Is there a Relationship between Pain Catastrophizing Scale (PCS), Opioid Use, and Overall Healthcare Resource Utilization (HRU) post-Total Knee Arthroplasty?

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Introduction

Total Knee Arthroplasty (TKA) is an effective procedure for relieving osteoarthritis pain, though approximately 20% of patients experience persistent pain post-surgery. The Pain Catastrophizing Scale (PCS) assesses pain-related cognitive-emotional responses, with higher scores linked to increased pain perception, opioid use, and healthcare resource utilization (HRU). Given its predictive potential, PCS is a key tool for identifying patients who may require enhanced perioperative pain management.

This study investigates the relationship between preoperative PCS scores, opioid use, and HRU within 6 months after TKA. By examining these relationships, the study aims to better understand how psychological factors such as pain catastrophizing affect opioid consumption and post-surgical healthcare resource utilization, potentially improving pain management strategies for post-TKA patients.

Odds Ratio of Filling an Opioid Prescription

Item1	Opioid pre-TKA OR (95% CI)	p-value	Opioid <30 days post-TKA OR (95% CI)	p-value	Opioid 30-180 days post-TKA OR (95% CI)	p-value
PCS	1.02 (0.98,1.06)	0.381	1.03 (0.96,1.07)	0.104	1.03 (0.96,1.07)	0.138
Fatigue (AFT4a)	1.02 (0.97,1.07)	0.404	**1.05 (1.00, 1.11)**	**0.041**	1.03 (0.98,1.08)	0.302
Anxiety (ANX4a)	1.02 (0.97, 1.07)	0.491	1.04 (0.99,1.09)	0.090	1.01 (0.96,1.06)	0.727
Depression (DEP4a)	1.01 (0.95, 1.07)	0.688	**1.07 (1.01,1.13)**	**0.023**	1.05 (0.99,1.11)	0.106
Physical Function (PFA4a)	0.97 (0.86, 1.09)	0.612	0.92 (0.82,1.03)	0.127	0.98 (0.87,1.10)	0.705
Pain Interference (PAI4a)	**1.11 (1.00, 1.23)**	**0.047**	**1.11 (1.01,1.23)**	**0.029**	1.06 (0.97,1.17)	0.195
Sleep Disturbance (SLP4a)	1.04 (0.96, 1.13)	0.352	1.06 (0.99,1.15)	0.109	1.02 (0.95,1.11)	0.540
Social Roles and Activities	0.93 (0.86, 1.00)	0.061	0.96 (0.91,1.02)	0.214	1.00 (0.94,1.07)	0.893
Pain Intensity (PAIN4a)	1.32 (0.93, 1.87)	0.123	**1.50 (1.07,2.11)**	**0.019**	1.22 (0.88,1.69)	0.229
Opioid user prior to TKA	--	--	2.28 (0.74,7.01)	0.148	**3.36 (1.05,10.8)**	**0.042**

PCS= XXX

1All variables were collected prior to TKA.

Figure 1: Odds ratios of filling an opioid prescription pre-TKA,, within 30 days post-TKA and between 30 and 180 days post-TKA according to multiple Patient-Reported Outcome variables (n=66). PCS scores did not significantly impact the likelihood of filling an opioid prescription at any of the time intervals. Depression, fatigue, pain interference and pain intensity significantly impacted the likelihood of an individual filling an opioid prescription.

Methods

- **Study Design:** Retrospective chart review.
- **Participants:** 66 patients who underwent primary TKA between January 2018 and April 2024.
- **Intervention:** All patients received Iovera cryo-neurolysis preoperatively.
- **Data Collected:** Demographics, preoperative PCS scores, opioid prescriptions (Louisiana Opioid Registry), HRU (physical therapy, emergency department visits, follow-up appointments).
- **Statistical Analysis:** Pearson and Spearman correlation, Wilcoxon Mann-Whitney tests, one-way ANOVA, and regression models adjusting for age, sex, BMI, comorbidities, and opioid naïveté.

Results

There was no significant correlation between PCS and:

1. Number of PT visits post TKA (p=0.493).
2. Number of regular FU visits post-TKA within 6 months (p=0.367).
3. Number of ED visits post-TKA within 6 months (p=0.916).
4. Number of other FU visits post-TKA within 6 months (p=0.382).

Conclusion

PCS scores were not significant predictors of postoperative opioid use or healthcare resource utilization (HRU) following TKA. However, given the observed associations between certain PROMIS variables and opioid use—particularly the significant correlation with depression—it may be valuable to expand the current study. Increasing the sample size and incorporating additional time points could help refine pain management strategies. Early identification of psychological risk factors, such as depression, in the preoperative period may allow for more personalized approaches to pain management and ultimately lead to improved patient outcomes.