

PREOPERATIVE ANXIETY AS A PREDISPOSING FACTOR FOR POST-ANESTHETIC AGITATION FOLLOWING GENERAL ANESTHESIA IN ADULT PATIENTS

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ABSTRACT

Surgical procedures involve invasive interventions performed for diagnostic or therapeutic purposes and may induce various physiological responses. General anesthesia is commonly administered to suppress consciousness and pain during surgery; however, agitation may occur during post-anesthetic recovery and can be associated with psychological conditions such as anxiety before surgery. This study examined the association between preoperative anxiety levels and post-anesthetic agitation in patients receiving general anesthesia. A cross-sectional design was applied to 71 eligible patients recruited through consecutive sampling according to predefined inclusion and exclusion criteria. The association between the two variables was examined using Spearman's rank correlation. The analysis demonstrated a statistically significant positive relationship between preoperative anxiety and post-anesthetic agitation ($\rho = 0.779$, $p = 0.001$). Thus, higher levels of anxiety before surgery were associated with greater post-anesthetic agitation following general anesthesia. These findings highlight the potential importance of identifying and appropriately managing preoperative anxiety as part of perioperative care for patients undergoing general anesthesia.

Keywords: *Agitation, anxiety, general anesthesia, adult patients, recovery room.*

INTRODUCTION

Surgery is an invasive medical intervention aimed at establishing a diagnosis or managing various pathological conditions, trauma, and physical deformities through surgical incisions that may induce physiological changes in the body (Musyaffa et al., 2024). Anesthesia is an essential component of surgical procedures and is generally classified into general, regional, and local anesthesia (Maulidina et al., 2025). An ideal anesthetic will have a rapid onset to consciousness immediately after the anesthetic is discontinued. Anesthesia can be administered by inhalation, injection, or a combination of both (Suyanto & Nugroho, 2023).

General anesthesia is a medical intervention intended to eliminate pain sensation and induce loss of consciousness through the administration of specific reversible drugs, resulting in a predictable state of amnesia (Millizia et al., 2023). General anesthesia offers several advantages, including the loss of consciousness and memory during surgery,

facilitation of muscle relaxation through neuromuscular blocking agents, maintenance and control of airway patency, and support for prolonged surgical procedures (Christy et al., 2025). The selection of anesthetic techniques and agents for general anesthesia should take into account several considerations, including patient safety, ease of administration, rapid induction and recovery, hemodynamic stability, potential adverse effects, and cost-effectiveness (Dewi et al., 2024).

Postoperative recovery in the post-anesthesia care unit (PACU) is a dynamic phase during which various organ systems gradually regain their normal physiological functions following exposure to anesthetic agents and surgical interventions. During this period, patients are at risk of experiencing several complications, one of which is agitation. Post-anesthetic agitation is a common complication that may affect the quality of recovery and directly compromise patient safety. It is characterized by psychomotor disturbances, including increased motor and emotional activity, such as restlessness, exaggerated reactions, or uncontrolled behavior resulting from internal discomfort, psychological stress, or impaired adaptation during emergence from anesthesia, which is often associated with anxiety (Huda et al., 2024).

Preoperative anxiety is one of the most common psychological problem experienced by patients undergoing surgery, with a reported prevalence ranging from 60% to 80% among surgical patients. This condition has been shown to adversely affect surgical outcomes by increasing postoperative pain perception, anesthetic drug requirements, and recovery time. Furthermore, preoperative anxiety has been associated with a higher risk of postoperative complications, including postoperative delirium and cardiovascular events (Shebl et al., 2025). In addition, the reported incidence of post-anesthetic agitation following general anesthesia ranges from 25% to 80% across different age groups. Post-anesthetic agitation typically occurs within the first 30 minutes after anesthesia, with the highest incidence observed during the first 5-15 minutes of the recovery period (Maulidina et al., 2025).

Post-anesthetic agitation may lead to various adverse events that potentially endanger patients, including accidental removal of intravenous lines, surgical drains, wound dressings, and disruption of surgical sutures. In addition to affecting patient safety, this condition may negatively influence patient satisfaction with the quality of care and services provided by the anesthesia team (Widyastuti et al., 2023). Furthermore, agitation may increase the risk of falls, accidental extubation or dislodgement of airway devices, respiratory depression in the recovery room, prolonged hospitalization, and increased healthcare costs. The occurrence of agitation may be prevented through non-pharmacological approaches, such as providing preoperative education, informing patients about potential postoperative pain or discomfort following anesthesia, and repeatedly offering verbal reorientation regarding time, place, and personal identity. Pharmacological management of agitation may include the administration of propofol, opioids, magnesium sulfate, and dexmedetomidine (Lee & Sung, 2020). Therefore, implementing routine preoperative anxiety screening and appropriate preventive interventions may contribute to reducing the risk of post-anesthetic agitation and

improving perioperative outcomes.

Anxiety is an emotional response that arises from an individual's perception of a threat, characterized by feelings of fear, worry, and physiological tension. Anxiety may be caused by excessive stress in various situations in daily life. When anxiety appears difficult to control and is accompanied by physical manifestations such as muscle tension, sleep difficulties, and restlessness, it can impair an individual's quality of life (Hastuti, 2024). In the perioperative setting, anxiety is a common psychological response among patients awaiting surgery. Approximately 70% of surgical patients experience high levels of preoperative anxiety, particularly those undergoing surgery for the first time. Uncontrolled preoperative anxiety may adversely affect patients' physiological condition by increasing blood pressure, heart rate, cortisol secretion, and resistance to anesthetic agents, thereby complicating intraoperative management and delaying postoperative recovery (Dasep et al., 2025).

Preoperative anxiety is a common condition, with a reported prevalence ranging from 60 to 80% among surgical patients, and may potentially affect surgical outcomes. Several studies have demonstrated that increased anxiety can influence postoperative conditions, including heightened pain perception, increased requirements for anesthetic medications, and prolonged recovery time. Furthermore, anxiety has been shown to cause more severe complications such as post-anesthetic agitation (Shebl et al., 2025).

A study conducted by (Yan et al., 2024) reported that 37.75% of patients experienced emergence agitation, and pre-anesthetic anxiety showed a significant positive correlation with post-anesthetic agitation scores. Previous studies have demonstrated varying perspectives and approaches in investigating post-anesthetic agitation. Although previous studies have identified preoperative anxiety as a potential risk factor for emergence agitation, most investigations have focused on pediatric populations or evaluated multiple perioperative risk factors simultaneously. Evidence specifically examining the relationship between preoperative anxiety and emergence agitation among adult patients undergoing general anesthesia remains limited, particularly in Indonesia. Moreover, previous studies have rarely focused on anxiety as the primary independent variable using standardized anxiety (APAIS) and post-operative agitation (RASS) assessment tools within routine perioperative clinical practice. Therefore, the novelty of this study lies in evaluating preoperative anxiety as an independent psychological predictor of post-anesthetic agitation among adult patients undergoing general anesthesia in an Indonesia hospital setting using validated clinical instruments (Heily et al., 2025).

This study is expected to contribute both scientifically and clinically. Scientifically, it provides additional evidence regarding the role of preoperative anxiety as a psychological determinant of post-anesthetic agitation among adult surgical patients, particularly within the Indonesia healthcare context. Clinically, the findings may support the implementation of routine preoperative anxiety screening using APAIS and the development of targeted anxiety management strategies to reduce post-anesthetic agitation, improve patient safety, and optimize postoperative recovery. Therefore, this

study aimed to determine the relationship between preoperative anxiety and post-anesthetic agitation among adult patients undergoing general anesthesia.

RESEARCH METHOD

This study used an analytical correlational design with a cross-sectional approach to examine the association between preoperative anxiety and post-anesthetic agitation. The cross-sectional approach was considered appropriate because the study focused on identifying the relationship between these variables rather than determining causality or testing an intervention. Preoperative anxiety was measured before surgery, whereas post-anesthetic agitation was evaluated during the immediate postoperative recovery period. The study included 71 respondents recruited through consecutive sampling according to predefined inclusion and exclusion criteria. Participants were adults aged 17–60 years who underwent surgery under general anesthesia at Pindad General Hospital, Turen. Data collection was conducted from April 6 to May 15, 2026. Ethical approval was obtained from the Health Research Ethics Committee of ITS RS dr. Soepraoen under ethical clearance number KEPK-EC/553/IV/2026.

Preoperative anxiety was measured using the Amsterdam Preoperative Anxiety and Information Scale (APAIS), originally developed by Moerman et al. in 1996. The APAIS contains six items scored on a five-point Likert scale and is organized into two subscales. The anxiety subscale comprises items 1, 2, 4, and 5, while the need-for-information subscale consists of items 3 and 6. The Indonesian version of the APAIS was validated by Perdana et al. (2020). Its content validity was evaluated through expert panel discussion, confirming that the questionnaire items were relevant and adequately represented the construct of preoperative anxiety. The instrument also showed good internal consistency, with Cronbach's alpha coefficients of 0.825 for the anxiety subscale and 0.863 for the need-for-information subscale. Post-anesthetic agitation was evaluated using the Richmond Agitation-Sedation Scale (RASS), a validated measure of agitation and sedation in adult patients. The Indonesian version of the RASS showed good validity, with a Spearman correlation coefficient of 0.743, as well as excellent reliability, indicated by a Cronbach's alpha coefficient of 0.951 (Suhandoko et al., 2014).

The data were analyzed using univariate and bivariate procedures. Univariate analysis was used to summarize respondent characteristics and the study variables. Bivariate analysis was subsequently performed to examine the association between preoperative anxiety and post-anesthetic agitation following general anesthesia. Spearman's rank correlation was applied because both preoperative anxiety levels and post-anesthetic agitation scores were measured on an ordinal scale, making this nonparametric correlation method appropriate for assessing the relationship between the two variables.

RESULTS AND DISCUSSION

Results

Characteristics of Respondents

The characteristics of the study participants included sex, age, American Society of Anesthesiologists (ASA), and type of surgery. The distribution of respondents' characteristics is presented in the table below.

Table 1. Characteristic Respondents

Characteristics	Respondent	Frequency (f)	Percentage (%)
Sex	Male	30	42.3
	Female	41	52.7
Age (years)	17-24 years	22	31
	25-34 years	11	15.5
	35-42 years	16	22.5
	43-51 years	12	16.9
	52-60 years	10	14.1
	ASA I	15	21.1
ASA Classification	ASA II	47	66.2
	ASA III	9	12.7
	Orthopedic surgery	30	42.3
Type of surgery	General surgery	30	42.3
	Otolaryngologic surgery (ENT)	5	7
	Obsectric and gynecologic sugery	5	7
	Ophthalmic sugery	1	1.4

As presented in Table 1, most participants were female (n = 41, 57.7%). The largest age group was 17-24 years, comprising 22 participants (31.0%). The majority of participants were classified as ASA II (n = 47, 66.2%). Regarding the type of surgery, orthopedic and general surgical procedures were the most frequently performed, with each category representing 30 participants (42.3%).

Data Analysis

Table 2. Correlation Between Preoperative Anxiety and Post-Anesthetic Agitation

Post-general Anesthesia Agitation												
Preoperatif Anxiety Levels	Calm		Restlessness		Agitation		Severe agitation		Total		ρ (rho)	p-value
	F	%	F	%	F	%	F	%	F	%		
Not anxious	21	29,6	5	7	0	0	0	0	26	36,6	0,779	0,001
Mild anxiety	7	9,9	7	9,9	1	1,4	0	0	15	21,1		
Moderate anxiety	1	1,4	12	16,9	7	9,9	0	0	20	28,2		
Severe	0	0	1	1,4	7	9,9	2	2,8	10	14,1		

anxiety										
Panic	0	0	0	0	0	0	0	0	0	0
Total	29	40,8	25	35,2	15	21,1	2	2,8	71	100

Based on Table 2, most respondents with no preoperative anxiety remained calm after general anesthesia, accounting for 21 participants (29.6%), while 5 participants (7.0%) experienced restlessness. Notably, no patients with no preoperative anxiety experienced agitation or severe agitation. Among respondents with mild anxiety, 7 participants (9.9%) experienced restlessness, and 1 participants (1.4%) experienced agitation. This suggests that even mild anxiety may begin to influence postoperative recovery. In the moderate anxiety group, the majority experienced restlessness, accounting for 12 participants (16.9%), while 7 participants (9.9%) experienced agitation. Moderate anxiety appears to be a critical threshold where agitation becomes more prevalent.

Overall, 29 respondents (40.8%) were classified as calm, while 25 (35.2%) showed restlessness, 15 (21.1%) exhibited agitation, and 2 (2.8%) experienced severe agitation. Spearman's rank correlation revealed a statistically significant and strong positive association between preoperative anxiety and post-anesthetic agitation after general anesthesia ($p = 0.779$, $p = 0.001$). This result indicates that greater preoperative anxiety was associated with more severe post-anesthetic agitation. Accordingly, assessing preoperative anxiety may be clinically relevant for identifying patients who are more likely to experience agitation during postoperative recovery and for informing appropriate perioperative anxiety management.

Discussion

The present study identified a statistically significant association between preoperative anxiety and post-anesthetic agitation among patients undergoing general anesthesia ($p = 0.779$, $p = 0.001$). The positive and relatively strong correlation indicates that greater anxiety before surgery tended to occur alongside more pronounced agitation during post-anesthetic recovery. This pattern underscores the relevance of patients' preoperative psychological condition when considering behavioral responses during emergence from general anesthesia.

The descriptive findings further support this pattern. Most patients without preoperative anxiety remained calm during recovery, whereas agitation was more frequently observed among those with moderate or severe anxiety. In particular, patients classified as having severe preoperative anxiety showed a greater tendency toward post-anesthetic agitation. Taken together, these observations suggest that psychological status before surgery may be relevant to identifying patients who are more susceptible to agitation during recovery. Preoperative psychological assessment may therefore provide useful information for recognizing patients who require closer attention during the perioperative period.

Several physiological and psychological pathways may help explain the observed association. Preoperative anxiety has been recognized as one of the psychological factors

associated with post-anesthetic agitation in adult surgical patients; nevertheless, agitation is a multifactorial phenomenon that may also be influenced by patient characteristics, anesthetic management, surgical factors, and the surrounding clinical environment (Heily et al., 2025). From a physiological perspective, anxiety can stimulate sympathetic nervous system activity and the hypothalamic-pituitary-adrenal (HPA) axis, accompanied by increased release of catecholamines and cortisol. These stress responses may contribute to changes in hemodynamic regulation, greater sensitivity to pain, and difficulty adapting during emergence from anesthesia, all of which may increase susceptibility to agitation. From a psychological perspective, patients experiencing anxiety may have greater emotional vulnerability and a reduced capacity to cope with perioperative stress (Abdullah et al., 2024).

The findings of this study are consistent with theoretical perspectives describing anxiety as an emotional response to perceived threats that can affect both physiological and behavioral outcomes. Previous studies have reported that elevated anxiety levels before surgery are associated with increased anesthetic requirements, delayed recovery, greater pain perception, and behavioral disturbances during emergence from anesthesia. According to perioperative nursing and anesthesia theories, psychological preparation is an essential component of comprehensive perioperative care, as unmanaged anxiety may adversely affect surgical outcomes.

The present findings are consistent with those reported by (Yan et al., 2024), who found that 33.75% of patients experienced emergence agitation and identified pre-anesthetic anxiety as a significant predictor of post-anesthetic agitation. Similarly, the recent scoping review by (Heily et al., 2025) highlighted preoperative anxiety as an important psychological factor associated with emergence agitation in adult surgical patients, while emphasizing that the condition is multifactorial and influenced by patient, anesthetic, surgical, and environmental-related factors. These findings support the result of the present study, which demonstrated a strong positive correlation between preoperative anxiety and post-anesthetic agitation. Although previous studies have predominantly focused on physiological determinants of post-anesthetic agitation, the present study provides additional evidence supporting the contribution of psychological factors, particularly preoperative anxiety, to the development of post-anesthetic agitation following general anesthesia.

The findings of the present study extend the existing evidence by demonstrating that preoperative anxiety, when assessed using a standardized instrument (APAIS), is strongly associated with post-anesthetic agitation assessed using the RASS among adult patients undergoing general anesthesia in an Indonesian hospital setting. These findings emphasize the importance of considering psychological factors, in addition to physiological factors, in perioperative risk assessment.

The findings of this study have practical relevance for perioperative care. Incorporating routine preoperative anxiety screening with a standardized instrument such as the Amsterdam Preoperative Anxiety and Information Scale (APAIS) may assist healthcare professionals in identifying patients who could be more susceptible to agitation

during post-anesthetic recovery. Strategies such as preoperative education, therapeutic communication, psychological support, and pharmacological management when clinically indicated may be considered to alleviate anxiety before surgery and support perioperative care (Agüero-Milan et al., 2023). Recent evidence from systematic reviews and meta-analyses also suggests that non-pharmacological approaches can reduce preoperative anxiety among adult surgical patients, providing further support for incorporating anxiety-management strategies into perioperative practice (Agüero-Milan et al., 2023; Li et al., 2025). Accordingly, integrating psychological assessment and appropriate anxiety management into perioperative care may contribute to more comprehensive anesthesia care and postoperative recovery. These findings may also inform the development of evidence-based protocols in which psychological assessment is incorporated into routine preoperative evaluation. Future multicenter research with larger and more heterogeneous patient populations is needed to verify the present findings and to determine whether interventions that reduce preoperative anxiety can also decrease the occurrence of post-anesthetic agitation.

CONCLUSION

The findings indicate a significant association between preoperative anxiety and post-anesthetic agitation in adult patients receiving general anesthesia. Greater anxiety before surgery was associated with more pronounced agitation during the post-anesthetic recovery period. This relationship underscores the relevance of patients' psychological condition, particularly anxiety, as an important consideration in perioperative care and postoperative recovery. Therefore, perioperative management should consider psychological assessment alongside physiological evaluation. Early recognition of preoperative anxiety and appropriate management may help identify and support patients who are more susceptible to agitation during recovery, thereby contributing to patient safety and the overall quality of postoperative care.

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