A Latent Profile Analysis of Global Distress and Mild Kinesiophobia Among Adults Seeking Psychology Treatment for Chronic Pain

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Introduction

- ~28% of adults worldwide experience chronic pain, and psychological interventions are first-line treatments designed to help patients manage their painful conditions
- People with chronic pain frequently experience comorbid psychological symptoms, including depression, anxiety, kinesiophobia, and pain catastrophizing
- Pain psychology interventions can be better personalized and more informed by identifying and defining distinct patient symptom profiles

Objective

- Apply a Latent Profile Analysis (LPA) on four symptoms (depression, anxiety, kinesiophobia, pain catastrophizing) to identify distinct patient profiles
- Characterize pain-related symptoms and demographics of each identified profile

Methods

- Participants: 548 adult patients completed a standard battery of PROMs at a pain psychology intake evaluation between April 2020-October 2023
- Measures:
  - Pain Catastrophizing Scale (PCS)
  - Tampa Scale for Kinesiophobia-13 (TSK-13)
  - Patient Health Questionnaire-9 (PHQ-9)
  - Generalized Anxiety Disorder-7 scale (GAD-7)
  - Oswestry Disability Index (ODI)
  - Screener and Opioid Assessment for Patients with Pain-Revised (SOAPP-R)
  - Pain Intensity – single item taken from the Patient-Centered Outcomes Questionnaire (PCOQ)
  - Demographics and Socioeconomic Status
- Analysis
  - All analyses were conducted using R (4.2.2), and LPA was used to identify distinct subgroups of patients based on their comorbid psychological symptoms

Results

Table 1. Aim 1 Symptom Profile Characteristics

Variable	Global Distress (n=368) Mean (SD)	Localized and Mild Kinesiophobia (n=180) Mean (SD)	Cohen's d	Effect Size Interpretation
Pain Catastrophizing (PCS)	30.87 (10.30) (Clinically Relevant)	13.17 (7.99) (Not Clinically Relevant)	1.917	Very Large
Kinesiophobia (TSK)	33.25 (6.99) (Moderate Severity)	27.01 (7.61) (Mild Severity)	0.855	Large
Depression (PHQ-9)	11.82 (6.07) (Moderate Severity)	3.40 (2.51) (Minimal Severity)	1.814	Very Large
Anxiety (GAD-7)	8.79 (5.79) (Mild Severity)	2.47 (2.19) (Minimal Severity)	1.443	Very Large

Note: The table summarizes the descriptive statistics for the two patient profiles revealed by our Latent Profile Analysis (LPA). For each profile, the mean score and the standard deviation are presented alongside a clinical severity interpretation grounded in the established cutoffs of the respective assessment scales. To quantify the magnitude of differences between these profiles, we calculated Cohen's d: a standardized effect size in which larger values reflect more pronounced distinctions. Following conventional benchmarks, effect sizes around 0.2 are deemed small, 0.5 medium, 0.8 large, and those exceeding 1.2 very large.

Table 2. Model Fit Indices for Latent Profile Analysis Solutions

Model	Classes	AIC	BIC	Entropy	ΔBIC	BIC Interpretation
Model 1	1	6,232.60	6,267.10	1	1183.8	Very strong support for best model
Model 2	1	6,232.60	6,267.10	1	1183.8	Very strong support for best model
Model 3	1	5,140.00	5,200.20	1	116.9	Very strong support for best model
Model 6	1	5,140.00	5,200.20	1	116.9	Very strong support for best model
Model 1	2	5,491.60	5,547.50	0.856	464.2	Very strong support for best model
Model 2	2	5,399.80	5,473.00	0.816	389.7	Very strong support for best model
Model 3	2	5,124.50	5,206.30	0.582	123	Very strong support for best model
Model 6	2	4,958.40	5,083.30	0.663	0	Best fitting model
Model 1	3	5,194.50	5,272.00	0.823	188.7	Very strong support for best model
Model 2	3	5,051.60	5,163.50	0.858	80.2	Very strong support for best model
Model 3	3	5,012.90	5,116.30	0.625	33	Very strong support for best model
Model 1	4	5,107.60	5,206.60	0.787	123.3	Very strong support for best model
Model 3	4	4,986.60	5,111.50	0.713	28.2	Very strong support for best model
Model 1	5	5,093.40	5,214.00	0.755	130.7	Very strong support for best model
Model 3	5	4,987.00	5,133.40	0.63	50.1	Very strong support for best model
Model 1	6	5,047.10	5,189.20	0.76	105.9	Very strong support for best model
Model 3	6	4,921.20	5,089.10	0.726	5.8	Positive support

Note: AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; ΔBIC = difference in BIC from best-fitting model. Lower AIC and BIC values indicate better model fit. Entropy values closer to 1.0 indicate better class separation (>0.80 considered good). The two-class Model 6 solution was selected based on lowest BIC value and theoretical interpretability.

Conclusions

- Two profiles were identified primarily by symptom severity, rather than transdiagnostically
- The *Global Distress* group (n=368; 67.2%) displayed clinically-elevated distress across all four symptom domains
- The *Localized and Mild Kinesiophobia* group (n=180; 32.8%) reported sub-clinical symptoms in all symptom domains except mild kinesiophobia
- The *Global Distress* group had higher levels of area deprivation, pain intensity, functional disability, and opioid misuse than the *Localized and Mild Kinesiophobia* group
- No profile emerged that exhibited *only* pain-related distress, even though those symptoms are often the primary target of many psychological chronic pain treatments

Limitations

- Some overlap is evident between the profiles, demonstrated by the modest classification accuracy of our two-profile solution
- Our data were limited to a single site, and findings may not be generalizable to patients in other settings
- We use the Oswestry Disability Index (ODI), which was developed for individuals with low back pain, to measure functional disability

Future Directions

- More qualitative research is needed to better understand patient perspectives, expectations, and desires when they present for pain psychology
- Prospective validation is needed to test profile stability
- Patients who fall into different symptom profiles may warrant greater personalization of care

Link to Poster & References

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