**Disparities in Clinical Outcomes Between Diabetic and Non-Diabetic Patients Following Lumbar Spinal Surgery: A Single-Institutional Cohort**

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**Introduction:** Spinal fusion is a common surgical intervention for degenerative spine disease with varied parameters. While diabetic patients are considered to have poorer health outcomes, the longitudinal effect of spinal surgery in this population remains underexplored. Addressing disparities in clinical parameters is essential for optimizing surgical strategies and post-operative care, ultimately enhancing their recovery.

**Methods:** A retrospective analysis investigated clinical disparities in 304 patients (95 with DM) undergoing lumbar spine surgery from 2018 to 2023. Parameters included Oswestry Disability Index (ODI), Visual Analog Scale (VAS), pre- and post-operative glucose, and HbA1c levels. Descriptive statistics and Kolmogorov-Smirnov test checked data distribution. Median differences were compared via Mann–Whitney U test, and significance was set at $p< 0.05$. The 30% reduction in MCID was calculated to estimate changes after 6 and 12 months. Multivariate logistic regression analyzed variables' impact on MCID.

**Results:** Preoperatively, diabetic patients had significantly higher HbA1c levels compared to non-diabetics (6.6%: IQR 6.1-8.25 vs 5.6%: IQR 5.3-5.8, $p< 0.0001$) and higher glucose levels (128 mg/dL: IQR 109.8-158 vs 98 mg/dL: IQR 89.00-107, $p< 0.0001$). In preoperative ODI assessments, diabetics reported greater disability (26.00: IQR 19-32) compared to non-diabetics (21.00: IQR 16-28, $p=0.0003$). At six and twelve months, diabetics reported a 30% reduction in MCID (25.22%) and (25.18%), respectively, while non-diabetics achieved a 30.38% and 29.23% reduction, respectively. Though VAS preoperatively was significantly greater in diabetics (8: IQR 6-9) compared to non-diabetic patients (7: IQR 5-8, $p< 0.0028$), both achieved a 30% reduction in MCID at 12 months of nearly 33% (Table 1). Multivariate logistic regression analysis revealed no relationship with MCID and clinical outcomes after 6 and 12 months of follow-up.

**Conclusion:** These findings indicate that while diabetic patients benefit significantly from lumbar spinal surgery, they experience slightly less improvement in key clinical outcomes compared to non-diabetics. Discussion of patient expectations, particularly in diabetic patients, is important to maximize outcomes.

| PROMs | Diabetic (DM) | Non-Diabetic | Mean ODI Diff | P value |
|---|---|---|---|---|
| **Mean Preoperative ODI** | 26.52 ± 8.59 | 22.38 ± 8.14 | -4.142 ± 1.004 | < .0001** |
| **Mean Preoperative VAS** | 7.320 ± 2.190 | 6.542 ± 2.283 | -0.7777 ± 0.2771 | < .0053 ** |
| **MCID (ODI) Reduction (30%) - 6 Months*** | 25.22% (26.52 – 19.83)/ 26.52) | 30.38% (22.38 – 15.58) / 22.38) | - | < .0002) * |
| **MCID (ODI) Reduction (30%)- 12 Months*** | 25.18% (26.52 – 19.84) / 26.52) | 29.93% (22.38 - 15.68) / 22.38) | - | < .0001* |
| **MCID (VAS) Reduction (30%)- 12 Months*** | 33.01% (7.3 – 4.89) / 7.3) | 32.92% (6.5 – 4.36) / 6.5) | - | < .2023 |

**Table 1:** Comparison of Mean ODI and VAS at Different Time Points in Diabetes (DM) and Non-Diabetic Patient Groups