

## Impact of Gender Disparities on Short-Term Patient Reported Outcomes and Satisfaction Measures After Elective Lumbar Spine Surgery

Liaqat Mahmood Awan, Muhammad Talha, Shahzad Inam, Babar Shamim, Shahzad Ahmed Qasmi, Waleed Bin Shfiq

Department of Spine Surgery, Combined Military Hospital, Rawalpindi/National University of Medical Sciences (NUMS) Pakistan

### ABSTRACT

**Objective:** To evaluate the short-term patient-reported outcomes and satisfaction indicators after elective lumbar spine surgery.

**Study Design:** Quasi-experimental study.

**Place and Duration of Study:** Department of Spine Surgery, Combined Military Hospital, Rawalpindi, Pakistan, from Jun to Dec 2024.

**Methodology:** Based on gender, patients were separated into two groups. Blood loss during surgery and operating time were recorded. Prior to and following three months of surgery, patients completed patient-reported outcome measures, EuroQol 5-dimensions and the Oswestry disability index.

**Results:** Mean age of males was  $52.85 \pm 10.83$  years and of females  $55.41 \pm 11.75$  years ( $p=0.308$ ). The median (IQR) operative time was similar for both groups i.e. 193(49.0) minutes in males vs. 178(54.5) minutes in females ( $p=0.319$ ). The median (IQR) blood loss was similar for both groups i.e. 262(195.5) ml in males vs. 303(170.0) ml in females ( $p=0.286$ ). At baseline, the median (IQR) Oswestry disability index (ODI) score was 74(21.5) in males and 73(18.5) in females ( $p=0.406$ ) but after 3 months median (IQR) ODI score was 30(10.5) in males and 34(10.0) in females ( $p=0.002$ ). Median (IQR) EuroQol 5-dimensions scores at baseline were 9(1.5) in males and 9(3.0) in females ( $p=0.660$ ). But after 3 months median (IQR) EuroQol 5-dimensions scores were 4(2.0) in males and 6(2.0) in females ( $p=0.003$ ). The median (IQR) patient-reported outcome measures score at baseline were 14(4.50) in males and 15(5.50) in females ( $p=0.378$ ). But after 3 months median (IQR) patient-reported outcome measures score was 38(11.0) in males and 34(4.0) in females ( $p<0.001$ ).

**Conclusion:** Outcomes of male patients were better than female patients, where surgery, seems to have better effect on males' quality of life and spine functionality.

**Keywords:** Degenerative intervertebral disc, Disparity, Gender, Lumbar spondylosis, Patient satisfaction.

**How to Cite This Article:** Awan LM, Talha M, Inam S, Shamim B, Qasmi SA, Shfiq WB. Impact of Gender Disparities on Short-Term Patient Reported Outcomes and Satisfaction Measures After Elective Lumbar Spine Surgery. Pak Armed Forces Med J 2025; 75(Suppl-7): S1158-S1161.

DOI: <https://doi.org/10.51253/pafmj.v75iSUPPL-7.13084>

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

### INTRODUCTION

There has been an increased emphasis on patient-reported outcomes and satisfaction metrics as measures of overall treatment quality affecting hospital compensation,<sup>1</sup> and finding disparities or demographics that may influence postoperative outcomes and patient-reported outcomes has become essential in the surgical field in order to comprehend satisfaction measure findings and implement quality improvement initiatives.<sup>2-4</sup> Limited studies have examined the differences between gender in patient-oriented health-related quality of life before and after spine surgery with the aim of this study being to investigate the impact of gender on baseline status and three-month postoperative outcomes in patients receiving elective spine surgery for various

degenerative spinal conditions. Several studies have shown that after undergoing medical and surgical procedures, such vascular, orthopedic, and oncologic operations, women report lower patient-reported outcomes, including health-related quality of life and satisfaction, indicating that gender disparities are a significant determinant of patient-reported outcomes.<sup>5-7</sup> Gender differences in spine surgery have been found to impact postoperative complications and postoperative care delivery, demonstrating that these differences have an impact on how lower back pain is managed, including choices about imaging and surgery. According to earlier research, women who have elective spine surgery are more likely to experience postoperative problems, longer hospital stay, and death however, there is still a dearth of information about how gender differences affect patient satisfaction and short- and long-term results following spine surgery.<sup>8,9</sup> As literature in this regard is scarce in Pakistan, rationale of current study was to

**Correspondence:** Dr Babar Shamim, Department of Spine Surgery, Combined Military Hospital, Rawalpindi Pakistan

Received: 09 Jan 2025; revision received: 17 Apr 2025; accepted: 18 Apr 2025

determine whether there are gender disparities in the 3-month patient-reported outcomes and satisfaction measures after elective lumbar spine surgery for degenerative spine disease in local population.

## METHODOLOGY

This Quasi-experimental study was conducted at Department of Spine Surgery, Combined Military Hospital (CMH), Rawalpindi, Pakistan, from June 2024 to December 2024, after approval from Ethics Review Committee (ERC letter Number: 622 dated 07 May 2024). Sample size of 82 cases; 41 males and 41 females was calculated with 95% confidence level, 80% power of study and mean ODI score i.e.  $21.58 \pm 15.35$  in males and  $13.43 \pm 10.33$  in females.<sup>10</sup> Patients were enrolled using non-probability, consecutive sampling.

**Inclusion Criteria:** Patients of either gender who were 20 years of age or older and scheduled to have elective lumbar spine surgery for degenerative spine disease.

**Exclusion Criteria:** Patients planned for redo surgery, trauma to spine, osteoporosis, osteomyelitis, rheumatic disease, malignant disease or metastatic disease were excluded.

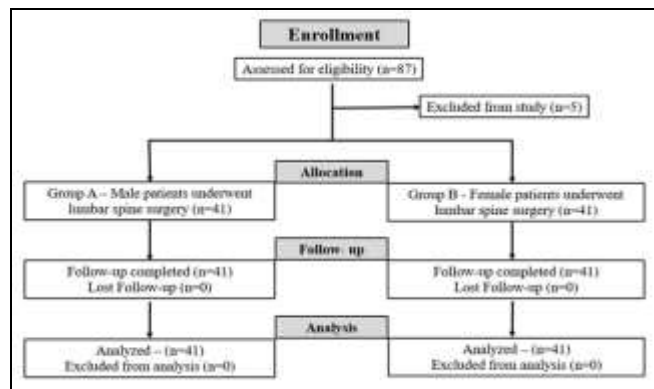


Figure: Patient flow Diagram (n=82)

Informed consent was taken before enrollment. Demographic data including age, gender, Body Mass Index (BMI), occupation and socioeconomic status, were noted. Patients were divided into Group-A (male) and Group-B (female). Prior to surgery, patients completed patient-reported outcome measures (PROMs) scale, EuroQol 5-dimensions (EQ 5-D), and the Oswestry disability index (ODI). Operative time and intraoperative blood loss were noted. After surgery, patients were shifted to post-surgical wards and were discharged. Hospital stay was noted and after 3 months of surgery, patients were examined for ODI, and EQ 5-D score. All data was entered in

Statistical Package for Social Sciences (SPSS) version 25, which was also used for data analysis. Normality of data was checked using Shapiro-Wilk test. Normally distributed numerical data was presented as Mean $\pm$ SD. For non-normally distributed data (operative time, blood loss) and the data of ODI score, EQ 5-D score and PROMs scale score, median (IQR) was calculated and Mann-Whitney-U test was applied to compared difference between the two groups where a  $p$ -value of  $<0.05$  was considered as significant.

## RESULTS

The mean age of male patients was  $52.85 \pm 10.83$  years, and mean age of female patients was  $55.41 \pm 11.75$  years. The demographic details and occupational and socioeconomic details and indications for surgery are summarized in Table-I.

Table-I: Demographic Details of Patients (n=82)

		Groups	
		Group-A (n=41)	Group-B (n=41)
Age (in years, Mean $\pm$ SD)		52.85 10.83	55.41 $\pm$ 11.75
BMI (kg/m <sup>2</sup> , median IQR)		29(6.0)	28(7.5)
Duration of disease (months, median IQR)		13(6.5)	12(6.5)
Smoking		16(39.0%)	0(0%)
Hypertension		25(61.0%)	18(43.9%)
Diabetes mellitus		21(51.2%)	24 (58.5%)
Family history of degenerative disease		1(26.8%)	12(29.3%)
History of menopause (in females)		NA	29(70.7%)
Occupation	Business	16(39.0%)	6(14.6%)
	Job	16(39.0%)	8(19.5%)
	Servant / maid	1(2.4%)	1(2.4%)
	Housewife	0(0.0%)	26(63.4%)
Socioeconomic status	Retired	8(19.5%)	0(0.0%)
	Low	10(24.4%)	17(41.5%)
	Middle	19(46.3%)	18(43.9%)
Indication for surgery	High	12(29.3%)	6(14.6%)
	Symptomatic disc herniation	9(22.0%)	7(17.1%)
	Lumbar stenosis	9(22.0%)	8(19.5%)
	Lumbar adjacent segment disease	7(17.1%)	10(24.4%)
	Scoliosis	8(19.5%)	9(22.0%)
	Kyphosis	8(19.5%)	7(17.1%)

\*BMI: Body Mass Index, SD: Standard Deviation

The median (IQR) operative time was similar for both groups, being 193 (49.0) minutes in males versus 178 (54.5) minutes in females ( $p=0.319$ ). The median (IQR) blood loss was similar for both groups, 262(195.5) ml in males compared to 303(170.0) ml in females ( $p=0.286$ ). At baseline, the median (IQR) ODI score was 74(21.5) in males and 73(18.5) in females ( $p=0.406$ ). But after 3 months median (IQR) ODI score was 30(10.5) in males and 34 (10.0) in females ( $p=0.002$ ). Similarly, median (IQR) EuroQol 5-dimensions scores at baseline were 9(1.5) in males and

9(3.0) in females ( $p=0.660$ ) but after 3 months, median (IQR) EuroQol 5-dimensions scores was 4(2.0) in males and 6(2.0) in females ( $p=0.003$ ). The median (IQR) patient-reported outcome measures (PROMs) score at baseline were 14(4.50) in males and 15(5.50) in females ( $p=0.378$ ) but after 3 months, median (IQR) patient-reported outcome measures score was 38(11.0) in males and 34(4.0) in females ( $p<0.001$ ). These results are summarized in Table-II.

Table-II: Comparison of Outcome in Both Groups (n=82)

Parameter	Groups		p-value ( $\leq 0.05$ )
	Group-A (n=41)	Group-B (n=41)	
Operative time (in min, median IQR)	193(49.0)	178(54.5)	0.319
Blood loss (in ml, median IQR)	262(195.5)	303(170.0)	0.286
ODI at baseline (median IQR)	74(21.5)	73(18.5)	0.406
ODI after 3 months (median IQR)	30(10.5)	34(10.0)	0.002
EuroQol at baseline (median IQR)	9(1.5)	9(3.0)	0.660
EuroQol after 3 months (median IQR)	4(2.0)	6(2.0)	0.003
PROMs at baseline (median IQR)	14(4.50)	15(5.50)	0.378
PROMs after 3 months (median IQR)	38(11.0)	34(4.0)	<0.001

\*IQR: Inter Quartile Range, ODI: Oswestry disability index, EuroQol: EuroQol 5-dimensions (EQ 5-D), PROM: Patient-Reported Outcome Measures

## DISCUSSION

The efficacy of different therapies has evolved from an earlier dependence on the clinician's perception to that of the patient, as the patient's perspective may differ from their physicians'.<sup>11</sup> Disease-specific questionnaires and health-related quality of life (HRQoL) measures are used to evaluate patient reported outcomes (PROs) and questionnaires of this kind complement one another, but determining the correlation between the two measures' outcomes is crucial.<sup>12</sup> According to research, gender may have an impact on PROs following specific surgical procedures,<sup>13,14</sup> as mixed outcomes regarding the role of gender in spinal operations have been reported.<sup>15</sup> Additionally, a number of authors proposed that the influence of gender on PROs may vary depending on the geographical and cultural context, and that this discrepancy should be taken into consideration.<sup>3,16</sup> On recent study reported a weak to moderate relationship between HRQoL and impairment as assessed by the ODI.<sup>17</sup> This could be because association depends on the type of spinal disease, or that these tools evaluate various areas of quality of life or have distinct conceptions. Another study revealed that women report being more sensitive to pain than males when comparable levels of stimuli are present,<sup>18</sup> similar to our study, where mean EuroQol was  $8.46 \pm 1.03$  vs.  $8.54 \pm 1.25$  at baseline that was reduced to  $4.27 \pm 1.29$  vs.  $5.22 \pm 1.39$  after 3 months of surgery, with similar

findings reported by a study following thoracolumbar burst fracture surgery, where female patients had a stronger link between disability and HRQoL.<sup>19</sup> The association may vary with disease, as it has been demonstrated that men and women react differently to particular clinical situations.<sup>20</sup> Female patients are also more likely to see different healthcare professionals and utilize certain drugs, diagnostic imaging tests, and nonsurgical treatment procedures.<sup>21</sup> A study to evaluate the effectiveness of lumbar surgery in both male and female patients found that at baseline, women reported comparable HRQOL but higher ODI and back and leg pain scores and the absolute differences in patient-reported outcomes persisted at the 6, 12, and 24 month follow-up ( $p\text{-value} < 0.05$ ), concluding that whereas women appear to report more severe symptoms at long-term follow-up, men and women have the same level of recovery,<sup>22</sup> thus, the question of whether there is a real difference or if these disparities are the result of surgical choices, variations in the propensity to seek medical counsel, accept or choose surgery, or other unidentified factors should be the subject of future research.<sup>23</sup>

## LIMITATIONS OF STUDY

This study has notable limitations as its quasi-experimental design and the non-random allocation of participants into groups based solely on gender introduce potential for confounding, as other unmeasured variables (e.g., socioeconomic, psychological, or specific surgical factors) could explain the outcome differences between males and females. Furthermore, the findings from a single hospital may not be generalizable to the broader population. Finally, the short-term follow-up period of only three months provides no insight into the long-term sustainability of the reported outcomes.

## CONCLUSION

Outcomes of male patients was better than female patients with surgery seeming to have better effect on males' quality of life and functionality of spine. The cause of differences must be investigated further, while placing this influence in a broader cultural and social context.

**Conflict of Interest:** None.

**Funding Source:** None.

## Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

LMA & MT: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

SI & BS: Conception, data analysis, drafting the manuscript, approval of the final version to be published.

SAQ & WBS: Data acquisition, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

## REFERENCES

1. Neiman PU, Tsai TC, Bergmark RW, Ibrahim A, Nathan H, Scott JW et al. The affordable care act at 10 years: evaluating the evidence and navigating an uncertain future. *J Surg Res* 2021; 263: 102-109. <https://doi.org/10.1016/j.jss.2020.12.056>
2. Zhang H, Glassman SD, Bisson EF, Potts EA, Jazini E, Carreon LY. Patient expectations impact patient-reported outcomes and satisfaction after lumbar fusion. *Spine J* 2024; 24(2): 273-277. <https://doi.org/10.1016/j.spinee.2023.09.023>
3. Triebel J, Snellman G, Sandén B, Strömquist F, Robinson Y. Women do not fare worse than men after lumbar fusion surgery: Two-year follow-up results from 4,780 prospectively collected patients in the Swedish National Spine Register with lumbar degenerative disc disease and chronic low back pain. *Spine J* 2017; 17(5): 656-662. <https://doi.org/10.1016/j.spinee.2016.11.001>
4. Sastry RA, Chen JS, Shao B, Weil RJ, Chang KE, Maynard K et al. Patterns in decompression and fusion procedures for patients with lumbar stenosis after major clinical trial results, 2016 to 2019. *JAMA Netw Open*. 2023; 6(7): e2326357. <https://doi.org/10.1001/jamanetworkopen.2023.26357>
5. Pochon L, Kleinstück FS, Porchet F, Mannion AF. Influence of gender on patient-oriented outcomes in spine surgery. *Eur Spine J* 2016; 25(1): 235-246. <https://doi.org/10.1007/s00586-015-4062-3>
6. Levine DM, Chalasani R, Linder JA, Landon BE. Association of the Patient Protection and Affordable Care Act with Ambulatory Quality, Patient Experience, Utilization, and Cost, 2014-2016. *JAMA Netw Open* 2022; 5(6): e2218167. <https://doi.org/10.1001/jamanetworkopen.2022.18167>
7. Rosenbaum S. The Patient Protection and Affordable Care Act: implications for public health policy and practice. *Public Health Rep*. 2011; 126(1): 130-135. <https://doi.org/10.1177/003335491112600118>
8. Reyes SG, Bajaj PM, Alvandi BA, Kurapaty SS, Patel AA, Divi SN. Impact of Social Determinants of Health in Spine Surgery. *Curr Rev Musculoskelet Med* 2023; 16(1): 24-32. <https://doi.org/10.1007/s12178-022-09811-1>
9. Bizzoca D, Solarino G, Pulcrano A, Brunetti G, Moretti AM, Moretti L, et al. Gender-related issues in the management of low-back pain: A current concepts review. *Clinics and Practice* 2023; 13(6): 1360-1368. <https://doi.org/10.3390/clinpract13060122>
10. Ungureanu G, Chitu A, Iancu I, Kakucs C, Maior T, Florian IS. Gender Differences in the self-assessment of quality of life and disability after spinal fusion for chronic low back pain at a neurosurgical center in Eastern Europe. *Neurospine* 2018; 15(3): 261-268. <https://doi.org/10.14245/ns.1836076.038>
11. Maayan O, Shahi P, Merrill RK, Pajak A, Lu AZ, Oquendo Y, et al. Ninety percent of patients are satisfied with their decision to undergo spine surgery for degenerative conditions. *Spine* 2024; 49(8): 561-568. <https://doi.org/10.1097/brs.0000000000004714>
12. Járomi M, Szilágyi B, Velényi A, Leidecker E, Raposa BL, Hock M, et al. Assessment of health-related quality of life and patient's knowledge in chronic non-specific low back pain. *BMC Public Health* 2021; 21(Suppl 1): 1479. <https://doi.org/10.1186/s12889-020-09506-7>
13. Matcham F, Norton S, Steer S, Hotopf M. Usefulness of the SF-36 Health Survey in screening for depressive and anxiety disorders in rheumatoid arthritis. *BMC Musculoskelet Disord* 2016; 17: 1-10. <https://doi.org/10.1186/s12891-016-1083-y>
14. Narayanan SP, Anderson B, Bharucha AE. Sex-and gender-related differences in common functional gastroenterologic disorders. *Mayo Clin Proc* 2021; 96(4): 1071-1089. <https://doi.org/10.1016/j.mayocp.2020.10.004>
15. Jamjoom AB, Gahtani AY, Alzaharani MT, Albeshri AS, Sharab MA. Review of the Most Cited Patient-Reported Outcome Measure (PROM) Studies Published in the Neurospine Surgical Literature. *Cureus* 2023; 15(8): e44262. <https://doi.org/10.7759/cureus.44262>
16. Strömquist F, Strömquist B, Jönsson B, Karlsson MK. Gender differences in the surgical treatment of lumbar disc herniation in elderly. *Eur Spine J* 2016; 25(11): 3528-3535. <https://doi.org/10.1007/s00586-016-4638-6>
17. Coury JR, Morrisette CR, Lee NJ, Cerpa M, Sardar ZM, Weidenbaum M, et al. Worse preoperative disability is predictive of improvement in disability after complex adult spinal deformity surgery. *Global Spine J* 2024; 14(2): 364-369. <https://doi.org/10.1177/21925682221104425>
18. Ho A, Ashe MC, DeLongis A, Graf P, Khan KM, Hoppmann CA, et al. Gender differences in pain-physical activity linkages among older adults: Lessons learned from daily life approaches. *Pain Res Manag*. 2016; 2016: 1931590. <https://doi.org/10.1155/2016/1931590>
19. Maior T, Ungureanu G, Kakucs C, Berce C, Petrushev B, Florian IS. Influence of gender on health-related quality of life and disability at 1 year after surgery for thoracolumbar burst fractures. *Global Spine J*. 2018; 8(3): 237-243. <https://doi.org/10.1177/2192568217710854>
20. Anwar FN, Roca AM, Vasudevan V, Ilyas Y, Loya AC, Medakkar SS, et al. Predictors of time to achieve clinically significant improvements following lateral lumbar interbody fusion. *J Clin Neurosci* 2024; 130: 110889. <https://doi.org/10.1016/j.jocn.2024.110889>
21. MacLean MA, Charest-Morin R, Stratton A, Singh S, Kelly AM, Pickett GE, et al. Gender differences in spine surgery for degenerative lumbar disease: prospective cohort study. *J Neurosurg Spine* 2024; 42(1): 24-32. <https://doi.org/10.3171/2024.7.spine231388>
22. Siccoli A, Staartjes VE, de Wispelaere MP, Schröder ML. Gender differences in degenerative spine surgery: Do female patients really fare worse? *Eur Spine J* 2018; 27(10): 2427-2435. <https://doi.org/10.1007/s00586-018-5737-3>
23. Sunderland G, Foster M, Dheerendra S, Pillay R. Patient-Reported Outcomes Following Lumbar Decompression Surgery: A Review of 2699 Cases. *Global Spine J* 2021; 11(2): 172-179. <https://doi.org/10.1177/2192568219896541>