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Original Research

The Impact of Organic and Psychological Pain Beliefs on Pain, Disability, Kinesiophobia, Catastrophizing, and Pain Knowledge in Shoulder Pain: A Cross-Sectional Study ☆,☆☆,★

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ABSTRACT

Purpose: The purpose of this research is to examine the effects of organic pain beliefs (OPB) and psychological pain beliefs (PPB) on pain intensity, disability, kinesiophobia, catastrophizing, and pain knowledge in chronic shoulder pain.
Design: Cross-sectional observational study.
Methods: In this cross-sectional study, 109 patients (66 females, 43 males; mean age 49.8 ± 10.4 years) with chronic rotator cuff–related shoulder pain were recruited using a convenience sampling method and completed the Pain Beliefs Questionnaire (PBQ), the Numeric Pain Rating Scale (NPRS), the Shoulder Pain and Disability Index (SPADI), the Tampa Scale for Kinesiophobia (TSK), the Pain Catastrophizing Scale (PCS), and the Revised Pain Neurophysiology Questionnaire (Revised-NPQ). Pearson correlation and multiple linear regression analyses were used to assess the relationships of OPB and PPB with the outcome measures.
Results: OPB were significantly positively correlated with activity-related pain ($r = 0.30$, $p = .001$), disability (SPADI total; $r = 0.21$, $p = .025$), kinesiophobia (TSK; $r = 0.42$, $p < .001$), and catastrophizing (PCS; $r = 0.40$, $p < .001$), and were negatively correlated with Revised-NPQ ($r=-0.34$, $p = .001$). In multiple regression models, OPB significantly predicted greater disability ($\beta=0.25$, $p = .013$), kinesiophobia ($\beta=0.45$, $p < .001$), and catastrophizing ($\beta=0.44$, $p < .001$), explaining 4.8%-17.4% of variance in these outcomes (adjusted $R^2=0.048$-0.174).
Conclusions: In chronic shoulder pain, OPB show weak to moderate associations with adverse clinical outcomes and a negative association with pain knowledge, whereas PPB are not significantly related to outcomes. These findings support the potential value of targeting maladaptive beliefs and improving pain knowledge within rehabilitation.
Clinical implications: Evaluating OPB and PPB in relation to pain-related parameters, kinesiophobia, and catastrophizing may help identify at-risk patients and support individualized rehabilitation and targeted education in chronic shoulder pain.

Shoulder pain is the third most common musculoskeletal complaint and may become persistent, limiting individuals' ability to perform daily activities both at home and in the workplace (Greving et al., 2012; Linaker & Walker-Bone, 2015). The course of chronic shoulder pain is often unpredictable, and no direct correlation has been found between pain intensity, the extent of tissue damage, and clinical imaging findings (Alburquerque-Sendín et al., 2013; Reyes et al., 2017). These observations suggest that chronic shoulder pain is not solely related to structural damage but also involves altered pain modulation and biopsy-

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chosocial factors (Martinez-Calderon et al., 2018; Pribicevic, 2012; Sanchis et al., 2015). Psychological distress, depressive symptoms, anxiety, preoperative fears, fear-avoidance behaviors, somatization, and pain catastrophizing have all been identified as contributors to the persistence of chronic shoulder pain (Martinez-Calderon et al., 2018).

Pain beliefs refer to individuals' perceptions about the causes, controllability, and consequences of pain, influencing its perception, persistence, and recovery (Edwards et al., 1992; Elfering et al., 2009). These beliefs are commonly categorized into organic pain beliefs (OPB) and psychological pain beliefs (PPB). OPB attribute pain primarily to tissue damage or physiological dysfunction, whereas PPB emphasize the role of emotional, cognitive, and psychosocial factors such as stress, mood, and attention (Edwards et al., 1992). These beliefs about pain influence the actual experience of pain, functionality, ability to cope with pain, attitudes towards pain, and the treatment process and adherence (Babadağ et al., 2015; Disceken & Köse, 2021; Jensen et al., 2016; Yıldızeli Topcu, 2018).

Evidence suggests that higher OPB are more strongly associated with maladaptive outcomes, including higher levels of pain catastrophizing, increased disability, greater pain intensity, and poorer clinical prognosis (Babadağ et al., 2015; Disceken & Köse, 2021; Pons et al., 2012; Yıldızeli Topcu, 2018). It has been reported that patients who attributed their pain to organic causes experienced greater helplessness and more difficulty in coping. Although PPB have been associated with more adaptive coping strategies, findings remain unclear (Babadağ et al., 2015). OPB may reinforce a biomedical interpretation of pain by attributing symptoms exclusively to tissue damage, thereby increasing fear-avoidance behaviors (Zale & Ditre, 2015). However, these findings are largely derived from non-shoulder pain populations, limiting their direct applicability to chronic shoulder pain.

Biomedical orientation may contribute to the persistence of maladaptive pain beliefs in individuals with chronic musculoskeletal conditions, including those with shoulder pain. Nevertheless, in patients with chronic shoulder pain characterized by strong OPB (Gillespie et al., 2017), the independent associations of OPB and PPB with clinical and psychological outcomes remain insufficiently investigated.

Pain knowledge plays an important role in shaping pain beliefs and coping strategies. Accordingly, interventions such as pain neuroscience education (PNE), which aim to explain the biological and neurophysiological basis of pain, have been increasingly used to enhance patients' understanding of pain and to promote a shift toward a biopsychosocial perspective (Watson et al., 2019; Wood & Hendrick, 2019). Therefore, examining the relationship between both OPB and PPB and pain knowledge can provide a foundation for developing personalized and effective interventions. However, the relationship between pain beliefs and pain knowledge has not been examined in shoulder pain.

Previous studies have suggested that patients' beliefs about the organic or psychological nature of pain may lead to differences in coping strategies. (Baird & Haslam, 2013; Briggs et al., 2010; Cornally & McCarthy, 2011). Individuals with stronger OPB tend to adopt strategies aimed at eliminating the perceived physical source of pain and restricting activity, whereas those with stronger PPB are more likely to use more adaptive coping strategies such as relaxation and distraction (Disceken & Köse, 2021; İster & Özdemir, 2018). Given these gaps in the literature, examining the differential effects of OPB and PPB on pain-related outcomes may provide valuable insights for improving pain management. Effective pain management requires a team approach involving nurses, physicians, physiotherapists, and other healthcare professionals, who are well-positioned to assess and monitor pain due to their close interaction with patients (Babadağ et al., 2015). In this context, a better understanding of patients' pain beliefs and their influence on coping strategies may enable clinicians to develop more targeted and patient-centered interventions by addressing maladaptive beliefs and improving pain-related knowledge.

Therefore, this study aims to investigate the effects of organic and psychological pain beliefs on pain intensity, disability, kinesiophobia, catastrophizing, and pain knowledge in individuals with shoulder pain.

Method

Study Design and Ethics

This cross-sectional study was approved by the Istanbul Kent University Health Sciences Research Ethics Committee (Approval Date: December 17, 2025; Meeting No: 2025-10) and confirmed to the Declaration of Helsinki. All participants provided written informed consent. The study protocol registered at ClinicalTrials.gov under the registration number NCT07118163.

Participants

A sample of 109 individuals (66 females, 43 males; mean age 49.8 $\pm$ 10.4 years) diagnosed with rotator cuff-related shoulder pain by an orthopedist and referred to (XXX University, Department of Physiotherapy and Rehabilitation) in XXX was evaluated between August and October 2025. Inclusion criteria were individuals aged between 18 and 75 years, presence of shoulder pain for at least 3 months, and at least one positive finding in each of the following categories: painful arc during flexion or abduction; positive Neer's or Kennedy–Hawkins tests; and pain during resisted external rotation, abduction, or empty can test. Exclusion criteria included a history of shoulder dislocation or fracture within the past 12 months, presence of a full-thickness rotator cuff tear, previous shoulder surgery, receipt of physiotherapy or corticosteroid injection for the shoulder within the past 3 months, presence of adhesive capsulitis or systemic diseases such as cancer or rheumatic disorders, or with high anxiety or depression scores, defined as Hospital Anxiety and Depression Scale (HADS) $\geq$ 11. Participants who met the inclusion criteria were invited to take part in the study, and written informed consent was obtained. The informed consent included information about the purpose of the study, that no intervention would be applied, that the assessment would be conducted using self-reported questionnaires, that participation was voluntary, that participants could withdraw at any time without any consequences, and that data confidentiality and anonymity would be ensured.

Sample Size Calculation

The sample size was calculated using G*Power 3.1.9.7. As the relationships between variables were to be analyzed, the correlation module (point-biserial model) of the program was used. With the test power set at 90%, the error margin to 5%, and the effect size to medium (0.30), the total required sample size was calculated to be 88.

Outcome Measures

All participants underwent standardized assessment during a single visit. Demographics (age, sex, BMI, education, symptom duration) and clinical data were recorded. Data were collected by an experienced physiotherapist with 8 years of experience in chronic pain management and certification in PNE.

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Pain beliefs

Pain beliefs were assessed using the Pain Beliefs Questionnaire (PBQ). The scale consists of 12 items evaluating organic and psychological beliefs about the cause and consequences of pain. It includes an 8-item subscale for OPB and a 4-item subscale for PPB. Each item is scored on a scale from 1 to 6 (Edwards et al., 1992). The scale was found to have good construct validity and internal consistency, with Cronbach's alpha ranging from 0.70 to 0.73 (Edwards et al., 1992).

Pain intensity

The Numeric Pain Rating Scale (NPRS) were used to assess pain intensity. Participants were asked to verbally rate the severity of their pain on a scale from 0 to 10 (Childs et al., 2005).

Disability

Disability related to shoulder pain were assessed by the Shoulder Pain and Disability Index (SPADI), a 13-item questionnaire divided into two subscales: pain (5 items) and disability (8 items). Each item is scored from 0 to 10, with higher scores indicating greater pain and functional impairment (Roach et al., 1991). The internal consistency of the SPADI was good, with Cronbach's alpha of 0.83 for both the pain and disability subscales (Bumin et al., 2008).

Kinesiophobia

Kinesiophobia were measured using the Tampa Scale for Kinesiophobia (TSK), a 17-item questionnaire assessing fear of movement or reinjury. Items are scored on a 4-point Likert scale ranging from "strongly disagree" to "strongly agree," with higher scores indicating greater fear (Lundberg et al., 2004). Cronbach's alpha for the TSK was 0.75, indicating acceptable internal consistency for measuring kinesiophobia (Acar et al., 2016).

Catastrophizing

Catastrophizing thoughts about pain were assessed by the Pain Catastrophizing Scale (PCS), a 13-item instrument evaluating three dimensions: rumination, magnification, and helplessness. Items are rated on a 5-point scale from 0 ("not at all") to 4 ("all the time"), with higher total scores reflecting greater catastrophic thinking (Sullivan et al., 1995). The PCS demonstrated high internal consistency, with Cronbach's alpha of 0.90 (Süren et al., 2014).

Pain knowledge

Pain Neurophysiology Questionnaire (Revised-NPQ) was used to assess participants' knowledge of pain neurophysiology. The scale consists of 12 items that can be self-administered, with response options of "true-false-not sure" for each item. Correct answers are scored as 1 point, while incorrect and "not sure" responses receive 0 points, with a total score calculated out of 12 (Catley et al., 2013). The test–retest reliability of the NPQ was moderate (ICC = 0.629); however, the internal consistency was relatively low with a Cronbach's alpha of 0.33 (Gül et al., 2023).

Statistical Analysis

Descriptive statistics, correlation, and regression analyses were conducted using the Statistical Package for the Social Sciences (SPSS, version 20, IBM Corp., 2011, Chicago, IL). Descriptive statistics (means, standard deviations [SDs], frequencies) characterized the sample. Data normality was confirmed via the Kolmogorov-Smirnov test and histogram plots. Pearson correlation was used to examine relationships between the OPB and PPB and pain intensity, disability, kinesiophobia, catastrophizing and pain knowledge. Correlation values ≥0.4 were considered satisfactory (r = 0.81 to 1.0, "excellent"; 0.61 to 0.8, "very good"; 0.41 to 0.6, "good"; 0.21 to 0.4, "fair"; and 0 to 0.2, "poor") (Terwee et al., 2007). Multiple linear regression analyses were conducted to examine whether OPB and PPB independently predicted disability, kinesiophobia and catastrophizing. Statistical significance was set at $p < .05$.

Results

A total of 141 individuals were screened, and 109 participants (66 females and 43 males; mean age 49.83±10.40 years) who met the inclusion criteria were included in the study (Fig.1). The mean body mass index (BMI) was 28.18 ± 4.48 kg/m². The mean symptom duration was 7.75 ± 11.52 months. Regarding education level, 14.7% had completed primary school ($n = 16$), 33.0% secondary school ($n = 36$), 19.3% high school ($n = 21$), 18.3% university ($n = 20$), and 14.7% had a postgraduate degree ($n = 16$). These demographic characteristics are presented in Table 1.

OPB were significantly positively correlated with NPRS-activity (r = 0.30, $p = .001$) SPADI total scores (r = 0.21, $p < .05$), TSK (r = 0.42, $p < .001$), PCS (r = 0.40, $p < .001$), and negatively correlated with Revised-NPQ (r = −0.34, $p = .001$). No significant correlations were observed between OPB and NPRS-rest, NPRS-night. In contrast, PPB did not show any significant correlations with any pain, disability, kinesiophobia, catastrophizing, or pain knowledge measures ($p > .05$). Correlations between OPB, PPB and outcome measures are shown in Table 2.

Multiple linear regression analyses were conducted to examine the predictive roles of OPB and PPB on disability, kinesiophobia, and pain catastrophizing. OPB remained a significant positive predictor of disability (β=0.25, $p = .013$, 95% Confidence Interval (CI) [1.13-9.18]), kinesiophobia (β=0.45, $p < .001$, 95% CI [1.91-4.53]), and catastrophizing (β=0.44, $p < .001$, 95% CI [2.82-6.74]). Each model was significant overall: for SPADI ($F(2,104)=3.66$, $p = .029$, adjusted $R^2=0.048$), TSK ($F(2,102)=11.98$, $p < .001$, ad-

Table 1
Demographic Characteristics of the Participants.

Age (years)	
Mean ± SD (Min-Max)	49.83 ± 10.40 (20-75)
Gender (n)	
Female (%)	66 (60.6%)
Male (%)	43 (39.3%)
BMI (kg/m²)	
Mean ± SD (Min-Max)	28.18 ± 4.48 (20-39)
Symptom duration (months)	
Mean ± SD (Min-Max)	7.75 ± 11.52 (3-55)
Education level (n)	
Primary school (%)	16 (14.7%)
Secondary school (%)	36 (33.0%)
High school (%)	21 (19.3%)
University (%)	20 (18.3%)
Postgraduate (%)	16 (14.7%)

Abbreviations: Min = minimum; Max = maximum; SD = Standard Deviation;BMI = Body Mass Index.

Table 2
Correlations Between OPB and PPB and Outcome Measures.

Measure	OPB (r)	PPB (r)
NPRS-rest	0.09	0.14
NPRS-activity	0.30*	0.01
NPRS-night	0.18	0.05
SPADI	0.21*	0.08
TSK	0.42*	0.02
PCS	0.40*	0.03
Revised-NPQ	−0.34*	0.04

Abbreviations: NPRS = Numeric Pain Rating Scale; SPADI = Shoulder Pain and Disability Index; TSK = Tampa Scale for Kinesiophobia; PCS = Pain Catastrophizing Scale; Revised-NPQ = Revised Pain Neurophysiology Questionnaire. *$p < .05$.

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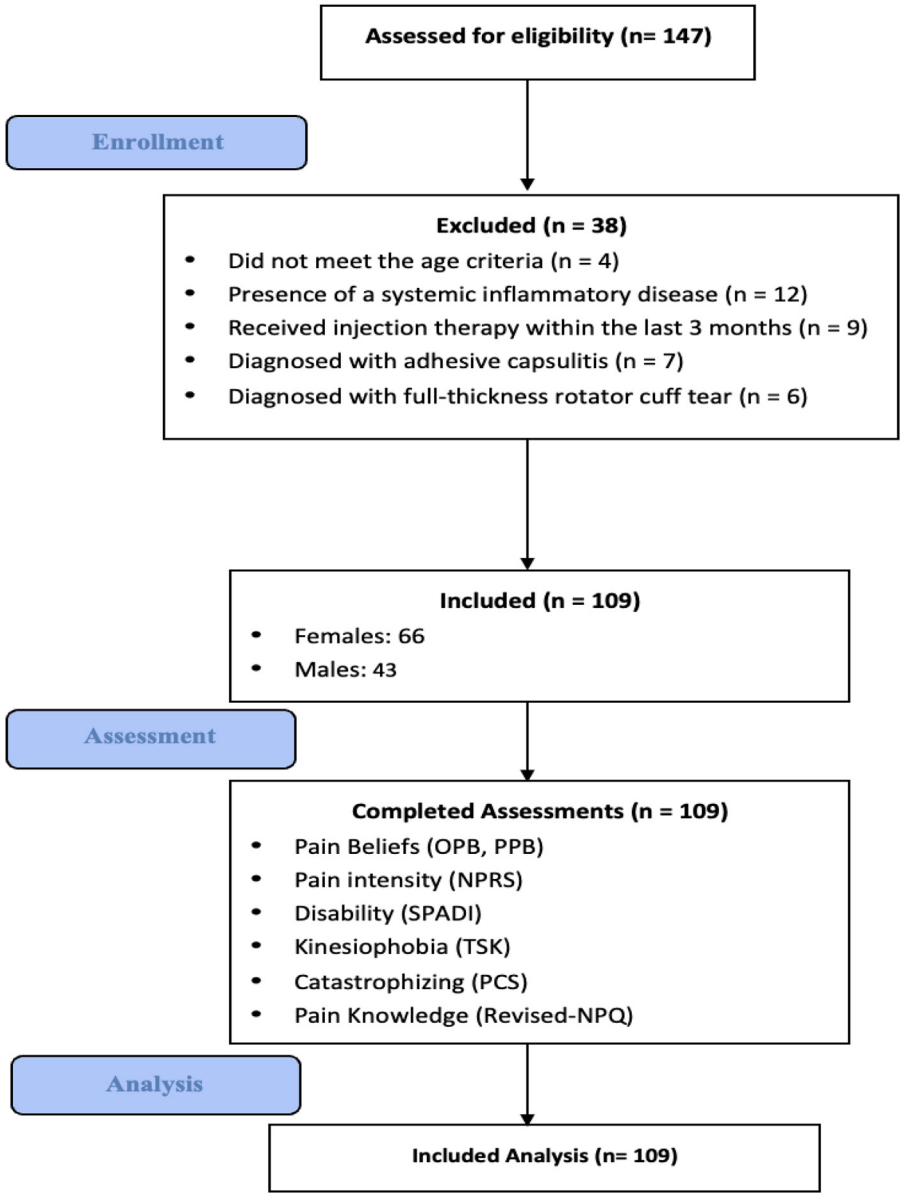

Figure 1. Flow diagram.

Table 3
Results of Multiple Linear Regression Analysis Predicting Disability, Kinesiophobia, and Catastrophizing From Pain Beliefs.

Dependent Variable	Predictor	B	SE B	β	t	Sig. (p)	R^2	Adjusted R^2	F(df)	Sig. (p)	95% CI
SPADI	PPB	−2.18	1.46	−0.15	−1.50	.136	0.066	0.048			[−5.06-0.70]
	OPB	5.16	2.03	0.25	2.54	.013*			3.66 (2,104)	.029*	[1.13-9.18]
TSK	PPB	−0.42	0.47	−0.08	−0.89	.374	0.190	0.174			[−1.35-0.51]
	OPB	3.23	0.66	0.45	4.89	< .001*			11.98 (2,102)	< .001*	[1.91-4.53]
PCS	PPB	−1.05	0.71	−0.14	−1.48	.143	0.184	0.169			[−2.45-0.35]
	OPB	4.79	0.99	0.44	4.84	< .001*			11.75 (2,104)	< .001*	[2.82-6.74]

Abbreviations: SPADI = Shoulder Pain and Disability Index; TSK = Tampa Scale for Kinesiophobia; PCS = Pain Catastrophizing Scale; PPB = Psychological Pain Beliefs; OPB = Organic Pain Beliefs; B = unstandardized regression coefficient; SE B = standard error of B; β = standardized regression coefficient; t = t-value; Sig = significance level; R^2 = coefficient of determination; Adjusted R^2 = adjusted coefficient of determination; F(df) = F-statistic with degrees of freedom; CI = Confidence Interval: *$p < .05$.

justed R^2=0.174), and PCS (F [2,104] =11.75, $p < .001$, adjusted R^2=0.169). PPB did not significantly predict any outcomes (all β $p > .05$). In summary, OPB explained between ~4.8% and ~17.4% of variance in disability, fear, and catastrophizing scores, whereas PPB added no predictive value (Table 3).

Discussion

This study examined the relationships between OPB and PPB in individuals with chronic rotator cuff–related shoulder pain. The findings showed that OPB were positively associated with

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aactivity-related pain, disability, kinesiophobia, and catastrophizing, and negatively associated with pain knowledge. Regression analyses revealed that OPB were significant positive predictors of disability, kinesiophobia, and catastrophizing. In contrast, PPB were not significantly related to or predictive of any outcome variables.

These findings indicate that OPB were significant predictors of disability, kinesiophobia, and catastrophizing, suggesting that they may play an important role in shaping pain-related outcomes in individuals with rotator cuff–related shoulder pain. Within the framework of the fear-avoidance model, stronger OPB may be associated with increased pain-related fear, avoidance behaviors, and functional limitations. Additionally, OPB may be associated with a tendency to interpret pain as a direct indicator of tissue damage, which may reinforce protective behaviors such as movement avoidance and activity restriction. This interpretation is consistent with previous studies indicating that patients with shoulder pain predominantly hold organic or pathoanatomical beliefs, give less consideration to psychosocial factors, and often attribute their condition to aging (Gillespie et al., 2017).

Relationship of Pain Beliefs with Pain and Disability

In our study, OPB showed a significant but fair association with pain during activity and disability (pain during activity: r = 0.30; SPADI: r = 0.21). In contrast, PPB showed no significant association with pain or functional outcomes. These findings suggest that, in this population, beliefs attributing pain to tissue damage or physical pathology may play a more prominent role in shaping pain experiences and functional capacity than beliefs related to psychological factors.

Although OPB was found to be a significant predictor of disability, kinesiophobia, and catastrophizing, the models explained only a modest proportion of the variance (adjusted R^2 = 0.048-0.174). This indicates that while OPB is associated with these outcomes, the potential influence of unmeasured confounders cannot be ruled out. Therefore, our findings should be interpreted in a relational rather than causal context.

Previous studies in chronic musculoskeletal conditions have shown that OPB may often be associated with increased pain and functional limitations (Sloan et al., 2008; Yildizeli Topcu, 2018; Walsh & Radcliffe, 2002). For instance, Topçu reported that OPB were significantly and positively associated with pain intensity, whereas PPB showed no significant relationship in patients with chronic pain (Yildizeli Topcu, 2018). Similarly, Walsh et al. observed that individuals with chronic low back pain who believed their pain had an organic origin tended to exhibit higher levels of physical disability (Walsh & Radcliffe, 2002). In another study, Sloan et al. found that patients with higher OPB scores experienced greater physical dysfunction, with heightened concern for poor outcomes being particularly pronounced in these individuals (Sloan et al., 2008). Furthermore, Pons et al. also reported a significant relationship between OPB and functional ability in patients with arthritis, indicating that individuals with stronger OPB may perceive pain as threatening, which could reduce their functional capacity (Pons et al., 2012). Although the relationship between OPB and pain severity and functional capacity has been extensively studied in other musculoskeletal conditions, the organic and psychological subdimensions of pain beliefs have not been separately evaluated in individuals with shoulder pain. Previous studies in shoulder pain populations suggest that cognitive factors such as fear-avoidance beliefs, kinesiophobia, and catastrophizing may influence pain intensity and disability (Bunzli et al., 2015; González Aroca et al., 2023; Luque-Suarez et al., 2020). Our study contributes to this literature by, for the first time, examining the distinct associations of OPB and PPB with cognitive and functional outcomes in shoulder pain, indicating that OPB may be particularly associated with activity-related pain and functional limitations, whereas PPB appear to have a more limited association in this context.

Relationship of Pain Beliefs with Kinesiophobia and Catastrophizing

In our study, OPB was moderate associated with kinesiophobia (r = 0.42) in individuals with shoulder pain, whereas PPB showed no such association. Kinesiophobia is defined as an excessive and irrational fear of movement due to a perceived vulnerability to pain or reinjury (Kori et al., 1990). Our findings suggest that individuals who perceive pain as a signal of tissue damage may be more likely to engage in avoidance behaviors during painful movements. High levels of OPB in patients with chronic shoulder pain may contribute to increased kinesiophobia, which could limit movement during daily activities and rehabilitation. These results highlight the importance of assessing cognitive pain beliefs in clinical interventions.

We also found a moderate association between OPB and catastrophizing (r = 0.40). Previous research in chronic low back pain indicates that individuals with stronger OPB tend to catastrophize their pain experiences (Pons et al., 2012; Johnson et al., 2007, Sloan et al., 2008). Catastrophizing is characterized by perceiving pain as threatening, exaggerating its severity, and feeling helpless. This cognitive pattern may reinforce beliefs about the harmful nature of pain and could strengthen the perception that pain is difficult to control. Our findings suggest that similar relationships may exist in shoulder pain populations, not just low back pain or other musculoskeletal conditions.

In contrast, PPB were not significantly associated with kinesiophobia or catastrophizing, suggesting that psychological pain beliefs may not directly influence avoidance behaviors. Individuals who attribute pain to psychological or emotional factors may perceive it as less threatening, resulting in lower levels of kinesiophobia (Vlaeyen & Linton, 2000). These results indicate that in chronic shoulder pain, OPB appear to play a more prominent role in kinesiophobia and functional limitations, whereas PPB appear to have a more limited impact.

It should also be considered that the PPB subdimension may not be inherently negative and could even be neutral or adaptive. Psychological beliefs can support patients' self-management and positively influence the well-being of those successfully coping with pain (Baird & Haslam, 2013; Briggs et al., 2010; Cornally & McCarthy, 2011). Indeed, interventions aimed at shifting pain perception from a biomedical to a psychological perspective are used clinically (Louw et al., 2016).

Finally, the limited associations observed between PSB and clinical or cognitive parameters may also reflect participants' clinical characteristics and socio-cultural context. Rotator cuff–related shoulder pain is often perceived as a "mechanical" or "structural" issue, which may lead individuals to place more emphasis on organic explanations (Vlaeyen & Linton, 2000). Cultural factors may also influence these perceptions, as physical explanations are often more widely accepted than psychological ones in many societies (Rao et al., 2007). Future research could further explore how cultural factors relate to pain beliefs and their associations with clinical outcomes.

Relationship of Pain Beliefs with Pain Knowledge

OPB were found to be negatively associated with pain knowledge This association can be considered fair in strength (r = 0.34). To our knowledge, no previous study has specifically examined

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the relationship between pain beliefs and pain knowledge in individuals with shoulder pain, making our study the first to explore this association. Although direct comparisons are not possible, our findings suggest that individuals with strong organic pain beliefs tend to have tend to have lower levels of understanding of pain mechanisms**.** This highlights the importance of PNE, which aims to explain the pain neurophysiology. Previous literature has shown that PNE can enhance biopsychosocial awareness of pain, promote reconceptualization of pain, and reduce both fear and disability (Louw et al., 2016; Siddall et al., 2022). Hence, addressing beliefs that focus solely on tissue damage may be an important aspect of educational approaches.

In contrast, PPB were not significantly associated with pain knowledge. This may indicate that even if individuals acknowledge the role of psychological factors in pain, they may still lack systematic understanding of its physiological mechanisms.

Clinical Implications

Overall, the relationships between OPB and these outcomes were weak to moderate, indicating modest associations rather than strong predictive effects. No significant associations were observed for PPB. Clinically, these findings suggest that examining maladaptive pain beliefs in patients with chronic shoulder pain in relation to pain-related clinical parameters, kinesiophobia, and catastrophizing may contribute to a better understanding of patients' risk profiles and their inclusion in individualized treatment planning. This approach may also support patient education, individualized care planning, and improved communication regarding pain beliefs across healthcare disciplines such as physiotherapy, medicine, and nursing. These results may help identify individuals who could benefit from targeted educational or cognitive-behavioral interventions. Furthermore, these findings highlight the need for future research to further clarify the role of pain beliefs in patient outcomes and to develop effective pain management strategies.

In addition, the negative relationship between OPB and pain knowledge suggests that higher levels of pain knowledge may be associated with lower maladaptive pain beliefs. Therefore, educational interventions delivered by healthcare disciplines aimed at improving pain knowledge may contribute to modifying maladaptive beliefs, and the inclusion of belief-based assessments such as the PBQ in clinical practice may support early identification and targeted intervention.

Limitations

This study has several limitations. First, the cross-sectional design precludes causal inferences; it is unclear whether OPB lead to worse outcomes or whether worsening outcomes reinforce OPB. In addition, participants were recruited using a convenience sampling method, which may limit the generalizability of the findings to the general population of individuals with shoulder pain. Results may vary across individuals with different sociocultural backgrounds or educational levels, as these subgroups were not specifically examined. Furthermore, covariates and potential confounding variables (e.g., age, symptom duration, education level, and prior pain education) were not included in the statistical analyses, which may have affected the interpretation of the findings.

Conclusion

This cross-sectional study indicates that in chronic shoulder pain, OPB are weak to moderate associated with higher pain, disability, fear of movement, and catastrophizing, while weak negatively associated with pain knowledge. Psychological pain beliefs (PPB) showed no significant relationships with any outcomes. These findings suggest that addressing maladaptive pain beliefs and providing education to enhance pain knowledge may contribute to more effective and comprehensive rehabilitation approaches for shoulder pain.

Informed Consent

Written informed consent was received from all participants.

Ethical Approval

Ethical approval was obtained from the Istanbul Kent University Health Sciences Research Ethics Committee.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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CRediT authorship contribution statement

Büşra Aksan Sadıkoğlu: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Yıldız Analay Akbaba:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Project administration, Methodology, Conceptualization. **Mehmet Fatih Güven:** Writing – review & editing, Visualization, Supervision, Project administration, Investigation.

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