



ORIGINAL RESEARCH

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## Effects of spinal anaesthesia related complication and demographic distribution on patient satisfaction following caesarean section

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### Abstract

Patient satisfaction is an important issue for patients overall health status and perception. Aim of the present study was to evaluate spinal anaesthesia related complications and other factors related with overall satisfaction level and compare satisfaction levels of patients' from 3 different regions of Turkey whom underwent caesarean section (CS) procedure under spinal anaesthesia. Satisfaction levels of 285 patients underwent caesarean section under spinal anaesthesia were evaluated at postoperative 1st and 3rd days using a questionnaire form. Also perioperative complications and possible correlations between satisfaction levels were investigated. Patients' satisfaction levels were not affected by origins of patients. Most of the patients expressed satisfaction after spinal anaesthesia both at 1st and 3rd days postoperatively (82.1% vs 79.6% respectively). Postoperative pain at surgical site, backache and headache were top 3 factors related with decreased patient satisfaction. Also recurrent spinal puncture attempts, painful puncture attempts, inadequate analgesia, postoperative nausea and vomiting were correlated with decreased satisfaction levels ( $p < 0.05$ ). Spinal anaesthesia was significantly related with high satisfaction levels of patients underwent caesarean section. Controlling and managing possible complications and giving detailed information to patients may lead increased patient satisfaction levels.

**Keywords:** Spinal anaesthesia, caesarean section, patient satisfaction, complication

### Introduction

Caesarean section (CS) is widely performed surgery for both elective and emergency indications for pregnancy. In developed countries such as USA, UK the proportion of total births by caesarean section was almost 30% however according to the OECD Healthcare report 2018, highest CS ratio is reached in Turkey with a ratio of 54.17% [1]. Although Turkish women believe that vaginal delivery is the most appropriate way for delivery, fear from labor pain effects their decision about way of delivery (vaginal or CS) [2].

Spinal anaesthesia has a history over 100 years and most of the CS procedures performed under spinal anaesthesia. Many studies from different countries have been indicated advantages of spinal anaesthesia over general anaesthesia for CS which includes lower direct morbidity rates related with anaesthesia type [3-5]. Spinal anaesthesia is accepted as an intervention without additional risks of general anaesthesia include failed intubation, aspiration

risk and ventilation failure. Also it has been reported that deep vein thrombosis, pulmonary embolism, abundant bleeding risks were significantly lower during CS with spinal anaesthesia [6,7]. Postoperative analgesic -including narcotics and other types of analgesics- consumption is less with earlier mobilization and hospital discharge options [6]. On the other hand post spinal headache, backache, nausea, vomiting, intraoperative hypotension, postoperative urine retention, failure of spinal anaesthesia are complications related with spinal anaesthesia [8].

Patient satisfaction is another important issue that affects overall health status of patients and implicits patients future expectations. Patient satisfaction rates were found relatively higher after spinal anaesthesia when compared with general anaesthesia in pregnant however perioperative complications can result in decreased satisfaction rates [7,8].

In this study we compared complication rates and patient satisfaction levels of patients from 3 distinct areas of Turkey (East, Southerneast Anatolia and Black Sea Region) –although previous study conducted by Yakupoglu et al [9] couldn't show correlation between origin of patients and satisfaction levels-. Different from many other previous studies, we compared complication rates and satisfaction rates at postoperative 1st and 3rd days.

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## Material and Methods

The study-a cross sectional descriptive prospective research- was conducted in Gaziosmanpaşa Education and Research Hospital Anaesthesia and Reanimation Clinic. After obtaining local ethical committee approval and patients' informed consent, risk and complications of spinal and general anaesthesia were explained to patients and 285 pregnant patients who prefer spinal anaesthesia for CS were included into study. Three study groups were created according to patients' origin (East, Southeast and Black Sea Region). Inclusion criteria were being Turkish citizen, aged between 18-45, having sufficient communication skills and being able to answer the questionnaire. Patients under 18 years or over 45 years, scheduled for CS under general anaesthesia and unable to communicate properly were excluded from study. All patients were asked to complete a survey -created by our research team- that include patients' medical history, education level, previous anaesthesia experience, overall satisfaction levels related with spinal anaesthesia, complications of current spinal anaesthesia include number of attempts for spinal puncture, postspinal/postoperative headache, backache, nausea, vomiting, intraoperative hypotension, failure of anaesthesia, pain during operation and postoperative period at postoperative 1st and 3rd days. Also patients' willingness of spinal anaesthesia for future CS was evaluated.

## Statistical Analysis

Normally distributed data were evaluated using one way variance analysis where KW one way variance analysis was used in order to evaluate non-normally distributed data. Categorical variables were evaluated using chi-square test, chi-square test with Yates

correction and fisher exact tests. A p value <0.05 was accepted as statistically significant.

## Results

A total of 285 patients were surveyed and three study groups were created each consisting of 95 patients who had originated from 3 different regions of Turkey (Black Sea, East Anatolia and Southeastern Anatolia). Ratios of surgeries performed elective or emergency were similar (51.2% vs 48.7% respectively). When we compared mean age, number of labor and CS of satisfied and dissatisfied patients we found no statistical difference in terms of demographical data (Table 1).

Mean number of labors was significantly higher in patients from Southeastern Anatolian Region compared with those from Black Sea Region (p=0.049). There was no difference between mean number of CSs when region based evaluation has performed (Table 2).

Percentage of patients satisfied with spinal anaesthesia at 1st postoperative day was 82.1% where 79.6% at postoperative 3rd day.

Ratio of illiterates in East Anatolian and Southeastern Anatolian Regions were significantly higher than those in Black Sea Region (p<0.01). In contrast ratio of primary and secondary school graduates in Black Sea Region were higher than those in other regions (p<0.001). Ratio of university graduates were found similar in three groups (p>0.05)(Table 3).

**Table 1.** Mean age, number of labor and CS of patients satisfied or dissatisfied at 1st or 3rd days postoperatively

	Satisfaction levels at postoperative 1st day						p
	NO			YES			
	N	Mean	Std. Deviation	N	Mean	Std. Deviation	
Age	49	28.69	5.173	236	28.44	5.552	0.773
Mean Nr of Labor	49	2.55	1.022	236	2.42	1.173	0.452
Mean Nr of CS	49	2.08	.838	236	1.89	.875	0.152
	Satisfaction levels at postoperative 3rd day						
Age	58	28.14	5.199	227	28.58	5.558	0.587
Nr of Labor	58	2.45	.994	227	2.44	1.186	0.943
Nr of CS	58	2.07	.814	227	1.88	.882	0.143

**Table 2.** Mean numbers of labor and CS from 3 different Regions

		N	Mean	Std. Deviation	P
Nr of Labor	East Anatolia Region*	95	2.43	1.173	0.049
	Southeastern Anatolia Region	95	2.64	1.193	
	Black Sea Region	95	2.24	1.049	
Nr of CS	East Anatolia Region	95	1.93	.866	0.410
	Southeastern Anatolia Region	95	2.00	.899	
		95	1.83	.846	

\*Compared with Black Sea Region,

**Table 3.** Relationship between patient satisfaction and educational level, type of CS and origin of patients

	Postspinal Patient Satisfaction				p	
	NO		YES			
	Nr	%	Nr	%		
Educational Level	Illiterate	4	15.4	22	84.6	0.790
	Literate	4	13.3	26	86.7	
	Primary School	37	19.5	153	80.5	
	Secondary School	3	10.3	26	89.7	
	University	1	10.0	9	90.0	

Ratio of patients in East Anatolian Region having knowledge about spinal anaesthesia before CS was significantly lower than patients in other groups ( $p < 0.05$ ). Patients in Black Sea Region expressed higher levels of spinal anaesthesia preference for future CS compared with patients in other regions ( $p < 0.05$ ). All other parameters (satisfaction levels, complication rates) were found similar between 3 groups.

We evaluated relationship between postspinal complications, previous anaesthesia history and satisfaction levels independent from origin of patients. Also patients future perspectives related with spinal anaesthesia were evaluated independent from origin of patients.

Significantly lower satisfaction levels were recorded at postoperative 1st day in relation with postoperative headache, backache, nausea, postoperative hypotension, recurrent spinal

puncture attempts, inadequate analgesia and pain at surgical site (Table 4).

In this study we found high satisfaction levels following spinal anaesthesia in patients who reported dissatisfaction following their previous general anaesthesia experiences. Also patients satisfied with previous regional anaesthesia had high levels of satisfaction after spinal anaesthesia. Patients who would opt for spinal anaesthesia in the future revealed high satisfaction levels (Table 5).

Survey at postoperative 3rd day revealed similar correlations between satisfaction and investigated parameters those noted at postoperative 1st day except postoperative nausea and number of painful attempts (Table 6 and Table 7). There was no correlation between postoperative nausea, painful attempts and decreased satisfaction levels at postoperative 3rd day (Table 6).

**Table 4.** Relationship between postoperative complications and patient satisfaction at postoperative 1st day

		Postoperative Patient Satisfaction at 1st day postoperatively				p
		NO		YES		
		Nr	%	Nr	%	
Post-spinal Nausea	No	39 <sup>a</sup>	15.5	213 <sup>a</sup>	84.5	0.047
	Yes	10 <sup>b</sup>	30.3	23 <sup>b</sup>	69.7	
Post-spinal hypotension	No	44 <sup>a</sup>	16.1	229 <sup>a</sup>	83.9	0.038
	Yes	5 <sup>b</sup>	41.7	7 <sup>b</sup>	58.3	
Post-spinal vomiting	No	46	16.7	230	83.3	0.188
	Yes	3	33.3	6	66.7	
Number of painfull spinal attempts	No	45 <sup>a</sup>	16.0	236 <sup>a</sup>	84.0	<0.001
	Yes	4 <sup>b</sup>	100.0	0 <sup>b</sup>	0.0	
Inadequate analgesia	No	40 <sup>a</sup>	14.7	232 <sup>a</sup>	85.3	<0.001
	Yes	9 <sup>b</sup>	75.0	3 <sup>b</sup>	25.0	
Postoperative Headache***	No	42 <sup>a</sup>	15.7	225 <sup>a</sup>	84.3	0.012
	Yes	7 <sup>b</sup>	38.9	11 <sup>b</sup>	61.1	
Postoperative Backache**	No	30 <sup>a</sup>	11.9	223 <sup>a</sup>	88.1	<0.001
	Yes	19 <sup>b</sup>	59.4	13 <sup>b</sup>	40.6	
Pain at Surgical Site*	No	45 <sup>a</sup>	16.2	232 <sup>a</sup>	83.8	0.013
	Yes	4 <sup>b</sup>	50.0	4 <sup>b</sup>	50.0	

\*Most common complication, \*\* Second most common complication, \*\*\* Third most common complication, Difference between <sup>a</sup> and <sup>b</sup> letters is statistically significant

**Table 5.** Relationship between patient satisfaction, previous medical experience, future preferences and preoperative lack of information (postoperative 1st day)

		Patient Satisfaction		Patient Satisfaction		p
		at postoperative 1st day		at postoperative 1st day		
		NO	NO	YES	YES	
		Nr	%	Nr	%	
Satisfaction after previous general anesthesia	No	2 <sup>a</sup>	7.7	24 <sup>a</sup>	92.3	0.041
	Yes	33 <sup>b</sup>	26.2	93 <sup>b</sup>	73.8	
Satisfaction after previous regional anesthesia	No	7 <sup>a</sup>	43.8	9 <sup>a</sup>	56.3	0.002
	Yes	4 <sup>b</sup>	7.1	52 <sup>b</sup>	92.9	
Previously having knowledge about spinal anesthesia	No	16	17.6	75	82.4	0.905
	Yes	33	17.0	161	83.0	
Future preference about spinal anesthesia	No	44 <sup>a</sup>	46.8	50 <sup>a</sup>	53.2	<0.001
	Yes	5 <sup>b</sup>	2.6	186 <sup>b</sup>	97.4	

Difference between <sup>a</sup> and <sup>b</sup> letters is statistically significant

**Table 6.** Relationship between postoperative complications and patient satisfaction at postoperative 3rd day

		Patient satisfaction at 3rd day postoperatively				p
		NO		YES		
		Nr	%	Nr	%	
Postspinal Hypotension	No	57	20.2	225	79.8	0.574
	Yes	1	33.3	2	66.7	
Postspinal vomiting	Yes	1	50.0	1	50.0	0.473
	No	58	20.5	225	79.5	
Number of painfull spinal attempts	No	56	19.9	225	80.1	0.185
	Yes	2	50.0	2	50.0	
Inadequate analgesia	No	52 <sup>a</sup>	19.1	220 <sup>a</sup>	80.9	0.009
	Yes	6 <sup>b</sup>	50.0	6 <sup>b</sup>	50.0	
Postoperative backache	No	43 <sup>a</sup>	16.1	224 <sup>a</sup>	83.9	<0.001
	Yes	15 <sup>b</sup>	83.3	3 <sup>b</sup>	16.7	
Postoperative backache	No	35 <sup>a</sup>	13.8	218 <sup>a</sup>	86.2	<0.001
	Yes	23 <sup>b</sup>	71.9	9 <sup>b</sup>	28.1	
Pain at surgical site	No	52 <sup>a</sup>	18.8	225 <sup>a</sup>	81.2	<0.001
	Yes	6 <sup>b</sup>	75.0	2 <sup>b</sup>	25.0	

Difference between <sup>a</sup> and <sup>b</sup> letters is statistically significant

**Table 7.** Relationship between patient satisfaction, previous medical experience, future preferences and preoperative lack of information (postoperative 3rd day)

		Patient Satisfaction				p
		NO		YES		
		Nr	%	Nr	%	
Satisfaction after previous general anesthesia	No	3 <sup>a</sup>	11.5	23 <sup>a</sup>	88.5	0.050
	Yes	36 <sup>a</sup>	28.6	90 <sup>a</sup>	71.4	
Satisfaction after previous regional anesthesia	No	9 <sup>a</sup>	56.3	7 <sup>a</sup>	43.8	<0.001
	Yes	5 <sup>b</sup>	8.9	51 <sup>b</sup>	91.1	
	No	20 <sup>a</sup>	22.0	71 <sup>a</sup>	78.0	0.640

## Discussion

In the present study satisfaction levels of patients from different regions of Turkey were found similar as true for complication rates both on 1st and 3rd days postoperatively. In this context although not statistically significant higher satisfaction levels were found in patients from Blacksea region which illiterate ratio is 0% (87.4%

vs 75.8% vs 75.8, p=0.066). On the other hand ratio of patients expressed that would choose spinal anaesthesia in future for a CS operation was significantly higher in Blacksea region group than others (80% vs 57.9% vs 63.2%, p=0.002). Total satisfaction levels of patients independent from patients' origin was 82.81% at 1st day and 79.64% at 3rd day postoperatively. Yakupoglu et al [9] investigated satisfaction levels and complication rates of 236

patients underwent CS. They evaluated change of these parameters in relation with origin of patients (all [7] regions of Turkey). They reported a satisfaction level of 72.5% (171 patients) where most frequent complication was nausea and vomiting (26.7%) followed by backache (20.1%). Similar with our findings the authors could not show any significant difference in terms of investigated parameters when they made a region based evaluation ( $p>0.05$ ).

We showed that pain at surgical site (76.14%), backache (38.59%) and headache (18.24%), nausea, vomiting, intraoperative hypotension, recurrent spinal puncture attempts, insufficient analgesia were predictive factors for decreased satisfaction levels at 1st day postoperatively. Overall satisfaction level with spinal anaesthesia was 82.1% at postoperative 1st day. Also pain at surgical site (64.21%), backache (36.14%) and headache (32.63) were most frequently reported complications at postoperative 3rd day. Recurrent spinal puncture attempts, insufficient analgesia were other reported factors that resulted in decreased satisfaction levels in 3rd day postoperatively. Overall satisfaction level was 79.64% at 3rd day postoperatively.

Similar studies from other countries revealed satisfaction levels between 83% and 97% [10]. Fassoulaki et al.[11] compared satisfaction levels of patients underwent CS with either general anaesthesia or spinal anaesthesia. They reported significantly higher satisfaction levels with spinal anaesthesia. Additionally 81% of patients underwent spinal anaesthesia expressed that they would prefer spinal anaesthesia for subsequent CS procedure. In another study Kumar et al [12] investigated satisfaction levels of patients underwent emergency CS and they found 88% ratio of satisfaction following spinal anaesthesia. Authors concluded that showing baby to mother, early breast feeding were closely related with increased maternal satisfaction [12]. Interestingly authors showed that informing patients before spinal anaesthesia did not result in decreased anxiety. They suggested that emergency nature of operation might lead such a result.

There are several accepted factors that lead patient dissatisfaction with spinal anaesthesia. Pain from spinal anaesthesia, increased numbers of puncture attempts, insufficient analgesia, postoperative spinal block, postoperative headache, backache, PONV, pruritis are prominent factors that may lead dissatisfaction with spinal anaesthesia[13-15].

In our study pain at surgical site was the most frequently seen complaint of patients both in 1st and 3rd days postoperatively. However we made the first questionnaire at least 12 hours after spinal anaesthesia when the effect of spinal anaesthesia might end or weakened. So we suggest that pain at surgical site was not directly related with inadequate subarachnoid block.

Second leading factor for patient dissatisfaction in the present study was postoperative backache. Ratio of patients reported backache was 38.59% and 36.14% at postoperatively 1st and 3rd days respectively. However previous studies indicated that postoperative backache could not directly related with subarachnoid block [8,16]. In line of these previous findings when we asked the patients about pre-existing backache, 55 patients (19.29%) suffered from previously started backache. Several factors include age, pregnancy, trauma history, prolonged operation time, surgical trauma, patient position during surgery, needle type, number of

punctures were predictive for backache [4,6].

We found the postoperative headache as the third cause for decreased satisfaction levels. 18 patients (6.31%) reported headache both at 1st and 3rd days postoperatively. These cases were not dural puncture related headache and managed only with non steroidal analgesic administration. Postoperative headache following spinal anaesthesia is a well known disturbing complication that patients may have great difficulty in even breastfeeding [17]. Nevertheless none of the patients with postoperative headache were treated invasive methods such as blood patch or occipital nerve block, they all healed following hydration and/or analgesic medication.

Another postspinal-postoperative complication following spinal anaesthesia was postoperative nausea and vomiting (PONV). Previous studies reported that vomiting was more common than nausea following spinal anaesthesia [6,18] however nausea rates were found significantly higher following epidural anaesthesia for labour. It was shown that opioid and local anesthetic mixture for spinal anaesthesia could be strongly responsible for PONV and using local anaesthetics solely for relatively shorter procedures such as CS can prevent PONV [6]. In our study interestingly number of patients complained from PONV at postoperative 1st day was significantly decreased at postoperative 3rd day. This result suggests that PONV may not be directly related with spinal anaesthesia. Furthermore we did not use opioid combinations with local anaesthetics during performing spinal anaesthesia which might increase PONV rates.

Intra operative hypotension following sympathetic blockade can result in intra and post-operative nausea and vomiting also. A decrease in systolic blood pressure more than 20% is accepted as hypotension. Range of hypotension following spinal anaesthesia was reported between 10-24% [19]. Turning the operation table to left in order to decrease the pressure of uterus over vena cava, administering intravenous bolus fluid and vasopressors such as ephedrin usually restore blood pressures without additional intervention [20]. In our study rate of intraoperative hypotension was 4.21% (12 patients) which was below reported ranges. Effective iv fluid administration and taken precautions before operations might lead such a statistics.

Other important factors that effected patient satisfaction levels in our study were inadequate analgesia during operation. Subarachnoid blockage of neurons usually results in preventing transmission of afferent signals from peripheral nociceptors. This blockage of transmission is desired effect of spinal anaesthesia however peritoneum stretching, manipulation of uterus and omentum may trigger pain transmission higher than block level. Another cause of inadequate analgesia may be lower levels of spinal block also. In order to manage with this situation, trendelenburg position can be preferred in order to increase level of spinal block [21].

When we compared predictive factors for patient satisfaction on postoperative 1st and 3rd days, all the factors that lead dissatisfaction on postoperative 1st day except recurrent spinal puncture attempts and PONV were found in correlation with decreased patient satisfaction on postoperative 3rd day. We suggest that decreased frequency of PONV at postoperative 3rd day and weakened pain memory – a memory that is weakened following holding a healthy baby [22] might lead such a result.



One of the important finding of present study was that most of patients who were dissatisfied from previous general anaesthesia were expressed high levels of satisfaction following spinal anaesthesia. In addition patients underwent previous CS with spinal anaesthesia were highly satisfied after recurrent spinal anaesthesia procedure. These results strongly correlated with previous studies from different countries which have shown better satisfaction levels with spinal anaesthesia compared with general anaesthesia [11-13].

## Conclusion

In the present study we found high levels of patient satisfaction following spinal anaesthesia for CS independent from origin of patients. Postoperative pain at surgical site, backache and headache were most common complications which managed successfully without any invasive intervention. We suggest that spinal anaesthesia is safe and comfortable anaesthesia technique for CS –both elective and emergency- with high satisfaction levels in Turkish women.

## Competing interests

*The author confirms that this article content has no conflict of interest.*

## Financial Disclosure

*All authors declare no financial support.*

## Ethical approval

*Consent of ethics was approved by the local ethics committee.*

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