Evaluation of preoperative anxiety, information desire, and their relationship with specific anesthesia concerns in elective surgery. A cross-sectional study

Luis Misael Guzman Ramirez M.D.
Barbara Mayela Miramontes Velázquez M.D.
Erick Alejandro Ramírez Valencia M.D
Fátima Careli Morado Manríquez M.D.
Habiram Pacheco Guerrero M.D.
Ricardo Serna Muñoz M.D.

Mexico City, Mexico

Original Article

Anesthesiology

OPEN ACCESS

Background: Background: Anxiety, desire for information, and anesthesia-related concerns represent distinct aspects of the preoperative experience.
Objective: To describe anxiety and desire for information, and explore the association between anxiety and anesthesia-related concerns during the preanesthetic consultation.
Materials and methods: This cross-sectional study included 100 ASA I-III adults scheduled for elective surgery. APAIS and an exploratory 10-item concerns questionnaire were administered. Analyses included Spearman correlation, nonparametric tests, and logistic regression.
Results: Median age was 44 years; 63% were men. Anxiety was low in 31%, moderate in 58%, and high in 11%; desire for information was high in 26%. Concerns were not significantly correlated with anxiety (rho=-0.060; p=0.556). In the adjusted model, general anesthesia was associated with higher odds of high anxiety (OR 5.18; p=0.029), whereas the concerns score was associated with lower odds (OR 0.83; p=0.041).
Conclusions: Moderate anxiety predominated, and one quarter of patients expressed a high desire for information. Adjusted associations were exploratory because of the small number of events and the lack of validation of the complementary questionnaire.

Keywords: Preoperative anxiety; APAIS scale; Preoperative information; General anesthesia; Elective surgery; Coping.

Preoperative anxiety comprises apprehension and discomfort regarding anesthesia and surgery. It must be distinguished from an anxiety disorder, whose diagnosis requires evaluating intensity, persistence, and functional impact (1). Its frequency varies depending on the population, evaluation tool, cutoff point, and timing of assessment (2). Two meta-analyses estimated prevalences of 48% across diverse surgical populations and 55.7% in low- and middle-income countries (3,4).

Anxiety may be accompanied by sympathetic and neuroendocrine activation, leading to changes in heart rate and blood pressure. It has been associated with increased postoperative pain, higher analgesic consumption, and impaired recovery (5). Associations with nausea, vomiting, and neurocognitive outcomes vary across studies; their presence cannot be causally attributed solely to anxiety (6). Evaluation can begin during the preanesthetic consultation, prior to operating room admission (5). Anticipation of the procedure, fear of pain, loss of control, intraoperative awareness, permanent sequelae, and death are concerns worth exploring (7). The intensity of these specific concerns and global anxiety require differentiated measurement.

Previous surgical experience, sex, surgical characteristics, and the healthcare context can influence anxiety levels; however, the magnitude and direction of these associations are not uniform (7,8). In Mexico, Valenzuela-Millán et al. evaluated preoperative anxiety in patients undergoing anesthetic procedures, providing a relevant local precedent (9). Nevertheless, single-institution findings do not inherently represent the broader health system.

Desire for information describes how much a patient wishes to know about anesthesia and surgery; this is distinct from the information sources used or the legal/ethical obligation of healthcare providers to inform. A low information desire score does not justify withholding explanations necessary for informed consent. The Amsterdam Preoperative Anxiety and Information Scale (APAIS) assesses anxiety and desire for information through two domains in its original structure (10); validated versions exist in Spanish and German (11,12). Specific concerns describe the qualitative content of fears, whereas age, sex, and clinical history represent patient characteristics.

This study aimed to describe anxiety and information desire during the preanesthetic consultation, characterize specific anesthesia-related concerns, and explore their association with preoperative anxiety. Information desire was analyzed descriptively and across subgroups.

Methods

Study design and setting

An observational, cross-sectional, and analytical study was conducted at Hospital Ángeles Metropolitano in Mexico City. Reporting followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (13). Preoperative anxiety, information desire, and anesthesia concerns were evaluated during the

Variable	Summary
Age (years)	Median 44 (IQR 32–61)
Sex	Male: 63 (63.0%); Female: 37 (37.0%)
Surgical type	Major: 52 (52.0%); Minor: 48 (48.0%)
Anesthetic technique	Regional: 55 (55.0%); General: 45 (45.0%)
APAIS item 1	1: 23 (23.0%); 2: 21 (21.0%); 3: 19 (19.0%); 4: 19 (19.0%); 5: 18 (18.0%)
APAIS item 2	5: 26 (26.0%); 4: 24 (24.0%); 2: 22 (22.0%); 1: 15 (15.0%); 3: 13 (13.0%)
APAIS item 3	5: 25 (25.0%); 1: 22 (22.0%); 2: 20 (20.0%); 3: 17 (17.0%); 4: 16 (16.0%)
APAIS item 4	4: 25 (25.0%); 5: 24 (24.0%); 1: 21 (21.0%); 2: 16 (16.0%); 3: 14 (14.0%)
APAIS item 5	3: 23 (23.0%); 5: 22 (22.0%); 2: 21 (21.0%); 1: 21 (21.0%); 4: 13 (13.0%)
APAIS item 6	2: 22 (22.0%); 1: 22 (22.0%); 3: 19 (19.0%); 5: 19 (19.0%); 4: 18 (18.0%)
APAIS total anxiety (items 1+2+5+6)	Median 12 (IQR 10–14)
APAIS information desire (items 3+4)	Median 6 (IQR 5–8)
Anxiety level (APAIS)	Moderate: 58 (58.0%); Low: 31 (31.0%); High: 11 (11.0%)
Information desire level (APAIS)	Moderate: 52 (52.0%); High: 26 (26.0%); Low: 22 (22.0%)
Concern: Fear of death	3: 23 (23.0%); 1: 23 (23.0%); 5: 21 (21.0%); 4: 17 (17.0%); 2: 16 (16.0%)
Concern: Intraoperative awareness	4: 21 (21.0%); 3: 21 (21.0%); 2: 20 (20.0%); 1: 19 (19.0%); 5: 19 (19.0%)
Concern: Postoperative pain	1: 22 (22.0%); 3: 21 (21.0%); 2: 20 (20.0%); 5: 19 (19.0%); 4: 18 (18.0%)
Concern: Postoperative nausea and vomiting	3: 23 (23.0%); 2: 22 (22.0%); 5: 21 (21.0%); 1: 19 (19.0%); 4: 15 (15.0%)
Concern: Permanent disability	1: 25 (25.0%); 2: 23 (23.0%); 5: 22 (22.0%); 4: 15 (15.0%); 3: 15 (15.0%)
Concern: Experience with anesthesiologists	5: 25 (25.0%); 3: 25 (25.0%); 1: 20 (20.0%); 2: 18 (18.0%); 4: 12 (12.0%)
Concern: Fear of needles and procedures	3: 23 (23.0%); 4: 22 (22.0%); 5: 21 (21.0%); 2: 20 (20.0%); 1: 14 (14.0%)
Concern: Feeling pain during surgery	1: 26 (26.0%); 4: 24 (24.0%); 2: 22 (22.0%); 3: 15 (15.0%); 5: 13 (13.0%)
Concern: Prior negative experiences (own/reported)	4: 24 (24.0%); 5: 23 (23.0%); 2: 22 (22.0%); 3: 18 (18.0%); 1: 13 (13.0%)
Concern: Other concerns	1: 26 (26.0%); 2: 21 (21.0%); 5: 21 (21.0%); 4: 20 (20.0%); 3: 12 (12.0%)
Total concerns score (1–5 per item)	Mean 29.80 (SD 4.28)

Table 1. General cohort characteristics and distribution of study variables. Anxiety and information desire domains were calculated using APAIS. Abbreviations: SD: standard deviation; IQR: interquartile range; APAIS: Amsterdam Preoperative Anxiety and Information Scale.

DOI 10.5281/zenodo.23611364
Copyright 2026 © Unauthorized reproduction of this article is prohibited.

Stratification	Comparison	APAIS total anxiety (median, IQR)	APAIS information desire (median, IQR)	p-value
Overall	-	12 (10–14)	6 (5–8)	-
Sex	Female vs Male	Female: 12 (10–14) Male: 12 (10–14)	-	p = 0.886
		-	Female: 6 (5–7) Male: 6 (5–8)	p = 0.673
Surgical type	Major vs Minor	Major: 13 (10–14) Minor: 12 (9–14)	-	p = 0.528
		-	Major: 6 (5–8) Minor: 6 (5–7)	p = 0.862
Anesthetic technique	General vs Regional	General: 13 (10–14) Regional: 12 (9–14)	-	p = 0.203
		-	General: 7 (6–8) Regional: 6 (4–7)	p = 0.056

Table 2. Preoperative anxiety and information desire scores measured by APAIS, overall and stratified by sex, surgical type, and anesthetic technique. Abbreviations: APAIS: Amsterdam Preoperative Anxiety and Information Scale; IQR: interquartile range.

preanesthetic consultation of patients scheduled for elective surgery.

Study population and selection criteria

The study population comprised adult patients of both sexes, aged 18 to 65 years, classified as ASA physical status I, II, or III, scheduled for elective surgery under general or regional anesthesia, recruited via consecutive sampling during preanesthetic evaluation. Excluded were patients with cognitive impairment or language barriers preventing questionnaire comprehension, pediatric patients, emergency surgeries, and patients who had received anxiolytic premedication prior to the interview to avoid pharmacological bias.

Sample size calculation

Sample size was calculated using a finite population formula for proportions, assuming a 95% confidence level, a 5% margin of error, and an expected proportion of 50%. Based on an estimated reference frame of 100 eligible procedures, a minimum sample size of 80 participants was derived. Recruitment was extended to 100 patients to compensate for potential dropouts or incomplete data. This calculation was aimed at proportion estimation rather than guaranteeing logistic regression model stability.

Data collection and instruments

Data were collected during the preanesthetic consultation prior to induction and medication administration, following signed informed consent. The APAIS consists of six items, featuring a 4-item anxiety domain (score range 4–20) and a 2-item information desire domain (score range 2–10) (10). The Spanish validation reported an overall Cronbach's alpha of 0.84 with a single-factor structure (11); this reliability coefficient pertains to the validation sample and not our study population. The second instrument was an exploratory 10-item concerns questionnaire (scored 1–5 per item, total score range 10–50). It lacks formal psychometric validation or a sample-specific reliability estimation; its score was analyzed as an exploratory measure.

Study variables

The primary outcome was the APAIS anxiety domain score; high anxiety was defined as a score >= 16 for logistic regression modeling. Information desire score, total concerns score, and individual concern items were described. Analyzed variables included age, sex, surgical type (major vs. minor), and anesthetic technique (general vs. regional). We hypothesized associations between higher anxiety and female sex, younger age, and higher concerns score.

DOI 10.5281/zenodo.23611364
Copyright 2026 © Unauthorized reproduction of this article is prohibited.

Concern Item	Overall (median, IQR)	Low anxiety	Moderate anxiety	High anxiety	p-value
Fear of death	3 (2–4)	3 (2–4)	3 (2–4)	4 (1–5)	0.504
Intraoperative awareness	3 (2–4)	3 (2–4)	3 (2–4)	3 (2–4)	0.968
Postoperative pain	3 (2–4)	3 (2–4)	3 (2–4)	3 (2–4)	0.797
Postoperative nausea and vomiting	3 (2–4)	3 (2–4)	3 (2–5)	2 (1–4)	0.385
Permanent disability	3 (2–4)	3 (2–4)	2 (1–4)	2 (1–4)	0.497
Experience with anesthesiologists	3 (2–4)	3 (2–5)	3 (2–4)	3 (2–3)	0.466
Fear of needles and procedures	3 (2–4)	3 (2–4)	4 (2–4)	3 (2–4)	0.245
Feeling pain during surgery	3 (1–4)	3 (1–4)	3 (2–4)	2 (2–3)	0.625
Prior negative experiences (own/reported)	3 (2–4)	4 (2–5)	3 (2–4)	3 (2–4)	0.225
Other concerns	3 (1–4)	3 (2–5)	2 (1–4)	3 (2–4)	0.738
Total concerns score (sum of 10 items)	29 (27–33)	30 (27–34)	29 (27–33)	29 (26–30)	0.252

Table 3. Specific anesthesia-related concern scores, by item and overall, stratified by anxiety level (APAIS: low, moderate, high). Abbreviations: IQR: interquartile range; APAIS: Amsterdam Preoperative Anxiety and Information Scale

Direct correlation between information desire and anxiety was not evaluated.

Statistical analysis

Analysis was conducted in R using RStudio. Continuous variables were summarized using mean and standard deviation (SD) or median and interquartile range (IQR) based on normality testing via Shapiro-Wilk. Categorical variables were presented as frequencies and percentages. Spearman's rank correlation evaluated associations between anxiety and concerns, with false discovery rate (FDR) adjustment applied for item-level correlations. Mann-Whitney U and Kruskal-Wallis tests compared subgroup distributions. Multivariable logistic regression included anesthetic technique and total concerns score, presenting odds ratios (OR). Statistical significance was set at $p < 0.05$, with results interpreted as exploratory given the 11 high-anxiety events.

Ethical considerations and specialist supervision

The protocol was approved by the Ethics and Research Committee of Hospital Ángeles Metropolitano. The study adhered to the Declaration of Helsinki. Written informed consent was obtained from all participants. Study design, result interpretation, and psychological concepts were supervised by a liaison psychiatry specialist. APAIS served as a screening tool without establishing formal psychiatric diagnoses (10).

Discussion

This study describes three dimensions of the preoperative experience: anxiety, information desire, and anesthesia concerns. Moderate anxiety was most prevalent (58%), 11% exhibited high anxiety, and 26% expressed high information desire. Total concerns showed near-zero correlation with anxiety, while adjusted regression revealed exploratory associations with anesthetic technique and concerns score.

DOI 10.5281/zenodo.23611364
Copyright 2026 © Unauthorized reproduction of this article is prohibited.

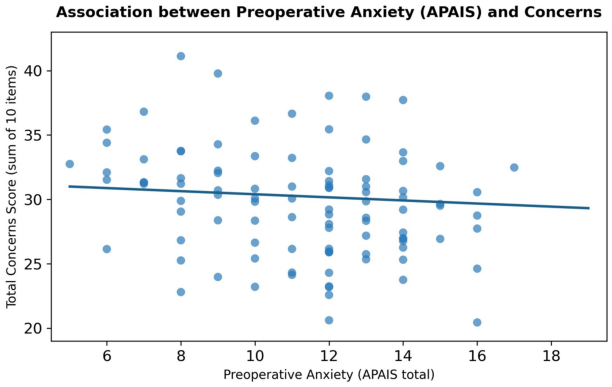


Figure 1. Association between preoperative anxiety and anesthesia-related concerns. Scatter plot of total anxiety score (APAIS; items 1+2+5+6) versus total concerns score (sum of 10 items, scale 1–5 per item).

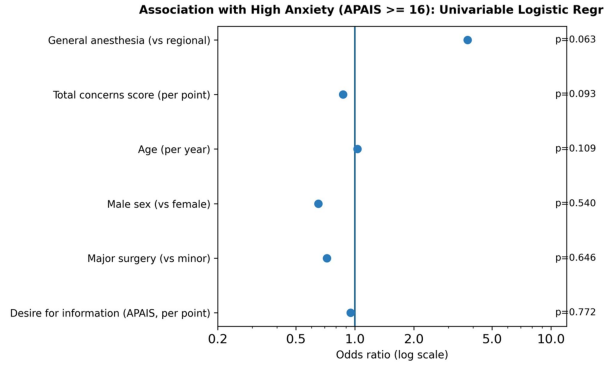


Figure 2. Univariable associations with high anxiety (APAIS >= 16). Odds ratios estimated via univariable logistic regression for each predictor. X-axis in logarithmic scale; vertical line indicates OR=1.

High anxiety prevalence (11%) was lower than the 27.1% reported by Shawahna et al. (14). Cutoff thresholds, surgical settings, and timing of preanesthetic evaluation contribute to variability across literature (7,14). Information desire (median 6, 26% high) was also lower than Shawahna et al.'s 57.1% (14). Although information desire trended higher in general anesthesia (p=0.056), this did not reach statistical significance.

The lack of correlation between specific concerns and overall anxiety may reflect conceptual independence between specific cognitive fears and broader affective anxiety, or measurement limitations of the exploratory questionnaire. The inverse association between concerns score and high anxiety in multivariable regression (OR 0.83) suggests possible active coping mechanisms through verbalization of specific fears, though measurement properties or model specification could also explain this finding.

Study limitations include the cross-sectional single-center design, small sample size, low number of high-anxiety events (n=11), and use of an unvalidated exploratory concerns scale. These factors necessitate caution and preclude causal inferences.

Conclusion

In elective surgical patients evaluated preoperatively, moderate anxiety predominated, and a quarter expressed high information desire. Specific anesthesia concerns were not correlated with overall anxiety levels. Adjusted associations of general anesthesia and specific concerns with high anxiety remain exploratory. Preoperative assessment should routinely evaluate anxiety, information needs, and specific patient concerns to tailor perioperative care.

Conflicts of interests

None declared by the authors.

Acknowledgements

The authors express their gratitude to the Department of Anesthesiology and the Research/Ethics Committee of Hospital Ángeles Metropolitano, as well as the liaison psychiatry service for their guidance in psychological concepts.

References

1. Craske MG, Stein MB. Anxiety. Lancet. 2016;388(10063):3048-59. doi:10.1016/S0140-6736(16)30381-6.
2. Bello CM, Eisler P, Heidegger T. Perioperative anxiety: current status and future perspectives. J Clin Med. 2025;14(5):1422. doi:10.3390/jcm14051422.
3. Abate SM, Chekol YA, Basu B. Global prevalence and determinants of preoperative anxiety among surgical patients: a systematic review and meta-analysis. Int J Surg Open. 2020;25:6-16. doi:10.1016/j.ijso.2020.05.010.
4. Bedaso A, Mekonnen N, Duko B. Prevalence and factors associated with preoperative anxiety among patients undergoing surgery in low-income and middle-income countries: a systematic review and meta-analysis. BMJ Open. 2022;12(3):e058187. doi:10.1136/bmjopen-2021-058187.
5. Stamenkovic DM, Rancic NK, Latas MB, Neskovic V, Rondovic GM, Wu JD, et al. Preoperative anxiety and implications on postoperative recovery: what can we do to change our history. Minerva Anestesiol. 2018;84(11):1307-17. doi:10.23736/S0375-9393.18.12520-X.
6. Ni K, Zhu J, Ma Z. Preoperative anxiety and postoperative adverse events: a narrative overview. Anesthesiol Perioper Sci. 2023;1:23. doi:10.1007/s44254-023-00019-1.
7. Eberhart L, Aust H, Schuster M, Sturm T, Gehling M, Euteneuer F, et al. Preoperative anxiety in adults: a cross-sectional study on specific fears and risk factors. BMC Psychiatry. 2020;20:140. doi:10.1186/s12888-020-02552-w.
8. Celik F, Edipoglu IS. Evaluation of preoperative anxiety and fear of anesthesia using APAIS score. Eur J Med Res. 2018;23:41. doi:10.1186/s40001-018-0339-4.
9. Valenzuela-Millán J, Barrera-Serrano JR, Ornelas-Aguirre JM. Ansiedad preoperatoria en procedimientos anestésicos. Cir Cir. 2010;78(2):151-6.

DOI 10.5281/zenodo.23611364
Copyright 2026 © Unauthorized reproduction of this article is prohibited.

10. Moerman N, van Dam FS, Muller MJ, Oosting H. The Amsterdam Preoperative Anxiety and Information Scale (APAIS). Anesth Analg. 1996;82(3):445-51. doi:10.1097/00000539-199603000-00002.
11. Vergara-Romero M, Morales-Asencio JM, Morales-Fernández A, Canca-Sanchez JC, Rivas-Ruiz F, Reinaldo-Lapuerta JA. Validation of the Spanish version of the Amsterdam Preoperative Anxiety and Information Scale (APAIS). Health Qual Life Outcomes. 2017;15:120. doi:10.1186/s12955-017-0695-8.
12. Berth H, Petrowski K, Balck F. The Amsterdam Preoperative Anxiety and Information Scale (APAIS): the first trial of a German version. Psychosoc Med. 2007;4:Doc01.
13. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. PLoS Med. 2007;4(10):e296. doi:10.1371/journal.pmed.0040296.
14. Shawahna R, Jaber M, Maqboul I, Hijaz H, Tebi M, Al-Sayed Ahmed N, et al. Prevalence of preoperative anxiety among hospitalized patients in a developing country: a study of associated factors. Perioper Med (Lond). 2023;12:47. doi:10.1186/s13741-023-00336-w.
15. Tadesse M, Ahmed S, Regassa T, Girma T, Hailu S, Mohammed A, et al. Effect of preoperative anxiety on postoperative pain on patients undergoing elective surgery: prospective cohort study. Ann Med Surg (Lond). 2022;73:103190. doi:10.1016/j.amsu.2021.103190.
16. Pekcan YO, Tuncalı B, Erol V. Effect of preoperative anxiety level on postoperative pain, analgesic consumption in patients undergoing laparoscopic sleeve gastrectomy: an observational cohort study. Braz J Anesthesiol. 2023;73(1):85-90. doi:10.1016/j.bjane.2021.11.003.
17. Marinelli V, Danzi OP, Mazzi MA, Secchettin E, Tuveri M, Bonamini D, et al. PREPARE: PreoPerative Anxiety REduction. One-year feasibility RCT on a brief psychological intervention for pancreatic cancer patients prior to major surgery. Front Psychol. 2020;11:362. doi:10.3389/fpsyg.2020.00362.

Ricardo Serna Muñoz
Department of Anesthesiology
Centro Médico ABC
Mexico City, Mexico.

 DOI 10.5281/zenodo.23611364
Copyright 2026 © Unauthorized reproduction of this article is prohibited.