Research Square

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Knowledge, Attitudes, and Practices of Anesthesiologists Regarding Preoperative Anxiety Management in China: A National Cross-Sectional Survey

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Research Article

Keywords: preoperative anxiety, management, anesthesiologist, perioperative care

Posted Date: June 5th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9323582/v1

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Additional Declarations: No competing interests reported.

Abstract

Background

Preoperative anxiety significantly affects postoperative recovery and patient satisfaction. Despite emphasis on perioperative mental health in enhanced recovery after surgery (ERAS) protocols, the current status of attitudes, practices, and the knowledge base of anesthesiologists to manage preoperative anxiety remains unclear.

Methods

We conducted a national cross-sectional online survey of Chinese anesthesiologists between July and August 2025. The survey covered demographic characteristics, knowledge of anxiety effects, risk factors, and clinical practices. We used multivariable logistic regression analysis to identify independent predictors of routine preoperative anxiety assessment.

Results

The results of 491 valid analysed questionnaires indicated that most respondents recognized the negative impact of preoperative anxiety, but only 16.1% were routinely assessed. The visual analogue scale for anxiety (VAS-A) was the most prevalent tool (58.9%). Multivariable analysis revealed that having > 10 years of practice (OR, 4.052; 95% CI, 1.326–12.383; P = 0.014) and preoperatively visiting patients (OR, 2.181; 95% CI, 1.152–4.129; P = 0.017) were independent predictors of routine assessments. Working in tertiary Grade A hospitals was associated with a significantly lower likelihood of routine assessment (OR, 0.533; 95% CI, 0.303–0.940; P = 0.030). Insufficient knowledge of assessment methods was the primary barrier to implementing management strategies

Conclusions

A significant knowledge-practice gap exists in preoperative anxiety management among Chinese anesthesiologists. Although awareness is high, routine assessments are limited, particularly in high-volume tertiary hospitals. Implementing simplified screening tools such as the Visual Analog Scale (VAS) during preoperative visits and addressing time constraints are crucial for improving perioperative mental health care.

1. Introduction

Preoperative anxiety is a prevalent psychological stress response during the perioperative period, with a prevalence range of 25%–80% among adult surgical patients [1–3]. Accumulating evidence indicates that excessive anxiety is associated with increased perioperative catecholamine release, hemodynamic

instability, higher anesthetic requirements, a range of adverse postoperative outcomes, including intensified pain, nausea and vomiting, delayed emergence, and reduced patient satisfaction [4–7]. Accordingly, current enhanced recovery after surgery (ERAS) recommendations and national expert consensus statements advocate routine assessment of preoperative anxiety and the implementation of multimodal management strategies [8, 9].

Despite these recommendations, the translation of evidence-based guidance into routine clinical practice remains inconsistent. Studies of perioperative anxiety have predominantly focused on patient-reported outcomes or the value of individual interventions [1, 2], whereas comparatively little attention has been paid to anesthesiologists, who are the primary decision-makers responsible for perioperative anxiety assessment and management. The knowledge base, attitudes toward anxiety evaluation, and real-world clinical practices of anesthesiologists are critical determinants of guideline adherence and patient benefits.

Anesthesiologists in China generally work under conditions of high surgical volume and rapid operating room turnover [10], which might further constrain the feasibility of structured psychological assessments. However, nationwide data characterizing the approaches of anesthesiologists to preoperative anxiety management remain scarce. Importantly, identifying gaps between knowledge and practice might reveal modifiable targets for improving perioperative care not only in China but also in other high-volume and resource-variable healthcare settings.

Therefore, we conducted a nationwide cross-sectional survey to evaluate knowledge, attitudes, and practices of anesthesiologists regarding preoperative anxiety management in China. We further aimed to identify independent factors associated with the routine assessment of preoperative anxiety using multivariate regression analysis.

2. Material and methods

2.1 Study design and participants

This descriptive cross-sectional survey was conducted between July 1 and August 30, 2025, using a convenience sampling strategy. Licensed anesthesiologists practicing in mainland China were eligible if they had at least one year of clinical anesthesia experience and provided informed consent to participate. Anesthesia interns and nonclinical anesthesia personnel and questionnaires with incomplete responses were excluded from the final analysis.

2.2 Survey instrument

A structured electronic questionnaire was developed based on a comprehensive literature review and the current guideline recommendations. Content validity was ensured by review by a panel of five senior anesthesiologists, each with > 10 years of clinical experience. We conducted a pilot test of 30 anesthesiologists and made minor linguistic revisions to enhance clarity.

The final questionnaire comprised four domains:

1. Demographic characteristics: sex, age, education, professional title, years of practice, and hospital level.
2. Knowledge and awareness: adverse effects of preoperative anxiety and recognized risk factors.
3. Attitudes and practices: assessment frequency, timing, methods, and management strategies.
4. Perceived barriers to standardized anxiety management.

The questionnaire consisted primarily of single- and multiple-choice items supplemented by open-ended questions (Supplementary File 1). The survey was administered anonymously *via* an online platform (Tencent Questionnaire). Each IP address was restricted to a single submission, and questionnaires completed in < 60 seconds were excluded to ensure data quality. The questionnaire was designed to capture routine clinical decision-making and perceived barriers by anesthesiologists under real-world perioperative conditions.

2.3 Statistical analysis

All data were statistically analysed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Categorical variables are presented as frequencies and percentages (%). Groups were compared using chi-square tests, independent sample t-tests, or one-way analysis of variance, as appropriate. Variables with $P < 0.10$ in univariate analyses were entered into a binary logistic regression model to identify independent factors associated with routine anxiety assessment. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated. Values with two-sided $P < 0.05$ were considered statistically significant.

A formal a priori sample size was not calculated because this study was exploratory. However, the size of the final sample exceeded that of most published national surveys of anesthesiologists and was considered adequate for descriptive and regression analyses.

3. Results

3.1 Characteristics of participants

A total of 493 questionnaires were received. After excluding two incomplete responses, 491 valid questionnaires were included in the final analysis, yielding a completion rate of 99.6%. Respondents were drawn from 27 provincial-level administrative regions across mainland China, and 56.0% were female. Most respondents were aged between 31 and 50 years, and most held bachelor's or master's degrees. The highest proportions consisted of attending and associate chief anesthesiologists, and most respondents were employed in tertiary grade A hospitals (82.9%). Table 1 summarizes the demographic characteristics of the respondents.

Table 1
Demographic and professional characteristics of participants (n = 491).

Characteristic	n (%)
Sex (M/F)	
	216(44.0)/275(56.0)
Age, years (≤ 30/31–35/36–40/41–45/46–50/>50)	
	193(39.3)/84(17.1)/94(19.1)/71(14.5)/19(3.9)/30(6.1)
Practice, years (≤ 5/6–10/11–15/16–20/>21)	
	207(42.2)/71(14.5)/99(20.2)/56(11.4)/58(11.8)
Education, degree (Bachelor/Master/Doctoral)	
	240(48.9)/213(43.4)/38(7.7)
Hospital status (tertiary Grade A/non-t **tertiary Grade A)**	
	407(82.9)/84(17.1)
Position (Resident/Attending/Associate Chief Physician and Above)	236(48.1)/151(30.8)/104(21.2)

3.2 Knowledge of preoperative anxiety

3.2.1 Awareness of preoperative anxiety and its adverse effects

We quantified how much anesthesiologists knew about the adverse effects of preoperative anxiety. We converted the nine multiple-choice items related to “adverse effects of anxiety” in the questionnaire into a continuous score (one point per selected item, with a maximum score of 8; “no effect” scored 0). The overall median knowledge score was 6 (IQR: 4–8). The results of the Mann–Whitney U tests in Table 2 revealed significant differences in knowledge scores based on age, years of practice, professional title, education, and hospital level ($P < 0.05$). Physiological impact was the most widely recognized specific adverse effect, with 95.9% of respondents identifying increased heart rates or blood pressure (Fig. 1A). However, awareness of long-term outcomes was lower; for instance, only 46.8% associated anxiety with a prolonged hospital stay.

In the open-ended section of the questionnaire, the participating anesthesiologists further reported additional potential adverse effects of preoperative anxiety. Through thematic analysis, these responses were mainly categorized into the following domains.

Physiological homeostasis and complications: Preoperative anxiety was perceived to precipitate pronounced intraoperative hemodynamic fluctuations, increase the incidence of postoperative shivering, and potentially exacerbate extant organic anxiety symptoms, thereby increasing perioperative mortality risk.

Quality of anesthesia and emergence: anxiety was considered to reduce the adequacy of regional anesthesia such as neuraxial anesthesia or peripheral nerve blocks and patient cooperation, while obviously increasing risk of postoperative agitation. Postoperative recovery and medical management: anxiety was thought to prolong stays in post-anesthesia care units (PACU), hinder long-term postoperative recovery, and increase the likelihood of medical complaints.

Table 2
Comparisons of knowledge scores by demographic and professional characteristics

Group	Scores		
	Adverse effects	**Risk factor**	**Known assessment scales**
Male (n = 216)	6.0 [4.0–8.0]	4.0 [3.0–5.0]	2.0 [0.0–3.0]
Female (n = 275)	6.0 [4.0–8.0]	4.0 [3.0–5.0]	1.0 [1.0–3.0]
P	0.860	0.070	0.134
Practice (years)			
≤ 10 (n = 278)	5.0 [3.0–7.0]	4.0 [3.0–5.0]	1.0 [0.0–3.0]
> 10 (n = 213)	6.0 [4.0–8.0]	4.0 [3.0–5.0]	2.0 [0.0–3.0]
P	< 0.001	0.047	0.130
Education			
Bachelor (n = 240)	6.0 [4.0–8.0]	4.0 [3.0–5.0]	1.0 [0.0–3.0]
Master /PhD (n = 251)	5.0 [4.0–7.0]	4.0 [3.0–5.0]	2.0 [1.0–3.0]
P	0.006	0.069	0.457
Hospital status			
Tertiary A (n = 407)	6.0 [4.0–7.0]	4.0 [3.0–5.0]	2.0 [1.0–3.0]
Non-Tertiary A (n = 84)	7.0 [5.0–8.0]	4.0 [4.0–5.0]	1.0 [0.0–3.0]
P	0.006	0.161	0.169
Age (years)			
≤ 35 (n = 277)	5.0 [3.5–7.0]	4.0 [3.0–5.0]	1.0 [1.0–3.0]
> 35 (n = 214)	6.0 [4.8–8.0]	4.0 [3.0–5.0]	2.0 [0.0–3.0]
P	< 0.001	0.017	0.278
Physician’s position			
Residents (n = 104)	7.0 [5.0–8.0]	4.0 [4.0–5.0]	2.0 [0.3–3.0]
Attending/Associate Chief Physician and above (n = 387)	5.0 [4.0–7.0]	4.0 [3.0–5.0]	1.0 [0.0–3.0]
P	< 0.001	0.175	0.079

*Data are presented as medians with interquartile ranges [IQR].

*Data are derived from the multiple-choice(A/B) and single-choice(C) section of the survey. (n = 491).

3.2.2 Awareness of risk factors

Based on the seven core risk factors for preoperative anxiety recommended in current anti-anxiety guidelines, each risk factor was converted into a continuous variable for scoring purposes (one point per identified factor, with a maximum score of 7). The mean knowledge score among the anesthesiologists was 4.19 ± 1.45 (Table 2. Groups)were compared using the Mann-Whitney U tests. The results revealed significant differences in age and years of practice among the groups ($P < 0.05$).

Long-term sleep disturbances (86.8%) and being female (77.0%) were the most prominent predictors of individual risk, followed by malignant tumors (70.9%) and specific types of surgery (68.6%). Notably, 56.4% of respondents considered older patients to have a higher risk of anxiety, whereas 44.8% identified higher educational attainment as a risk factor (Fig. 1B).

In response to the open-ended questions, the anesthesiologists reported additional potential risk factors beyond those included in the guidelines. Qualitative analysis categorized these factors into the following themes: psychological traits and comorbidities (history of anxiety or depression and highly sensitive personality traits), social support systems (transmission of anxiety from family members and financial burden), perioperative communication (inadequate understanding of disease prognosis, and insufficient informed consent, or misconceptions about anesthesia procedures).

3.2.3 Surgical specialty and perceived anxiety prevalence

Regarding the anticipated prevalence of preoperative anxiety among different surgical specialties, 39.5% of the anesthesiologists considered patients undergoing obstetric and gynaecological surgery to have the highest incidence of preoperative anxiety, followed by those undergoing cardiovascular surgery (23.4%) and neurosurgery (16.3%) (Fig. 1C).

3.3 Assessment of preoperative anxiety

3.3.1 Frequency and timing of assessment

The survey responses indicated that the routine assessment of preoperative anxiety has not been widely implemented in daily clinical practice. Only 16.1% of the anesthesiologists reported routinely assessing patients' anxiety levels, while 52.1% occasionally assessed preoperative anxiety, and 11.8% reported never assessing anxiety (Fig. 2A). The subgroup analysis of respondents who had never conducted anxiety assessments (n = 76) revealed that the main barriers were a lack of knowledge regarding assessment methods (32.0%), limited clinical time (26.0%), and the belief that assessment was unnecessary (22.0%). Most anesthesiologists conducted initial evaluations during preoperative visits in a ward or an outpatient clinic, followed by assessment after the patient entered the operating room (Fig. 2E).

*Data are derived from the single-choice(A/B/C) and multiple-choice(D/E/F/G/H) section of the survey(n = 491).

3.3.2 Assessment methods

The assessment approaches used by the anesthesiologists obviously relied on subjective judgment (Fig. 2F). The most frequent methods were observations of patient behaviour (72.5%) and direct inquiry into feelings of patients (69.0%), followed by indirect assessment based on fluctuations in vital signs (63.7%).

In contrast, standardized assessment tools were relatively limited, with only 18.7% of the respondents routinely using formal scales. In terms of awareness of specific instruments (Fig. 2D), the Visual Analog Scale for Anxiety (VAS-A) was the most widely recognized (58.9%), followed by the Self-Rating Anxiety Scale (SAS; 40.7%). Notably, awareness of perioperative-specific instruments, such as the Amsterdam Preoperative Anxiety and Information Scale (APAIS; 24.6%) and the modified Yale Preoperative Anxiety Scale (13.8%), was low, and 26.1% of anesthesiologists reported being unfamiliar with any anxiety assessment scales.

3.3.3 Factors influencing assessment behaviour

We used a binary logistic regression analysis to identify independent factors associated with routine preoperative anxiety assessments (Fig. 3). Variables including education level and professional title, which were significant in the univariate analysis, did not retain significance in the multivariable model.

Working in a Tertiary Grade A hospital was identified as an independent negative predictor (OR, 0.533; 95% CI, 0.303–0.940; P = 0.030), suggesting that anesthesiologists in top-tier hospitals were less likely to routinely assess patients. In contrast, longer practice (> 10 *vs*. ≤10 years), OR, 4.052; CI, 1.326–12.382; P = 0.014), deeper knowledge of anxiety assessment scales (OR, 1.368; 95% CI, 1.198–1.562), and visiting patients preoperatively (OR, 2.181; CI, 1.152–4.129;P = 0.017) were positively associated with more frequent assessments.

Beyond the factors identified in the regression model, Spearman correlation analysis further revealed a positive correlation between educational level and the number of assessment methods used (ρ = 0.132, P = 0.003). This suggests that anesthesiologists with higher educational backgrounds tend to utilize a broader range of assessment tools.

*OR:odds ratios, CI: confidence intervals.

3.4 Clinical management strategies and barriers to implementation

3.4.1 Pharmacological interventions: preferences for sedatives

Pharmacological sedation remains the primary strategy for managing anxiety. Overall, 38.5% of the respondents stated that preoperative sedatives were routinely administered in their workplace. Dexmedetomidine was the most preferred agent, slightly surpassed midazolam (63.7% *vs*. 61.9%; Fig. 2G). The open-ended responses included estazolam, remimazolam, and sufentanil as alternative options.

3.4.2 Non-pharmacological interventions: a gap between awareness and practice

Although non-pharmacological interventions are widely recommended, only 29.9% of the anesthesiologists reported their routine application in clinical practice (Fig. 2C). The specific measures were limited to basic verbal reassurance (92.1%) and preoperative education (67.6%; Fig. 2H). In contrast, recent interventions requiring additional resources such as a family presence (28.1%), music therapy (19.1%), and virtual reality (VR)- or multimedia-based preoperative education were infrequently applied as shown by low utilization rates.

Spearman correlation analysis revealed a significant positive correlation between anesthesiologists' awareness scores and the diversity of non-pharmacological interventions employed ($\rho = 0.227$, $P < 0.001$). Similarly, a significant positive correlation was observed between educational level and intervention diversity ($\rho = 0.147$, $P = 0.001$), indicating that anesthesiologists with higher academic backgrounds tend to apply a wider range of non-pharmacological strategies.

3.4.3 Major barriers to implementation

Respondents identified four key barriers to standardizing the management of preoperative anxiety: insufficient institutional or departmental emphasis (84.7% of anesthesiologists considered neglect of anxiety management within the healthcare system or their departments to be the most significant obstacle), lack of appropriate tools (81.7% reported the absence of rapid and accurate screening instruments), absence of standardized workflows (67.0% indicated a lack of simple and feasible intervention protocols), and concerns about adverse effects (61.9% of anesthesiologists were worried about potential side effects or uncertainty regarding the effectiveness of interventions).

Open-ended feedback further revealed that excessive clinical workload, limited time for doctor-patient communication, and a shortage of human resources represent practical bottlenecks that hinder the effective implementation of preoperative anxiety management strategies.

4. Discussion

This nationwide survey yielded the following main findings. Routine assessments and standardized management were uncommon despite awareness of the clinical importance of preoperative anxiety. Misconceptions regarding anxiety-related risk factors, particularly patient age, were prevalent. Pharmacological strategies such as dexmedetomidine were favoured over non-pharmacological approaches.

Our findings revealed a critical misconception: 56.4% of anesthesiologists perceived that older patients are more susceptible to preoperative anxiety. This perception contradicts existing epidemiological evidence. Younger age has been consistently identified in large studies as one of the strongest independent predictors of preoperative anxiety [11, 12]. Younger patients tend to be more concerned about family responsibilities, postoperative recovery, and body image, whereas older patients may exhibit lower trait anxiety due to greater life experience or a more fatalistic attitude toward illness [13]. Such a cognitive bias might result in anesthesiologists overlooking the psychological needs of younger patients. These findings suggest that future medical education should address and correct the stereotype that more advanced age is associated with higher anxiety risk and instead emphasize younger patients who might appear physically resilient but are substantially distressed psychologically.

A concerning finding of our study was that working in a tertiary Grade A hospital was an independent negative predictor of routine anxiety assessment (OR = 0.533). Theoretically, top-tier hospitals possess better resources and should provide standardized care. However, our results suggest the opposite. This likely reflects the immense pressure for efficiency and the high surgical turnover in Chinese major medical centres. As noted in our barrier analysis, "insufficient time" and "workload" were the major impediments. In high-volume settings, the imperative to maximize operating room utilization might inadvertently marginalize "soft" clinical indicators such as anxiety. This underscores a systemic need; individual clinicians in high-pressure environments are unlikely to prioritize anxiety assessment when it is not incorporated into standard quality metrics such as ERAS.

The present study also found that only 18.7% of anesthesiologists routinely used standardized anxiety assessment scales, with most relying on behavioural observations or direct questioning. Although subjective assessment is convenient [14], the correlation between subjective judgments by anesthesiologists and self-reported APAIS scores provided by patients is poor. Thus, clinicians often significantly underestimate patients' true anxiety levels. Lack of time has frequently been cited as a major barrier. Given that traditional instruments such as the State–Trait Anxiety Inventory (STAI) are time-consuming and impractical in demanding clinical settings, the promotion of ultra-brief screening tools such as the single-item VAS-A might be more feasible. The agreement between the VAS-A and STAI is high and it can be completed in less than one minute, supporting its routine clinical application [15].

Our results indicated that dexmedetomidine (63.7%) surpassing midazolam as the preferred sedative among Chinese anesthesiologists. This trend is consistent with recent advances in ERAS and perioperative neuroprotection. A meta-analysis has shown that dexmedetomidine is an effective anxiolytic can also reduce the incidence of postoperative delirium and preserve arousability more effectively than benzodiazepines [16]. These findings suggest that anesthesiologists in China are gradually shifting from focus on sedation and anxiolysis towards a higher goal of perioperative brain health management.

Our study also found that higher educational level was associated with greater diversity in anxiety assessment methods and non-pharmacological interventions. This may reflect that anesthesiologists

with advanced training are more familiar with a broader array of options, potentially enabling more individualized care. However, whether greater diversity directly translates into improved patient outcomes requires further investigation.

Insufficient institutional attention and transmission of anxiety from family members were identified as major barriers to the effective management of anxiety. The effects of family anxiety range from psychological distress to tangible clinical outcomes. High parental anxiety was significantly associated with increased postoperative pain scores and complication rates in children undergoing adenotonsillectomy [17]. This finding provides empirical evidence of the “contagious” nature of perioperative anxiety and its potential to compromise physiological recovery. However, our results showed that interventions targeting family members have rarely been implemented. Future preoperative assessment models should adopt a family-focussed care approach and expand anxiety assessment and education to include primary caregivers of patients [18].

This study had a few limitations. Convenience sampling and self-reported data introduced potential for selection and reporting bias. The predominance of respondents from tertiary hospitals might limit the generalizability of our results to smaller institutions. In addition, patient-reported anxiety levels were not assessed, preventing a direct comparison between clinician perceptions and actual patient experiences.

5. Conclusions

This nationwide survey revealed that although anesthesiologists widely recognize the importance of preoperative anxiety, routine assessments and standardized management remain limited. Misconceptions regarding risk factors for anxiety, underutilized validated screening tools, and reliance on pharmacological strategies contribute to a persistent knowledge–practice gap. These findings emphasize the need to integrate brief anxiety screening and standardized management strategies into routine perioperative workflows.

Glossary

APAIS: Amsterdam Preoperative Anxiety and Information Scale

CI: Confidence Interval

ERAS: Enhanced Recovery After Surgery

IQR: Interquartile Range

KAP: Knowledge, Attitudes, and Practices

OR: Odds Ratio

PACU: Post-Anesthesia Care Unit

SAS: Self-Rating Anxiety Scale

SPSS: Statistical Package for the Social Sciences

STAI: State–Trait Anxiety Inventory

VAS: Visual Analog Scale

VAS-A: Visual Analog Scale for Anxiety

VR: Virtual Reality

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki and was approved by the Institutional Review Board of The Third Affiliated Hospital of Sun Yat-sen University(Approval No. [2024]02-076-06). Electronic informed consent was obtained from all participants prior to survey completion.

Clinical trial number

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding source

This research was financially supported by the Guangdong Basic and Applied Basic Research Foundation (Joint Fund for Enterprise Innovation)[grant number 2024A1515220031]and The Third Affiliated Hospital of Sun Yat-sen University, Clinical Research Program[grant number YHJH202407].

Authors' contributions

ZC and HF conceived and designed the study. ZC and YY acquired the data. YW reviewed the data. ZC and YG performed the statistical analysis. ZC, YY, and HF drafted the manuscript. All authors critically revised the manuscript. All authors read and approved the final manuscript.

Acknowledgements

We thank all participating anesthesiologists and the survey platform. We would like to thank Editage (www.editage.cn) for English language editing.

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Figures

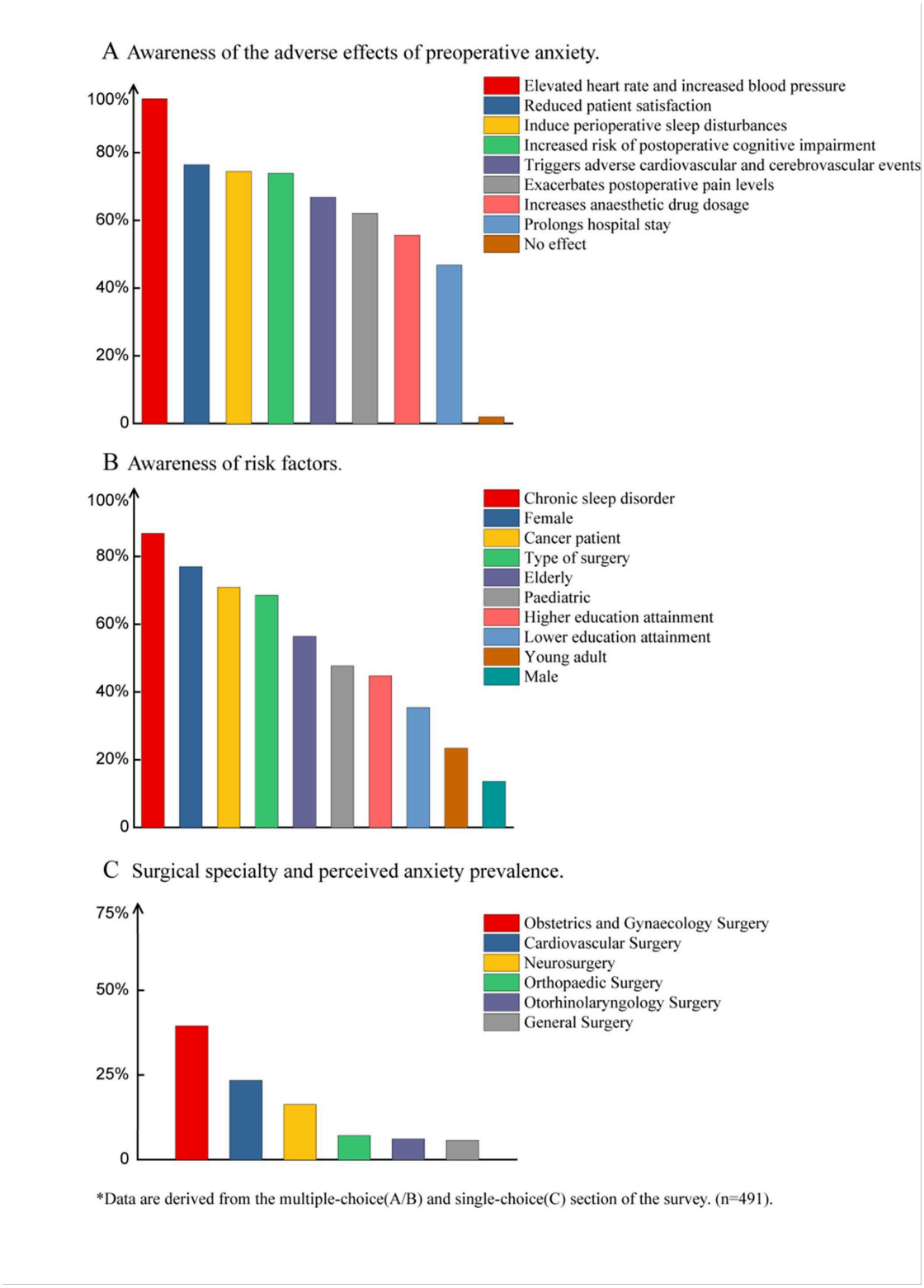


Figure 1

Anesthesiologists' knowledge and perceptions regarding preoperative anxiety.

*Data are derived from the multiple-choice(A/B) and single-choice(C) section of the survey. (n=491).

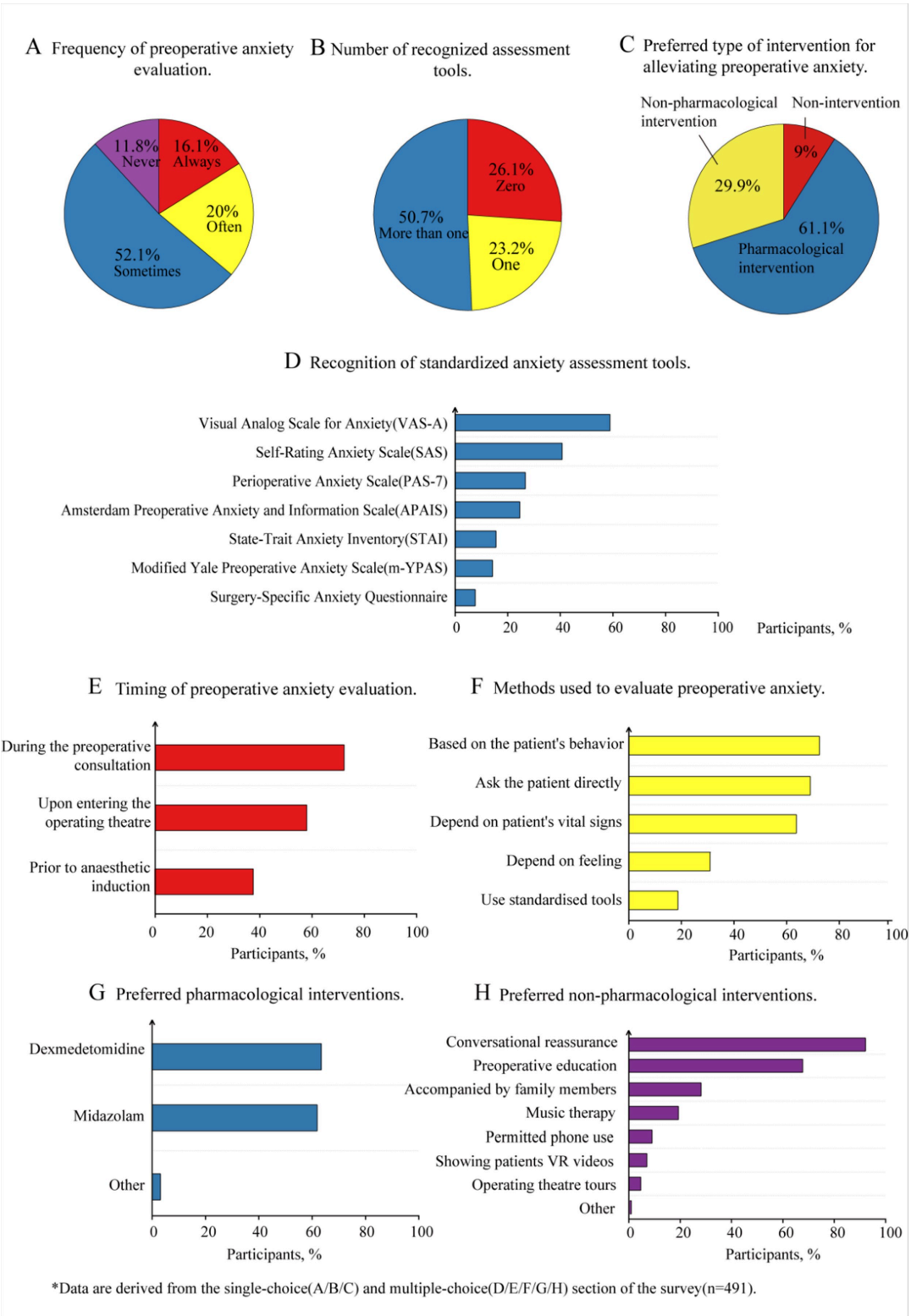


Figure 2

Anesthesiologists' practices and preferences in the assessment and intervention of preoperative anxiety.

*Data are derived from the single-choice(A/B/C) and multiple-choice(D/E/F/G/H) section of the survey(n=491).

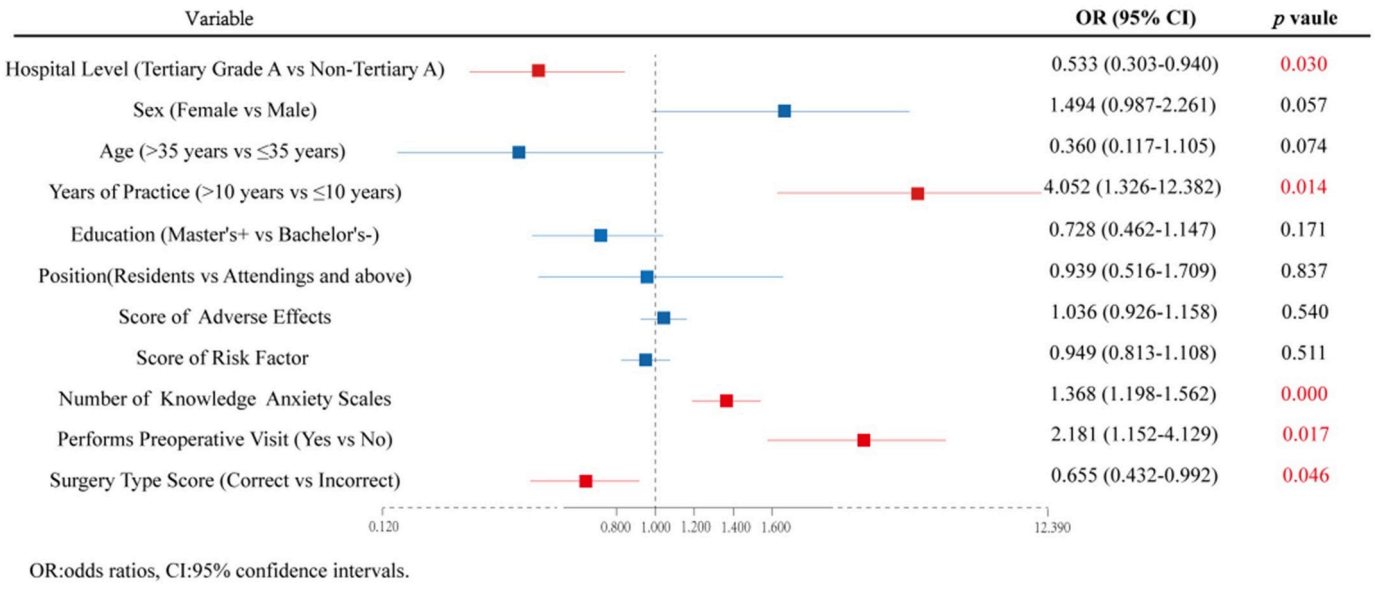


Figure 3

Factors Associated with Preoperative Anxiety Assessment Frequency.

*OR:odds ratios, CI: confidence intervals.

Supplementary Files

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- SupplementaryFile4.23.docx