Correlation of PROMIS to SRS-22r in Surgical Adult Deformity Patients: An Analysis of 187 Visits

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INTRODUCTION:

Adult spinal deformity patients often undergo extensive surgeries with high complication risks. Patient reported outcomes (PRO) such as SRS-22r can provide greater insight into the impact of the surgery beyond radiographic measures. Our objective is to evaluate the correlation of the SRS-22r to the PROMIS which uses computer adaptive technology (CAT).

METHODS: Retrospective cohort study performed at a single academic medical center. PROMIS was adopted in our Orthopedic department in April 2015. Adult scoliosis patients who underwent complex spinal deformity surgery between 10/2013 to 12/2020 at a single academic medical center were enrolled. Patients having surgery prior to April 2015 only completed post-operative PROMIS and SRS-22r questionnaires. All other patients completed both the PROMIS and SRS-22r questionnaires during their pre- and post-operative visits. The following PROMIS domains—Physical Function (PF), Pain Interference (PI), and Depression were completed. PROMIS domains were compared to scores within the SRS-22r Function, Pain and Mental Health domains, respectively. Spearman correlation (ρ) coefficients were calculated, and the absolute value of each correlation was taken for ease of analysis. Significance was set at $p < 0.05$.

RESULTS: A total of 187 unique visits and 55 procedures representing 49 unique patients met our inclusion criteria. A majority were female (37; 76%) and Caucasian (43; 88%). The average age was 63 years (range: 21-81) and the average follow-up was 12.9 months (SD 12.8). Moderate correlation existed between PROMIS PF and SRS Function domains (ρ = 0.53, $p < 0.0001$; n = 121) and between PROMIS PI and SRS Pain domains showed (ρ = 0.58, $p < 0.0001$; n = 121). PROMIS Depression and SRS Mental Health domains demonstrated a strong correlation (ρ = 0.84, $p < 0.0001$; n = 117). PROMIS demonstrated negligible ceiling and floor effects for all domains (range, 0.44% to 8.04%). Although the ceiling effect was larger for SRS domains (range, 1.07% to 35.39%), the floor effect was not as pronounced (range, 0.54% to 3.93%).

DISCUSSION AND CONCLUSION:

PROMIS PF, PI, and Depression domains capture similar clinical insight as the SRS-22r Function, Pain and Mental Health domains. Thus, spine surgeons can consider using these PROMIS domains as an alternative to SRS-22r to follow adult deformity patients pre- and post-operatively.

Table 1. Patient Demographics and Spearman Correlations between PROMIS and SRS Domains*

Demographic	mean (SD) (Range) or n (%)
Age	63 (11) (21 to 81)
Gender	
Male	12 (24)
Female	37 (76)
Race	
White or Caucasian	43 (88)
Black or African American	6 (12)
Questionnaire Domains	**Spearman Correlation (n)**
PROMIS PF & SRS PF	0.53 (121)
PROMIS PI & SRS Pain	-0.58 (121)
PROMIS Dep & SRS MH	-0.84 (117)

*55 procedures representing 49 unique patients. PF = physical function, PI = pain interference, Dep = depression, MH = mental health. For Spearman correlations between PROMIS and SRS domains, average follow-up was 12.9 months (SD 12.8).

Table 2. Ceiling and floor effects by PROMIS and SRS domains

	Ceiling effect	Floor effect
PROMIS, n (%)		
Physical Function	1 (0.44)	3 (1.32)
Pain Interference	1 (0.44)	1 (0.44)
Depression	1 (0.45)	18 (8.04)
SRS		
Physical Function	2 (1.07)	2 (1.07)
Pain	8 (4.30)	1 (0.54)
Mental Health	13 (6.99)	1 (0.54)
Self-Image	4 (2.16)	2 (1.08)
Management	63 (35.39)	7 (3.93)