Depression Among Lumbar Spine Surgery Patients: Uncovering the Untold Story

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INTRODUCTION: Spine surgery patients have greater rates of preoperative depression and anxiety than the public, with about 1 in 3 patients experiencing these mental health conditions. PROMIS Depression survey measures the cognitive and affective manifestations of depression. This survey has been found to correlate well with formal depression screening tools, such as the Patient Health Questionnaire-9 (PHQ-9). The purpose of this study is to assess the effects of depression on patient-reported outcomes and its potential underdiagnosis in our patient population.

METHODS:

Patients who underwent lumbar decompression ± ≤ 2 level fusion at a single institution between March 2019 and January 2021 were identified from a prospectively maintained database. PROMIS Anxiety, Depression, Fatigue, Pain Interference (PI), Physical Function (PF), Sleep disturbance (SD), and Social Roles (SR) surveys were recorded at preoperative intake with subsequent follow-up at 6, 12 months and 24 months postoperatively. Exclusion criteria included those with missing prescription data from the electronic medical record (EMR) system, any patients undergoing surgery for tumor or infection, and patients with history of refractory depression prior to surgery.

Patients were categorized into three groups based on ICD10 code diagnosis for depression and their baseline PROMIS Depression Scores obtained at intake: 1) positive ICD10-based diagnosis of depression (PDD), 2) no ICD10 or PROMIS-based diagnosis of depression (NDD), 2) and 3) at-risk for undiagnosed depression (ARUD). ARUD was defined as patients without an ICD10-based diagnosis of depression, but who had a PROMIS Depression score ≥ 55 [Cheng AL et al. JBJS 2023].

Primary outcome measures were the between-cohort comparisons of the mean for each PROMIS survey. Comparisons were performed using ANOVA along with post-hoc Tukey test. Secondary outcome measures were changes in mean PROMIS scores at 1- and 2-year postoperatively. Correlations between PROMIS Depression and other PROMIS domain scores were investigated using spearman rank correlation. Impact of antidepressants on PROMIS measures were conducted on patients with depression. Lastly, multivariate analysis via logistic regression was conducted to detect risk factors associated with ARUD.

RESULTS:

Two-hundred seventeen patients were included in the final cohort. In total, 151 of 217 patients were ICD10-negative for depression and 66 were PDD. No differences between subgroups were observed for age, duration of surgery, postoperative LOS, number of prior spine surgeries, SII, or co-morbidities with the exception of diabetes (3.97% vs 12.12%, p=0.025). When the ICD10-negative group was further subdivided based on their baseline PROMIS-Depression scores, 115 were NDD and 36 were ARUD (Figure 1).

The ARUD cohort had worse PROMs across all domains and all timepoints compared to the NDD cohort, with the exception of PROMIS Fatigue at 6-month (49.87 ± 10.46 vs. 46.22 ± 9.43, p=0.197) and 2-year (51.58 ± 9.38 vs. 47.76 ± 9.79, p=0.091) follow-up. Subsequent comparison between PDD and ARUD cohorts revealed no difference in PROM scores across all survey domains and all measured timepoints, with exception of baseline PROMIS Depression (55.87 ± 8.80 vs. 59.57 ± 4.75, p<0.001) and PROMIS Anxiety at 1-year (55.09 ± 9.57 vs. 50.68 ± 10.17, p=0.048) (Figure 2).

At 2-year follow-up, mean improvement in PROMIS scores for the ARUD exceeded minimal clinically important difference (MCID) in all domains. Improvements in the PDD and NDD cohorts exceeded MCID only for ODI and PROMIS PF, PI and SR.

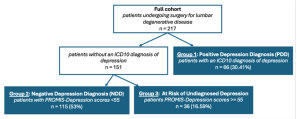
Of the 102 combined cohort of patients with depression and at-risk for depression, 28 (27.45%) were receiving treatment with SSRIs and 74 were not being medically treated for depressive symptoms at the time of surgery. There was no difference in PROMs between those who were and were not being treated, with the exception of preoperative ODI (54.64 ± 19.51 vs. 46.00 ± 15.86, p=0.042) and PROMIS Anxiety at 1-year follow-up (56.80 ± 10.26 vs. 52.30 ± 9.63, p=0.050).

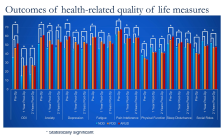
Spearman Rank test revealed PROMIS Depression correlated moderately with ODI, PROMIS Fatigue, PF, PI, Sleep Disturbance, and Social Roles, and strongly with PROMIS Anxiety (Table 1).

Lastly, multivariate analysis of social determinants of health factors, preoperative co-morbidities and other health status indicators, revealed that age 75+ and body mass index (BMI) between 30-35 were associated with an increased likelihood of depression going undiagnosed depression. Additionally, if present, a history of substance abuse increased the odds of having a diagnosis of depression.

DISCUSSION AND CONCLUSION: Our findings suggest that depression is associated with worse patient-reported outcome metrics and that depression is potentially underdiagnosed in spine patients. Consideration of utilizing PROMIS Depression scores as a screening tool for depression could aid in detecting this risk factor in our spine patients. Future

work is needed to understand the role of treating depression and psychiatric intervention in preoperative optimization for lumbar surgery.





Spearman Rank correlation between PROMIS Depression and other health-related quality of life measures

	Pre-op	6-month post-op	1-year post-op	2-year post-op
ODI	0.471	0.524	0.487	0.409
PROMIS Anxiety	0.699	0.823	0.795	0.774
PROMIS Fatigue	0.563	0.605	0.608	0.546
PROMIS Pain Interference	0.481	0.558	0.495	0.407
PROMIS Physical Function	-0.359	-0.511	-0.460	-0.398
PROMIS Sleep Disturbance	0.387	0.516	0.457	0.431
PROMIS Social Roles	-0.441	-0.516	-0.551	-0.500

Strength was assessed as weak" (0.00 to 0.19), "weak" (0.20 to 0.39), "moderate" (0.40 to 0.59), "strong" (0.60 to 0.79), and "very strong" (0.80 to 1.00)

All correlations were significant; p<0.001

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