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Factors Affecting Perioperative Patient Satisfaction with Regional Anesthesia: A Patient-Centered Survey Study

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ABSTRACT

Objective: To determine the demographic and clinical characteristics that affect patient satisfaction with regional anesthesia.

Methods: This study was conducted at Kahramanmaras Sutcu Imam University Hospital between June-July 2019. The patients were included on a voluntary basis and all had undergone obstetrics, urology, orthopedics or general surgery, and met the following inclusion criteria: (1) age >18 years, (2) received regional anesthesia, (3) ASA-PS score of ≤ 3, and (4) no cognitive problem that would prevent self-expression. A Personal Information Form and the Evaluation of the Experience of Regional Anesthesia Questionnaire were applied to 402 patients at 48 hours after surgery performed under regional anesthesia in a university hospital in Turkey.

Results: The EVAN-LR total scores were 71.2±15.6 in obstetrics patients, followed by 54.9±24.9 in orthopedic patients, 26.6±24.4 in urology patients and 15.9±7.2 in general surgery patients ($p<0.001$). In the comparisons of the subscale points of the EVAN-LR points of attention (58.2±34.5), information (57.6±31.8), discomfort (41.1±31.8), waiting (45.4±36.4) and pain (36.5±32.7), the lowest mean scores of EVAN-LR were seen to be in the subscale of pain. The total mean scores of males were determined to be higher than those of females ($p<0.05$). The EVAN-LR total scores of the patients administered with premedication were statistically significantly higher than those of the patients who did not receive premedication ($p<0.001$). According to the multiple linear regression model, the best predictive variables for patient satisfaction with regional anesthesia were gender, history of anesthesia, and premedication.

Conclusions: The results of this study showed that the satisfaction with the regional anesthesia service of the participants was at a moderate level. This indicates the need to educate the anesthesia team to increase the patient satisfaction with regional anesthesia, especially in respect of postoperative pain management.

Keywords: Patient-centred surgery, patient satisfaction, perioperative satisfaction, regional anesthesia

1. INTRODUCTION

Traditionally, patient satisfaction, which is a complex and multi-dimensional concept, has been defined as the relationship between the patient's expectations and the perceived success of the treatment (1,2). The American Society of Anesthesiologists (ASA) recommend that it is important to evaluate patient satisfaction when evaluating clinical care quality and postoperative success, and the evaluation should be made with various measurement tools (2-5).

One of the functions of anesthetists is to determine the best anesthesia method for the patient, but the application of the method perceived to be best by the physician may not always provide satisfactory results from the patient's perspective (4). If it is considered that regional anesthesia increases patient comfort by providing the opportunity for operation with a conscious sedation strategy, it is necessary to make a detailed investigation of patient satisfaction with regional anesthesia (6). The success of the regional anesthesia technique affects patient satisfaction (2).

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The satisfaction of patients administered with regional anesthesia has been reported to be affected by several variables, such as previous experience of anesthesia, the technique used, the duration of the procedure, and communication (4-7,9,10). The technique used and the success of the regional anesthesia performance are known to affect patient satisfaction (2). It has been reported that when a block is applied and sedation is sufficient in the intraoperative period, patient anxiety is reduced and acceptance of the regional anesthesia is increased (8).

As patients are anxious and tense in the preoperative period in particular, the surgical team need to provide emotional support in this period (4,11). Mui et al. (12) reported that patients needed more emotional support and communication when regional anesthesia is applied. Respect for privacy of the patient has also been reported to be an important element in perioperative patient satisfaction (13). In busy surgical units, time pressure may present a challenge to the anesthesia team in respect of preserving and not violating the dignity of the patient during clinical applications. Accordingly, safeguarding patient dignity should be a paramount concern for all healthcare professionals. If the dignity and privacy of the patient are ignored in the application of regional anesthesia, he/she can feel weak and defenceless (11,13). Specifically informing the patient about potential postoperative complications such as surgical site infection, bleeding, paresthesia, back pain, headache and giving care recommendations not only increase patient satisfaction but are an important responsibility of the surgery team and other healthcare professionals (14,15).

The aim of this study was to determine the demographic and clinical characteristics that affect the patient satisfaction with regional anesthesia.

2. METHODS

2.1. Sample / Setting

This study was designed as a single-center, prospective, cross-sectional survey study. The study was conducted on 402 patients who were administered with regional anesthesia in a large public University Training and Research Hospital between July-September 2019. Using G*Power 3.19.4, the planned sample size was calculated as n=435 patients (0.85 power level, 0.12 effect size and 0.05 type I error). Therefore, it was decided to include 110 patients for each surgical branch evaluated. Due to incomplete data, 33 questionnaires had to be excluded, so the data of 402 surgery patients were analyzed. Quota sampling was used, which is defined as a non-probability sampling method in which the researchers create a sample including individuals that represent a population. The patients were selected according to the inclusion criteria and four surgical procedures in which regional anesthesia is most used. A self-report survey-based data collection procedure was applied in the patient's hospital room two days after surgery using the paper-and-pencil method face-to-face. The patients were included on a voluntary basis and had undergone surgery in obstetrics, urology, orthopedics or general surgery, had been applied with spinal anesthesia (for obstetrics, urology, and general surgery) or peripheral nerve block (for orthopedic surgery), were aged >18 years, had an ASA-PS score of ≤ 3, and had no cognitive problem that would prevent self-expression. All the participants in this study were recipients of publicly-supported healthcare. They were insured by the Social Insurance Institution of the Republic of Turkey and they were able to access standard clinical services. Patients were excluded from the study if surgery was performed under general anesthesia, or local infiltration anesthesia was applied for minor surgeries, if additional anesthesia was required for pain control, or if regional block was performed for chronic pain treatment.

2.2. Standard of Regional Anesthesia Care

In our clinic, regional anesthesia is administered to patients by experienced physicians specialized in anesthesiology. An experienced team (including anesthesia nurses, anesthesia residents) in regional anesthesia is involved in pre – and post-anesthesia care. In our hospital, there is adherence to the Basic Standards for Pre-anesthesia Care guidelines, which were developed by the American Society Anaesthesiologists for the administration of regional anaesthesia (https://www.ra-uk.org/index.php/guidelines-standards).

To improve a patient's overall perioperative experience, anesthesiology teams frequently administer preoperative anxiolytic medications to calm patients before they enter the operating room (16). However, it is not known how well the anxiety is treated by these medications or how they influence the overall perioperative experience (6,16). In the present study, the premedication selected according to the patient's preoperative assessment was applied for central antiemetic effect, sedation, anxiolysis and H2 receptor antagonism. Drug selection in premedication was made according to the patient's other concomitant diseases and medical conditions. With the exception of pregnant women, all the patients in the current study received diazepam to cope with surgery anxiety. Frequently, 10 mg Benzodiazepine premedication IM is administered half an hour before surgery to reduce anxiety in our clinic, but this is known to possibly cause amnesia, drowsiness, and cognitive impairment, which may be deleterious to some surgical patients (17). Therefore, the premedication was administered according to the patient's clinical condition and features. Apart from in an obstetric anesthesia setting, patients in Turkey typically receive Midazolam sedation, when undergoing regional anesthesia.

2.3. Instrumenets

Personal informational form

With the benefit of the literature, the researchers prepared an 11-item Personal Information Form to determine age, gender, the branch performing the operation, anesthesia history, and the development of anesthesia-related complications.

Evaluation of the Experience of Regional Anesthesia (EVAN-LR)

The 19-item "Evaluation of the Experience of Regional Anesthesia" (EVAN-LR) (Evaluation du Vécu de l'Anesthésie LocoRégionale) was applied. The EVAN-LR was administered up to 48 hours after surgery, as recommended by Maurice-Szamburski et al. (6) By restricting the questionnaire period to 48 hours, it was intended to weigh perceptions related to anesthesia over perceptions related to surgery, but with a risk of recall bias. Data were collected from patients in face-to-face interviews. The EVAN-LR scale has been proven to be a valid and reliable tool for the measurement of perioperative patient satisfaction with regional anesthesia in the Turkish population. The Cronbach alpha reliability coefficient was calculated as 0.95. A five-factor structure was confirmed, comprising the subscales of attention, information, discomfort, waiting, and pain (17).

The EVAN-LR consists of 19 items related to different procedures in the perioperative period. Negative items (numbers 7, 8, 9, 10, 11, 12, 13, 14, 18, 19) are reverse scored. The subscales of the scale are attention (items 6, 15, 16, 17), information (items 1, 2, 3, 4, 5), discomfort (items 7, 8, 9, 12), waiting (items 18, 19), and pain (items 10, 11, 13, 14) (for items see Appendix 1) (6). The subscale scores are totaled to give a raw score, then this is calculated as a standard score ranging from 0-100 (standard score = [raw score – minimum score] x 100 / possible score range). The mean standard scores obtained from the subscales are accepted as the total score. A higher total score and subscale scores indicate a higher level of patient satisfaction (6,18,19). There is no cutoff point for the scores.

The attention sub-dimension evaluates patient perception in respect of nursing and medical staff in the operating room, recovery room and patient's room. The information sub-dimension evaluates the information given by the anesthesiologist and surgeon about the operation. The discomfort sub-dimension evaluates unpleasant feelings such as thirst, hunger, nausea, or headache during and after the surgery. The waiting sub-dimension evaluates waiting times to obtain an appointment with the anesthetist or surgeon and waiting during the preoperative visits. The pain sub-dimension evaluates the patient's perception of pain after the surgery (17).

Clinical Forms

Intraoperative Anesthesia Assessment Form: This form is used by the anesthesia provider and is an integral part of the everyday anaesthesia practice in our clinic. It is used to document the preoperative anaesthetic assessment, the actions and interventions of the anaesthetist, the patient's vital signs throughout surgery, and important events or complications and provides information about the anaesthesia record. It contains the following sections about peri-anesthesia (time-based record of events): (A) Immediate review prior to initiation of anesthetic procedures: (1) Patient re-evaluation. (2) Check of equipment, drugs and gas supply. (B) Monitoring the patient, which states that during all anesthesia the patient's oxygenation, ventilation, circulation and temperature shall be continually evaluated. (C) Amounts of all drugs and agents used, and times given. (D) The type and amounts of all intravenous fluids used including blood and blood products, and times given. (E) The technique(s) used. (F) Unusual events during the anesthesia period. (G) The status of the patient at the conclusion of the anesthesia.

Perioperative Nursing Assessment Form; contains (A) Patient interview to review medical, anesthesia and medication history. (B) Appropriate physical examination. (C) Review of objective data (e.g., laboratory, electrocardiogram, x-ray). (D) Assignment of the American Society of Anaesthesiologists (ASA) physical status. (E) Formulation of an anesthesia plan with the patient and/or responsible adult. In this study, respiratory function including respiratory rate, airway patency, and oxygen saturation, cardiovascular function including pulse rate and blood pressure, mental status, temperature, pain, spinal cord damage, headache, infective complications such as epidural abscess, and postoperative hydration, nausea and vomiting were recorded with the Perioperative Nursing Assessment Form.

Postanesthesia Assessment Form; is completed and documented by a physician qualified to administer anesthesia no later than 48 hours after surgery or a procedure requiring anesthesia services. The form contains information about respiratory function including respiratory rate, airway patency, and oxygen saturation; cardiovascular function including pulse rate and blood pressure; mental status; temperature; pain; nausea and vomiting; and postoperative hydration. This form was used to follow up postoperative anesthesia complications such as cardiovascular function, respiratory function, mental status, pain, nausea and vomiting.

2.4. Statistical Analyses

The data were analyzed with SPSS v 22 software (IBM Corp., 2013). To determine the perioperative satisfaction level according to the demographic and clinical characteristics of the patients, conformity of the data to normal distribution was assessed with the Kolmogorov-Smirnov test. As the scale scores were not normally distributed, the Mann Whitney U-test and Kruskal-Wallis variance analysis (post-hoc Siegel-Castellan test) were used in the comparison of the scale scores of various groups. To evaluate the correlations between age and the scale scores and subscale scores, Spearman's rho correlation analysis was applied. Quantitative data were stated as mean ± standard deviation and median (minimum – maximum) values, and categorical data as number (n) and percentage (%). A value of $p<0.05$ was accepted as statistically significant.

To predict the patients' scores for satisfaction with regional anesthesia, multiple linear regression analysis was used

based on the independent sociodemographic and health-related variables considered. The collinearity between the factors was analyzed to avoid including correlated variables in the model. The model was constructed using backward stepwise regression, finally including the variables that were shown to be significantly associated in the bivariate analysis. Estimates of the model parameters and standard errors for these estimates were calculated. The independent associations of prespecified factors with patient satisfaction were examined with proportional odds multivariable regression analysis. To determine whether patient satisfaction with regional anesthesia was associated with personal and clinical features, the odds ratio (OR) with 95% confidence interval (95% CI) of patient satisfaction was calculated for each variable with univariate statistics (unadjusted OR), followed by multivariate logistic regression using backward variable selection to control for gender, education level, surgical branch, anesthesia history, premedication, intraoperative complications, complications in recovery room, and ASA-PS score (adjusted OR). Parameter estimates were exponentiated to obtain ORs for higher satisfaction scores together with the corresponding 95% CI. Statistical significance was concluded when the 95% CI did not include unity ($p<0.01$).

2.5. Ethical Approval

Approval for the study was granted by the Clinical Research Ethics Committee of Kahramanmaraş Sütçü Imam University (decision no:2019/10). Clinical Trials ID (NCT 04009018) was obtained for the study. Informed consent was obtained from all the study participants, who were assured about the confidentiality, protection, and anonymity of data. The research was conducted in accordance with the ethical criteria of the Helsinki Declaration.

3. RESULTS

3.1. Demographic characteristics of the participants

The study participants comprised 50.4% males and 49.6% females with a mean age of 44.1±18.4 years. Regional anesthesia was applied for an obstetrics operation in 24.1% of cases, urological procedures in 24.3%, an orthopedic operation in 26.4%, and a general surgery operation in 25.2%. Of the total patients, 56.7% had no history of anesthesia, and premedication was administered to 68.6%. No intraoperative complications were observed in 66.1% of the patients, and the most common intraoperative complication was pain in 16.9%. There were no complications in the recovery room in 77.6% of the patients. ASA-PS scores were determined as ASA-PS 1 in 35.5%, ASA-PS 2 in 50.3% and ASA-PS 3 in 14.2% of the patients (Table 1).

Table 1. *Demographic and clinical characteristics of the patients*

Characteristics	Mean±SD		
	Groups	**n**	**%**
Age (years)	18-30	**128**	31.8
	31-44	**94**	23.4
	45-54	**49**	12.2
	55-64	**59**	14.7
	65 and above	**72**	17.9
Gender	Male	203	50.4
	Female	199	49.6
Employment status	Employed	142	35.3
	Unemployed	260	64.7
Level of Education	Did not finish primary school	77	19.1
	Primary school	141	35.0
	High school	122	30.4
	University and above	62	15.5
Surgical Branch	Obstetrics	97	24.1
	Urology	98	24.3
	Orthopedics	106	26.4
	General Surgery	101	25.2
Anesthesia History	Yes	174	43.2
	No	228	56.8
Premedication	Yes	276	68.6
	No	126	31.4
Intraop Complications	None	266	66.2
	Hypotension	45	11.1
	Pain	68	17.0
	Nausea and Vomiting	16	3.9
	Dyspnea	7	1.8
Recovery Room Complications	None	312	77.6
	Hypotension	9	2.3
	Pain	39	9.7
	Nausea and Vomiting	38	9.5
	Shaking	4	0.9
ASA-PS score	1	143	35.6
	2	202	50.2
	3	57	14.2

Intraop: Intaraoperative; ASA-PS: The American Society of Anesthesiologists Physical Status Classification Score

3.2. The level of perioperative patient satisfaction with regional anesthesia

The level of perioperative patient satisfaction with regional anesthesia was evaluated in this study. In addition, the item total scores of the subscales of attention, information, discomfort, waiting and pain of the EVAN-LR scale were evaluated according to demographic and clinical characteristics. The total perioperative EVAN-LR mean score was determined to be 47.7±28.6. When the item total scores of the EVAN-LR were examined according to education level, the lowest level of satisfaction was determined in those with a high school level of education ($p<0.001$). The perioperative satisfaction level of males administered with regional anesthetic (57.1±25.5) was determined to be statistically significantly higher than that of females (38.2±28.5)

(p<0.001). The EVAN-LR item total scores were 71.2±15.6 in obstetrics patients, followed by 54.9±24.9 in orthopedic patients, 26.6±24.4 in urology patients, and 15.9±7.2 in general surgery patients (p<0.001). The EVAN-LR item total scores of the patients administered with premedication (73.4±13.9) were statistically significantly higher than those of the patients who did not receive premedication (30.0±25.8) (p<0.001).

When the development of complications in the intraoperative period was examined via the Intraoperative Anesthesia Assessment Form, the EVAN-LR item total scores were determined as 46.2±29.9 in patients who did not develop any complications, 34.3±22.6 in those who developed hypotension, 60.0±23.8 in those who experienced pain, 57.5±21.8 in those with nausea and vomiting, and 50.7±25.3 in those who developed dyspnea (p<0.01). In the evaluation of the satisfaction levels of the patients according to ASA-PS scores, the highest levels were seen in patients with ASA-PS 3 (53.3±27.0) (p<0.05). When perioperative patient satisfaction with regional anesthesia was evaluated according to the development of complications in the recovery room, the highest satisfaction levels were determined in patients who experienced pain (p<0.001) (Table 3).

Multiple linear regression analysis was performed in the study to determine which of the independent variables affect the dependent variable and to determine the value of the dependent variable using the data affecting the dependent variable. According to the multiple linear regression model, the best predictive variables for patient satisfaction with regional anesthesia were male gender, having a history of anesthesia, and not receiving premedication (Table 4). It was seen that the independent variables in the model explained 41.7% of the dependent variable (patient satisfaction).

3.3. The total mean scores of sub-scales of the EVAN-LR

The mean scores were 58.2±34.5 for attention, 57.6±31.8 for information, 41.1±31.8 for discomfort, 45.4±36.4 for waiting, and 36.5±32.7 for pain (Table 2). In the subscale total scores, the mean scores for attention were higher for employed patients compared to unemployed patients (59.2±34.9 vs. 57.6±34.4), the information subscale scores were the same, and the scores for the subscales of discomfort, waiting and pain were lower (Table 3).

Table 2. *Total scores of EVAN-LR and subscales*

Scale (Number of Items)	Mean ± SD	Median
EVAN-LR (19)	47.7±28.6	49.3
Subscales (Number of Items)	**Mean ± SD**	**Median**
Attention (4)	58.2±34.5	62.4
Information (5)	57.6±31.8	68.6
Discomfort (4)	41.1±31.8	55.0
Waiting (2)	45.4±36.4	58.4
Pain (4)	36.5±32.7	45.6

The scores of the subscales were seen to be higher for males than for females (p<0.001). The lowest level of patient satisfaction with regional anesthesia in all the subscales was determined in the general surgery patients (p<0.001). The satisfaction level of patients with a history of anesthesia (53.3±27.2) was found to be higher than that of patients with no anesthesia history (p<0.001). A statistically significant difference was determined between those with and without a history of anesthesia in respect of attention, information and pain subscales (p<0.05) (Tables 3).

There was a similar 40-point difference between those who received or did not receive premedication in the subscale scores of attention, information, discomfort, waiting and pain, and the differences were statistically significant (p<0.001) (Table 3). When the mean subscale scores of the EVAN-LR were examined according to the development of intraoperative complications, the highest levels of patient satisfaction with regional anesthesia were seen to be in the subscales of attention, discomfort, waiting and pain in those who developed intraoperative pain, and the highest satisfaction levels were seen in the subscale of information in those who experienced nausea and vomiting (Tables 3). When the subscales of the EVAN-LR were examined, the highest satisfaction level in the subscale of attention was determined in ASA-PS 1 patients (59.9±31.2), and the highest satisfaction levels in the subscales of information, discomfort, waiting and pain were seen in ASA-PS 3 patients (Table 3).

4. DISCUSSION

In today's highly competitive medical environment, traditional health care involves one or more elements (e.g. quality of health care, health care system costs, price, convenience, new technology and innovation and superior products or services). Patient satisfaction has become the core element in the competitiveness of medical and health institutions (19, 20). Evaluating patient satisfaction for the entire surgical process (nurses, anesthesiologist, surgeon) from the perioperative period to the postoperative period makes the EVAN-LR an important measurement tool (18). The scale consists of information, attention, waiting, discomfort and pain sub-dimensions that are determined as a guide for evaluating intraoperative patient satisfaction (6). The results of the current study showed a moderate level of perioperative patient satisfaction with regional anesthesia (47.7±28.6). The mean perioperative total EVAN-LR score was found to be 84.6±9.9 by Courtot et al. (19), and 78.83±15.61 by Maurice-Szamburski et al. (6). The lower level of patient satisfaction with regional anesthesia in the current study may be a result of the current research having been conducted in the region's largest university hospital. Since the number of daily operations (approximately150) and the number of patients per physician is high, there is less time to take care of the patients. Patient satisfaction rates improve as visit length increases (21). This finding is important to increase our awareness of our weaknesses regarding patient satisfaction with regional anesthesia and to review our practice.

Table 3. *The total points of the EVAN-LR subscales of attention, information, and discomfort, according to the demographic and clinical characteristics of the patients*

Participants' characteristics (n)	Attention			Information			Discomfort			Waiting			Pain			EVAN-LR		
	M ± SD	z/KW (p)	*Median (Min–Max)*	*M* ± SD	z/KW (p)	*Median (Min–Max)*	*M* ± SD	z/KW (p)	*Median (Min–Max)*	*M* ± SD	z/KW (p)	*Median (Min–Max)*	*M* ± SD	z/KW (p)	*Median (Min–Max)*	*M* ± SD	z/KW (p)	*Median (Min–Max)*
Gender																		
Female (203)	46.9±34.5	4.76	37.5 (0.0–100.0)	48.0±31.4	5.93	45.0 (0.0–100.0)	31.5±32.3	6.66	25.0 (0.0–100.0)	36.8±35.6	4.76	50.0 (0.0–100.0)	27.6±32.2	5.94	50.0 (0.0–100.0)	38.2±28.5	6.69	59.8 (0.0–100.0)
Male (199)	69.2±30.9	**<0.001**	81.3 (0.0–100.0)	66.9±29.3	**<0.001**	75.0 (0.0–100.0)	50.5±28.4	**<0.001**	50.0 (0.0–100.0)	53.8±35.3	**<0.001**	25.0 (0.0–100.0)	45.3±30.8	**<0.001**	12.5 (0.0–100.0)	57.1±25.5	**<0.001**	27.5 (0.0–100.0)
Employment Status																		
Employed (142)	59.2±34.9	2.67	62.5 (0.0–100.0)	57.9±32.8	0.21	60.0 (0.0–100.0)	35.9±32.9	2.78	25.0 (0.0–100.0)	39.5±38.5	2.67	25.0 (0.0–100.0)	33.9±33.0	1.19	25.0 (0.0–100.0)	45.3±29.4	1.41	42.6 (0.0–100.0)
Unemployed (260)	57.6±34.4	**0.008**	62.5 (0.0–100.0)	57.4±31.2	0.837	55.0 (0.0–100.0)	43.9±30.0	**0.005**	37.5 (0.0–100.0)	48.6±34.9	**0.008**	50.0 (0.0–100.0)	38.0±32.5	0.233	37.5 (0.0–100.0)	49.1±28.2	(0.159)	50.5 (0.0–100.0)
Level of Education																		
Literate (77)	64.2±31.6	11.24	68.8 (0.0–100.0)[a]	64.4±26.4	19.35	65.0 (0.0–100.0)[a]	47.2±25.8	33.21	43.8 (0.0–100.0)[a]	46.6±32.1	11.24	50.0 (0.0–100.0)[a,b]	38.9±27.9	30.16	31.3 (0.0–100.0)[a]	52.3±26.3	27.69	50.0 (6.5–100.0)[a]
Primary school (141)	65.6±32.5	**<0.001**	75.0 (0.0–100.0)[a]	63.7±29.0	**<0.001**	65.0 (0.0–100.0)[a]	49.4±31.3	**<0.001**	50.0 (0.0–100.0)[a]	51.8±35.5	**<0.001**	50.0 (0.0–100.0)[a]	46.5±32.7	**<0.001**	50.0 (0.0–100.0)[a]	55.4±29.1	**<0.001**	58.0 (0.0–100.0)[a]
High school (122)	48.3±34.6		31.3 (0.0–100.0)[b]	48.0±32.6		40.0 (0.0–100.0)[b]	30.7±31.1		21.9 (0.0–100.0)[b]	37.3±35.7		25.0 (0.0–100.0)[b]	26.1±31.6		12.5 (0.0–100.0)[b]	38.1±29.1		23.9 (0.0–100.0)[b]
University and above (66)	53.2±37.4		50.0 (0.0–100.0)[a,b]	54.0±37.2		55.0 (0.0–100.0)[a,b]	35.0±34.5		25.0 (0.0–100.0)[b]	45.2±42.3		25.0 (0.0–100.0)[a,b]	31.5±33.7		15.7 (0.0–93.8)[b]	43.8±33.5		27.0 (3.0–98.0)[b]
Surgical Branch																		
Obstetrics (97)	82.5±19.7	71.77	87.5 (18.8–100.0)[a]	78.5±21.8	160.16	80.0 (0.0–100.0)[a]	64.7±23.7	147.32	62.5 (0.0–100.0)[a]	67.5±32.8	71.77	75.0 (0.0–100.0)[a]	62.9±24.0	169.43	62.5 (0.0–100.0)[a]	71.2±15.6	182.85	72.3 (22.3–99.0)[a]
Urology (98)	29.5±28.1	**<0.001**	25.0 (0.0–100.0)[b]	30.4±26.7	**<0.001**	27.5 (0.0–100.0)[b]	24.2±30.9	**<0.001**	12.5 (0.0–100.0)[c]	32.4±31.0	**<0.001**	25.0 (0.0–100.0)[c]	16.7±29.1	**<0.001**	0.0 (0.0–100.0)[c]	26.6±24.4	**<0.001**	20.0 (0.0–93.8)[c]
Orthopedics (106)	70.0±29.2		75.0 (0.0–100.0)[a]	67.7±27.3		75.0 (0.0–100.0)[a]	46.4±28.8		43.8 (0.0–100.0)[b]	48.3±36.6		50.0 (0.0–100.0)[b]	42.4±29.3		37.5 (0.0–100.0)[b]	54.9±24.9		51.5 (0.0–100.0)[b]
General surgery (101)	19.6±13.0		25.0 (0.0–56.3)[b]	27.1±15.1		25.0 (0.0–60.0)[b]	10.1±11.3		6.3 (0.0–43.8)[c]	19.5±22.8		25.0 (0.0–100.0)[c]	3.7±5.3		0.0 (0.0–18.8)[c]	15.9±7.2		16.0 (0.0–33.8)[c]
Anesthesia history																		
Yes (174)	66.7±33.4	0.91	81.25 (0.0–100.0)	64.7±30.0	3.85	75.0 (0.0–100.0)	45.3±30.6	2.56	40.6 (0.0–100.0)	47.9±37.4	0.91	43.8 (0.0–100.0)	42.2±31.3	3.39	37.5 (0.0–100.0)	53.3±27.2	3.38	53.5 (0.0–100.0)
No (228)	51.7±34.1	0.363	50.0 (0.0–100.0)	52.1±32.1	**<0.001**	50.0 (0.0–100.0)	37.9±32.3	**0.010**	31.3 (0.0–100.0)	43.8±35.7	0.363	37.5 (0.0–100.0)	32.2±33.1	**0.001**	18.8 (0.0–100.0)	43.5±29.1	**0.001**	40.6 (0.0–100.0)
Premedication																		
Yes (276)	46.5±33.7	9.33	31.3 (0.0–100.0)	47.0±30.4	9.88	40.0 (0.0–100.0)	29.1±27.7	11.24	25.0 (0.0–100.0)	33.7±32.5	9.33	25.0 (0.0–100.0)	23.8±28.5	11.46	12.5 (0.0–100.0)	30.0±25.8	11.99	28.4 (0.0–100.0)
No (126)	83.7±19.1	**<0.001**	87.5 (6.3–100)	80.7±20.5	**<0.001**	85.0 (0.0–100.0)	67.4±23.1	**<0.001**	68.8 (0.0–100.0)	70.9±31.3	**<0.001**	75.0 (0.0–100.0)	64.4±22.4	**<0.001**	62.5 (0.0–100.0)	73.4±13.9	**<0.001**	75.0 (38.8–100.0)
Intraop complications																		
None (266)	56.2±35.4	1.19	62.5 (0.0–100.0)[b]	53.8±33.6	41.32	55.0 (0.0–100.0)[b]	39.4±33.0	11.18	37.5 (0.0–100.0)[a,b]	46.1±36.3	1.19	50.0 (0.0–100.0)	35.7±32.9	24.81	31.3 (0.0–100.0)[a,b]	46.2±29.9	23.39	48.9 (0.0–100.0)[a]
Hypotension (45)	34.2±26.6	0.880	25.0 (0.0–100.0)[a]	43.2±22.1	**<0.001**	35.0 (0.0–100.0)[a]	33.3±19.2	**0.025**	31.3 (6.3–87.5)[a,b]	40.8±27.4	0.880	37.5 (0.0–100.0)	20.1±25.8	**<0.001**	6.3 (0.0–100.0)[b]	34.3±22.6	**<0.001**	27.5 (3.8–93.8)[b]
Pain (68)	76.2±25.6		81.3 (6.3–100.0)[c]	75.3±21.9		75.0 (25.0–100.0)[c]	55.0±31.8		50.0 (0.0–100.0)[a]	47.6±41.5		37.5 (0.0–100.0)	48.7±30.5		50.0 (0.0–100.0)[a]	60.0±23.8		52.3 (22.0–97.8)[a]
Nausea and vomiting (16)	75.8±25.0		78.1 (18.8–100.0)[c]	79.1±17.9		85.0 (25.0–100.0)[c]	52.0±31.8		46.9 (6.3–100.0)[a,b]	42.2±40.0		43.8 (0.0–100.0)	45.3±29.6		34.4 (0.0–93.8)[a,b]	57.5±21.8		57.3 (11.3– 90.5) [a]
Dyspnea (7)	73.2±30.1		81.3 (31.3–100.0)[c]	70.4±27.2		75.0 (30.0–100.0)[c]	45.3±31.1		25.0 (0.0–81.3)[b]	33.9±35.9		25.0 (0.0–100.0)	34.8±38.5		12.5 (0.0–100.0)[a,b]	50.7±25.3		60.0 (14.8–83.8)[a]
Complications in Recovery room	56.3±34.8	4.67	62.5 (0.0–100.0)[b]	54.8±33.0	18.65	55.0 (0.0–100.0)[b]	40.2±33.0	7.61	34.4 (0.0–100.0)	45.9±29.6	4.67	37.5 (0.0–100.0)	36.5±33.5	11.57	31.3 (0.0–100.0)[b]	46.7±29.8	12.90	49.1 (0.0–100.0)[b]
None (312)	38.2±31.0	3.323	25.0 (6.3–100.0)[a]	53.9±26.5	**0.001**	50.0 (20.0–100.0)[b]	45.1±19.0	0.107	43.8 (25.0–75.0)	51.4±42.6	3.323	50.0 (25.0–100.0)	29.2±27.8	**0.021**	18.8 (0.0–81.3)[b]	43.6±25.6	**0.012**	33.8 (22.8–91.3)[b]
Hypotension (9)	80.8±23.0		93.8 (18.8–100.0)[c]	77.4±19.2		87.5 (40.0–100.0)[a]	53.5±31.2		50.0 (0.0–100.0)	49.0±42.6		37.5 (0.0–100.0)	49.8±28.9		50.0 6.3 (–100.0)[a]	62.1±21.8		59.5 (28.5–97.8)[a]
Pain (39)	53.1±34.4		53.1 (0.0–100.0)[b]	58.6±25.5		34.4 (0.0–100.0)[b]	34.7±19.3		31.3 (6.3–100.0)	34.2±31.8		37.5 (0.0–100.0)	24.5±24.8		18.8 (0.0–93.8)[b]	41.0±20.6		36.6 (11.3–90.5)[b]
Nausea and vomiting (38)	76.6±35.5		90.0 (25.0–100.0)[b]	78.8±28.4		80.0 (30.0–100.0)[a]	42.2±41.9		43.8 (0.0–81.3)	62.5±43.3		62.5 (25.0–100.0)	39.1±40.3		34.4 (0.0–87.5)[a]	59.8±28.9		61.3 (23.0–93.8)[a]
Shaking (4)																		
ASA-PS																		
1 (143)	59.9±31.2	23.58	62.5 (0.0–100.0)	57.2±30.8	0.19	60.0 (0.0–100.0)	34.9±30.3	13.38	25.0 (0.0–100.0)[a]	35.1±35.6	23.58	25.0 (0.0–100.0)[a]	32.5±30.1	3.10	25.0 (0.0–100.0)	43.9±27.3	6.25	42.5 (0.0–100.0)[a]
2 (202)	57.2±36.1	**<0.001**	62.5 (0.0–100.0)	57.3±33.4	0.912	60.0 (0.0–100.0)	42.5±33.3	**0.001**	37.5 (0.0–100.0)[a,b]	49.3±38.1	**<0.001**	50.0 (0.0–100.0)[b]	38.1±34.0	0.212	37.5 (0.0–100.0)	48.9±29.8	**0.044**	52.5 (0.0–100.0)[a,b]
3 (57)	57.1±37.3		62.5 (0.0–100.0)	59.5±28.6		50.0 (0.0–100.0)	51.6±27.1		43.8 (6.3–100.0)[b]	57.2±24.3		50.0 (25.0–100.0)[b]	41.2±33.5		37.5 (0.0–100.0)	53.3±27.0		63.8 (0.0–100.0)[a]

**The difference between groups with the same letter for each variable was significant (p<0.05)*

According to results of the original study by Maurice-Szamburski A et al. (6), female sex was associated with a significantly lower Information score, patients with ASA-PS score II had a significantly lower Attention score, and patients older than 55 years showed higher satisfaction scores for all dimensions except Attention. Similarly, in the current study, male sex was associated with a significantly higher Information score and patients with ASA-PS score I had a significantly higher Attention score (Table 3). Furthermore, according to the multiple linear regression model, the best predictive variables for patient satisfaction with regional anesthesia were male gender, having a history of anesthesia, and not receiving premedication (Table 4). As Maurice-Szamburski et al. (6) did not give regression analysis results in the original study, the best predictor variables in patient satisfaction could not be compared.

Table 4. *Results of the multivariate logistic regression (adjusted) with patient satistaction (n=402) as the dependent variable (OR and 95% CI)*

Variable	Coef	Std Error	Beta	t	Sig	95% Confidence Intervel
Constant	1.154	0.247		4.674	0.00	0.70-1.64
Male gender	0.265	.097	-0.113	-1.946	0.01	1.15-116
Having a history of anesthesia	0.301	.051	0.227	5.937	0.00	0.20-0.40
Not receiving premedication	1.361	.105	0.539	12.909	0.00	-0.45-0.73

In this study, it was aimed to explore the link between demographics or clinical status and patient satisfaction with regional anesthesia related to the information, attention, waiting, discomfort, and pain subscales of the EVAN-LR. When the subscales were examined in the current study, the subscale with the highest level of satisfaction was attention (58.2±34.5). In a study by Courtot et al. (19) of orthopedic patients, the subscale with the highest mean item total scores was also found to be attention (92.7±10.4), while in the study by Maurice-Szamburski et al. (6), it was discomfort (86.65±17.78). The lower level of patient satisfaction with regional anesthesia in the current study compared to other studies that have used the EVAN-LR can be attributed to the effect of the social, cultural, political and economic structure of the country where the patients live. In our hospital, the anesthesia care of patients who are to undergo surgery is applied in the anesthesia polyclinic, in the clinic at the preoperative visit, in the operating theatre immediately before surgery, and at the postoperative visit in the clinic. However, as this is a university hospital, there may be different anesthetists undertaking these steps in the anesthesia care process, because of training requirements. This can be thought to have a negative effect on patient satisfaction with regional anesthesia. The subscale score for pain (36.5 ± 32.7) in the present study was particularly lower than in other studies by Maurice-Szamburski et al. (6) (79.16 ± 26.15) and Courtot et al. (19) (75.2 ± 19.2). Insufficient analgesia might induce a lower subscale score for pain, which leads to a lower total satisfaction score (22, 23). At our hospital, when the condition of patients stabilize after the operation, the patients are transferred to the postoperative clinics of the relevant branch, and analgesia management is not performed by anesthesiologists. Pain management is performed by the specialist doctor of the branch performing surgery. Low patient satisfaction with regional anesthesia related to pain can arise from different approaches of specialist physicians in pain control.

In addition to gender and education, the levels of patient satisfaction were found to be higher in those undergoing obstetric surgery, those with previous experience of anesthesia and those who were not administered premedication. The reason for the highest level of patient satisfaction with regional anesthesia in obstetrics surgery can be considered to be that the majority of the sample were caesarean section delivery patients and they were excited about the birth of the infant. The duration of the operation was also thought to have an effect on the variable of surgical branch. In another study, which was conducted with gynaecology, urology, general surgery, and orthopedic surgery patients by Akpinar et al. (24) in Turkey, patients who underwent gynaecological and obstetric surgeries and the patients in the age group between 26 and 35 years were mostly satisfied with regional anesthesia. Furthermore, it was reported that patients mostly felt comfortable during urological surgeries, and mostly felt anxious during general surgical procedures. However, in the current study, orthopedic surgery patients had a higher satisfaction score than urology and general surgery patients. The reason for the high level of satisfaction in orthopedic patients may be the application of peripheral nerve block in surgery. There are known to be several benefits of peripheral nerve block compared with general anesthesia that directly affect patients, including reductions in postoperative pain, analgesic use, and postoperative nausea and vomiting (25). In addition, peripheral nerve block provides superior postoperative pain control compared with systemic opioids, with a corresponding reduction in opioid-related adverse events (22).

A statistically significant relationship was determined in the current study between perioperative satisfaction and the development of complications intraoperatively or in the recovery room ($p<0.05$). In contrast, Benwu and Gebremedhin (23) determined no relationship between patient satisfaction and the type of anesthesia applied or the development of complications. Although it has been stated in literature that the physical symptoms leading to substantial morbidity are associated with decreased satisfaction with care (1,6), patients in the current study who experienced pain intraoperatively or in the recovery room were found to have higher perioperative satisfaction levels than those who did not develop any complications (Table 3). As patients experience pain differently, it is difficult to develop a routine procedure to improve patient satisfaction with regional anesthesia (15,22,26). It has been previously reported that empathy with the patients and successful pain management have a positive effect on patient satisfaction (26,27). In the current study, the reason for the higher patient satisfaction with regional

anesthesia in patients experiencing intraoperative pain may have been due to the efforts of the anesthesia team to reduce the patient's pain during surgery. An interesting finding of this study is that patient satisfaction with regional anesthesia increases as the ASA score increases. The reason for this may be that patients with more chronic diseases are more likely to have more anxiety related to surgery (14,28) and that patients experience psychological relief when they come to the second postoperative day and they might be thankful.

Soltner et al. (28) stated that good medical communication, for example by changing anesthesiologists' attitude to increase empathy, has been reported to improve patient satisfaction and brings other benefits such as increasing adherence to medical advice. However, patient satisfaction is not only related to anesthesiologists' individual behavior (6), but it is a multi-dimensional healthcare construct affected by many variables, such as expectations, communication, connection with the patient and healthcare team, shared decision-making, and positive attitude and behaviour of the healthcare professionals (2,19,21). Ironfield et al. (22) emphasized that providing information, pain, and interaction with an anesthesiologist are three important areas in patient satisfaction with regional anesthesia. In the current study, a significant association was determined between patient satisfaction with regional anesthesia and gender, level of education, surgical branch, anesthesia history, premedication, intraoperative complications, complications in the recovery room and ASA-PS score. The multivariate regression model showed that the best predictor variables for EVAN-LR scores in the sample were gender, history of anesthesia, and premedication. Evaluation was made of preoperative, intraoperative, and postoperative processes with the EVAN-LR, but in another study conducted by Ironfield et al. (22) with 154 orthopedic and trauma surgery patients, regression analysis showed the complaint of needle puncture to be the greatest negative factor in patient satisfaction with regional anesthesia.

There were some limitations to this study, primarily that the patient group comprised only patients who presented at a single university hospital and underwent surgery in obstetrics, urology, orthopedics or general surgery, which are the branches where regional anesthesia is most applied. The heterogenous nature of the procedures included in the study made it difficult to compare the relevant covariates. Furthermore, excluding patients who required additional anesthesia for pain control was necessary because the different types of anesthesia would have affected the patient's consciousness and introduced a bias. Although the importance of using a standardized scale for patient satisfaction with regional anesthesia and anesthesia services is emphasized by ASA (30), there is no valid and reliable measurement tool used for this in Turkey. The insufficient number of valid and reliable measurement tools for the determination of patient satisfaction and the lack of a standardized scale are another limitation of the study. Therefore, there is a need for further larger studies to confirm the results of this study.

5. CONCLUSION

Patient satisfaction is emerging as an important indicator of the quality of health care, and identifying deficiencies in discrete aspects of satisfaction may allow targeted interventions to improve quality (22). Factors determined to have an effect on perioperative patient satisfaction were found to be male gender, a higher level of education, previous experience of anesthesia, obstetric surgery, an ASA-PS score of 3, complication development and the provision of premedication.

Conflict of Interest

There are no conflicts of interest in connection with this paper.

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Appendix 1. 19-Item Experience of Regional Anesthesia Questionnaire

The Evaluation du Vécu de l'Anesthésie LocoRégionale (EVAN-LR)*

During the preoperative visits with the anesthetist:	
1	I received information about what was going to happen
2	I was able to ask the questions I wanted
3	I felt reassured, relaxed, and confident
During the preoperative visits with the surgeon:	
4	I received information about what was going to happen
5	I felt reassured, relaxed, and confident
At operating room entrance:	
6	My privacy was respected
During the surgery:	
7	I had unpleasant feelings such as thirst, hunger, nausea, or headache…
8	I felt uncomfortable hearing and/or seeing what was happening
After the surgery:	
9	I had unpleasant feelings such as thirst, hunger, nausea, or headache…
10	I felt uncomfortable: cold, warm, badly positioned on the bed…
11	I had pain
Since I came back to my bedroom or home	
12	I had unpleasant feelings such as thirst, hunger, nausea, or headache…
13	I felt uncomfortable: cold, warm, badly positioned on the bed…
14	I had pain
Overall, about the nursing and medical staff:	
15	Upon OR admission, medical staff were attentive
16	In the recovery room, nursing and medical staff were attentive
17	Since I came back to my bedroom, nursing staff were attentive
Waiting times in the hospital seemed too long:	
18	To obtain an appointment with the anesthetist or surgeon
19	During the preoperative visits

Items of the sub-scales:

Attention: Items 6, 15, 16, 17; Information: Items 1, 2, 3, 4, 5; Discomfort: Items 7, 8, 9, 12; Waiting: Items 18, 19; Pain: Items 10, 11, 13, 14

**To use the English version of the EVAN-LR please contact Axel Maurice-Szamburski, to use the Turkish version of the Turkish version of the EVAN-LR please contact Omer Faruk BORAN*

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