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Article

Knowledge and Awareness of Anesthesia and Its Associated Risks Among Surgical Patients: A Cross-Sectional Study

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ABSTRACT

Background: Anesthesia care is an essential part of surgical care. However, the knowledge about anesthesia as well as its risks in patients could still be considered inadequate in many health care setups. Objectives: The objective of this study was to determine the knowledge and awareness about the risks associated with anesthesia in patients admitted in the Tertiary Care Hospital in Multan. Methods: The cross-sectional study was conducted on 60 surgical patients aged above 18 years admitted in Multan City Hospital for elective surgeries. A pre-designed interviewer administered questionnaire was used to gather data about socio-demographics, knowledge about purpose, types, and anesthesiologists' role in anesthesia administration, as well as knowledge about the risks associated with the technique. The scoring system used for knowledge measurement was poor, fair, and good. Descriptive statistics such as proportions and inferential statistics such as chi-square tests were utilized in the study. The results described the association between adequate knowledge about the risks associated with the technique. Results: Of the total 60 patients, 30 (50%) had poor knowledge about the technique, while only 12 (20%) patients had good knowledge about the technique. The knowledge about types, role of anesthesiologists in administration, as well as risks associated with the technique, was also inadequate in the patients. Higher education and surgical experiences were independently associated with an adequate knowledge about the technique ($p < 0.05$). The adjusted odds ratio indicated that patients with higher education had more than eight-fold higher odds for having adequate knowledge about the technique, while surgically experienced patients had a significantly better knowledge about the technique than surgically naïve ones. Conclusion: The knowledge and awareness about the risks associated with the technique in surgical patients were generally inadequate, especially in less educated patients with surgical inexperience. Therefore, efforts would be required to ensure educated patients about the technique.

Keywords: Anesthesia awareness; Surgical patients; Perioperative education; Informed consent; Cross-sectional study

INTRODUCTION

Anesthesia represents a crucial element of contemporary surgical management, making possible the safe conduct of surgical and other procedures with respect to the suppression of pain, anxiety, and physiological stress. Anesthesia represents a pharmacologically mediated technique for inducing a reversible loss of sensation or consciousness with the preservation of the physiological functions of the patient. The efficacy of anesthesia procedures has been considerably improved due to advances in the field of anesthesia and monitoring. However, the quality of anesthesia may also rely upon the patient's understanding and co-operation, as well as the issue of informed consent (1).

Anesthesia has been recognized as an integral part of the surgical process; however, it has not been quite clear to patients. In past studies, it has been seen that patients undergoing surgical procedures pay little heed to the procedure itself, whereas they lack much information about anesthesiologists, the procedure for administering anesthetics, as well as risks associated with anesthetics too (2).

The risks associated with anesthetics are many, such as postoperative vomiting, allergic reactions, respiratory complications, instabilities in the cardiac system, along with potentially serious consequences in rare cases (3).

In developing countries, the practice of patient education in the realm of anesthesia is hampered by the number of patients to be dealt with in a time-constrained manner. Patient literacy also remains a concern. Moreover, studies have also been carried out in varied settings to determine the lack of patient knowledge regarding the specialty of anesthesiologists, as well as the knowledge regarding the complications associated with anesthesia (4–6).

Whereas global literature underlines the relevance of pre-anesthesia counseling for enhancing patient knowledge and alleviating anxiety, broad and pertinent data within a tertiary care setup and especially within an urban center like Multan are not well documented within Pakistan's health scenario when it comes to patients undergoing surgery and may form a distinctive demographic requiring unique approaches based on their inherent educational and cultural inclinations as well as their access to health care when determining knowledge and awareness gaps for their specific counseling and knowledge enhancement regarding quality of health care during the preoperative phase Hence, the purpose of this study became evaluating the extent of knowledge and awareness about anesthesia as well as the risks associated with anesthesia among surgical patients admitted into a tertiary care hospital in Multan so that gaps may be identified regarding the awareness of these patients and addressed accordingly.

MATERIALS AND METHODS

A cross-sectional observational study was conducted at Multan City Hospital among adult surgical patients scheduled for elective procedures to assess knowledge and awareness of anesthesia and its associated risks. The study was implemented in the preoperative inpatient and pre-anesthesia assessment workflow after administrative permission, and all procedures were performed in accordance with accepted ethical standards for research involving human participants. The design was selected to quantify the distribution of anesthesia-related knowledge at a single point in time and to examine its relationship with patient characteristics relevant to preoperative communication, anxiety, and informed consent processes (7–9).

Participants were recruited using consecutive convenience sampling until the required sample was achieved. Adults aged ≥18 years admitted for elective surgery and able to communicate in the local language were eligible. Patients undergoing emergency surgery, those who were critically ill, had documented cognitive impairment, or were unable to participate in an interview were excluded to ensure valid comprehension and response quality. Recruitment occurred prior to surgery during routine preoperative preparation; eligible patients were approached in a standardized manner, provided with a brief explanation of the study purpose and procedures, and enrolled after written informed consent. To reduce selection and information bias, the same eligibility screening process was applied to all patients. Interviews were conducted before induction of anesthesia to avoid perioperative sedation effects, and participation did not influence clinical care.

Data were collected using a structured interviewer-administered questionnaire developed from commonly assessed domains in anesthesia awareness literature, including knowledge of the purpose of anesthesia, recognition of anesthesia types (general, regional, local), understanding of the anesthesiologist's role in intraoperative monitoring and safety, awareness of the need for pre-anesthetic assessment, and awareness of common and serious anesthesia-related complications (10–14). The tool was reviewed for face validity by clinicians and pretested on a small group of surgical patients to ensure clarity and cultural appropriateness, after which minor wording refinements were made. Demographic and clinical covariates captured a priori as potential confounders included age, sex, education level, and previous surgical exposure, given their established relationships with health literacy, perioperative expectations, and patient–provider communication . Each knowledge item was scored as 1 for a correct response and 0 for an incorrect or "don't know" response, producing a total knowledge score. Overall knowledge level was operationally categorized as poor (<50% correct), fair (50–74% correct), and good (≥75% correct) to facilitate clinically interpretable stratification and comparison across patient subgroups.

The sample size of 60 was selected to estimate the proportion of patients with adequate anesthesia awareness with acceptable precision for a single-center survey. Using a conservative expected proportion of 50% (maximizing variance), a 95% confidence level, and an absolute precision of approximately 13%, the minimum required sample approximates 57–60 participants, supporting the final enrolled sample for descriptive prevalence estimation and exploratory association testing. Data quality and reproducibility were strengthened through interviewer training, use of a standardized script, immediate review of completed questionnaires to minimize missingness, and double-entry verification of the dataset prior to analysis.

Statistical analysis was performed using standard statistical software. Continuous variables were summarized using mean and standard deviation, while categorical variables were reported as frequencies and percentages. Associations between knowledge categories (poor/fair/good) and key predictors (education level, sex, and previous surgery) were evaluated using chi-square tests or Fisher's exact tests where cell counts were small. For clinically focused comparisons, odds ratios with 95% confidence intervals were computed to quantify the strength of association between higher awareness and explanatory variables. To assess confounding, multivariable logistic regression models were planned with knowledge status dichotomized as adequate (fair/good) versus poor and adjusted for age, sex, education, and previous surgical exposure; adjusted odds ratios and 95% confidence intervals were reported. Missing data were handled using complete-case analysis because questionnaires were checked at the point of collection to ensure completeness. Subgroup analyses were conducted a priori by education level and prior surgical exposure to examine whether awareness differed systematically across these clinically relevant strata, consistent with evidence linking perioperative information

needs and anxiety to patient characteristics and counseling practices (18–21). A two-sided p-value <0.05 was considered statistically significant.

RESULTS

A total of 60 elective surgical patients were analyzed (Table 1). The largest age stratum was 31–45 years, comprising 26 participants (43.3%), followed by 46–60 years with 20 (33.4%) and 18–30 years with 14 (23.3%). Males represented 35 (58.3%) of the sample and females 25 (41.7%). In terms of education, 27 participants (45.0%) had secondary education, 18 (30.0%) had primary education, and 15 (25.0%) had higher education. Previous surgical exposure was reported by 22 participants (36.7%), while 38 (63.3%) had no prior surgery, indicating that most respondents were encountering perioperative counseling as first-time surgical patients.

Knowledge about anesthesia purpose and the anesthesiologist's role showed notable gaps (Table 2). While 38 patients (63.3%) correctly recognized that anesthesia makes surgery painless, fewer than half—28 (46.7%)—reported knowledge of different anesthesia types. Only 24 participants (40.0%) identified the anesthesiologist as a qualified physician, and just 21 (35.0%) were aware that anesthesiologists monitor patients intraoperatively, reflecting limited understanding of anesthesia team responsibilities. Awareness of the importance of pre-anesthetic assessment was also suboptimal, with 26 participants (43.3%) acknowledging its significance. Awareness of anesthesia-related risks was generally low across all domains (Table 3). The most recognized complication was postoperative nausea and vomiting, identified by 25 participants (41.7%), whereas breathing complications were recognized by 19 (31.7%) and allergic reactions by 17 (28.3%). Knowledge of cardiovascular complications was the lowest, reported by only 14 participants (23.3%). Awareness that anesthesia may carry rare serious risks was present in 16 participants (26.7%), suggesting that nearly three-quarters of patients lacked awareness of uncommon but clinically important adverse outcomes.

Overall knowledge categorization indicated that half of the participants demonstrated poor anesthesia knowledge (30/60; 50.0%), while 18 (30.0%) had fair knowledge and only 12 (20.0%) achieved good knowledge (Table 4). When knowledge was dichotomized into adequate (fair/good) versus poor for analytic comparisons, education demonstrated a strong gradient (Table 5). Adequate knowledge was present in 4/18 (22.2%) of primary-educated patients compared with 15/27 (55.6%) of secondary-educated patients and 11/15 (73.3%) of higher-educated patients. Relative to primary education, the odds of adequate knowledge were significantly higher in secondary education (OR 4.38, 95% CI 1.16–16.5; p=0.028) and highest among participants with higher education (OR 9.63, 95% CI 2.05–45.3; p=0.003), with a moderate-to-strong association indicated by Cramér's V of 0.42.

Table 1. Demographic Characteristics of Surgical Patients (n = 60)

Variable	Category	n	%
Age (years)	18–30	14	23.3
	31–45	26	43.3
	46–60	20	33.4
Sex	Male	35	58.3
	Female	25	41.7
Education level	Primary	18	30.0
	Secondary	27	45.0
	Higher	15	25.0
Previous surgery	Yes	22	36.7
	No	38	63.3

Table 2. Knowledge of Anesthesia and Anesthesiologist Role (n = 60)

Knowledge item	Yes n (%)	No n (%)
Anesthesia makes surgery painless	38 (63.3)	22 (36.7)
Knowledge of anesthesia types	28 (46.7)	32 (53.3)
Anesthesiologist is a qualified physician	24 (40.0)	36 (60.0)
Anesthesiologist monitors patient during surgery	21 (35.0)	39 (65.0)
Importance of pre-anesthetic assessment	26 (43.3)	34 (56.7)

Table 3. Awareness of Anesthesia-Related Risks (n = 60)

Risk awareness item	Yes n (%)	No n (%)
Postoperative nausea and vomiting	25 (41.7)	35 (58.3)
Breathing complications	19 (31.7)	41 (68.3)
Allergic reactions	17 (28.3)	43 (71.7)
Cardiovascular complications	14 (23.3)	46 (76.7)
Possibility of rare serious risks	16 (26.7)	44 (73.3)

Table 4. Overall, Knowledge Level Distribution (n = 60)

Knowledge level	n	%
Poor	30	50.0
Fair	18	30.0
Good	12	20.0

Table 5. Association Between Education Level and Knowledge Status (n = 60)

Education level	Adequate n (%)	Poor n (%)	Odds Ratio (95% CI)	p-value
Primary (ref)	4 (22.2)	14 (77.8)	1.00	—
Secondary	15 (55.6)	12 (44.4)	4.38 (1.16–16.5)	0.028
Higher	11 (73.3)	4 (26.7)	9.63 (2.05–45.3)	0.003

Table 6. Association Between Previous Surgical Exposure and Knowledge Status (n = 60)

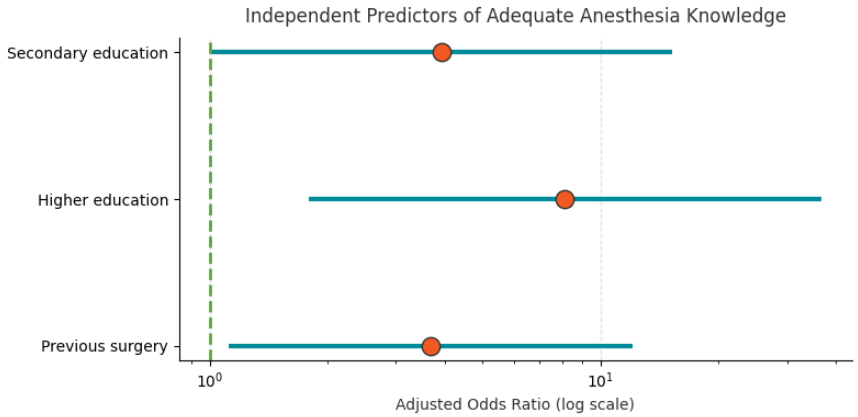
Previous surgery	Adequate n (%)	Poor n (%)	Odds Ratio (95% CI)	p-value
No (ref)	14 (36.8)	24 (63.2)	1.00	—
Yes	16 (72.7)	6 (27.3)	4.57 (1.47–14.2)	0.007

Table 7. Multivariable Logistic Regression for Adequate Knowledge of Anesthesia (n = 60)

Predictor	Adjusted OR	95% CI	p-value
Secondary education	3.92	1.01–15.3	0.048
Higher education	8.11	1.79–36.8	0.007
Previous surgery	3.68	1.12–12.1	0.031
Age (per year)	1.02	0.98–1.06	0.29
Male sex	1.21	0.41–3.61	0.73

Previous surgical exposure was also significantly associated with knowledge status (Table 6). Adequate knowledge was observed in 16/22 (72.7%) of participants with previous surgery compared with 14/38 (36.8%) among those without prior surgery, corresponding to higher odds of adequate knowledge in previously operated patients (OR 4.57, 95% CI 1.47–14.2; p=0.007) and a moderate association strength (phi=0.34). In multivariable analysis adjusting for age and sex, education and previous surgery remained independent predictors of adequate knowledge (Table 7).

Compared with primary education, secondary education was associated with higher adjusted odds of adequate knowledge (aOR 3.92, 95% CI 1.01–15.3; p=0.048) and higher education demonstrated a stronger adjusted association (aOR 8.11, 95% CI 1.79–36.8; p=0.007). Previous surgery also retained significance (aOR 3.68, 95% CI 1.12–12.1; p=0.031), whereas age (aOR 1.02 per year, p=0.29) and male sex (aOR 1.21, p=0.73) were not significantly associated with adequate anesthesia knowledge.



After multivariable adjustment, education level and previous surgical exposure emerged as independent determinants of adequate anesthesia knowledge. Patients with secondary education demonstrated nearly fourfold higher odds of adequate knowledge compared with those having primary education (aOR 3.92; 95% CI 1.01–15.3), while those with higher education showed the strongest association, with more than eightfold higher odds (aOR 8.11; 95% CI 1.79–36.8). Previous surgical exposure was also independently associated with improved awareness, conferring approximately 3.7 times higher odds of adequate knowledge compared with patients undergoing their first surgery (aOR 3.68; 95% CI 1.12–12.1). The confidence intervals for all three predictors remained above the null value, indicating statistically meaningful effects. Collectively, these patterns demonstrate a graded and clinically relevant relationship between prior healthcare exposure, educational attainment, and anesthesia-related knowledge, underscoring the importance of targeted preoperative counseling for first-time and less-educated surgical patients.

DISCUSSION

The present cross-sectional study assessed the level of knowledge and awareness regarding anesthesia and its associated risks among surgical patients at a tertiary care hospital in Multan. The findings indicate that overall patient awareness was suboptimal, with half of the participants demonstrating poor knowledge and only one-fifth achieving good knowledge. Although a majority of patients recognized the basic purpose of anesthesia, detailed understanding of anesthesia types, the professional role of anesthesiologists, and potential anesthesia-related complications was limited. These results highlight a critical gap in patient knowledge that may affect informed consent and perioperative cooperation.

The limited awareness observed in this study is consistent with findings from previous regional and international studies. Khan and Hassan reported poor patient awareness regarding anesthesia and anesthesiologists in a tertiary care hospital in Pakistan, with many patients unable to identify the anesthesiologist as a physician responsible for perioperative monitoring (4). Similar observations have been reported from studies conducted in India and other low- and middle-income countries, where patient understanding of anesthesia-related risks and anesthetic roles remains inadequate (5,6,11). The consistency of these findings across diverse settings suggests that insufficient preoperative communication is a widespread issue rather than an isolated institutional problem.

An important finding of this study is the strong association between education level and anesthesia knowledge. Patients with secondary and higher education were significantly more likely to demonstrate adequate knowledge compared with those having primary education, even after adjustment for age and sex. This association has been previously documented in the literature, where higher educational attainment has been linked to improved health literacy, greater engagement in medical decision-making, and better comprehension of perioperative information (13,15). The graded relationship observed in the present study further emphasizes education as a key determinant of patient awareness.

Previous surgical exposure also emerged as an independent predictor of adequate anesthesia knowledge. Patients with prior surgical experience demonstrated significantly higher awareness levels than first-time surgical patients. This finding aligns with earlier studies reporting that repeated exposure to perioperative environments enhances familiarity with anesthetic procedures and increases opportunities for patient–provider communication (10,16). This suggests that first-time surgical patients represent a particularly vulnerable group that may benefit from targeted educational interventions.

Awareness of anesthesia-related risks was notably low across all domains, particularly regarding cardiovascular and respiratory complications. These findings are concerning, as inadequate risk awareness may limit meaningful informed consent and increase perioperative anxiety when unexpected postoperative symptoms occur. Previous studies have shown that structured pre-anesthetic counseling and provision of standardized information significantly improve patient understanding and reduce anxiety levels (7,18,20). Incorporating such strategies into routine preoperative workflows may help address the knowledge deficits identified in this study.

Several limitations should be considered when interpreting the findings. The single-center design and relatively small sample size may limit generalizability to other settings. The use of a convenience sampling approach may introduce selection bias, and self-reported responses may be influenced by recall or social desirability bias. However, standardized data collection procedures, interviewer administration, and multivariable analysis strengthen the internal validity of the study. Despite these limitations, the findings provide valuable insight into patient knowledge gaps in a tertiary care setting and underscore the need for improved preoperative education practices (21).

In summary, this study demonstrates that knowledge and awareness of anesthesia among surgical patients remain insufficient, particularly among individuals with lower educational attainment and no prior surgical exposure. Addressing these gaps through structured, patient-centered preoperative counseling may enhance informed consent, reduce anxiety, and improve overall perioperative care quality.

CONCLUSION

This cross-sectional study demonstrates that knowledge and awareness of anesthesia and its associated risks among surgical patients at a tertiary care hospital in Multan are generally inadequate. Although most patients were aware of the basic purpose of anesthesia, substantial gaps were identified in understanding the types of anesthesia, the role of anesthesiologists, and potential anesthesia-related complications. Lower educational attainment and lack of previous surgical experience were significant determinants of poor knowledge, highlighting vulnerable patient groups that require focused attention. The findings underscore the importance of implementing structured and standardized preoperative counseling programs to enhance patient understanding and support informed decision-making. Tailoring educational interventions to patients with limited health literacy and first-time surgical exposure may improve perioperative communication, reduce anxiety, and contribute to safer surgical outcomes. Further multicenter studies with larger sample sizes are recommended to confirm these findings and to evaluate the effectiveness of targeted educational strategies in improving anesthesia-related knowledge and patient satisfaction.

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