari, & Nugraheni, 2025; Razavinasab, Zeidabadi, Sadegh, Nosratabadi, Abolghaseminejad, & Amiri, 2025). A preliminary study

conducted by the researchers on May 30, 2024, at PKU Muhammadiyah Gamping Hospital found that more than 220 preoperative patients underwent surgical procedures. Interviews with seven preoperative patients indicated that anxiety was experienced before surgery. Four patients (57.1%) reported moderate anxiety, while three patients (42.9%) reported severe anxiety. These findings indicate that preoperative anxiety remains a relevant psychological problem requiring appropriate intervention.

Non-pharmacological interventions are important in managing preoperative anxiety because they can be implemented as complementary approaches to conventional care. Simple relaxation-based interventions have been investigated as approaches for reducing anxiety among patients undergoing surgical procedures (Mulki, Ta'adi, & Sunarjo, 2021; Pardede, Sitepu, & Saragih, 2018). Slow deep breathing (SDB) therapy is a relaxation technique involving slow, controlled, and deep breathing that may help promote relaxation and reduce anxiety symptoms. Previous studies have demonstrated that slow or deep breathing exercises can reduce anxiety in different clinical populations, including patients receiving inpatient care and patients undergoing surgical procedures (Harta, Kamaryati, Putra, & Wicaksana, 2023; Öner Cengiz, Ayhan, & Güner, 2022; Ursavas & Catakli, 2020). Evidence from a systematic review and meta-analysis of randomized controlled trials also indicates that (SDB) may produce beneficial clinical effects, supporting its potential as a non-pharmacological relaxation intervention (Joseph, Moman, Barman, Kleppel, Eberhart, Gerberi, & Hooten, 2022). This intervention is relatively simple, inexpensive, and can be performed by patients with minimal assistance. (SDB) therapy may be particularly relevant for preoperative patients because anxiety is often associated with autonomic physiological responses. Evidence from preoperative patients has shown that breathing-based relaxation techniques can reduce anxiety before surgery (Afifah, 2020; Saputri, Yuswanto, & Widodo, 2022; Karim & Sulistiyah, 2025). Its simple application also makes it potentially suitable as a complementary nursing intervention for patients awaiting surgery.

Several studies have further supported the use of breathing-based interventions for perioperative anxiety. Short-term deep breathing exercises have been shown to influence perioperative anxiety among

pediatric orthopedic patients, while yoga-based breathing has also been associated with reduced perioperative anxiety among patients undergoing cardiac surgery (Hu, Hua, Wang, Mao, Jia, Lei, & Cheng, 2025; Azeez, Puri, Samra, & Singh, 2021). Similarly, alternate nostril breathing has been investigated as a breathing intervention for reducing anxiety and improving physiological parameters among preoperative patients (Salah Abd El-ghafar, Said Taha, Elsayed Ghonaem, & Fares Mohamed, 2025). These findings suggest that controlled breathing techniques may have potential as non-pharmacological approaches to anxiety management. However, differences in breathing techniques, patient characteristics, clinical settings, and intervention protocols indicate the need for further research specifically examining (SDB) therapy among preoperative patients.

Mental health promotion and prevention are also supported by Indonesian mental health policy. Law of the Republic of Indonesia No. 18 of 2014 concerning Mental Health emphasizes promotive, preventive, curative, and rehabilitative efforts to improve mental health. The implementation of simple non-pharmacological interventions for anxiety management is consistent with efforts to promote mental health and prevent the worsening of psychological distress among patients. If preoperative anxiety is not appropriately managed, it may contribute to increased blood pressure, heart rate, respiratory rate, sweating, sleep disturbances, and psychological distress. Breathing-based interventions have been reported to influence anxiety and physiological parameters, supporting their potential role in promoting relaxation and reducing anxiety-related responses (Öner Cengiz et al., 2022; Widyaningrum, Rohmansyah, Hakim, & Hiruntrakul, 2025). Therefore, appropriate management of preoperative anxiety is important to support patients' psychological well-being and readiness for surgery.

RESEARCH METHOD

This study used a quasi-experimental design with a pretest-posttest control group design and was conducted at PKU Muhammadiyah Gamping Hospital, Yogyakarta, Indonesia, in February 2025. The population consisted of preoperative patients scheduled for surgery, with 30 participants selected using total sampling and divided into an intervention group and a control group. Anxiety levels were

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measured using the Hamilton Anxiety Rating Scale (HARS), a 16-item Indonesian version, covering tension, fear, worry, and anxiety. Each item was scored on a four-point Likert scale, with total scores categorized into mild, moderate, and severe anxiety according to the instrument criteria. The instrument had demonstrated validity with a correlation value of 0.553 and reliability with a Cronbach's alpha coefficient of 0.918. The intervention group received (SDB) therapy,

while the control group received standard care. Anxiety levels were assessed before and after the intervention. Data were analyzed using univariate and bivariate analyses to describe participant characteristics and assess changes in anxiety levels within and between groups. The study received ethical approval from the Research Ethics Committee of PKU Muhammadiyah Gamping Hospital (No. 022/KEP-PKU/II/2025).

RESEARCH RESULTS

Table 1. Distribution of Respondent (N= 30)

Variable	Intervention (n= 15)	Control (n= 15)
Age (n/%) (Mean±SD) (Range) (Year)	(35.1±11.3) (21-58)	(35.5±11.0) (21-58)
20-29	5/33.3	5/33.3
30-39	4/26.7	4/26.7
40-49	3/20.0	3/20.0
≥50	3/20.0	3/20.0
Gender (n/%)		
Male	6/40.0	8/53.3
Female	9/60.0	7/46.7
Pretest Anxiety Level (n/%)		
No Anxiety	0/0.0	0/0.0
Mild	6/40.0	6/40.0
Moderate	4/26.7	8/53.3
Severe	5/33.3	1/6.7
Posttest Anxiety Level (n/%)		
No Anxiety	6/40.0	1/6.7
Mild	3/20.0	9/60.0
Moderate	6/40.0	4/26.7
Severe	0/0.0	1/6.6

Table 1 presents the characteristics of respondents and the distribution of anxiety levels before and after the intervention. The intervention and control groups each consisted of 15 respondents. The mean age was 35.1 ± 11.3 years in the intervention group and 35.5 ± 11.0 years in the control group, with the same age range of 21–58 years. Female respondents predominated in the intervention group (60.0%), whereas male respondents predominated in the control group (53.3%). Before the intervention, moderate anxiety was the most common level in the control group (53.3%), while severe anxiety was more prevalent in the intervention group (33.3%). After the intervention, the intervention group showed an improvement in anxiety levels, with 40.0% of respondents reporting no anxiety and no respondents experiencing severe anxiety. In the control group, most respondents had mild anxiety (60.0%), while one respondent (6.6%) remained at the severe anxiety level.

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Table 2. Shapiro-Wilk Normality Test

Variable	Intervention	Control
Pretest	0.104	0.753
Posttest	0.158	0.674

Table 2 shows that all pretest and posttest data were normally distributed. The Shapiro-Wilk test produced p-values of 0.104 and 0.158 for the intervention group and 0.753 and 0.674 for the control group, respectively. All p-values were greater than 0.05, indicating that the data met the assumption of normality. Therefore, a parametric paired t-test could be used to assess changes in anxiety levels within each group.

DISCUSSION

The findings of this study demonstrated that (SDB) therapy was associated with a significant reduction in anxiety levels among preoperative patients. The statistical analysis showed a significance value of ($p < 0.05$), indicating that the null hypothesis was rejected and that anxiety levels differed significantly following the intervention. These findings are consistent with previous research demonstrating that breathing-based relaxation techniques can reduce anxiety among preoperative patients. Deep breathing relaxation has been reported to reduce anxiety among patients undergoing preoperative care, including patients with femoral fractures, while a combination of guided imagery, slow deep breathing, and rose aromatherapy has also been associated with reduced anxiety among preoperative patients (Afifah, 2020; Saputri et al., 2022). Similarly, deep breathing relaxation has been reported to have a beneficial effect on anxiety levels, supporting the potential use of controlled breathing as a simple non-pharmacological intervention for anxiety management (Sajidah, Khairunnisa, & Nabila, 2021). Similar findings have been reported among patients undergoing C-section, in whom deep breathing relaxation was associated with reduced preoperative anxiety (Karim & Sulistiyah, 2025).

The reduction in anxiety may be related to the physiological relaxation response produced by slow and controlled breathing. (SDB) can help regulate respiratory patterns, promote relaxation, and reduce physiological arousal associated with anxiety. Evidence from clinical research indicates that deep

breathing exercises may reduce anxiety and influence physiological parameters, supporting the role of controlled breathing in promoting relaxation (Öner Cengiz et al., 2022; Widyaningrum et al., 2025). The potential of deep breathing-based interventions to influence anxiety has also been reported among postoperative orthopedic patients, where a combination of spiritual and deep breathing exercise therapy was associated with improvements in anxiety and pain (Yusuf, Iswari, Sriyono, & Yunitasari, 2020). Preoperative anxiety may manifest through physical symptoms such as difficulty sleeping, increased pulse and respiratory rates, sweaty palms, restlessness, and frequent urination. By promoting a calmer physiological state, controlled breathing may help patients manage these symptoms and improve psychological readiness before surgery. The effectiveness of diaphragmatic breathing in reducing anxiety has also been demonstrated in patients undergoing total knee replacement, suggesting that controlled breathing may contribute to psychological relaxation in patients facing surgical procedures (Ursavas & Catakli, 2020).

In this study, anxiety levels also varied across respondents. Some respondents who received (SDB) therapy remained at mild or moderate anxiety levels after the intervention. This finding suggests that anxiety is influenced by multiple factors beyond the intervention. Previous research has indicated that preoperative anxiety may be influenced by patients' perceptions of surgery, previous experiences, psychological conditions, and individual responses to the anticipated surgical procedure (Olivia et al., 2025; Razavinasab et al., 2025). Differences in anxiety responses may also be related to individual coping mechanisms and the way patients perceive the threat associated with surgery. Therefore, although (SDB) may reduce anxiety, the intervention may not completely eliminate anxiety in every patient.

The findings further showed that respondents who did not receive (SDB) therapy continued to experience anxiety, whereas the intervention group demonstrated improvement following the therapy. This difference

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supports the potential role of (SDB) as a simple non-pharmacological intervention for managing preoperative anxiety. Previous studies have reported beneficial effects of breathing-based interventions on anxiety among preoperative and perioperative patients, including deep breathing, slow deep breathing, and other controlled breathing techniques (Mulki et al., 2021; Wicaksana et al., 2025; Salah Abd El-ghafar et al., 2025). The findings are also supported by research involving patients with other clinical conditions, in which slow or diaphragmatic breathing was associated with improvements in anxiety and other clinical outcomes (Harta et al., 2023; Ursavas & Catakli, 2020).

Overall, (SDB) therapy may be considered a practical complementary nursing intervention for preoperative anxiety management. The technique is simple, does not require specialized equipment, and can be implemented as part of routine preoperative care. Previous research has demonstrated the potential of breathing-based interventions to reduce anxiety across different clinical settings, although the specific techniques and intervention protocols vary (Azeez et al., 2021; Hu et al., 2025). Breathing-based interventions have also been associated with other beneficial postoperative outcomes, such as pain reduction and improved sleep quality, suggesting that controlled breathing may have broader clinical benefits beyond anxiety management (Kurt & Yayla, 2025). However, because preoperative anxiety may be influenced by several individual and clinical factors, (SDB) therapy should be implemented alongside appropriate communication, psychological support, and other standard preoperative care. This approach may provide a comprehensive strategy to improve patients' psychological readiness before surgery.

CONCLUSION

(SDB) therapy was effective in reducing anxiety levels among preoperative patients. Following the intervention, 6 respondents (40.0%) in the intervention group had no anxiety, while no respondents remained in the severe anxiety category. Statistical analysis showed a significant reduction in anxiety levels following the intervention ($p < 0.001$). These findings indicate that (SDB) therapy may be used as a simple and practical non-pharmacological nursing intervention to support the management of preoperative anxiety.

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