



Maternal Satisfaction of Spinal Anesthesia for Elective Cesarean Section in an Academic Hospital

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Abstract

Background: Currently, spinal anesthesia is an acceptable method for cesarean section (CS) throughout the world, since general anesthesia is associated with higher maternal morbidity and mortality rates. The current study was performed to survey different factors for maternal satisfaction of spinal anesthesia.

Methods: This cross sectional study was performed on women who were candidates for elective CS at Dr. Shariati hospital. Informed consents were obtained from all the patients, and the risks and side effects of both spinal and general anesthesia were explained preoperatively. The mothers were free to choose the anesthetic technique. One day after the operation, all mothers were examined with respect to the variables.

Results: A total of 84 women with the mean age of 30.7 ± 5.63 years and mean body mass index (BMI) of 31.2 ± 4.15 kg/m² were anesthetized through the spinal method. Overall, 28.6% of the subjects were distressed about perioperative awareness, while 40.5%, 29.8%, and 46.4% reported postoperative pain at the injection site, headache, and lumbar pain, respectively. Maternal satisfaction of the spinal method and willingness to choose this method again in future surgeries were 83.8% and 78.5%, respectively.

Conclusions: Women undergoing CS are highly satisfied with spinal anesthesia, and the majority are likely to choose this method in the future. Factors decreasing satisfaction include inadequate preoperative explanations about the anesthesia method by the anesthesiologist, postoperative pain at the injection site, headache, and lumbar pain.

Keywords: Spinal Anesthesia, Cesarean Section, Maternal Satisfaction

1. Background

Spinal anesthesia is a favorable anesthetic technique for cesarean section (CS). Since its first application in obstetric anesthesia, it has evolved and gained worldwide approval and popularity (1). Compared to general anesthesia, spinal anesthesia has several advantages, including reduced need for postoperative analgesia, higher Apgar scores, fewer thromboembolic events, and more importantly, earlier onset of postoperative oral nutrition in mothers (2). Selection of the correct anesthetic method is multifactorial for mothers. Anesthesiologists usually prefer a method, which is safe and comfortable for the mother and is associated with the least fetal depression and the best surgical conditions for the gynecologist; spinal anesthesia has all these characteristics (3-5).

Patient satisfaction is a subjective and complicated concept, involving physical, emotional, psychological, social, and cultural factors. Patient satisfaction of clinical

services in pre-, peri-, and postoperative periods is a multidimensional subjective concept (6). Based on reports from the United Kingdom, 75% of CS deliveries were performed under general anesthesia 25 years ago, which has decreased to 16% today (7).

Prospective evaluation of maternal satisfaction is an important factor in understanding the required changes to improve this technique and expand high-quality and safe care services. One of the important factors influencing patient satisfaction is the role of the person who delivers a specific service (ie, spinal anesthesia in this study). This is an important factor when studying patients at academic hospitals, where residents play a major role in delivering health services to patients and learning new techniques.

With this background in mind, in this study, evaluation of the causes of patient dissatisfaction with the anesthetic technique was the primary outcome. Therefore, the current study was performed to assess maternal satisfaction and dissatisfaction of spinal anesthesia for CS and the re-

lated factors in an academic-based hospital.

2. Methods

This analytical, cross sectional study was performed on women who were candidates for elective CS at Dr. Shariati hospital, as an academic-based hospital in Tehran, Iran. The inclusion criteria were as follows: 1) maternal age range of 15 - 49 years; 2) ASA class I and II; and 3) undergoing CS. On the other hand, the exclusion criteria were neurologic defects, coagulopathies, incomplete pain blockade (perioperative pain), and perioperative complications leading to the change of the anesthetic method.

An anesthesiologist thoroughly explained both general and spinal anesthesia, the associated risks, and side effects to mothers who were candidates for elective CS at Shariati hospital. In total, 84 mothers signed the informed consent forms to undergo spinal anesthesia and entered the study. The subjects' demographic data, including age, weight, height, anesthesia history, and lumbar pain history, were gathered and recorded in a prepared questionnaire.

On arrival to the operating room, standard monitoring (electrocardiographic monitoring, pulse oximetry, and noninvasive blood pressure systems) was established. After receiving 5 ml/kg of normal saline infusion, spinal anesthesia was administered in the sitting position by means of a Quincke spinal needle (with a suitable size) on the best site through midline injection; the first choice was a 25-gauge Quincke spinal needle on the L4 - L5 intervertebral level.

Bupivacaine 0.5% (12.5 mg) was injected intrathecally to induce anesthesia. The procedure was carried out by a second-year resident, who had adequate experience of spinal anesthesia, under the supervision of the attending anesthesiologist. In case of 2 failed attempts, the attending anesthesiologist performed the procedure. After immediately moving the patient to the supine position, surgery was started, following reassurance of favorable sensory block by the anesthesiologist. The data related to the procedure, including the number of attempts for successful spinal anesthesia, education level of spinal anesthesia operator (attending anesthesiologist or resident), needle size, and surgery complications (if occurred), were recorded.

Based on the clinical protocols of the surgery ward of Shariati hospital, the patients' postoperative pain was managed using adult diclofenac suppository. Twenty-four hours after the surgery, the subjects were visited by an anesthesiologist, who had neither participated in the surgery nor intervened in the anesthesia procedure. The anesthesiologist asked about maternal satisfaction of

anesthetic method and probability of choosing the spinal method in future surgeries. Numeric pain rating and Likert scales were used to evaluate pain severity and satisfaction level, respectively.

The gathered data were analyzed in SPSS, using analytical and descriptive methods. Spearman's rank correlation coefficient test was used to determine the relationship between quantitative variables and maternal satisfaction. The codistribution of satisfaction for two-way and multi-way qualitative variables was evaluated by Mann-Whitney test and Kruskal-Wallis test, respectively. Moreover, a logistic regression model was used to determine the synchronic effects of independent variables on the dependent variable, ie, maternal satisfaction of spinal anesthesia (satisfaction, score 4 - 5; dissatisfaction, score 1 - 3).

3. Results

The mean age of the subjects was 30.7 ± 5.63 years (range, 17 - 49 years), and the mean body mass index (BMI) was 31.3 ± 4.15 kg/m². Sixty-two (73.8%) subjects had a history of anesthesia (average, 1.5 ± 0.9 times), including 17 cases of general anesthesia (27.4%), 31 cases of spinal anesthesia (50%), and 14 cases of both anesthetic methods (22.6%). Nineteen (22.6%) subjects had a history of lumbar pain before CS. Anesthesia was induced twice in 32 subjects, 3 times in 12 subjects, and once in the remaining subjects. The frequency of the used needle size was 24 (41%), 25 (39%), 23 (19%), and 26 (1%), respectively.

The most frequent perioperative complications were hypotension (50%), bradycardia (26.2%), nausea and vomiting (13.1%), and dyspnea (8.3%), respectively. Overall, 14.3% of the subjects had nausea and vomiting until 24 hours after surgery. Moreover, 28.6% of the subjects reported discomfort due to perioperative awareness. The mean pain severity at the injection site was 0.75 ± 1.19 , and the mean postanesthesia headache severity was 0.74 ± 1.53 . The mean lumbar pain severity following spinal anesthesia (1.65 ± 2.39) showed no significant relationship with the history of lumbar pain ($P = 0.06$).

Based on the Likert scale, the mean maternal satisfaction of anesthesiologist's explanations was 2.43 ± 1.25 ; overall, 41.6% of the subjects had moderate satisfaction. Moreover, the mean maternal satisfaction of spinal anesthesia was 3.9 ± 1.37 ; overall, 83.3% of the subjects had satisfaction above average. The mean maternal satisfaction to choose spinal anesthesia in future surgeries was 3.75 ± 1.51 ; overall, 78.5% of the subjects were willing to choose this method in future surgeries.

Pain severity at the injection site, postoperative lumbar pain, and satisfaction of anesthesiologist's explanations had significant correlations with maternal satisfac-

tion of spinal anesthesia and willingness to choose this method for future surgeries ($P < 0.05$). However, maternal satisfaction of spinal anesthesia significantly decreased due to increased needle size in the third attempt and postoperative headache ($P < 0.05$) (Table 1). Discomfort of perioperative awareness had a significant relationship with both maternal satisfaction of spinal anesthesia and willingness to choose this method again for future surgeries ($P < 0.05$) (Table 2).

Table 1. Spearman's Correlation Coefficients

	Spearman's Correlation Coefficients	
	Satisfaction of Spinal Anesthesia	Willingness to Choose Spinal Anesthesia Again
Age	-0.101	-0.119
BMI	-0.170	-0.204
Number of attempts	-0.125	-0.081
First anesthesia needle size	-0.015	0.006
Second anesthesia needle size	-0.003	0.066
Third anesthesia needle size	-0.690 ^a	0.552
Postoperative pain at the injection site	-0.310 ^b	-0.364 ^b
Postoperative headache	-0.326 ^b	-0.173
Postoperative lumbar pain	-0.336 ^b	-0.309 ^b
Satisfaction of anesthesiologist's explanations	0.266 ^a	0.242 ^a

^aStatistical significance of 5%.

^bStatistical significance of 1%.

Using the multiway logistic regression model, effects of all factors on maternal satisfaction of spinal anesthesia were synchronically surveyed. Discomfort of intraoperative awareness was the only variable significantly related to maternal satisfaction of spinal anesthesia; the more discomfort mothers had, the lower the probability of satisfaction was (about 0.11 probability compared to other subjects) ($P < 0.05$) (Table 3).

4. Discussion

Based on the current findings, maternal satisfaction of spinal anesthesia was generally high (83.3%), and 78.6% of mothers wished to choose this anesthetic method again in future surgeries. Maternal satisfaction rates have been reported to range from 70% to 90% throughout the world, which is in accordance with the present study (8-12).

Mekonan et al. (2015) in a developing African country showed that lower Apgar scores were significantly more prevalent among mothers who underwent CS with general anesthesia, compared to those who underwent CS with spinal anesthesia. However, postoperative nausea and vomiting were more prevalent in the general anesthesia group, whereas mothers with spinal anesthesia had more demands for analgesics postoperatively (13). Considering the effectiveness and side effects of this method, patient satisfaction and influential factors should be studied in order to help CS candidates be more satisfied with anesthesia.

Among other aspects of spinal anesthesia are peri- and postoperative complications. The current findings revealed perioperative hypotension in 50% of subjects, bradycardia in 26.2% of subjects, nausea and vomiting in 13% of subjects, and dyspnea in 8.3% of subjects. Moreover, 14.1% of the subjects had nausea and vomiting postoperatively. In this regard, Juhani et al. (1993) suggested hypotension (42%) and nausea (14%) as the most prevalent postoperative complications of spinal anesthesia (2).

In another study, the most prevalent postoperative complications of spinal anesthesia were nausea and vomiting (26.7%) and lumbar pain (20.1%) (10). Therefore, perioperative complications in the current research were similar to previous studies, except for postoperative lumbar pain, which was less prevalent in our study. Most previous studies have also shown no significant relationship between maternal satisfaction and perioperative complications.

Hu et al. (2007) found that spinal attempts, patient's age, and gender are effective factors in patient satisfaction of spinal anesthesia (14). Major reasons for patients' unwillingness to repeat spinal anesthesia include low back pain (related to the number of attempts to induce anesthesia), needle type (Quincke with less favorable results than Whitacre), and tingling sensation in the lower extremities immediately after anesthesia induction (8).

In a previous study, variables such as extra attempts to induce anesthesia, pain during neuronal block, and postoperative urinary retention were related to dissatisfaction of spinal anesthesia. However, reasons for unwillingness to repeat spinal anesthesia in future surgeries included female gender, low body weight, perioperative nausea and vomiting, and lower satisfaction with the anesthetic method (15). Bhattarai et al. (2005) suggested that the main reasons for maternal dissatisfaction of spinal anesthesia were inability to move the lower extremities and dysesthesia in the upper extremities (16).

Although many of the abovementioned studies have assessed similar variables to the present study, we also evaluated the role of residents in performing the procedure and carried out the study in an academic hospi-

Table 2. Distribution of Maternal Satisfaction of Spinal Anesthesia^a

		Satisfaction of Spinal Anesthesia			Willingness to Choose Spinal Anesthesia Again		
		Mean \pm SD	Median	Probability ^b	Mean \pm SD	Median	Probability ^b
First anesthesia operator	Resident	4 \pm 1.23	5	0.18	3.9 \pm 1.37	4	0.058
	Attending	3.4 \pm 1.69	4		3 \pm 1.83	3	
Hypotension	Yes	3.9 \pm 1.2	4	0.95	3.7 \pm 1.47	4	0.57
	No	3.8 \pm 1.53	5		3.7 \pm 1.57	5	
Dyspnea	Yes	3.6 \pm 1.13	3	0.33	2.7 \pm 1.7	3	0.053
	No	3.9 \pm 1.4	5		3.8 \pm 1.47	4	
Bradycardia	Yes	4 \pm 0.67	4	0.87	3.7 \pm 1.34	4	0.58
	No	3.8 \pm 1.49	5		3.7 \pm 1.58	5	
Nausea and vomiting	Yes	3.5 \pm 1.44	4	0.33	3 \pm 1.79	4	0.11
	No	3.9 \pm 1.37	5		3.8 \pm 1.45	4	
History of anesthesia	Yes	3.7 \pm 1.41	4	0.36	3.6 \pm 1.53	4	0.322
	No	4.1 \pm 1.24	5		4 \pm 1.45	5	
Past anesthesia method	Spinal	4.1 \pm 1.37	5	0.157	3.9 \pm 1.5	5	0.131
	General	3.4 \pm 1.54	4		3.4 \pm 1.62	4	
	Both	3.6 \pm 1.28	3		3.2 \pm 1.47	3.5	
History of lumbar pain	Yes	3.7 \pm 1.48	4	0.66	3.8 \pm 1.55	4	1
	No	3.9 \pm 1.35	5		3.7 \pm 1.51	4	
Discomfort of perioperative awareness	Yes	2.7 \pm 1.26	3	< 0.0001 ^c	2.7 \pm 1.63	2.5	< 0.0001 ^c
	No	4.3 \pm 1.15	5		4.2 \pm 1.25	5	
Postoperative nausea and vomiting	Yes	3 \pm 1.67	3	0.06	3 \pm 1.73	4	0.1
	No	4 \pm 1.28	5		3.8 \pm 1.46	4.5	

^aStatistical significance of 5%.^bTwo-group comparisons based on Mann-Whitney test and multigroup comparisons based on Kruskal-Wallis test.^cStatistical significance of 1%.

tal, where residents were learning the procedure at the same time. The majority of studies showed that explanation by the anesthesiologist (spinal anesthesia operator) is very important in patient satisfaction of spinal anesthesia and willingness to choose this method again. In the current study, most mothers (59.7%) were dissatisfied with the anesthesiologist's explanations, which significantly influenced maternal satisfaction of spinal anesthesia and willingness to choose this method again.

Similar to previous studies, the current results showed that pain (including postoperative pain at the injection site, lumbar pain, and headache) plays a key role in patient satisfaction of spinal anesthesia. In the current study, a significant percentage of mothers complained of postoperative pain at the injection site, lumbar pain, and headache (40.5%, 29.8%, and 46.4%, respectively). Another shared point between the current study and previous research is

the undeniable effect of patient discomfort caused by perioperative awareness on satisfaction and willingness to repeat spinal anesthesia. In the current study, 28.6% of mothers were distressed about perioperative awareness, which showed a significant relationship with satisfaction of spinal anesthesia and willingness to choose this method again. Therefore, controlling this factor could easily lead to improved maternal satisfaction of spinal anesthesia, which calls for precise interventional studies in the future.

Although some studies have revealed the effect of patients' age on their satisfaction, age had no significant relationship with maternal satisfaction and willingness to choose the method again in our study. The possible explanation for such finding is the selection of subjects from the same age group (mean age, 31 years) in the current study, making it impossible to precisely survey the effect of age on satisfaction.

Table 3. Constants and Probabilities of Multidimensional Logistic Regression Model Parameters

	Constant	Wald Statistic	Degree of Freedom	Probability	Odds Ratio
Anesthesia operator	0.243	0.081	1	0.776	1.27
Needle size	0.544	0.772	1	0.38	1.72
Number of attempts	-0.28	0.317	1	0.754	0.755
Last sensory block	-0.069	0.071	1	0.76	0.933
Hypotension	0.968	0.846	1	0.358	2
Bradycardia	0.915	0.771	1	0.38	2.497
Dyspnea	-1.22	0.873	1	0.35	0.393
Nausea	0.054	0.002	1	0.967	1.055
Age	-0.053	0.833	1	0.361	0.948
History of anesthesia	-0.799	0.899	1	0.343	0.45
History of lumbar pain	-0.682	0.657	1	0.417	0.505
Discomfort of perioperative awareness	-2.17	6.75	1	0.009 ^a	0.114
Perioperative pain	0.445	2.39	1	0.122	0.641
Postoperative nausea	-0.252	0.047	1	0.829	0.777
Postoperative pain	-0.179	0.304	1	0.581	0.836
Postoperative headache	-0.231	1.44	1	0.23	0.794
Postoperative lumbar pain	-0.229	2.249	1	0.134	0.795
Satisfaction of anesthesiologist's explanations	0.353	1.34	1	0.247	1.423
BMI	-0.127	1.75	1	0.186	0.88

^aStatistical significance of 1%.

The current findings showed that a large number of mothers choosing the spinal method for CS were satisfied with their choice and wished to use this method for similar future surgeries. Some factors, such as dissatisfaction with the presented explanations by the spinal anesthesiologist, injection site pain, postoperative lumbar pain, and maternal discomfort of perioperative awareness were effective variables in satisfaction of spinal anesthesia, which could be simply controlled.

It is suggested to design future studies, using factors related to maternal satisfaction of spinal anesthesia and willingness to choose this method again in order to introduce some interventions for improving satisfaction of patients undergoing surgeries. It should be noted that the role of service provider in patient satisfaction is of great importance, especially in academic-based hospitals where residents play a major role in delivering patient care.

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