

Patient Attitudes and Awareness of Anesthesia Risks and Perioperative Instructions in Preoperative Anesthesia Clinics: A Multicenter Cross-Sectional Survey in Digestive Endoscopic Patients

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Purpose: To meet the rapidly growing demand for digestive endoscopies and daytime surgeries, the setup of preoperative assessment clinics is increasing explosively in China. This study aims to explore patient attitudes to patient education and to assess patient awareness scores regarding informed consent and perioperative instructions in preoperative anesthesia clinic, as well as to evaluate the preference of current patient education tools.

Patients and Methods: A cross-sectional study was conducted across five hospitals. A 37-item digital questionnaire was administered to patients who attended preoperative anesthesia assessment clinics and underwent digestive endoscopies between September 1 and September 20, 2024. Awareness scores were calculated as the sum of correct responses to 15 questions assessing perioperative knowledge, with a total score ranging from 0 to 15, and higher scores indicating greater awareness.

Results: A total of 1300 participants were included in the study. Over 97% of the patients reported a positive attitude to the preoperative assessment clinic. Approximately 20% of patients reported poor recall of the information provided by anesthesiologists. Mean awareness rates were 51.2% for preoperative precautions, 62.7% for anesthesia-related risks, and 56.7% for postoperative precautions, with an overall awareness score of 8.37 ± 4.2 points. Higher awareness scores correlated with higher education levels ($p < 0.05$), shorter intervals (≤ 1 week) between clinic visits and procedures ($p < 0.05$), and the use of multimedia and interactive educational methods ($p < 0.05$).

Conclusion: Sole reliance on preoperative anesthesia assessment clinics for patient education on informed consent and perioperative instructions is inadequate. We recommend a multimodal, patient-centered approach that accounts for educational background, integrates periodic reinforcement, and employs diverse educational tools, including multimedia and interactive strategies, to optimize information comprehension and retention.

Keywords: preoperative anesthesia clinic, risk informing, patient education, awareness, perioperative instructions

Introduction

According to the 2023 national endoscopic census data, as many as 27.5 million digestive endoscopic interventions and 1.45 million ambulatory surgeries¹ were conducted in China alone. To accommodate the rapidly increasing demand for gastrointestinal endoscopies and daytime surgeries, standalone preoperative anesthesia assessment clinics have expanded significantly all around the world.^{2,3} Preoperative anesthesia clinics are highly recommended for preoperative patient

assessment and instruction prior to the procedures to reduce perioperative morbidity and mortality.^{1,4} An effective preoperative clinic should conduct comprehensive health assessments, optimize chronic medications, provide psychological preparation, facilitate patient counseling, clarify procedural expectations, and deliver risk communication and precautionary instructions.⁵ However, some institutions without anesthesia clinics still offer preoperative assessments for patients undergoing digestive endoscopy at endoscopy centers on the day of surgery.

According to an unpublished internal survey conducted by our group in October 2023, a substantial proportion of sampled hospitals in China reported having established preoperative anesthesia assessment clinics. Most doctors applaud preoperative anesthesia clinics and believe that interviewing the patients on the day of procedure is hasty and insufficient. Furthermore, inadequate preoperative evaluation and preparation may lead to an increased risk of perioperative complications. The proper amount of information and its manner of presentation remains unclear, as providing too much information may increase the level of pre-operative anxiety in patients,⁶ whereas providing insufficient information may affect patient expectations and lead to worse subjective outcomes.⁷

As emphasized in recent literature, quality improvement in preoperative anesthesia clinics should incorporate patient feedback as a key guiding metric.⁸ Studies have assessed satisfaction with the preoperative visit experience for upcoming surgeries.⁹ In addition, Edward et al developed and validated the Patient Experiences with the Preoperative Assessment Clinic (PEPAC) questionnaire.¹⁰ However, these studies primarily focused on patient satisfaction with care delivery and service flow rather than patients' perioperative awareness, which in the present study refers to patients' understanding of essential perioperative information. This study aims to: (1) explore patient attitudes to patient education in preoperative anesthesia clinics, (2) quantitatively assess patient awareness scores regarding informed consent and perioperative instructions, and (3) evaluate the efficacy of current patient education tools. The findings are expected to inform optimization of patient education processes, enhance educational quality, and ultimately ensure patient safety and improve patient satisfaction.

Materials and Methods

Ethical Approval

This multicenter cross-sectional survey received ethical approval from the Institutional Review Board of Peking Union Medical College Hospital in accordance with the Declaration of Helsinki (approval number K6957). Patient consent was secured right at the first page of the digital questionnaire.

Study Setting and Population

The study was initiated by Peking Union Medical College Hospital in collaboration with four tertiary medical centers: the First Affiliated Hospital of Inner Mongolia Medical University, Second Xiangya Hospital of Central South University, General Hospital of Northern Theater Command, and Wuhan Central Hospital. The patient education tools adopted by each hospital were documented.

Patients scheduled for gastroenterology endoscopy between September 1 and September 20, 2024, who had attended a preoperative anesthesia assessment clinic were considered eligible in the study. All eligible patients were invited to participate, and digital questionnaires were distributed either in-person on the day of the procedure or remotely via text message prior to the procedure. Participation was voluntary. Convenience sampling was used. To ensure representativeness, we targeted inclusion of at least 30% of eligible patients per hospital over one month, with an overall goal of collecting more than 1200 completed questionnaires.

Questionnaire Design

The 37-item self-developed questionnaire comprised single-choice and multiple-choice questions divided into three sections: demographic data, patient perspectives about risk disclosure and patient instructions, and awareness of anesthesia-related risks and perioperative precautions.

Three satisfaction items assessed perceptions of the consent process, with the satisfaction score calculated as the sum of responses. Twelve items evaluated awareness of anesthesia risks/postoperative precautions using three response

options: “Doctors informed me, and I recall”, “Doctors did not inform me”, “Doctors informed me, but I forgot”. Based on these responses of the three options, we derived awareness rate (proportion correctly recall), “Not mentioned” rate (proportion reporting nondisclosure) and forgetting rate (proportion forgetting disclosed information). A composite awareness score (range: 0–15) was calculated as the sum of correct responses to 15 questions assessing perioperative knowledge, with higher scores indicating greater awareness. The questionnaire was reviewed by a panel of three anesthesia experts for content validity and pilot-tested in 10 patients to ensure clarity and feasibility.

Statistical Analysis

Analyses were performed using SPSS Statistics (Version 26; IBM, USA). Data were assessed for normality using the Kolmogorov–Smirnov test. Normally distributed continuous variables were reported as *mean* ± *SD*, non-normally distributed data as medians and interquartile ranges (*IQR*). Categorical variables were presented as numbers (percentages). Comparisons between groups for continuous variables were performed with one-way analysis of variance (ANOVA) or independent *t*-test for approximately normally distributed data or with the Mann–Whitney *U*-test for non-normally distributed data. Categorical variables were compared with the χ^2 test. A two-tailed $P < 0.05$ defined statistical significance.

Results

A total of 1863 eligible patients were identified and invited to participate, of whom 1320 completed the questionnaire, yielding a response rate of 70.9%. Twenty incomplete questionnaires were excluded, resulting in 1300 questionnaires for analysis. Among respondents, 193 were older than 60 years, and 779 were women. Demographic characteristics are presented in Table 1.

Table 1 Demographic Characteristics of the Respondents

Demographic Data	No	%
Gender		
• Female	779	59.9%
• Male	521	40.1%
Age		
• >60 years old	193	14.8%
• ≤60 years old	1107	85.2%
Level of education*		
• Low	106	8.2%
• Middle	657	50.5%
• High	537	41.3%
Hospitals		
• Peking Union Medical College Hospital	249	19.2%
• Affiliated First hospital of Inner Mongolia Medical Hospital	380	29.2%
• Second Xiangya Hospital of Central South University	278	21.4%
• General Hospital of Northern Theater Command	219	16.8%
• Central Hospital of Wuhan	174	13.4%
Standalone clinic		
• Yes	746	57.4%
• No	554	42.6%
Interval between operation and clinic		
• In 1 week	1117	85.9%
• In 1 week to 1 month	117	9.0%
• Over 1 month	66	5.1%

Notes: *Low level: completed only primary education. Middle level: completed secondary school and/or community college. High level: more than 1 year of university.

Perceptions of Informed Consent and Instructions

Overall, over 97% valued preoperative clinics and rated anesthesiologists' information as satisfactory. The median satisfaction scores differed significantly between standalone and dependent clinic systems [33 (IQR 32, 33) vs 33 (IQR 33, 33), $P = 0.001$]. Approximately 20% of patients reported difficulty recalling most anesthesia-related information and precautions (Table 2).

Awareness Rates

The average awareness rate for six questions on preoperative precautions was about 51.2%, ranging from 40.1% to 66.7% (see [Supplementary Table 1](#)). For five questions assessing anesthesia-related risks and seven questions on postoperative precautions, the average awareness rates were 62.7% and 56.6%, respectively. The “not mentioned” rate was higher for postoperative precautions than anesthesia risks ($\chi^2 = 122.17$, $P < 0.001$), while the forgetting rate showed the inverse pattern ($\chi^2 = 52.31$, $P < 0.001$) (Table 3).

Awareness Scores

Various auxiliary educational tools were adopted by different hospitals. Paper-based materials (posters) were most common (three centers), followed by short messages (SMS; two centers). One hospital adopted other tools, such as WeChat Official accounts, videos, and telephone.

The mean composite awareness score was 8.37 ± 4.2 points. Awareness scores were significantly higher among patients with middle or high educational background compared to those with low education level, patients assessed within one week versus more than 1 week preoperatively, and recipients of multimedia (WeChat/videos/telephone) versus SMS-based education ($p < 0.001$, Table 4).

Table 2 Opinions About the Process of Consent and Perioperative Instructions

	No	%
Attitudes		
You think the informed anesthetic risks and perioperative instructions are very important (>7 points)	1278	98.3%
You think the informed anesthetic risks were fully detailed (>7 points)	1269	97.6%
You think the informed perioperative instructions were fully detailed (>7 points)	1273	97.9%
You hope all the anesthetic risks can be explained clearly (>7 points)	1275	98.1%
You hope all the perioperative instructions can be explained clearly (>7 points)	1283	98.7%
How much can you recall about informed anesthetic risks/perioperative instructions?		
• All of the information	484/500	37.2%/38.5%
• Most of the information	535/525	41.2%/40.4%
• Some of the information	239/238	18.4%/18.3%
• None of the information	42/37	3.2%/2.8%
What benefits can preoperative assessment clinic bring to you?		
• Relieving anxiety caused by ignorance of anesthesia	878	67.5%
• A better understanding of perioperative instructions	822	63.2%
• A better understanding of anesthetic risks	743	57.2%
What informed modalities on perioperative instructions do you prefer?		
• Verbal explanation	1033	79.5%
• Written material (eg posters)	721	55.5%
• WeChat official account	410	31.5%
• Short message notification	271	20.8%
• Others	8	0.6%

Table 3 Average Awareness Rate, “Not Mentioned” Rate and Forgetting Rate of Anesthetic Risks and Postoperative Points for Attention [n (%)]

	Awareness Rate		“Not Mention” Rate		Forgetting Rate	
	No	%	No	%	No	%
Anesthetic risks	815	62.7%	169	13.0%	316	24.3%
Postoperative precautions	736	56.7%	391	30.1%	172	13.2%

Notes: Awareness rate (%) = (Number of “Doctors informed me, and I recall” options/Total number of questions) × 100%; “Not mention” rate (%) = (Number of “Doctors did not inform me” options/Total number of questions) × 100%; Forgetting rate = (Number of “Doctors informed me, but I forgot” options/Total number of questions) × 100%.

Table 4 Comparison of Awareness Scores Across Subgroups

	Awareness Scores (Mean ± SD)	t/F	P Value
Demographic characteristics			
Age		0.098	0.922
• >60 years old	8.40 ± 4.20		
• ≤60 years old	8.37 ± 4.20		
Level of education background		3.407	0.033
• Low	7.38 ± 4.60		
• Middle	8.40 ± 4.30*	2.246	0.025
• High	8.54 ± 3.98*	2.670	0.017
Hospital		9.279	<0.001
• General Hospital of Northern Theater Command	10.80 ± 3.46		
• Other hospitals	7.88 ± 4.17		
Preoperative assessment clinic			
Interval		9.344	<0.001
• In 1 day to 1 week	8.57 ± 4.17		
• In 1 week to 1 month	6.92 ± 4.08 [†]	4.065	<0.001
• Over 1 month	7.62 ± 4.38	1.768	0.074
Standalone		0.972	0.331
• Yes	8.47 ± 3.98		
• No	8.24 ± 4.48		
Educational tools			
Type of education tools			
• Posters (no/yes)	8.40 ± 4.17/8.34 ± 4.24	0.245	0.807
• Short message (no/yes)	8.96 ± 4.07/7.74 ± 4.28	5.268	<0.001
• Other (Wechat, Video or Telephone)	7.88 ± 4.17/10.8 ± 3.46	9.279	<0.001
Number of education tools		49.334	<0.001
• One	8.29 ± 3.70		
• Two-Three	7.74 ± 4.31 ^{&}	1.901	0.058
• Four	10.8 ± 3.46 ^{&#}	7.742/9.709	<0.001

Notes: *Statistic difference compared to low educational level; [†]Statistic difference compared to within one week; [&]Statistic difference compared to one education tool; ^{&#}Statistic difference compared to one and two-three education tools.

Discussion

In this multicenter study, our findings highlight suboptimal awareness rates (51.2–62.7%) and relatively low overall knowledge scores (8.37/15 points), underscoring gaps in current patient education in preoperative anesthesia clinics.

Despite widespread implementation of preoperative anesthesia clinics, important gaps remain in patients' understanding and retention of anesthesia-related risks and perioperative precautions. Interactive, multimodal approaches correlated with better outcomes, aligning with evidence that dynamic methods enhance information retention.

A key observation was the marked discrepancy between high patient satisfaction and modest perioperative awareness. While more than 97% of participants reported satisfaction with preoperative anesthesia consultations, a substantial proportion failed to recall essential information. This discrepancy suggests that patient satisfaction primarily reflects perceptions of communication style, clinician attitude and service flow, rather than true comprehension or retention of perioperative information. Previous studies, including those using the PEPAC questionnaire,¹⁰ have focused predominantly on patient satisfaction with the preoperative assessment process. Our findings extend this literature by demonstrating that high satisfaction does not necessarily translate into adequate perioperative awareness.

Several mechanisms may explain this phenomenon. Awareness requires active cognitive processing and memory consolidation, which may be hindered by the complexity and volume of perioperative information, combined with patient anxiety and limited consultation time. Indeed, preoperative anxiety affects 16.7% of patients undergoing outpatient cancer surgery and has been linked to higher rates of adverse outcomes.¹¹ In this context, systematic and structured preoperative education may therefore play an important role not only in mitigating anxiety and its potential complications but also in improving information retention.

Consistent with these mechanisms, our survey revealed that over 20% of patients failed to retain most of the information provided by anesthesiologists during preoperative consultations. In fact, nearly half remained unaware of anesthesia-related risks and perioperative precautions even after attending the clinic. Similar findings have been reported in a previous study,¹² which showed that patients often struggle to recall risks described by clinicians, particularly when medical terminology is unfamiliar. Moreover, in minor procedures like gastrointestinal endoscopy, anesthesiologists may intentionally limit discussion of rare but severe complications out of concern for inducing anxiety. They may prefer to use broad language, instead of detailing all possible complications.¹³ However, over 98% of the patients preferred to be fully informed of all the risks. A previous study revealed that a similar proportion of patients prefer to be well informed of the risks of anesthesia, even at the cost of potentially increased anxiety.¹⁴ These findings highlight the need for personalized risk communication. Anesthesiologists should distinguish between information seekers and information avoiders before tailoring their disclosure strategy.

Our subgroup analyses provide further insight into factors influencing perioperative awareness. Firstly, educational attainment significantly impacted awareness, highlighting the need for tailored educational materials. To bridge this gap, simplified language, visual aids, and interactive formats should be prioritized to ensure accessibility across diverse literacy levels. Secondly, awareness scores decreased over time, particularly among patients assessed more than one week after the preoperative clinic. This underscores the necessity of periodic reinforcement, such as follow-up reminders or structured refresher sessions, to sustain long-term retention. Importantly, patients exposed to multimodal educational approaches, including videos, WeChat official accounts, and telephone follow-up, tend to report higher awareness scores than those receiving SMS-based education alone. While SMS-based education has been reported as effective for preoperative instructions,¹⁵ its limited depth and interactivity may reduce its effectiveness for comprehensive perioperative education. The multimedia and interactive educational approaches have developed rapidly and have been associated with information retention, potentially contributing to greater awareness. These approaches are therefore increasingly used in clinical practice as promising patient education strategies.

From a service delivery perspective, patient satisfaction was significantly higher with dependent (hospital-integrated) anesthesia clinics than with standalone clinics. Given these gaps in retention and accessibility, along with patient-reported difficulties in seeking multidisciplinary consultations, a one-stop service model is recommended. This integrated approach would combine gastrointestinal department consultations, streamlined laboratory testing, and preoperative anesthesia clinics to improve patient education, convenience, and perioperative outcomes.

Several limitations of this study should be acknowledged. As an exploratory study, a predefined sample size or power calculation was not performed, which may limit the ability to detect small but potentially meaningful effects. Second, awareness data were based on self-reported patient responses, which are subject to recall bias and reporting bias. Selection bias is also possible, as patients who chose to participate may have been more engaged with perioperative care. Finally, differences in preoperative clinic structures, educational practices, and surgical contexts across institutions and countries may limit the generalizability of our findings.

Conclusion

Relying solely on the preoperative anesthesia clinic to educate patients about informed consent and perioperative instructions is inadequate. It is advocated for a multifaceted approach during and after the clinic, one that considers the educational background of the patients, incorporates periodic reinforcement, leverages effective educational tools, and employs a combination of modalities to maximize awareness. And it warrants further high-quality interventional studies. Future interventions should aim to integrate these insights to develop more targeted, engaging, and sustainable patient education programs.

Data Sharing Statement

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Author Contributions

All authors made a significant contribution to the work reported, whether in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Chinese Society of Anesthesiology. Guidelines for anesthesia management for ambulatory surgery. *Natl Med J China*. 2023;103(43):3462–3471. doi:10.3760/cma.j.cn112137-20230803-00151
2. Tariq H, Ahmed R, Kulkarni S, et al. Development, functioning, and effectiveness of a preoperative risk assessment clinic. *Health Services Insights*. 2016;9(S1):1–7. doi:10.4137/HSI.S40540
3. Edward GM, Razzaq S, de Roode A, et al. Patient flow in the preoperative assessment clinic. *Eur J Anaesthesiol*. 2008;25(4):280–286. doi:10.1017/S0265021507003122
4. Sidhu R, Turnbull D, Haboubi H, et al. British Society of Gastroenterology guidelines on sedation in gastrointestinal endoscopy. *Gut*. 2024;73(2):219–245. doi:10.1136/gutjnl-2023-330396
5. Silvay G, Zafirova Z. Ten years experiences with preoperative evaluation clinic for day admission cardiac and major vascular surgical patients: model for “Perioperative Anesthesia and Surgical Home”. *Semin Cardiothorac Vasc Anesth*. 2016;20(2):120–132. doi:10.1177/1089253215619236
6. Cyna AM, Simmons SW. Guidelines on informed consent in anaesthesia: unrealistic, unethical, untenable. *Br J Anaesth*. 2017;119(6):1086–1089. doi:10.1093/bja/aex347
7. White SM, Baldwin TJ. Consent for anaesthesia. *Anaesthesia*. 2003;58(8):760–774. doi:10.1046/j.1365-2044.2003.03202.x
8. Yen C, Tsai M, Macario A. Preoperative evaluation clinics. *Curr Opin Anaesthesiol*. 2010;23(2):167–172. doi:10.1097/ACO.0b013e328336f4b9
9. Hepner DL, Bader AM, Hurwitz S, Gustafson M, Tsen LC. Patient satisfaction with preoperative assessment in a preoperative assessment testing clinic. *Anesth Analg*. 2004;98:1099–1105. doi:10.1213/01.ANE.0000103265.48380.89
10. Edward GM, Lemaire LC, Preckel B, et al. Patient Experiences with the Preoperative Assessment Clinic (PEPAC): validation of an instrument to measure patient experiences. *Br J Anaesth*. 2007;99(5):666–672. doi:10.1093/bja/aem259
11. Majumdar JR, Vertosick EA, Cohen B, Assel M, Levine M, Barton-Burke M. Preoperative anxiety in patients undergoing outpatient cancer surgery. *Asia Pac J Oncol Nurs*. 2019;6(4):440–445. doi:10.4103/apjon.apjon_16_19
12. Zarnegar R, Brown MR, Henley M, Tidman V, Pathmanathan A. Patient perceptions and recall of consent for regional anaesthesia compared with consent for surgery. *J R Soc Med*. 2015;108(11):451–456. doi:10.1177/0141076815604494
13. Jovaisa T, Norkiene I, Karjagin J, et al. Are we meeting the current standards of consent for anesthesia? An international survey of clinical practice. *Med Sci Monit*. 2020;26:e925905. doi:10.12659/MSM.925905
14. Burkle CM, Pasternak JJ, Armstrong MH, Keegan MT. Patient perspectives on informed consent for anaesthesia and surgery: American attitudes. *Acta Anaesthesiol Scand*. 2013;57(3):342–349. doi:10.1111/aas.12037
15. Deng XQ, Wang YT, Zhang WY, Yin Y, Ye L, Zhu T. The impact of short message on the preoperative preparation effectiveness of patients undergoing painless gastroenteroscopy. *Chin J Anesthesiol*. 2015;35(2):251–252. doi:10.3760/cma.j.issn.0254-1416.2015.02.031

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