Pain Self-Efficacy (PSEQ) Score of <22 is Associated with Daily Opioid Use, Back Pain, Disability, and PROMIS Scores in Patients Presenting for Spine Surgery

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INTRODUCTION:

Pain self-efficacy, or the belief that one can carry out activities despite pain, has been shown to be associated with back and neck pain severity. However, the literature correlating psychosocial factors to opioid use, barriers to proper opioid use, and Patient-Reported Outcome Measurement Information System® (PROMIS®) scores is sparse. The primary aim of this study was to determine whether pain self-efficacy is associated with daily opioid use in patients presenting for spine surgery. The secondary aim was to determine whether there exists a threshold self-efficacy score that is predictive of daily preoperative opioid use and subsequently to correlate this threshold score with opioid beliefs, disability, resilience, patient activation, and PROMIS scores.

METHODS:

This was a comparative cohort study using prospectively collected data. Adult patients undergoing elective spine surgery patients from August 2020 to December 2021 at a single institution were asked to complete questionnaires preoperatively. Questionnaires were: preoperative opioid use and beliefs, Pain Self-Efficacy Questionnaire (PSEQ), Brief Resilience Scale (BRS), modified short version of the Barriers Questionnaire-Taiwan (S-BQT), PROMIS-29 v2.0 Profile, Oswestry Disability Index (ODI), and Patient Activation Measure (PAM). Recorded patient characteristics included: age, sex, ethnicity, race, educational attainment, annual household income, marital status, Charlson Comorbidity Index, and whether patients underwent surgical fusion of >4 levels.

RESULTS:

A total of 578 patients met inclusion criteria, including 286 females **(Table 1)**. The mean (± SD) age was 54.7 (± 21.5) years. Of these, 100 (17.3%) reported daily opioid use during the 30-day period preceding surgery. The optimal PSEQ cutoff score for prediction of daily opioid use was found to be 22. Most patients (66.1%) were classified as having high pain self-efficacy using this threshold (PSEQ ≥22). Low self-efficacy patients reported lower household income compared to high self-efficacy patients (p=.023). No other significant differences were observed in demographics, Comorbidity Index, or surgical factors. With regards to opioid beliefs, PSEQ scores <22 were associated with beliefs that pain medication cannot really control pain (p=.034), greater concern about medication adverse effects (p=.014) and greater concern about disease progression with the use of pain medications (p=.019) **(Table 2)**. The low self-efficacy group also had less confidence in the use of non-opioid medications for the control of postoperative pain (p=.003). On multivariable logistic regression, patients with a PSEQ score <22 had 2-times greater odds of being daily opioid users than those with a score ≥22. Further, PSEQ <22 was significantly associated with lower patient activation; increased leg and back pain; higher ODI; higher PROMIS pain, fatigue, depression, and sleep scores; and lower PROMIS physical function and social satisfaction scores **(Table 3)**.

DISCUSSION AND CONCLUSION:

In patients presenting for elective spine surgery, a PSEQ score of <22 is associated with twice the odds of reporting daily opioid use during the 30-day preoperative period. Further, this threshold is associated with greater pain, disability, fatigue, and depression. A PSEQ score <22 can help identify patients at high risk for daily opioid use and can guide targeted rehabilitation to optimize postoperative quality of life.

Table 1. Demographics by Pain Self-Efficacy Questionnaire (PSEQ) Score

	Total	High Self Efficacy PSEQ ≥22	Low Self Efficacy PSEQ <22	p value
	N=578	n=382	n=196	
Mean age	54.7 (21.5)	55.6 (21.4)	52.9 (21.8)	.16
Mean CCI	.655 (.33)	.66 (.322)	.646 (.346)	.63
Female	286 (49.5%)	196 (51.3%)	90 (45.9%)	.22
Race				.10
White	430 (77.2%)	282 (77.0%)	148 (77.5%)	
Black	82 (14.7%)	48 (13.1%)	34 (17.8%)	
Hispanic	45 (8.1%)	36 (9.8%)	9 (4.7%)	
Living alone	178 (30.8%)	121 (31.7%)	57 (29.1%)	.52
Education				.11
No college	245 (42.3%)	150 (39.4%)	93 (48.3%)	
College	165 (28.6%)	116 (30.4%)	49 (25.0%)	
Graduate	167 (28.9%)	115 (30.2%)	52 (26.5%)	
Income				.02
<$30,000	71 (12.4%)	40 (10.6%)	31 (15.8%)	
$30,000–$80,000	141 (24.6%)	89 (23.6%)	52 (26.5%)	
>$80,000	247 (43.1%)	179 (47.5%)	68 (34.7%)	
Unknown	114 (19.9%)	69 (18.3%)	45 (23.0%)	
> 4 levels fused	117 (20.2%)	78 (20.4%)	39 (19.9%)	.88
Daily opioid use for 30 days before preoperative visit	100 (17.3%)	39 (10.0%)	61 (31.1%)	<.001

Abbreviations: AIDS, autoimmune deficiency syndrome; CCI, Charlson Comorbidity Index; COPD, chronic obstructive pulmonary disease; PSE, Pain Self-Efficacy Questionnaire

Table 2. Preoperative Opioid Use Barriers/Beliefs by Pain Self-Efficacy Questionnaire (PSEQ) Score

	Total	High Self Efficacy PSEQ ≥22	Low Self Efficacy PSEQ <22	p value
	N=578	n=382	n=196	
Pain medication cannot really control pain	1 (0–3)	1 (0–3)	2 (0–3)	.03
People get addicted to pain medication very easily	4 (2–5)	4 (2–5)	4 (2–5)	.06
Good patients avoid talking about pain	0 (0–1)	0 (0–1)	0 (0–1)	.85
It is easier to put up with pain than the side effects of pain medication	2 (0–3)	2 (0–3)	1 (0–3)	.01
Complaints of pain could distract the doctor from treating my underlying condition	0 (0–2)	0 (0–2)	0 (0–2)	.07
Pain medication should be "saved" until the pain gets worse.	1 (0–3)	1 (0–3)	1 (0–3)	.73
The experience of pain is a sign that the condition for which you are undergoing surgery has gotten worse.	2 (1–4)	2 (0–4)	3 (1–4)	.02
How confident are you that non-opioid/non-narcotic pain medications alone can control your pain following surgery?	3 (1–3)	3 (2–3)	3 (1–3)	.003
Do you personally know anyone who became addicted to opioid/narcotic pain medication?	180 (34.4%)	108 (31.1%)	72 (40.9%)	.03
Do you personally know anyone who has overdosed on opioid/narcotic pain medication?	89 (17.0%)	58 (16.7%)	31 (17.6%)	.80
How would you dispose of your unused opioid/narcotic pain medication?	5.04 (1.79)	5.03 (1.84)	5.06 (1.69)	.88
How comfortable are you with using naloxone in the event of an overdose?	2.5 (1.18)	2.52 (1.13)	2.47 (1.27)	.64

Table 3. 30-Day Preoperative and 6-Week Postoperative Patient-Reported Outcomes by Pain Self-Efficacy Questionnaire (PSEQ) Score

	Preoperative (30 days)				Postoperative (6 weeks)			
	Total	HSE (PSEQ ≥22)	LSE (PSEQ <22)	p value	Total	HSE (PSEQ ≥22)	LSE (PSEQ <22)	p value
	N=578	n=382	n=196		N=578	n=382	n=196	
ODI	45.8 (16.9)	39.1 (14.9)	57.3 (13.5)	<.001	35.5 (18.3)	31.6 (17.7)	44.6 (16.3)	<.001
PROMIS-29 v2.0 Profile								
Pain interference	64.1 (7.96)	61.4 (7.35)	69.4 (6.25)	<.001	58.3 (8.56)	57 (8.27)	61.8 (8.34)	<.001
Physical function	36.6 (6.92)	38.8 (6.44)	32.4 (5.76)	<.001	38.8 (7.33)	39.9 (7.13)	36 (7.16)	<.001
Fatigue	54.1 (10.2)	52.1 (9.58)	58.1 (10.4)	<.001	51.8 (9.56)	50.1 (9.12)	56.2 (9.32)	<.001
Anxiety	52.7 (10.3)	51.4 (9.23)	55.4 (11.6)	<.001	49.6 (8.84)	48.7 (8.62)	51.7 (9.06)	.008
Depression	50.3 (9.21)	47.8 (7.82)	55.1 (9.78)	<.001	48.5 (8.22)	46.9 (7.43)	52.5 (8.77)	<.001
Sleep disturbance	55.1 (8.17)	53.3 (7.66)	58.4 (8.14)	<.001	51.9 (8.71)	50.8 (8.11)	54.9 (9.3)	<.001
Satisfaction w/ social participation	42.5 (8.66)	45.6 (7.59)	36.4 (7.28)	<.001	44.9 (8.92)	46.8 (8.64)	39.9 (7.66)	<.001
Patient Activation Measure	69.3 (18.7)	71.6 (19.2)	64.8 (16.9)	<.001	70 (19.3)	72.1 (19.8)	64.9 (17)	.002
Brief Resilience Scale	3.72 (.706)	3.83 (.686)	3.49 (.689)	<.001	3.78 (.702)	3.83 (.7)	3.58 (.668)	<.001
Numeric Pain Rating Scale								
Back pain, worst	7.68 (2.44)	7.19 (2.62)	8.51 (1.81)	<.001	4.27 (2.75)	4.15 (2.72)	4.55 (2.83)	.34
Leg pain, worst	6.36 (3.28)	5.95 (3.29)	7.04 (3.14)	.002	2.71 (2.8)	2.34 (2.64)	3.54 (2.98)	.004

Abbreviations: HSE, high self-efficacy; LSE, low self-efficacy; ODI, Oswestry Disability Index; PSEQ, Pain Self-Efficacy Questionnaire; PROMIS, Patient-Reported Outcome Measurement Information System