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Development and validation of the Anesthesia Process Satisfaction Scale: A psychometric instrument for use in Türkiye

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Abstract

Developing instruments that allow patients to evaluate healthcare services within their cultural and systemic context has become increasingly essential. Understanding the psychological effects of medical procedures and patients' perceptions of care is critical for improving quality and enhancing standards in healthcare delivery. This study presents the development of the Anesthesia Process Satisfaction Scale (APSS), a patient-reported outcome instrument designed to comprehensively assess satisfaction with anesthesia services in Türkiye. Item generation was guided by previous research and refined through expert consultations to ensure cultural relevance and conceptual clarity. During the development process, relevant literature was reviewed, and feedback was obtained from two anesthesiologists and one anesthesia technician regarding the draft version of the scale. Their evaluations confirmed that the items were appropriate and clinically relevant. Additionally, a pilot study was conducted with five patients who had undergone surgery within the past 24–48 hours to assess the clarity, adequacy, and representativeness of the items in capturing the anesthesia process. A total of 324 patients participated in the study, of whom 314 were included in the final analysis. The sample consisted predominantly of female patients (60.9%), with a mean age of 32.1 ± 10.8 years. The final scale comprises nine dimensions: overall satisfaction, fear of anesthesia, comfort, practitioner behavior, fear of the procedure, preoperative clinic process, information, trust, and postoperative symptoms. Psychometric evaluation demonstrated high internal consistency (Cronbach's alpha = 0.92) and strong construct validity, with a total explained variance of 72.1%. Among the demographic and clinical variables examined, the type of surgery was associated with the greatest variation in subscale scores. The APSS provides preliminary evidence of reliability and construct validity while reflecting cultural specificity in the evaluation of anesthesia services.

Keywords: Healthcare, anesthesia, psychometrics, satisfaction, scale development, validity, reliability

Introduction

Patient satisfaction and the factors that influence it are essential components of healthcare delivery, and numerous studies have examined this topic [1]. Evidence suggests a relationship between patient satisfaction and overall health outcomes [2]. Anxiety—particularly that associated with anesthesia and surgical procedures—is known to adversely impact patient management and recovery during the perioperative period [3], emphasizing the importance of comprehensive anesthesia care.

Assessing satisfaction throughout the anesthesia process is inherently complex, involving physical, psychological, social, and cultural dimensions. Patient satisfaction is shaped not only by clinical outcomes but also by personal experiences and perceptions [4]. Moreover, potential anesthesia-related complications may influence overall satisfaction levels. Given the multidimensional nature of healthcare delivery, a comprehensive approach is required to evaluate satisfaction effectively.

Anesthesia constitutes a core component of surgical care, and satisfaction with anesthesia services is a recognized indicator of healthcare quality. Previous studies have shown that factors such as the duration of preoperative clinic visits may affect satisfaction scores [5].

In this context, the present study aimed to develop and validate a culturally specific Turkish-language instrument designed to assess patient satisfaction throughout the anesthesia process—from preoperative evaluation to postoperative care. The study

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further explored how satisfaction varied across different domains and demographic characteristics. Addressing a significant gap in the literature in Türkiye, this culturally specific scale is intended to provide a valid and reliable tool for evaluating anesthesia-related patient experiences.

Material and Methods

This study used a descriptive, cross-sectional design and included 324 participants, recruited using convenience sampling at a private hospital in Türkiye. The minimum age for inclusion was 16 years, as the scale was designed to serve not only adult patients but also adolescent surgical patients receiving anesthesia. Data were collected between November 2022 and December 2023. Participation was voluntary, and all respondents completed a self-administered questionnaire. For participants under the age of 18, written informed consent was obtained from their legal guardians in addition to the participants' own assent. Incomplete or inconsistent responses were excluded, resulting in a final sample of 314 participants.

This study was approved by the Ethics Committee of İstanbul Yeni Yüzyıl University (Date: 07.11.2022, Decision No: 2022/11/926). A review of the literature in Türkiye revealed that existing studies evaluating the anesthesia process are scarce, and most of the available sources are in English.

Given the lack of a comprehensive, reliable, and multidimensional patient-reported outcome instrument that holistically evaluates the anesthesia experience—including both the preoperative clinic process and postoperative period—two existing tools were selected to guide the development of the new measure. One of these was the instrument developed by Wui-Chiu et al. (2011), which includes seven dimensions: Practitioner–patient relationship, information, anesthesia-related sequelae, fear, interest, discomfort and needs, and waiting period [6].

Although "fear" and "interest" were treated as distinct dimensions in the original scale, the items under "interest" were found to conceptually overlap with fear. Furthermore, the dimensions "discomfort and needs" and "waiting period" were excluded from the original scale due to Cronbach's alpha coefficients below 0.70. In this study, however, those items were re-evaluated and incorporated into the overall satisfaction domain to improve the content coverage of the newly developed instrument.

The second tool referenced during the development phase was the Patient Satisfaction Questionnaire-18 (PSQ-18), a widely used English-language instrument [7]. The PSQ-18 includes dimensions such as reliability and empathy, assurance and tangibility, and responsiveness. To avoid redundancy, certain items were excluded based on conceptual similarity. An initial item pool was created in English, and forward–backward translation was conducted by professional linguists to improve linguistic equivalence and minimize cultural inconsistencies. Additionally, open-ended items from the scale developed by Uysal et al. (2013) were used to inform new item development [8].

The scale development process was further informed by a review of the relevant literature and expert consultation. Feedback on clarity, clinical relevance, and applicability was obtained from two anesthesiologists and one anesthesia technician. A pilot study was also conducted with five patients who had undergone surgery within the past 24 to 48 hours to evaluate the comprehensibility and clinical relevance of the draft items. In this pilot study, only the comprehensibility of the statements was evaluated, because the content and structure of the items had already been established through expert review. As all five pilot participants indicated that the statements were comprehensible, no items were reworded or removed at this stage, and the scale proceeded to psychometric testing without modification.

The scale used in the study by Parakkamodom et al. (2016) was a shorter instrument containing fewer items. In that study, the anesthesia process was evaluated using 15 items, resulting in three dimensions [7]. These dimensions include reliability and empathy, assurance and tangibility, and responsiveness.

In the Turkish literature, questions assessing satisfaction with the anesthesia process were primarily formulated as open-ended questions [8]. In the scale designed, these questions were converted into closed-ended statements and incorporated into the new scale.

Statistical analysis was performed using IBM SPSS Statistics and JAMOVI software packages. Analyses included frequency distributions, correlation analyses, tests of normality, exploratory factor analysis (EFA), and confirmatory factor analysis (CFA). EFA was conducted using Varimax rotation, yielding nine factors with eigenvalues greater than 1. Several items were excluded due to either cross-loadings or low factor loadings below 0.40.

Results

Participant Characteristics:

The mean age of the participants was 32.1 ± 10.8 years, with an age range of 16 to 82 years. The sample included one participant aged 16, two participants aged 17, and one participant was aged 76 and another 82 years. The majority of participants fell within the 18–66 age range. Participants were categorized into four age groups, and these groups were used for between-group comparisons. Nineteen percent of the participants did not report their age; these individuals were excluded from the age-based subgroup analyses (Table 1).

Exploratory Factor Analysis and Reliability Findings:

As this was the first validation study of the scale, both exploratory and confirmatory factor analyses were conducted. The results revealed a nine-factor structure: Overall Satisfaction, Fear of Anesthesia, Comfort, Practitioner Behavior, Fear of the Procedure, Preoperative Clinic Process, Information, Trust, and Postoperative Symptoms (Table 2).

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The following items were excluded from the factor analysis due to insufficient factor loadings or cross-loading on multiple factors: 8 The information provided about the anesthesia process was sufficient. 9 I had the opportunity to ask questions about the anesthesia process. 12 I was told how long I would need to fast before surgery. 41* I was afraid of being in the operating room. 42* I felt anxious during the recovery period after surgery. 52* I had a sore throat after surgery. *Items marked with an asterisk are reverse-coded.

All retained items had factor loadings above 0.55. The total variance explained by the scale was 72.1%, distributed across the nine dimensions. The overall internal consistency of the scale was high (Cronbach's alpha = 0.92), with subscale reliability coefficients ranging from 0.67 to 0.97.

Confirmatory Factor Analysis:

The goodness-of-fit indices obtained from the confirmatory factor analysis indicated suboptimal fit ($\chi^2 = 3483$; df = 953; $p < 0.001$; CFI = 0.79; RMSEA = 0.09). It has been suggested that poor model fit can result from a large number of items and factors or from a relatively small sample size. Although the model did not achieve ideal fit, the confirmatory factor analysis results indicate an acceptable level of model adequacy for an early-phase validation study. Such moderate fit indices are frequently observed in complex, multidimensional instruments with numerous items, where model parsimony is limited. Considering the theoretical consistency of the nine-factor structure and the strong internal reliability coefficients obtained, the overall model was deemed conceptually coherent and empirically interpretable. Previous methodological studies have suggested that ideal fit indices may not always be attainable in complex multidimensional models [9,10].

The analysis revealed that five out of the nine subdimensions exhibited skewness and kurtosis values exceeding ±1.5, indicating non-normal distribution. Accordingly, non-parametric tests were employed for intergroup comparisons (Table 3).

Correlation Analysis:

The age variable showed a low but significant positive correlation with the Overall Satisfaction and Information subdimensions (Table 4). The scale's subdimensions were moderately to highly intercorrelated. Among them, Overall Satisfaction was most strongly associated with Practitioner Behavior and Information. The Fear of the Procedure subdimension showed moderate correlations with both Fear of Anesthesia and Comfort. The total scale score demonstrated strong positive correlations with Fear of Anesthesia, Comfort, and Fear of the Procedure, and a moderate correlation with Postoperative Symptoms.

Subgroup Comparisons:

The mean scores and standard deviations for Anesthesia Process Satisfaction Scale (APSS) subdimensions across various demographic and clinical groups are presented below (Table 5). In the total mean score of the Anesthesia Process Satisfaction Scale, male participants scored significantly higher than female participants (mean difference = 0.21), which was the only statistically significant difference in the overall score. Married individuals scored significantly higher than single individuals in the subdimensions of Overall Satisfaction, Practitioner Behavior, Information, and Trust, with respective mean differences of 0.07, 0.14, 0.23, and 0.22.

Significant differences were also found in the Comfort and Practitioner Behavior subdimensions based on income level. Participants with a monthly income of 18,000–25,000 TL had significantly higher scores than those earning less than 5,500 TL, with a mean difference of 1.21 in Comfort. In the Practitioner Behavior subdimension, this group scored higher than participants earning both <5,500 TL (mean difference = 0.63) and 5,501–8,000 TL (mean difference = 0.65).

Regarding the type of surgery, patients who underwent plastic surgery had significantly lower scores in the subdimensions of Overall Satisfaction, Practitioner Behavior, Preoperative Clinic Process, Information, and Trust. For instance, their Overall Satisfaction scores were 0.28 points lower than those who underwent ENT surgery and 0.33 points lower than those who underwent gynecological and obstetric procedures. In the Practitioner Behavior subdimension, plastic surgery patients scored 0.26 points lower than ENT surgery patients. Within the Preoperative Clinic Process dimension, patients who underwent ENT surgery scored significantly higher than those who underwent plastic or general surgery (mean differences = 0.41 and 0.45, respectively). In the Information dimension, gynecology and obstetrics patients scored significantly higher than those in plastic surgery (mean difference = 0.45) and general surgery groups (mean difference = 0.53).

In the trust subdimension, plastic surgery patients had significantly lower scores compared to ENT (mean difference = 0.56) and gynecology and obstetrics patients (mean difference = 0.61).

Significant differences were also observed according to surgery urgency. Patients who underwent planned surgeries had significantly higher scores in Fear of Anesthesia (mean difference = 0.93) and Fear of the Procedure (mean difference = 0.97) compared to those who underwent emergency surgeries.

In the Information subdimension, those who received regional anesthesia scored significantly higher than those who received general anesthesia (mean difference = 0.23). Additionally, in the Comfort subdimension, scores differed based on the healthcare professional providing preoperative information. Specifically, patients who received information from a surgeon had lower comfort scores than those who were informed by an anesthesiologist (mean difference = 1.2), an anesthesia technician (mean difference = 1.24), or a nurse (mean difference = 0.95).

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Table 1. Demographic and descriptive characteristics of the participants

Variable	Category	n	%
Gender	**Female**	176	60.9
	Male	113	39.1
Age groups	**16-22 years**	47	18.4
	23-27 years	56	22.0
	28-33 years	55	21.6
	34-40 years	46	18.0
	> 40 years	51	20.0
Household monthly income (TRY)	**< 5.500**	23	7.6
	5.501-8.000	42	14
	8.001-12.000	110	36.5
	12.001-18.000	77	25.6
	18.000-25.000	27	9
	> 25.000	22	7.3
Type of anesthesia	**General**	196	62.4
	Regional	78	24.8
	Local	40	12.7
Duration of anesthesia	**< 1 hour**	70	22.7
	1-2 hours	120	39
	2-4 hours	111	36
	4-6 hours	7	2.3
Person providing ınformation	**Operating surgeon**	56	18.5
	Anesthesiologist	88	29
	Anesthesia technician	60	19.8
	Nurse	47	15.5
	I don't know / Unidentified	52	17.2
Marital status	**Single**	181	58.8
	Married	127	41.2
Education level	**Primary / secondary school**	84	26.9
	High school	113	36.2
	Associate degree	47	15.1
	Bachelor's degree	54	17.3
	Master's / Doctorate	14	4.5
Type of surgery	**ENT (Ear, nose, and throat)**	160	51.1
	Obstetrics & gynecology	74	23.6
	Plastic surgery	44	14.1
	General surgery	30	9.6
	Other	5	1.6
Type of admission	**Elective**	288	91.7
	Emergency	26	8.3
Previous anesthesia experience	**First time**	141	45
	Second time	95	30.4
	Third time	48	15.3
	≥ Fourth or more	29	9.3
Chronic disease	**No**	286	92
	Yes	25	8

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Table 2. Exploratory and confirmatory factor analysis results of the Anesthesia Process Satisfaction Scale

Factor name	Item description	Factor loading	Explained variance (%)	Reliability	Standard deviation (SD)
Overall satisfaction	The anesthesia technician's or anesthesiologist's approach during awakening was positive	0.91	24	0.97	6.44 (0.63)
	The anesthesia staff was respectful towards me	0.90			
	The anesthesiologist or technician in the operating room was generally attentive	0.89			
	The attitude of the anesthesiologist or technician made me feel well	0.88			
	The anesthesia technician/anesthesiologist on duty in the operating room was generally attentive	0.86			
	The approach of the anesthesia technician/anesthesiologist was positive when I was awakened	0.82			
	The anesthesia staff respected my privacy	0.76			
	I was able to easily contact the anesthesia staff when needed before the operation	0.74			
	I was able to easily contact the anesthesia staff after the operation when needed	0.74			
	The information provided regarding preoperative preparation was sufficient	0.72			
	The answers given to my questions about the anesthesia process were sufficient	0.70			
	I felt psychologically reassured during the information about anesthesia	0.68			
	If I had surgery again, I would want to receive services from the same anesthesia team	0.67			
	The approach of the anesthesia technician/anesthesiologist was professional	0.65			
Fear of anesthesia	I was afraid of not waking up after anesthesia*	0.86	12.5	0.92	3.68 (1.80)
	I was afraid of not waking up after surgery *	0.83			
	I was afraid of feeling pain or suffering during the surgery*	0.81			
	I was afraid of experiencing pain related to the surgery*	0.81			
	I was afraid of the side effects of anesthesia *	0.80			
	I was afraid of waking up during the surgery*	0.77			
	I was afraid of negligence by the anesthesia staff*	0.65			
	I was extremely fearful the day before my surgery*	0.60			
Comfort	Feeling thirsty or hungry during the surgery made me feel uncomfortable*	0.76	7.3	0.85	4.90 (1.61)
	My body position during the surgery made me feel uncomfortable*	0.75			
	I had to wait a long time in the operating room before the anesthesia was administered*	0.74			
	I felt cold during the surgery*	0.63			
	I experienced nausea and vomiting during the surgery*	0.60			
Practitioner behavior	I am satisfied with the type of anesthesia administered	0.76	6.6	0.86	6.42 (0.66)
	I am generally satisfied with the anesthesia administered during the surgery	0.72			
	I generally felt well when I woke up after the surgery	0.71			
	My surgeon and the anesthesiologist worked collaboratively during my surgery	0.65			
Fear of the procedure	I was afraid of having a catheter inserted after the surgery *	0.79	6.4	0.88	4.74 (1.77)
	I was afraid of receiving an injection in my back during anesthesia*	0.76			
	I was afraid that an intravenous line could not be found for anesthesia *	0.70			
	I was afraid of having a tube inserted into my throat during anesthesia *	0.62			
	I was afraid of talking nonsense while being awakened *	0.61			

KMO = 0.91; Chi-square = 12.289.944; df = 1081; $p < 0.001$; Note: Items marked with an asterisk (*) are reverse-coded

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Table 2. Exploratory and confirmatory factor analysis results of the Anesthesia Process Satisfaction Scale

Factor name	Item description	Factor loading	Explained variance (%)	Reliability	Standard deviation (SD)
Preoperative clinic process	**I received services from the preoperative anesthesia clinic at the scheduled appointment time**	0.87	4.2	0.68	6.29 (0.90)
	I easily scheduled an appointment with the preoperative anesthesia clinic before the surgery	0.85			
	My pain was managed in a timely manner after the surgery	0.55			
Information	**I was informed about the anesthesia process before the surgery**	0.70	4.0	0.67	6.35 (0.83)
	I was informed about which anesthesia method would be used	0.62			
Trust	**I felt relaxed and safe in the operating room**	0.80	3.7	0.81	6.16 (1.04)
	I felt relaxed and safe after the surgery	0.79			
Postoperative symptoms	**I experienced nausea and vomiting after the surgery ***	0.70	3.4	0.68	4.55 (1.96)
	I experienced a headache after the surgery *	0.65			
Total			72.1	0.92	5.52 (0.72)

KMO = 0.91; Chi-square = 12.289.944; df = 1081; $p < 0.001$; Note: Items marked with an asterisk (*) are reverse-coded

Table 3. Skewness and Kurtosis values for the total scale score and ıts subdimensions

Statistic	Overall satisfaction	Fear of anesthesia	Comfort	Practitioner behavior	Fear of the procedure	Preoperative clinic process	Information	Trust	Postoperative symptoms	Total score
Kurtosis	**10.065**	-1.225	-0.104	**5.368**	-0.623	**6.457**	**7.053**	**6.127**	-1.089	-0.510
Skewness	**-2.091**	0.066	-0.787	**-1.662**	-0.712	**-2.087**	**-2.115**	**-2.130**	-0.434	-0.102

Table 4. Correlational analysis of the scale subdimensions

Variables	Age	Overall satisfaction	Fear of anesthesia	Comfort	Practitioner behavior	Fear of the procedure	Preoperative clinic process	Information	Trust	Postoperative symptoms
Overall satisfaction	**0.152***									
Fear of anesthesia	-0.013	0.048								
Comfort	0.050	0.076	0.531***							
Practitioner behavior	0.150*	**0.648*****	0.047	0.175**						
Fear of the procedure	0.002	0.070	**0.641*****	**0.605*****	0.058					
Preoperative clinic process	0.098	0.251***	0.053	0.007	0.242***	-0.078				
Information	**0.201****	**0.645*****	0.062	0.053	0.458***	0.045	0.205***			
Trust	0.030	0.450***	-0.136*	-0.020	0.363***	-0.052	0.174**	0.267***		
Postoperative symptoms	0.043	0.162**	0.398***	0.572***	0.196***	0.442***	0.027	0.083	0.097	
Total scale score	0.089	0.500***	**0.784*****	**0.729*****	0.430***	**0.751*****	0.201***	0.365***	0.183**	**0.610*****

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

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Table 5. Group comparisons of research variables based on mean and standard deviation values

Demographic and clinical variables	Overall satisfaction*	Fear of anesthesia	Comfort	Practitioner behavior*	Fear of the procedure	Preoperative clinic process*	Information*	Trust*	Postoperative symptoms	Total score
	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)
Gender										
Female	6.42 (0.7)	3.42 (1.68)	4.88 (1.58)	6.4 (0.7)	4.6 (1.73)	6.28 (0.89)	6.32 (0.91)	6.15 (1.04)	4.38 (1.97)	**5.44[1] (0.71)**
Male	6.46 (0.53)	4.04 (1.95)	4.95 (1.7)	6.43 (0.63)	4.92 (1.81)	6.32 (0.95)	6.37 (0.73)	6.12 (1.12)	4.78 (1.92)	**5.63[1] (0.75)**
Age groups										
16-22 years	6.43 (0.67)	3.86 (1.72)	5.11 (1.73)	6.42 (0.8)	4.8 (1.71)	6.22 (1.18)	6.19 (0.98)	6.23 (0.88)	4.62 (2.16)	5.57 (0.82)
23-27 years	6.26 (0.84)	3.63 (1.73)	4.58 (1.67)	6.32 (0.58)	4.56 (1.71)	6.24 (0.83)	6.29 (0.79)	5.88 (1.17)	4.04 (2.05)	5.36 (0.78)
28-33 years	6.45 (0.51)	3.58 (1.74)	4.76 (1.73)	6.35 (0.76)	4.76 (1.82)	6.33 (0.97)	6.34 (0.81)	6.26 (1)	4.85 (1.98)	5.5 (0.68)
34-40 years	6.52 (0.53)	3.45 (1.81)	5.05 (1.58)	6.43 (0.64)	4.46 (1.88)	6.33 (0.93)	6.52 (0.68)	6.35 (0.94)	4.91 (1.88)	5.54 (0.7)
> 40 years	6.57 (0.62)	3.77 (2.08)	5.12 (1.63)	6.6 (0.53)	4.75 (1.93)	6.41 (0.84)	6.59 (0.5)	6.07 (1.38)	4.41 (1.8)	5.63 (0.72)
Marital status										
Single	**6.41[2] (0.58)**	3.8 (1.81)	4.85 (1.59)	**6.37[3] (0.68)**	4.81 (1.75)	6.32 (0.89)	**6.27[4] (0.85)**	**6.07[5] (1.03)**	4.56 (2.02)	5.53 (0.74)
Married	**6.48[2] (0.69)**	3.47 (1.76)	4.94 (1.66)	**6.51[3] (0.64)**	4.57 (1.8)	6.25 (0.91)	**6.46[4] (0.8)**	**6.29[5] (1.06)**	4.49 (1.86)	5.5 (0.7)
Education level										
Primary/secondary school	6.54 (0.49)	3.48 (1.83)	4.93 (1.63)	6.45 (0.63)	4.74 (1.83)	6.34 (0.89)	6.45 (0.68)	6.31 (0.87)	4.55 (2)	5.54 (0.72)
High schooll	6.43 (0.66)	3.71 (1.76)	4.83 (1.64)	6.38 (0.74)	4.87 (1.69)	6.29 (0.86)	6.38 (0.81)	6.3 (0.83)	4.68 (1.86)	5.53 (0.74)
Associate degree	6.36 (0.86)	3.51 (1.8)	4.79 (1.65)	6.42 (0.67)	4.41 (1.83)	6.23 (1.06)	6.35 (0.79)	6.03 (0.99)	4.06 (1.88)	5.38 (0.75)
Bachelor's degree	6.42 (0.52)	3.85 (1.83)	5 (1.53)	6.47 (0.56)	4.68 (1.8)	6.41 (0.75)	6.3 (0.79)	5.94 (1.34)	4.52 (2.13)	5.57 (0.72)
Master's/doctorate	6.31 (0.51)	4.26 (1.95)	5.34 (1.63)	6.41 (0.54)	4.87 (1.88)	6.36 (0.46)	5.68 (1.56)	5.61 (1.52)	4.93 (2.1)	5.6 (0.62)
Household monthly ıncome (TRY)										
< 5.500	6.46 (0.49)	3.14 (1.45)	**4.03[6] (1.58)**	**6.18[7] (0.78)**	4.23 (1.74)	6.35 (0.66)	6.37 (0.61)	6.33 (0.79)	3.93 (2.05)	5.25 (0.5)
5.500-8.000	6.39 (0.66)	3.51 (1.71)	4.74 (1.51)	**6.16[8] (0.98)**	4.82 (1.72)	6.01 (1.27)	6.32 (0.79)	5.93 (1.47)	4.88 (1.7)	5.43 (0.72)
8.001-12.000	6.43 (0.6)	3.84 (1.76)	5.06 (1.61)	6.47 (0.54)	4.9 (1.7)	6.36 (0.88)	6.24 (0.93)	6.28 (0.77)	4.78 (1.98)	5.61 (0.74)
12.001-18.000	6.39 (0.72)	3.81 (1.87)	**5.24[6] (1.44)**	6.43 (0.61)	4.86 (1.64)	6.39 (0.66)	6.32 (0.93)	6.25 (0.92)	4.62 (1.84)	5.58 (0.74)
18.001-25.000	6.79 (0.35)	3.53 (2.03)	4.68 (1.9)	**6.81[7,8] (0.39)**	4.24 (2.1)	6.52 (0.76)	6.76 (0.47)	6.07 (1.13)	4.07 (2.12)	5.6 (0.76)
> 25.000	6.46 (0.46)	3.6 (1.8)	4.73 (1.79)	6.4 (0.61)	4.8 (2.04)	5.97 (1.06)	6.48 (0.48)	5.8 (1.19)	4.14 (2.11)	5.45 (0.71)
Type of surgery										
ENT	**6.48[9] (0.66)**	3.8 (1.92)	4.95 (1.65)	**6.48[11] (0.66)**	4.93 (1.74)	**6.44[12,13] (0.73)**	6.39 (0.77)	**6.25[16] (1)**	4.52 (2.03)	5.6 (0.77)
Obstetrics & gynecology	**6.53[10] (0.57)**	3.54 (1.61)	4.89 (1.61)	6.42 (0.72)	4.47 (1.8)	6.24 (0.92)	**6.53[14,15] (0.74)**	**6.3[17] (0.96)**	4.86 (1.89)	5.52 (0.67)
Plastic surgery	**6.2[9,10] (0.59)**	3.34 (1.79)	4.88 (1.47)	**6.22[11] (0.6)**	4.39 (1.85)	**6.03[12] (1.1)**	**6.08[14] (0.95)**	**5.69[16,17] (1.3)**	4.28 (1.94)	5.27 (0.6)
General surgery	6.29 (0.56)	3.93 (1.47)	4.64 (1.54)	6.36 (0.57)	4.85 (1.72)	**5.99[13] (1.19)**	**6[15] (1.01)**	5.9 (0.87)	4.37 (1.63)	5.43 (0.69)
Other	6.8 (0.45)	3.48 (2.42)	5.4 (2.51)	6.8 (0.45)	4.96 (2.05)	6.8 (0.45)	6.8 (0.45)	6.6 (0.55)	4.5 (2.6)	5.78 (0.82)

Mean scores across demographic and clinical subgroups based on APSS subdimensions; *: Since the skewness and kurtosis values in these subdimensions were greater than 1.5, non-parametric tests were applied; 1: F = 1.60; t = -0.7; p = 0.04; 2: Mann Whitney U: 12.56; t = 1.96; SH = 730; p = 0.05. 3: Mann Whitney U: 13.13; t = 2.23; SH = 735; p = 0.026. 4: Mann Whitney U: 13.20; t = 2.38; SH = 714; p = 0.017 5: Mann Whitney U: 13.44; t = 2.72; SH = 718; p = 0.007. 6: $F_{(5.295)}$ = 2.52;SH = 0.38; p = 0.019; 7: Kruskal-Wallis = 15.56; t = -3.29; SH = 23.6; p = 0.015; 8: Kruskal-Wallis = 15.56; t = -3.53; SH = 20.53; p = 0.006. 9: Kruskal-Wallis = 19.14; t = 3.50; SH = 11.89; p = 0.005. 10: Kruskal-Wallis = 19.14; t = 3.26; SH = 16.7; p = 0.011. 11: Kruskal-Wallis = 11.48; t = 2.92; SH = 14.72; p = 0.035. 12: Kruskal-Wallis = 12.9; t = 2.45; SH = 17.08; p = 0.036. 13: Kruskal-Wallis = 12.9; t = 2.5; SH = 14.61; p = 0.012. 14: Kruskal-Wallis = 18.6; t = 3.41 SH = 16.0; p = 0.006; 15: Kruskal-Wallis = 18.6; t = 2.98; SH = 18.18; p = 0.029. 16: Kruskal-Wallis = 19.80; t = 3.47; SH = 14.4; p = 0.005; 17: Kruskal-Wallis = 19.80; t = 3.40; SH = 16.1; p = 0.007. 18: F = 325; t = 2.56; p = 0.011; 19: F = 1.0; t = 2.71; p = 0.007. 20: Kruskal-Wallis = 9.0; t = 2.59; SH = 11.3; p = 0.029. 21: $F_{(4.298)}$ = 6.45; SH = 0.27; p<0.001. 22: $F_{(4.298)}$ = 6.45; SH = 0.29; p<0.001. 23: $F_{(4.298)}$ = 6.45; SH = 0.31; p = 0.02

Table 5. Group comparisons of research variables based on mean and standard deviation values

Demographic and clinical variables	Overall satisfaction*	Fear of anesthesia	Comfort	Practitioner behavior*	Fear of the procedure	Preoperative clinic process*	Information*	Trust*	Postoperative symptoms	Total score
	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)	x̄ (σ)
Type of admission										
Elective	6.43 (0.63)	**3.75[18] (1.8)**	4.92 (1.6)	6.41 (0.66)	**4.82[19] (1.74)**	6.3 (0.87)	6.33 (0.84)	6.13 (1.05)	4.51 (1.95)	5.53 (0.73)
Emergency	6.58 (0.49)	**2.8218 (1.61)**	4.82 (1.79)	6.51 (0.68)	**3.85[19] (1.91)**	6.24 (1.16)	6.54 (0.66)	6.42 (0.87)	4.92 (2.01)	5.37 (0.66)
Previous anesthesia experience										
First time	6.43 (0.51)	3.62 (1.68)	4.95 (1.62)	6.4 (0.59)	4.68 (1.66)	6.26 (0.98)	6.26 (0.75)	6.16 (0.93)	4.67 (1.97)	5.51 (0.68)
Second time	6.41 (0.68)	3.67 (1.94)	4.67 (1.63)	6.31 (0.71)	4.78 (1.77)	6.25 (0.79)	6.43 (0.67)	6.26 (0.84)	4.36 (1.88)	5.48 (0.75)
Third time	6.45 (0.76)	3.64 (1.76)	4.93 (1.74)	6.52 (0.81)	4.62 (2)	6.43 (0.81)	6.39 (1.07)	6.01 (1.36)	4.71 (2.15)	5.52 (0.81)
≥Fourth or more	6.53 (0.72)	4.11 (1.91)	5.42 (1.23)	6.68 (0.43)	5.21 (1.79)	6.34 (0.97)	6.43 (1.14)	6.02 (1.48)	4.21 (1.85)	5.73 (0.64)
Type of anesthesia										
General	6.4 (0.63)	3.64 (1.85)	4.95 (1.63)	6.41 (0.61)	4.74 (1.79)	6.37 (0.8)	**6.26[20] (0.86)**	6.06 (1.1)	4.25 (2.01)	5.49 (0.73)
Regional	6.49 (0.59)	3.56 (1.56)	4.92 (1.46)	6.39 (0.71)	4.54 (1.7)	6.12 (1.04)	**6.49[20] (0.77)**	6.28 (0.96)	5.11 (1.66)	5.52 (0.64)
Local	6.53 (0.69)	4.07 (1.96)	4.68 (1.8)	6.51 (0.79)	5.14 (1.81)	6.28 (1)	6.51 (0.74)	6.4 (0.83)	4.9 (1.96)	5.66 (0.82)
Duration of anesthesia										
< 1 hour	6.51 (0.57)	3.49 (1.73)	4.83 (1.62)	6.38 (0.72)	4.82 (1.83)	6 (1.29)	6.5 (0.74)	6.31 (0.92)	4.91 (1.83)	5.52 (0.68)
1-2 hours	6.45 (0.6)	3.68 (1.83)	4.94 (1.61)	6.47 (0.66)	4.64 (1.81)	6.4 (0.71)	6.32 (0.85)	6.07 (1.16)	4.63 (2)	5.52 (0.76)
2-4 hours	6.36 (0.69)	3.72 (1.88)	4.81 (1.66)	6.37 (0.62)	4.71 (1.75)	6.32 (0.75)	6.25 (0.87)	6.13 (1)	4.2 (1.97)	5.47 (0.71)
4-6 hours	6.81 (0.5)	4.46 (0.95)	6.29 (0.58)	6.68 (0.85)	5.74 (1.21)	6.62 (0.76)	6.86 (0.38)	6.21 (1.07)	4.71 (2.34)	6.11 (0.48)
Person providing information										
Operation surgeon	6.46 (0.63)	3.48 (1.73)	**4.05[21.22.23] (1.74)**	6.36 (0.74)	4.28 (1.89)	6.3 (0.77)	6.27 (1.05)	6.21 (0.91)	4.23 (2.05)	5.33 (0.76)
Anesthesiologist	6.47 (0.69)	3.85 (1.81)	**5.25[21] (1.39)**	6.44 (0.64)	5.03 (1.53)	6.49 (0.56)	6.48 (0.67)	6.03 (1.17)	4.78 (1.88)	5.65 (0.72)
Anesthesia technician	6.43 (0.49)	3.62 (1.69)	**5.29[22] (1.46)**	6.43 (0.67)	4.78 (1.7)	6.23 (1.05)	6.34 (0.81)	6.33 (0.73)	4.68 (1.78)	5.57 (0.72)
Nurse	6.52 (0.55)	3.77 (2.1)	**5[23] (1.58)**	6.52 (0.54)	5.04 (1.78)	6.26 (0.98)	6.4 (0.74)	6.18 (0.97)	4.6 (2.1)	5.61 (0.74)
I don't know / unidentified	6.32 (0.75)	3.54 (1.76)	4.69 (1.8)	6.37 (0.74)	4.45 (1.93)	6.07 (1.19)	6.18 (0.92)	6.07 (1.21)	4.06 (2.1)	5.35 (0.67)
Chronic disease										
No	6.42 (0.64)	3.69 (1.8)	4.93 (1.62)	6.41 (0.68)	4.74 (1.77)	6.29 (0.92)	6.33 (0.84)	6.15 (1.02)	4.53 (1.96)	5.52 (0.73)
Yes	6.61 (0.42)	3.58 (1.84)	4.74 (1.56)	6.59 (0.46)	4.75 (1.8)	6.44 (0.55)	6.5 (0.74)	6.12 (1.35)	4.58 (1.99)	5.57 (0.66)

Mean scores across demographic and clinical subgroups based on APSS subdimensions; *: Since the skewness and kurtosis values in these subdimensions were greater than 1.5, non-parametric tests were applied; 1: F = 1.60; t = -0.7; p = 0.04; 2: Mann Whitney U: 12.56; t = 1.96; SH = 730; p = 0.05. 3: Mann Whitney U: 13.13; t = 2.23; SH = 735; p = 0.026. 4: Mann Whitney U: 13.20; t = 2.38; SH = 714; p = 0.017 5: Mann Whitney U: 13.44; t = 2.72; SH = 718; p = 0.007. 6: $F_{(5.295)}$ = 2.52;SH = 0.38; p = 0.019; 7: Kruskal-Wallis = 15.56; t = -3.29; SH = 23.6; p = 0.015; 8: Kruskal-Wallis = 15.56; t = -3.53; SH = 20.53; p = 0.006. 9: Kruskal-Wallis = 19.14; t = 3.50; SH = 11.89; p = 0.005. 10: Kruskal-Wallis = 19.14; t = 3.26; SH = 16.7; p = 0.011. 11: Kruskal-Wallis = 11.48; t = 2.92; SH = 14.72; p = 0.035. 12: Kruskal-Wallis = 12.9; t = 2.45; SH = 17.08; p = 0.036. 13: Kruskal-Wallis = 12.9; t = 2.5; SH = 14.61; p = 0.012. 14: Kruskal-Wallis = 18.6; t = 3.41 SH = 16.0; p = 0.006; 15: Kruskal-Wallis = 18.6; t = 2.98; SH = 18.18; p = 0.029. 16: Kruskal-Wallis = 19.80; t = 3.47; SH = 14.4; p = 0.005; 17: Kruskal-Wallis = 19.80; t = 3.40; SH = 16.1; p = 0.007. 18: F = 325; t = 2.56; p = 0.011; 19: F = 1.0; t = 2.71; p = 0.007. 20: Kruskal-Wallis = 9.0; t = 2.59; SH = 11.3; p = 0.029. 21: $F_{(4.298)}$ = 6.45; SH = 0.27; p<0.001. 22: $F_{(4.298)}$ = 6.45; SH = 0.29; p<0.001. 23: $F_{(4.298)}$ = 6.45; SH = 0.31; p = 0.02

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Discussion

The Anesthesia Process Satisfaction Scale (APSS), developed in this study, is designed to assess patient satisfaction with anesthesia procedures through a culturally specific, psychometrically sound, and multidimensional approach. To our knowledge, it represents the first instrument in Türkiye to simultaneously evaluate all stages of the anesthesia process. Although widely used tools such as ISAS, PSPACq, and EVAN-G are often unidimensional or limited to specific phases of the perioperative period, the APSS may contribute to the literature and provide practical clinical utility by encompassing the entire anesthesia experience [6,11,12]. Unlike many existing instruments that focus solely on intraoperative or postoperative periods, this scale adopts a comprehensive framework addressing multiple domains, including information provision, anxiety and fear, trust, comfort, interaction with anesthesia providers, and postoperative symptoms.

The dimensions identified in the scale developed by Wui-Chiu et al. (2011)—including Practitioner-patient relationship, information, anesthesia-related sequelae, fear, concern, discomfort and needs, and waiting period—show substantial smilarity to the factor structure of the scale developed in the present study [6]. Notably, substantial structural similarity exists in the subdimensions of information, fear, discomfort/needs, and waiting period, suggesting consistency with prior conceptualizations of perioperative satisfaction [6].

The scale used in the study by Parakkamodom et al. (2016) was a relatively brief instrument consisting of 15 items. Factor analysis yielded three dimensions: reliability and empathy, assurance and tangibility, and responsiveness [7]. These dimensions are generally consistent with multidimensional models of patient satisfaction reported in the literature. To ensure conceptual alignment and facilitate comparison with existing scales, the dimensions derived from the present study were named using similar terminology where appropriate.

The nine subdimensions identified through exploratory and confirmatory factor analyses in this study demonstrated strong structural validity and internal consistency. In particular, the subdimensions of Overall Satisfaction ($\alpha = 0.97$), Fear of Anesthesia ($\alpha = 0.92$), and Practitioner Behavior ($\alpha = 0.86$) demonstrated high internal consistency. These coefficients are higher than the internal consistency ($\alpha = 0.80$) reported in the study adapting the ISAS-T to Turkish [13].

One of the distinctive features of the APSS is its distinction between "fear of anesthesia" and "fear of the procedure" as two separate dimensions. This differentiation enables a more detailed assessment of patient anxiety, a feature also emphasized by Wang et al. (2022) in the Chinese version of the EVAN-G scale [14].

Similarly, the original developers of the PSPACq emphasized that patient satisfaction is not a unidimensional construct; rather, dimensions such as safety, information, and a sense of control are directly associated with satisfaction with anesthesia care [6]. In a recent study by Garcia-Galicia et al. (2024), preoperative information was found to be associated with the highest satisfaction scores, highlighting the important role of patient education in anesthesia experiences [15].

The scale developed by Parakkamodom et al. (2016) identified "reliability," "empathy," and "responsiveness" as key components of anesthesia service quality. This tripartite structure appears to directly align with the "trust" and "Overall Satisfaction" dimensions of the Anesthesia Process Satisfaction Scale [7].

These findings suggest that the "practitioner behavior" dimension is one of the most influential elements affecting patient satisfaction. Indeed, a study conducted by Koster et al. (2023) in Switzerland revealed that, even when patients received comprehensive preoperative information, 40% still considered continuity of care with the same anesthesia provider throughout the process to be important [16]. This suggests the substantial role of trust and continuity in shaping patient satisfaction within anesthesia care.

Schiff et al. (2013) reported significantly lower levels of satisfaction with anesthesia among parents of children with disabilities, particularly highlighting dissatisfaction with the anesthesiologist's demeanor during counseling, the adequacy of information provided, and the management of preoperative anxiety [17]. These findings are conceptually consistent with the lower scores observed in the "information" and "practitioner behavior" subscales in the present study.

In our sample, male participants reported higher total satisfaction scores compared to females, a trend that is consistent with the sociodemographic findings reported by Andemeskel et al. (2019) [4]. Notably, both studies identified the "information" dimension as having the relatively lowest satisfaction scores, suggesting a potential gap in patient education during the anesthesia process.

Similarly, Lakshminarasimhan and Pilendran (2022) found that male patients in India reported significantly higher satisfaction than female patients, and that the use of combined anesthesia techniques was associated with greater satisfaction [18]. These results support the influence of demographic and clinical factors—such as gender and type of anesthesia—on patient satisfaction.

Although no statistically significant difference was found in overall satisfaction scores across educational levels in this study, individuals with postgraduate education reported lower satisfaction, especially in the "information" and "trust" subscales. This trend mirrors findings from studies conducted by Lemos et al. (2023) in Brazil and Bayable et al. (2020) in Ethiopia, both of which demonstrated a significant negative correlation between education level and patient satisfaction [19,20]. These findings may reflect a tendency among highly educated individuals to evaluate healthcare services more critically, with heightened expectations influencing their perceptions

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of care quality. In addition, the private hospital setting of the study may have contributed to higher baseline expectations regarding perioperative care, potentially influencing satisfaction perceptions across several subscales.

The findings of Yazan et al. (2018) indicate that educational status does not generally result in differences in overall patient satisfaction with healthcare services; however, satisfaction with the international patient unit was significantly lower among participants without university education and those with postgraduate degrees [21]. Demir et al. (2011) similarly reported no significant difference in total satisfaction scores by education [22], and Korkmaz and Çuhadar (2017) found that perceived service quality did not differ across educational levels [23]. In contrast, Kara et al. (2023) observed higher overall satisfaction scores among participants with lower educational attainment [24], and Emhan and Bez (2010) likewise reported significantly higher satisfaction with radiology services in this group [25]. Yelegen and Eren-Bana (2025) found that satisfaction with mammography was significantly higher among university graduates than among participants with lower educational status [26]. Taken together, these findings suggest that educational status does not, in most cases, lead to significant differences in overall patient satisfaction; nevertheless, in specific service areas such as mammography, radiology, and anesthesia, satisfaction does appear to vary with education. A systematic review would be required to draw a definitive conclusion on this issue. Within the present study, the lower satisfaction reported by highly educated patients—particularly on the "information" and "trust" subscales—likely reflects a more critical evaluation of the perioperative communication rather than overall dissatisfaction with care. These patients may have specific informational needs (e.g., regarding anesthetic technique, intraoperative monitoring, and recovery trajectory) that standard preoperative briefings do not fully address. This finding may support the development of education-tailored information protocols.

Consistent with previous studies, our results also indicate higher satisfaction levels among patients who received regional anesthesia compared to those who underwent general anesthesia [4]. For example, a study from Eritrea involving women undergoing cesarean section under spinal anesthesia reported a very high overall satisfaction level of 99% regarding anesthesia care [27]. Despite differences in setting and methodology, both studies suggest that regional anesthesia is positively perceived by patients across diverse populations.

Finally, the "information" dimension showed the lowest satisfaction scores in both our study and the Eritrean sample, where only 16.7% of mothers reported satisfaction with the preoperative evaluation process [27]. This further emphasizes the importance of effective preoperative communication and highlights a common area for improvement in anesthesia care.

In addition, Idris et al. reported a significant association between marital status and satisfaction levels, indicating that married women demonstrated higher levels of satisfaction. In line with this, the present study found that married individuals scored higher than single individuals particularly in the subdimensions of information and trust [27].

A low but significant positive correlation was also observed between age and the subdimensions of Overall Satisfaction and Information. The sample, with a mean age of 32.1 ± 10.8 years, showed that participants—particularly those over the age of 40—reported higher levels of overall satisfaction. Similarly, a study conducted by Schneider-Matyka et al. (2020) in Poland revealed a positive relationship between age and anesthesia-related satisfaction, with older patients reporting higher satisfaction levels. This trend may be attributable to increased healthcare experience and evolving expectations with age [28].

In comparisons based on the type of surgery, patients who underwent plastic surgery reported lower satisfaction scores, particularly in the subscales of "trust," "practitioner behavior," and "information." This suggests that heightened expectations associated with aesthetic procedures may negatively influence satisfaction levels. Supporting this, a prospective study by Stahl et al. (2024) involving patients who underwent aesthetic breast surgery highlighted that patient expectations, concerns, and knowledge level are key determinants of satisfaction. The study emphasized that prioritizing patient education and preoperative counseling may significantly contribute to improved satisfaction outcomes [29]. Similarly, Boran et al. (2022) demonstrated that patient comfort is an important determinant of satisfaction in regional anesthesia practices [30].

One of the notable findings of this study concerns differences between providers of preoperative information: patients informed by the anesthesia team had significantly higher comfort scores than those informed by surgeons. The literature indicates that preoperative anxiety is associated with greater postoperative pain and slower recovery, and that adequately informed patients report less postoperative pain [31]. However, no prior study was identified that directly examines whether the professional providing preoperative information— surgeon versus anesthesia team — influences patient experience differently. This highlights the novelty of the present finding and points to a gap in the literature. Although the small number of staff at the participating hospital and the absence of an evaluation of providers' individual characteristics constitute limitations, the result provides preliminary evidence regarding the distinctive role of the anesthesia team in shaping patient comfort. Further multicenter studies with larger samples are warranted to evaluate the role of the anesthesiologist from the patient's perspective.

When planned and emergency surgeries were compared, patients undergoing planned procedures scored higher in the sub-dimensions of fear of anesthesia and fear of the procedure, indicating greater anxiety levels. This may be attributed to the fact that patients scheduled for elective surgeries have more time to anticipate the upcoming procedure, potentially leading

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to increased anxiety. Previous studies have also shown that preoperative anxiety is quite common in patients undergoing planned surgery and is associated with fear of postoperative pain, anesthesia, and recovery [32,33].

Postoperative symptoms were evaluated as a distinct dimension, and findings revealed that symptoms such as nausea and headache significantly reduced patient satisfaction. A study conducted by Shaaib et al. (2023) in Saudi Arabia among mothers undergoing cesarean section under regional anesthesia similarly emphasized the role of comfort and the anesthesia team's communication style as important determinants of satisfaction [34]. Specifically, staff courtesy, respect for patient privacy, and professional conduct were strongly associated with higher satisfaction scores. These findings highlight the importance of interpersonal dynamics in shaping patient perceptions, particularly within the dimensions of comfort and Practitioner Behavior.

Furthermore, the high scores obtained in the " information" and "practitioner behavior" subscales in this study indicate that effective information sharing and communication skills of the anesthesia team may significantly enhance patient satisfaction. Similarly, in a multicenter study conducted by Chen et al. (2025), a statistically significant relationship was identified between medical information delivery, communication competencies, and patient satisfaction [35]. Regression analysis revealed that satisfaction with communication accounted for 28.7% of the variance in overall satisfaction. These findings further support the important role of communication quality as a determinant of the patient experience.

Although the single-center design of this study limits the generalizability of the findings, the analysis based on data from 314 participants represents notable strengths in terms of sample size, demographic diversity, and the comprehensiveness of the statistical analyses employed. For instance, the ISAS-Br study involved only 127 participants and reported low internal consistency for certain scale dimensions (e.g., CR = 0.428 for the "anxiety relief" dimension) [36]. In contrast, the present study demonstrates greater robustness in both sample size and the multidimensional structure of the developed scale. Moreover, existing studies in the literature often adopt unidimensional instruments or limit the number of scale items [6,8,14].

The multidimensional nature of the APSS provides healthcare professionals with a practical and clinically informative tool for identifying specific areas requiring improvement in anesthesia care. Kepekçi and Kepekçi (2023) emphasized that anesthesia is a fundamental component of modern surgical practice and noted that increased awareness of clinical hygiene—especially in the post-COVID-19 period—has introduced additional factors influencing patient satisfaction [37]. In line with this, the present study revealed a positive and statistically significant association between overall satisfaction and the trust and information dimensions.

Two contributions of this study warrant separate consideration: the psychometric structure of the scale and its potential value in daily anesthesia practice. Psychometrically, the exploratory factor analysis yielded a nine-factor structure accounting for 72.1% of the total variance, with all item loadings exceeding 0.55, supporting construct validity. Internal consistency was high overall (Cronbach's $\alpha = 0.92$), with subscale coefficients ranging from 0.67 to 0.97; the Overall Satisfaction ($\alpha = 0.97$), Fear of Anesthesia ($\alpha = 0.92$), and Practitioner Behavior ($\alpha = 0.86$) subscales demonstrated particularly strong internal consistency. The confirmatory factor analysis, however, produced fit indices below conventional thresholds (CFI = 0.79; RMSEA = 0.09), which should be acknowledged as a limitation. Such moderate fit is frequently observed in complex multidimensional instruments at the early validation stage and underscores the need for retesting in larger, multicenter samples.

Clinically, the multidimensional structure of the APSS enables the identification of specific weaknesses across the anesthesia process. The relatively low scores in the Information subscale point to a need for improvement in preoperative patient education; notably, patients who received information from a surgeon reported lower Comfort scores than those informed by an anesthesiologist, anesthesia technician, or nurse, supporting the importance of information delivery by the anesthesia team. The Trust and Practitioner Behavior subscales capture the role of continuity in the patient–practitioner relationship and professional demeanor in shaping satisfaction, while the Comfort and Fear of Anesthesia subscales allow assessment of perioperative anxiety management. The Postoperative Symptoms subscale, in turn, monitors the impact of complaints such as nausea and headache, enabling identification of areas requiring improvement in postoperative care. Together, these dimensions provide clinicians not with a single aggregate satisfaction score, but with a clinically informative profile indicating which sub-process requires intervention.

Regarding the use of the term "practitioner behavior," although anesthesiologists and anesthesia technicians are not interchangeable in terms of clinical responsibility, patient counseling, decision-making, and perioperative management, anesthesia procedures are often performed by technicians under the supervision and overall responsibility of the anesthesiologist. The collaborative model is also common across other healthcare professions. Different provider types were therefore intentionally included in this study to reflect real-world practice and to capture the impact of the information source on patient satisfaction. The type of the professional performing the procedure (anesthesiologist vs. technician) was treated as a variable, and statistical analyses were conducted to examine whether this distinction produced differences across subscale scores. In addition, the survey included multiple personnel categories (anesthesiologist, anesthesia technician, nurse, and surgeon) as the source of preoperative information, in order to mirror the reality that such information may be provided by

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different healthcare professionals and to examine its potential effect on the patient experience. In clinical practice, although anesthesiologists, anesthesia technicians, and other healthcare professionals carry distinct responsibilities, patients tend to perceive the anesthesia process as a unified experience delivered by a team — which supports retaining a composite "Practitioner Behavior" dimension while interpreting its findings with attention to the underlying role differences.

It should also be acknowledged that some dimensions of the APSS overlap with issues common to the broader surgical process. Because the scale is designed to capture patient perception, it should be recognized that patients evaluate anesthesia-related risks together with the risks of the surgical operation itself. For example, the Fear of the Procedure subscale reflects not only anesthesia-related fears but also fears tied to the surgical intervention. The perception of postoperative comfort should be interpreted within the same context: the nature, extent, and complexity of the surgical procedure are themselves variables that shape comfort in the postoperative period. Given the interdependence among healthcare disciplines, fully isolating the anesthesia process from the surgical process is methodologically difficult.

The correlations observed in the present study between the Fear and Comfort subscales support this process interdependence within healthcare delivery. The APSS was therefore intentionally designed to be comprehensive across the perioperative trajectory; users are nonetheless advised to interpret its scores while remaining mindful of the surgical, nursing, and patient-level variables that jointly influence the experience. This dual nature — comprehensiveness as both a strength and a constraint — should be understood as an inherent feature of the construct the scale captures.

Another important consideration concerns the very high internal consistency coefficients observed in some subscales (e.g., Overall Satisfaction, $\alpha = 0.97$), which may indicate item redundancy. While such values statistically reflect a high level of measurement precision, we acknowledge that an instrument of 50 items distributed across 9 factors imposes a non-trivial respondent burden in routine clinical use. The present study was deliberately designed to report the full psychometric structure of the APSS; building on this foundation, the development of a more parsimonious clinical short form, derived through systematic item-reduction procedures, is planned as a subsequent stage of the validation program. This short form is intended to retain the multidimensional coverage of the original scale while improving its practicality for bedside and outpatient use.

Conclusion

In conclusion, the Anesthesia Process Satisfaction Scale (APSS) provides preliminary evidence of reliability and construct validity and is consistent with current literature while also reflecting cultural specificity. While the initial findings are promising, further validation in larger and more diverse populations across multiple centers is required to confirm its psychometric properties and establish its practical utility for monitoring the quality of anesthesia services in Türkiye.

Limitations

This study aimed to develop a multidimensional scale to comprehensively assess patients' experiences across all stages of the anesthesia process. However, several limitations should be considered. First, the study was conducted with a relatively limited sample size from a single center, which restricts the generalizability of the findings. Second, although the reliability and psychometric properties of the scale and its subscales were acceptable in this preliminary phase, the presence of only two items in certain subscales suggests the need for further refinement and validation. Future studies should replicate and expand upon these findings in larger and more diverse populations to enhance generalizability and strengthen the psychometric properties of the scale.

Furthermore, the data were collected exclusively in a private hospital, which represents an additional source of bias that should be acknowledged. Patients who choose to pay for services otherwise available free of charge in the public healthcare system may differ systematically in socioeconomic status, baseline expectations, and standards for evaluating quality of care, and these characteristics may have influenced the satisfaction levels reported here. Future studies using the APSS across public hospitals and centers serving more heterogeneous socioeconomic populations would substantially strengthen evidence regarding its psychometric properties across different populations and improve the interpretation of its scores.

A further methodological consideration concerns the model fit indices obtained in the confirmatory factor analysis (CFI = 0.79; RMSEA = 0.09), which fall below the conventional thresholds typically recommended in psychometric research. This pattern may primarily reflect the methodological consequences of the relatively large and complex structure of the scale, which comprises 50 items distributed across 9 factors, rather than indicating a fundamental structural problem with the instrument. Further support for the structure of the APSS is provided by statistically significant factor loadings for all items ($p < 0.001$) and a high KMO value of 0.914 indicating sampling adequacy. The current nine-dimensional structure was therefore retained in order to preserve the clinical depth and conceptual coverage of the instrument, and the methodological limitation of the fit indices is explicitly acknowledged here. Future studies conducted with larger multicenter samples may yield improved fit values.

To improve the clinical applicability of the scale, an additional factor analysis was conducted using items from the four subscales with the strongest psychometric performance (Overall Satisfaction, Fear of Anesthesia, Comfort, and Practitioner Behavior). The analysis demonstrated that the retained items preserved their original factor structure and continued to load under the same dimensions. The total explained variance was

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68%, and the Cronbach's alpha coefficient was 0.90. However, the confirmatory factor analysis did not demonstrate improved fit indices. It is anticipated that improved model fit may be achieved through larger multicenter studies conducted in more diverse clinical settings and with increased sample sizes.

Another important consideration is the retention of the full nine-dimensional structure. The aim of this study was to develop a multidimensional scale capable of evaluating patient satisfaction across the entire anesthesia process. Existing instruments in the literature have largely been unidimensional or focused on only one phase of the perioperative process; the originality of the APSS lies in its ability to address the holistic perioperative experience. Accordingly, the present study was designed to report the full psychometric structure of the scale, even though complex multidimensional models may generate fit indices below conventional thresholds in confirmatory factor analysis. This pattern was also observed in the present analysis and is interpreted here as a methodological consequence of model complexity rather than reflecting a fundamental structural problem with the instrument.

Despite the moderate CFI and RMSEA values, all item factor loadings were statistically significant ($p < 0.001$), the KMO value was high (0.914), and exploratory factor analysis accounted for 72.1% of the total variance, supporting the construct validity of the proposed structure. To examine the feasibility of a shortened version of the scale, a separate factor analysis was conducted including only the four subscales with the strongest psychometric performance (Overall Satisfaction, Fear of Anesthesia, Comfort, and Practitioner Behavior). The same items consistently loaded onto their corresponding dimensions, with a total explained variance of 68% and a Cronbach's alpha coefficient of 0.90. Although a shorter version restricted to these four dimensions would likely be more practical for routine clinical use, the present 50-item structure was retained because the present study represents the first psychometric evaluation of the APSS, and evaluating the full item pool was considered appropriate at this initial validation stage.

Ethical Approval
This study was approved by the Ethics Committee of İstanbul Yeni Yüzyıl University (Date: 07.11.2022, Decision No: 2022/11/926).

Patient Consent
Informed consent was obtained from all participants prior to inclusion in the study.

Conflict of Interest
The authors confirm the absence of any conflicts associated with this work.

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