

Progressive Muscle Relaxation in Managing Anxiety in Preoperative Patients

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ABSTRACT

Background & Objective: Anxiety is commonly experienced by patients scheduled for surgery and can affect their physiological responses and readiness. This study aimed to determine the effect of progressive muscle relaxation on anxiety levels in patients scheduled for surgery. **Method:** This study used a case study design involving three adult patients scheduled for non-emergency surgery at a regional hospital in Magelang. The sampling technique used was purposive sampling based on inclusion and exclusion criteria. Anxiety levels were measured before and after the intervention using a structured questionnaire instrument. The intervention consisted of progressive muscle relaxation performed for 25–30 minutes in a comfortable environment. Data were presented descriptively and analyzed by comparing pre- and post-intervention anxiety scores. **Result:** All respondents experienced moderate to severe anxiety before the intervention. After the intervention, anxiety levels decreased in all respondents. The mean anxiety score decreased from 19.3 to 15.6, with a difference of 3.7 points. There was also a shift in anxiety categories from severe to moderate and from moderate to mild. **Conclusion:** Progressive muscle relaxation is effective in reducing anxiety levels in preoperative patients and can be applied as a non-pharmacological nursing intervention to improve patient readiness for surgery.

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Introduction

Surgical procedures are a vital component of healthcare worldwide, addressing a wide range of diseases and injuries. According to WHO data (2020), approximately

165 million surgical procedures are performed annually worldwide. This number continues to rise, with approximately 234 million people worldwide undergoing surgery in 2020. According to Dobson (2020) there were approximately 312.9 million surgeries globally, a 33.6% increase compared to eight years prior, with the need for surgical procedures exceeding 300 million per year. However, the distribution of these procedures remains uneven, as the majority of surgeries are performed in high-income countries. Based on data from the Indonesian Ministry of Health (2021), 1.2 million surgical cases were recorded in 2020, ranking 11th among the 50 most common disease treatments. About 32% of these were elective surgeries, indicating that the need for and utilization of national surgical services continue to rise as public awareness of the importance of appropriate medical care grows (Handa et al., 2024).

Studies report that preoperative anxiety is the most common issue among patients undergoing surgery, with prevalence rates ranging from 15.8% to 61% depending on the population and the assessment tool used (Bedaso et al., 2022). Data reported by Yu et al (2022) indicate that approximately 15.8% of adult patients in China experience preoperative anxiety, while systematic reviews in low- and middle-income countries and Ethiopia report rates of 55.7% and 61%, respectively. Another study by Lami et al (2025) noted that high levels of anxiety can increase the need for anesthesia, slow the wound healing process, and prolong the hospital stay. This phenomenon is a serious concern in nursing because anxiety can affect physiological conditions, such as increased blood pressure, heart rate, respiratory rate, and excessive muscle tension (Gu et al., 2023).

In Indonesia, preoperative anxiety is still commonly observed in various hospitals. It is estimated that this anxiety affects 75–90% of preoperative patients ((Yuliastuti et al., 2023). Similar findings were reported by Bedaso et al (2022), who found that the prevalence of preoperative anxiety in Asian countries, including Indonesia, reached approximately 62.6%, with higher rates among patients undergoing major surgery and those who had never undergone surgery before. This is triggered by fear of pain, concerns about surgical outcomes, and a lack of information from healthcare providers (Sahara & Hutasoit, 2020). This situation indicates that patients' psychological aspects are often not a primary focus in surgical preparation, despite having a significant impact on recovery and postoperative outcomes (Agüero- et al., 2023).

Poorly managed preoperative anxiety can have a direct impact on physiological conditions and surgical outcomes (Shebl et al., 2025). This condition can stimulate the sympathetic nervous system, leading to increased levels of stress hormones such as adrenaline and cortisol, which can ultimately raise blood pressure and worsen the patient's condition (Kassahun et al., 2022). Nurses play a strategic role in the nursing context to provide comprehensive nursing care, which focuses not only on the physical but also on the psychological aspects of the patient. Therefore, effective interventions are needed to help patients reduce anxiety prior to surgery (Kische et al., 2022).

Various methods have been used to reduce preoperative anxiety, both pharmacological and nonpharmacological. Pharmacological interventions typically involve the use of sedatives or anxiolytics; however, they carry the risk of side effects such as excessive drowsiness, impaired consciousness, and drug dependence (Ali et al., 2025). In contrast, non-pharmacological interventions such as music therapy,

aromatherapy, guided imagery, and progressive muscle relaxation are considered safer and easier to implement (Wang et al., 2022).

Several studies have demonstrated the effectiveness of Progressive Muscle Relaxation (PMR) in reducing preoperative anxiety (Tika & Candrawati, 2025). A study conducted by Aristiani and Susanti (2022) showed that patients who were given progressive muscle relaxation exercises for 25–30 minutes three times a day during the preoperative phase experienced a significant reduction in anxiety levels, from the moderate anxiety category to the mild anxiety category. Similar results were also found by Lizawati et al (2022), indicating that administering progressive muscle relaxation techniques for 20 minutes per session before surgery can reduce anxiety levels from moderate to mild after intervention. These findings reinforce the evidence that progressive muscle relaxation is an effective, easy-to-implement nursing intervention that does not cause side effects.

Based on the above findings, it can be concluded that preoperative anxiety is a significant issue that requires serious attention in nursing practice. The use of progressive muscle relaxation is expected to help patients achieve a state of calm and mental readiness before undergoing surgery. Therefore, the researcher is interested in conducting a study on “The Effect of Progressive Muscle Relaxation on Anxiety Levels in Preoperative Patients.”

Objective

To determine the effect of progressive muscle relaxation on anxiety levels in preoperative patients at Magelang Regional Hospital in 2025.

Method

This study employed a case study design and was conducted from October 20 to November 1, 2025, at Magelang Regional Hospital. The study participants consisted of three adult patients scheduled to undergo non-emergency surgery.

Inclusion criteria included patients aged ≥ 18 years who were fully conscious, willing to participate and sign an informed consent form, not receiving other pharmacological or non-pharmacological treatments for anxiety, having moderate to severe anxiety scores based on the Amsterdam Preoperative Anxiety and Information Scale (APAIS), and able to follow progressive muscle relaxation instructions. Exclusion criteria included patients with hearing impairment, impaired consciousness, or severe pain that could interfere with the relaxation process.

The instrument used was the Amsterdam Preoperative Anxiety and Information Scale (APAIS), which consists of six items covering two factors: preoperative anxiety (items 1, 2, 4, and 5) and the need for information (items 3 and 6). Each item was rated on a 1-to-5 Likert scale, where a score of 1 indicates no anxiety at all and a score of 5 indicates extreme anxiety. The total score ranges from 6 to 30, with higher scores indicating a greater level of anxiety. The assessment results are then categorized into several anxiety levels: a score of 6 is categorized as no anxiety/normal, scores 7–12 as mild anxiety, scores 13–18 as moderate anxiety, scores 19–24 as severe anxiety, and scores 25–30 as panic. These categories are used to determine the patient’s anxiety level prior to undergoing surgery. This instrument has been validated for both validity and reliability (Perdana et al., 2015), with a content validity coefficient of 1.0 and a construct validity of 70.79%. The Cronbach’s alpha reliability coefficient was

0.825 for the anxiety scale and 0.863 for the information needs scale. Measurements were taken before and after the intervention.

The study procedure began with an explanation of the study's objectives and a request for the participants' consent, followed by the administration of the APAIS questionnaire (pre-test). Patients with moderate to severe anxiety received a Progressive Muscle Relaxation (PMR) intervention lasting approximately 25–30 minutes in a quiet and comfortable environment. The intervention began with deep breathing exercises for approximately 2 minutes, involving inhaling through the nose for 4 seconds, holding the breath for 1 second, and exhaling through the mouth for 6 seconds, repeated 3–4 times. This was followed by muscle contraction and relaxation exercises using the simplified Jacobson technique. Participants were instructed to contract a muscle group for 5–7 seconds, then release it and feel the relaxation for 10–15 seconds before moving on to the next muscle group. The sequence of muscle groups included the hands and arms, forearms and upper arms, shoulders and neck, chest and abdomen, back, buttocks and thighs, calves and ankles, and feet and toes. If there were physical limitations, the exercises were adapted to the participant's condition. After the entire sequence is completed, a closing breathing exercise is performed for approximately 3 minutes to help the participant achieve optimal relaxation. After the session ends, the participant completes the APAIS questionnaire (post-test). All responses and events during the intervention are recorded. Data are analyzed descriptively by comparing total anxiety scores before and after the intervention.

Results

TABLE 1. Distribution of Respondent Characteristics by Age, Gender, Highest Level of Education, Type of Surgery, and Previous Surgical Experience (n=3)

No.	Patient ID	Age (Years)	Gender	highest level of education	Type of Surgery	Previous Surgical Experience
1	P1	24	Female	Senior High School	Appendectomy	No
2	P2	67	Male	Junior High School	Laparotomy	Yes, ureteroscopy
3	P3	54	Female	Senior High School	Mastectomy	No

Based on Table 1, this study involved three respondents who were scheduled to undergo non-emergency surgery. In terms of age, the respondents ranged from young adults to the elderly, specifically 24, 54, and 67 years old. The youngest respondent was P1 (24 years old), while the oldest was P2 (67 years old).

Based on gender, the majority of the respondents were female, namely two individuals (P1 and P3), while one respondent was male (P2). In terms of highest level of education, one respondent had completed high school (P1), while the other two had completed junior high school (P2 and P3).

The types of surgeries the respondents underwent varied: appendectomy for respondent P1, laparotomy for respondent P2, and mastectomy for respondent P3. Based on prior surgical experience, two respondents (P1 and P3) had never undergone surgery, while one respondent (P2) had a history of a previous surgery, namely ureteroscopy.

TABLE 2. Distribution of APAIS Pre-test and Post-test Scores Among Respondents (n=3)

No.	Patient ID	Pre-test		Post-test	
		APAIS Score	Anxiety Category	APAIS Score	Anxiety Category
1	P1	21	Severe	18	Moderate
2	P2	18	Moderate	12	Mild
3	P3	19	Severe	17	Moderate

Based on Table 2, it was found that all respondents experienced preoperative anxiety with varying levels of anxiety prior to the intervention. In the pre-test measurement using the Amsterdam Preoperative Anxiety and Information Scale (APAIS), two respondents (P1 and P3) showed severe anxiety levels with scores of 21 and 19, respectively, while one respondent (P2) showed moderate anxiety with a score of 18.

After the intervention, the post-test results showed a decrease in anxiety scores among all respondents. Respondent P1 experienced a decrease in score from 21 (severe anxiety) to 18 (moderate anxiety). Respondent P2 experienced a decrease in score from 18 (moderate anxiety) to 12 (mild anxiety). Similarly, respondent P3 experienced a decrease in score from 19 (severe anxiety) to 17 (moderate anxiety).

TABLE 3. Mean Anxiety Scores Before and After the Intervention (n=3)

Variable	Mean	Minimum	Maximum
APAIS Score			
Pre-test	19.3	18	21
Post-test	15.6	12	18
Decrease in score	3.7	6	3

Based on Table 3, it was found that the respondents' average anxiety score before the intervention (pre-test) was 19.3, with a minimum score of 18 and a maximum score of 21. After the intervention, the respondents' average anxiety score (post-test) decreased to 15.6, with a minimum score of 12 and a maximum score of 18. The difference in average anxiety scores before and after the intervention was 3.7 points, indicating an overall reduction in anxiety.

Discussion

The results of the study indicate that all respondents experienced preoperative anxiety prior to the intervention, with an average APAIS score of 19.3, which falls within the moderate-to-severe category. Preoperative anxiety is a common psychological response in patients about to undergo surgery, characterized by feelings of fear, tension, and worry regarding the surgical procedure, anesthesia, or potential complications (Bello et al., 2025). This condition can trigger activation of the sympathetic nervous system, leading to increased heart rate, blood pressure, respiratory rate, and muscle tension as part of the body's stress response (Nabilah et al., 2023). Additionally, the stress response triggers an increase in stress hormones such as cortisol and catecholamines, which play a role in heightening patients' alertness and anxiety during the preoperative period (Lee et al., 2023). This aligns with the findings of this study, in which all participants exhibited preoperative anxiety with relatively high APAIS scores prior to the intervention.

Based on respondent characteristics, factors such as age, gender, education, and prior surgical experience can influence anxiety levels (Ntock et al., 2025). In this study, respondents who had never undergone surgery exhibited higher anxiety levels compared to those with prior surgical experience. This is evident in the differences in the decrease in APAIS scores among respondents P1, P2, and P3. Although both experienced a decrease in anxiety levels, respondent P2 showed a more significant decrease of 6 points compared to respondents P1 and P3. This was influenced by the factor of prior surgical experience in P2, which served as a learning and adaptation process, enabling the patient to have a more concrete understanding of the procedure to be undergone. This finding aligns with the research by Nuraini and Ari (2023) which indicates that patients without prior surgical experience tend to have higher anxiety due to a lack of psychological preparedness and uncertainty regarding the surgical procedure. In addition, educational level also influences patient anxiety, as a higher level of education can enhance an individual's ability to understand medical information and develop better coping mechanisms (Ahmed et al., 2025). Thus, individual characteristics such as age, education, and prior surgical experience can influence patients' perceptions of the risks associated with surgery and contribute to the level of anxiety they experience.

The results of the study indicate that following the intervention, all participants experienced a decrease in anxiety scores, with the average APAIS score dropping from 19.3 to 15.6, representing a reduction of 3.7 points. Additionally, there was a shift in anxiety categories from severe to moderate and from moderate to mild. These findings align with the study by Tika and Candrawati (2025), which demonstrated that progressive muscle relaxation significantly reduced anxiety levels in preoperative patients, with those experiencing moderate to severe anxiety showing a reduction to mild anxiety following the intervention. Research by Arvela et al (2025) also indicates that progressive muscle relaxation techniques are effective in significantly reducing anxiety, with the majority of participants experiencing a shift in anxiety category to a milder level following the intervention. The reduction in anxiety scores in this study demonstrates that the intervention provided is effective in helping patients manage their anxiety responses prior to undergoing surgical procedures.

Physiologically, the reduction in anxiety following relaxation interventions occurs through mechanisms of autonomic nervous system regulation, specifically by decreasing sympathetic nervous system activity and increasing parasympathetic nervous system activity (Nabilah et al., 2023). Activation of the sympathetic nervous system during anxiety leads to increased heart rate, blood pressure, and muscle tension, whereas activation of the parasympathetic nervous system during relaxation reduces these physiological responses, allowing the body to become calmer and more stable. Additionally, relaxation techniques also help reduce muscle tension, improve oxygen circulation, and enhance patient comfort, which contributes to a reduction in overall perceived anxiety (Kische et al., 2022). This mechanism demonstrates that relaxation interventions not only work psychologically but also influence the body's physiological response to stress.

In addition, relaxation interventions also affect the neuroendocrine system, which plays a role in regulating stress and anxiety (Chan & Wu, 2024). During stressful conditions, the body increases the production of cortisol and catecholamine hormones, which trigger an anxiety response and increase the activity of the sympathetic nervous system. However, relaxation interventions can reduce the

activation of the sympathetic nervous system and increase parasympathetic activity, thereby helping to stabilize the body's physiological response and reduce anxiety (Rogerson et al., 2024). Other studies also indicate that relaxation techniques are effective in reducing anxiety by increasing feelings of comfort, reducing physical tension, and enhancing an individual's ability to manage stress responses (Raut et al., 2024). Thus, relaxation interventions can provide therapeutic effects both physiologically and psychologically.

The average decrease in anxiety scores of 3.7 points in this study indicates the effectiveness of the intervention in reducing preoperative anxiety. These results are consistent with the study by Tika and Candrawati (2025), which showed that relaxation interventions are effective in reducing anxiety, improving physiological responses, and enhancing patients' readiness before surgery. Furthermore, relaxation interventions have also been shown to enhance comfort, reduce stress responses, and improve patients' physiological stability during the perioperative period (Rogerson et al., 2024). Thus, relaxation interventions can serve as an effective self-administered nursing intervention to reduce preoperative anxiety and enhance patients' readiness for surgical procedures.

Conclusion

All respondents experienced a reduction in anxiety levels after receiving the progressive muscle relaxation intervention, as indicated by a decrease in the mean APAIS score from 19.3 to 15.6. This indicates that the intervention is effective in improving preoperative readiness. Future studies should involve larger samples and objective physiological measures to strengthen these findings.

References

- Agüero-, B., Abajas-, M. R. N. R., & Ortego-, C. (2023). Efficacy of nonpharmacologic interventions in preoperative anxiety : A systematic review of systematic reviews. *Journal of Clinical Nursing*, 32, 6229–6242. <https://doi.org/10.1111/jocn.16755>
- Ahmed, A., Nasur, M., Mohamed, E., Faragalla, A., Ahmed, M., Mohammed, M., Yusuf, A., & Issak, M. (2025). Preoperative Anxiety and Information Desire Among Patients Undergoing Elective Surgery in Northern Sudan: Multicenter Cross-Sectional Study. *JMIR Perioperative Medicine*, 8. <https://doi.org/10.2196/75736>
- Ali, M. A., Khan, M. H., & Salim, B. (2025). Comparing Pharmacological and Nonpharmacological Interventions for Alleviating Preoperative Anxiety in Pediatric Surgical Patients : A Randomized Controlled Trial in Pakistan. *Cureus*, 17(4), 1–7. <https://doi.org/10.7759/cureus.82502>
- Aristiani, I. D., & Susanti, I. H. (2022). Management of Preoperative Anxiety Patients with Progressive Muscle Relaxation Therapy Interventions. *Genius Journal*, 03(01), 113–118. <https://doi.org/10.56359/gj>
- Arvela, A., Wulandari, A., & Susanti, N. I. (2025). The Effect Of Progressive Muscle Relaxation Techniques On Anxiety Levels In Preoperative Patiens With General Anesthesia Techniques At Amanda Cikarang South Hospital. *Journal Indonesia Anesthesiology Nursing*, 1(2).

- Bedaso, A., Mekonnen, N., & Duko, B. (2022). Prevalence and factors associated with preoperative anxiety among patients income and undergoing surgery in low- - income countries: a systematic review and meta- - analysis. *BMJ*, 12, 1-10. <https://doi.org/10.1136/bmjopen-2021-058187>
- Bello, C. M., Eisler, P., & Heidegger, T. (2025). Perioperative Anxiety: Current Status and Future Perspectives. *Journal of Clinical Medicine*, 14(5), 1-12. <https://doi.org/10.3390/jcm14051422>
- Chan, I. I., & Wu, A. M. S. (2024). Assessing the Role of Cortisol in Anxiety, Major Depression, and Neuroticism: A Mendelian Randomization Study Using SERPINA6/SERPINA1 Variants. *Biological Psychiatry Global Open Science*, 4(3), 100294. <https://doi.org/10.1016/j.bpsgos.2024.100294>
- Dobson, G. P. (2020). Trauma of Major Surgery: A Global Problem That is Not Going Away. *International Journal of Surgery*, 81(May), 47-54. <https://doi.org/10.1016/j.ijsu.2020.07.017>
- Gu, X., Zhang, Y., Wei, W., & Zhu, J. (2023). Effects of Preoperative Anxiety on Postoperative Outcomes and Sleep Quality in Patients Undergoing Laparoscopic Gynecological Surgery. *Clinical Medicine Article*, 12(1835), 1-9.
- Handa, A., Gaidhane, A., & Choudhari, S. G. (2024). Role of Robotic-Assisted Surgery in Public Health: Its Advantages and Challenges. *Cureus*, 16(6). <https://doi.org/10.7759/cureus.62958>
- Kassahun, W. T., Mehdorn, M., Wagner, T. C., Babel, J., Danker, H., & Gockel, I. (2022). The effect of preoperative patient-reported anxiety on morbidity and mortality outcomes in patients undergoing major general surgery. *Scientific Reports*, 12(6312), 1-11. <https://doi.org/10.1038/s41598-022-10302-z>
- Kische, H., Zenker, M., Pieper, L., Beesdo-Baum, K., & Asselmann, E. (2022). Applied relaxation and cortisol secretion: findings from a randomized controlled indicated prevention trial in adults with stress, anxiety, or depressive symptoms. *Stress*, 25(1), 122-133. <https://doi.org/10.1080/10253890.2022.2045939>
- Lami, M., Negash, A., Dereje, J., Hiko, A., Mesfin, S., Gebreyesus, A., Belama, N., Omer, A., Balis, B., & Jibro, U. (2025). Prevalence of Preoperative Anxiety and Associated Factors Among Surgical Patients: Systematic Review and Meta-Analysis in Ethiopia. *Health Services Insights*, 18, 1-12. <https://doi.org/10.1177/11786329251316748>
- Lee, E., Jee, Y. J., Jung, J., Lee, M. H., & Hong, S. ok. (2023). Extraction of mandibular third molars: Relationship of preoperative anxiety with body mass index, serum high-sensitivity C-reactive protein levels, and visual analog scale scores and predictors of postoperative complications. *Journal of the Korean Association of Oral and Maxillofacial Surgeons*, 49(5), 252-261. <https://doi.org/10.5125/jkaoms.2023.49.5.252>
- Lizawati, Rahardiantini, I., & Agustina. (2022). Pengaruh Terapi Progressive Muscle Relaxation terhadap Rasa Cemas Pre Operasi Sectio. *Jurnal Keperawatan*, 12(1), 37-43. <https://doi.org/10.59870/jurkep.v12i1.136>

- Nabilah, D. P., Susanto, A., & Sebayang, S. M. (2023). Hubungan Tingkat Kecemasan dengan Tekanan Darah pada Pasien Pre Operasi dengan General Anestesi. *Jurnal Keperawatan Malang*, 8(2), 387–396.
- Ntock, F. N., Kona, S., Pouth, C. N., Beryl, N. D., Biloguy, W., Behiya, G., Bengono, R. B., Njankouo, Y. M., & Mbengono, J. A. M. (2025). Factors Associated with Preoperative Anxiety. *Open Journal of Anesthesiology*, 15(07), 179–189. <https://doi.org/10.4236/ojanes.2025.157013>
- Nuraini, R., & Ari, O. (2023). Analisis Faktor-faktor yang berhubungan dengan Tingkat Kecemasan Pada Pasien Pre Operasi. *Jurnal Kesehatan Akper Kesdam II Sriwijaya Palembang*, 12(1).
- Perdana, A., Firdaus, M. F., & Kapuangan, C. (2015). Uji Validasi Konstruksi dan Reliabilitas Instrumen The Amsterdam Preoperative Anxiety and Information Scale (APAIS) Versi Indonesia.
- Raut, S. J., Shetty, L., Chhatiwala, A., Domah, T. K., & Camblay, G. (2024). Effect of meditation and relaxation therapy on preoperative anxiety and stress in oral squamous cell carcinoma patients scheduled for oral and maxillofacial surgery: An experimental study. *National Journal of Maxillofacial Surgery*, 15(1), 67–74. <https://doi.org/10.4103/njms.NJMS>
- Rogerson, O., Wilding, S., Prudenzi, A., & O'Connor, D. B. (2024). Effectiveness of stress management interventions to change cortisol levels: a systematic review and meta-analysis. *Psychoneuroendocrinology*, 159(August 2023), 106415. <https://doi.org/10.1016/j.psyneuen.2023.106415>
- Sahara, M., & Hutasoit, L. (2020). Pengaruh Edukasi Persiapan Pre Operasi Terhadap Tingkat Kecemasan Pasien Pre Operasi Di Ruang Bedah Rsu Uki Tahun 2017. *Jurnal Antara Keperawatan*, 1(1).
- Shebl, M. A., Toraih, E., Shebl, M., Tolba, A. M., Ahmed, P., Banga, H. S., Orz, M., Tammam, M., Saadalla, K., Elsayed, M., Kamal, M., Abdulla, M., & Aiash, H. (2025). Preoperative anxiety and its impact on surgical outcomes : A systematic review and meta-analysis. *Journal of Clinical and Translational Science*, 9(33), 1–10. <https://doi.org/10.1017/cts.2025.6>
- Tika, A. R., & Candrawati, S. (2025). The Effectiveness Of Progressive Muscle Relaxation Therapy On Preoperative Anxiety : A Systematic Review. *Indonesian Journal of Global Health Research*, 7(4), 79–84.
- Wang, R., Huang, X., Wang, Y., Akbari, M., & Wang, Y. (2022). Non-pharmacologic Approaches in Preoperative Anxiety , a Comprehensive Review. *Frontiers in Public Health*, 10(854673). <https://doi.org/10.3389/fpubh.2022.854673>
- Yu, J., Zhang, Y., Yu, T., Mi, W., Yao, S., & Wang, Z. (2022). Preoperative Anxiety in Chinese Adult Patients Undergoing Elective Surgeries : A Multicenter Cross-Sectional Study. *World Journal of Surgery*, 46, 2927–2938. <https://doi.org/10.1007/s00268-022-06720-9>
- Yuliasuti, E., Enikmawati, A., & Ikawati, L. (2023). Gambaran Kecemasan Pasien Pra-operasi dengan Peningkatan Tekanan Darah. *Jurnal Kebidanan Dan Keperawatan*

Vol, 14(2), 181-192. <https://doi.org/10.33859/dksm.v14i2.922>