



# Gender Disparities in Decision-Making and Outcomes in Lumbar Spine Surgery: A Retrospective Analysis

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## Abstract

**Aim:** The objective of this study is to explore gender differences in decision-making and outcomes in lumbar spine surgery.

**Material and Method:** In this retrospective analysis, 74 patients (42 women and 32 men) who had lumbar spine surgery at İstinye University's Gaziosmanpaşa Hospital between January 2023 and April 2024 were included. Sociodemographics, surgical choices, comorbidities, and medication use were among the data gathered; these were examined to find variations.

**Results:** Women were more likely to attend appointments with family members and to have surgery at their initial consultation. In addition, women were more likely than men to have smoked, had previous surgery, and used antidepressants. In terms of surgical operations, stabilizing procedures were more commonly assigned to women. Additionally, compared to patients with only a primary school education, those with better educational backgrounds—especially those who have graduated from university—tended to make judgments faster. Preoperative discomfort and impairment were higher among women, according to the results.

**Conclusion:** Comorbidities, gender, and educational background have a big influence on lumbar spine surgical decision-making and results. By addressing these issues in therapeutic settings, it may be possible to improve patient care and lessen treatment and recovery inequities.

**Keywords:** Gender disparities, lumbar spine surgery, decision-making, patient outcomes, educational status

## INTRODUCTION

Gender disparities have affected medical procedures at a spectrum of specialties, as well as any area of life. Prior studies have found that women were less likely to receive diagnostic angiography than men, even after considering confounding factors (1). Despite advanced outreach of medical procedures in the modern world, these discrepancies remain. The underutilization of diagnostic procedures still causes higher mortality and morbidity rates for women across many fields (2). Atypical symptomatology, as well as implicit gender biases, can

lead to incorrect diagnosis and delayed true diagnosis in women (3). This bias and disparities have been seen in multiple specialties including endocrinology, immunology, cardiology, (1,3-5). Similar results have been observed in spine surgery in previous studies as well. Reports indicate women are less likely to receive surgical intervention than men for spinal conditions. According to a systematic review by Mobbs et al. (6), women are more prone to have wound-related complications, and men tend to have more medical complications and mortality following spinal surgery. These reports underscore the importance of addressing gender biases in any clinical setting. Our study

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aims to examine the role of gender in the decision-making process for lumbar spine surgery and analyze the impact of gender factors throughout the stages before, during, and after surgical interventions. Additionally, it remains unclear how gender differences influence doctors' recommendations for surgical interventions and patient preferences. Furthermore, this study seeks to reveal how gender affects surgical decisions, postoperative recovery processes, and patient satisfaction in lumbar spine surgery. Key factors influencing surgical decisions may include patient expectations, the surgeon's clinical approach, and gender-based biases. Notably, it is believed that female patients may experience lower rates of surgical decision-making, whereas males may be directed toward surgical intervention more rapidly. The goal is to present the impact of these differences on patient outcomes using scientific data. The results may enhance the understanding of gender-related clinical differences in lumbar spine surgery and contribute to the development of strategies aimed at improving surgical processes.

## MATERIAL AND METHOD

Following the Institutional Review Board's approval, a retrospective patient archive search was conducted for patients undergoing lumbar spinal surgery at İstinye University, Gaziosmanpaşa Hospital, in the Department of Neurosurgery between January 1, 2023, and April 1, 2024. Institutional review board approval was obtained from İstinye University, Faculty of Medicine (Protocol No: 24-215, 22.11.2024).

Inclusion criteria were as follows: 1) patient age 18 years or older, 2) has a diagnosis requiring a lumbar spinal surgery, 3) literate educational status, and 4) has signed the informed consent for participation. Patients were excluded if, 1) with a history of lumbar spinal trauma, 2) malignancy at the lumbar spine, 3) patients age <18 years.

### Data Collection

Patients' data were collected from individual patient records, including demographic data (age, gender), Marital Status (Married, Single), Educational level (Primary, High school, University), Type of Surgery (MicroDiscectomy, Posterior Stabilization), Acceptance of Surgery at the first consultation, Atendece to first consultation alone or with a relative, Later attendance (Alone or with a relative), Attendance to more than two consultations, the Time difference between first consultation and the preoperative anesthesia planning, Patients clinical Status at the first consultation (Presence of Neurologic Deficits, Presence of Comorbidities, History of Previous Surgery, History of Previous Spine Surgery), Patients perspective on surgery postoperatively (Failed, Successful), Delay of surgery due to anti-platelet therapy, Smoking history, Antidepressant use. The given variables were compared between two genders and surgical procedural types.

## Statistical Analysis

Statistical analyses were conducted using the SPSS (version 22.0, SPSS Inc., Chicago, IL, USA). Continuous variables were reported as means and standard deviations, while the Categorical variables were dichotomized and presented as percentages and frequencies. Shapiro-Wilk test was used to asses the normality and a p value of <0.05 was considered statistically significant.

## RESULTS

The study included 42 women with an average age of  $50.36 \pm 13.29$  and 32 men with an average age of  $46.00 \pm 14.90$ . The comparison of the patients' sociodemographic characteristics by gender is provided in Table 1. The educational status and type of surgery of the groups were statistically significantly different ( $p < 0.001$ ). The number of women who accepted surgery at the first consultation, visited more than twice, later came with a first-degree relative, had a surgical history, smoking history, and used antidepressants was statistically significantly higher than men ( $p < 0.05$ ). The duration between the first consultation and anesthesia preparation was similar for women and men ( $p = 0.272$ , Table 1).

According to the educational status, the duration between the first consultation and anesthesia preparation differed between the patients ( $p = 0.05$ ). Patients with only primary school education ( $8.55 \pm 8.11$  days) had a longer duration between the first consultation and anesthesia preparation compared to high school graduates ( $4.33 \pm 6.34$  days) ( $p = 0.004$ ) and university graduates ( $4.71 \pm 9.20$  days) ( $p = 0.007$ ). There was no difference between high school and university graduates ( $p = 0.939$ ). Patients who used antidepressants ( $11.31 \pm 8.90$  days) had a longer duration between the first consultation and anesthesia preparation compared to those who did not use antidepressants ( $4.66 \pm 7.26$  days) ( $p = 0.003$ ). The duration between the first consultation and anesthesia preparation was similar for patients who had previous surgeries ( $7.08 \pm 7.26$  days) and those who had not ( $5.56 \pm 8.50$  days) ( $p = 0.445$ ).

In the disc surgery group, 19 (43.2%) women and 25 (56.8%) men were included, while in the stabilization surgery group, 23 (76.7%) women and 7 (23.3%) men were included. The number of patients who accepted disc surgery at the first consultation and came alone was higher compared to the stabilization surgery group ( $p < 0.05$ ). In the stabilization surgery group, the number of patients who later came with a first-degree relative, visited more than twice, had comorbidities, were waiting due to antiplatelet use, and used antidepressants was statistically significantly higher compared to the disc surgery group ( $p < 0.05$ ). The duration between the first consultation and anesthesia preparation was shorter in the disc surgery group ( $p = 0.015$ ).

**Table 1. Sociodemographic variables by gender**

Variables	Female (n=42)	Male (n=32)	p-value
<b>Age, years</b>	50.36±13.29	46.00±14.90	0.189
<b>Marital status</b>			
Married	35 (83.3%)	23 (71.9%)	0.236
Single	7 (16.7%)	9 (28.1%)	
<b>Educational status</b>			
Primary school	25 (59.5%)	4 (12.5%)	<0.001
High school	5 (11.9%)	19 (59.4%)	
University	12 (28.6%)	9 (28.1%)	
<b>Type of operation</b>			
Disc surgery	19 (45.2%)	25 (78.1%)	0.004
Stabilization surgery	23 (54.8%)	7 (21.9%)	
Accepted surgery at first consultation	19 (45.2%)	23 (71.9%)	0.022
Came alone to first consultation	20 (47.6%)	20 (62.5%)	0.203
Later came with a first-degree relative	19 (45.2%)	6 (18.8%)	0.017
Attended more than two consultations	19 (45.2%)	5 (15.6%)	0.007
Time between first consultation and anesthesia preparation	7.00±7.39	4.91±8.86	0.272
Motor deficit	8 (19%)	6 (18.8%)	0.974
Comorbidity	22 (52.4%)	3 (9.4%)	<0.001
History of prior surgery	21 (50%)	6 (18.8%)	0.006
History of spinal surgery	10 (23.8%)	7 (21.9%)	0.845
History of unsuccessful surgery	6 (14.3%)	1 (3.1%)	0.104
Waited due to antiaggregant use	6 (14.3%)	1 (3.1%)	0.104
Smoking history	10 (23.8%)	25 (78.1%)	<0.001
Antidepressant use	13 (31%)	3 (9.4%)	0.025

## DISCUSSION

Our study examined 42 women and 32 men, to assess gender differences in lumbar spinal surgery decision making. Between women and men, significant differences were seen in educational status and types of surgery these groups will be receiving. Based on our finding from our cohort, women were more likely to accept surgery during the first consultation, visit the clinic more than twice, attend the appointments with a relative, have a prior history of surgical history and smoking, and use antidepressants. Our findings align with previous studies in the literature where women often report worse preoperative pain, disability, health-related quality of Life (HRQL) compared to men, leading to more decisive decision (7-9).

Although there were no significant differences between preoperative counseling and the anesthesia appointment. Naturally, educational status affected the decision-making duration, where university graduate patients were faster to decide on surgery than the Primary school graduates. Moreover, increased education level possibly pushes those patients to do more self-research, leading to conclusions which might benefit the duration between consultation and preoperative anesthesia (8). Furthermore, the patients with an antidepressant use have significantly longer duration between consultation and preoperative anesthesia, this might be due to the increased incidence of anxiety

disorders within the population, leading to prolonged decision making presumably due to excessive thinking of all possible outcomes (9). Finally, there is also a possible link between smoking history and antidepressants use.

When compared between surgical procedures, there were more patients within the disc surgery group to accept surgery than the stabilization group; this was also seen attending alone rather than with a relative between the two groups. Furthermore, the duration between anesthesia and preoperative counselling was significantly shorter in the disc surgery group. This may be explained by the perception that stabilization surgeries are regarded as more aggressive in patients' minds than disc surgeries. In the stabilization group, patients tended to come more with their relatives, had comorbidities, visited the clinic more than twice, had been receiving antiplatelet therapy, which prolonged the preoperative period, and also had been using antidepressants more than the disc surgery group (8,9). Given the incidence and prevalence of coronary arterial disease, and risk of atherosclerosis in the Turkish population, it might be expected that comorbidities and antiplatelet use are juxtaposed within our cohort.

Furthermore, in the literature, several authors looked at both the preoperative patient symptomatology and postoperative reported outcomes. Maclean et al. (7) in their prospective study concluded that female patients

had worse preoperative clinical assessment, and selected healthcare resources. Furthermore, in their review they have concluded that female patients had worse postoperative disability and quality of life (10). Siccoli et al. (8) had consistent findings in their study as well, where female patients had more severe preoperative symptoms, and in the postoperative long-term follow-up as well. Störmqvist et al. (9) found that female patients had a higher rate of consumption of analgesics postoperatively, and a higher rate of postoperative pain, and less improvement in their quality of life, when compared to men and their preoperative status. In summary, existing literature provides some insights between two genders, where these results indicate that gender plays an important role in patient outcomes, and differences should be considered in both the preoperative and postoperative settings.

Our study has provided some valuable insights, however, not without limitations. Firstly, the relatively small sample size may limit the generalizability of our findings. A more diverse cohort with a widened age range, and socioeconomic background could provide more comprehensive results. Furthermore, retrospective single-center design of our study may limit our ability to draw natural conclusions and introduce selection biases. Lastly, our study had only two surgery types to compare, so we are limited and can not generalize our findings to a broader range of surgical interventions. Our cohort comprised a single culture background of patients, which is also a limitation and hinders our results from being applied to different cultural populations.

## CONCLUSION

Our study underscores the importance of gender-bias in the preoperative decision-making setting. We have tried to explore how gender, educational status, various patient-centered variables such as smoking history, comorbidities, and medication use, such as antidepressants, influence the preoperative decision-making. We hope that physicians remind themselves of these gender differences during their approaches to patients to achieve a more favorable outcome. However, for greater applicability of our results, we need more prospective, multi-institutional, multi-cultural studies to achieve a greater perspective, across many cultural dimensions.

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**Conflict of interest:** The authors have no conflicts of interest to declare.

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