

Fear of Injury Predicts Self-Reported and Behavioral Impairment in Patients With Chronic Low Back Pain

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Abstract: Fear of injury has been posited as crucial in pain-related anxiety and in the development of chronic pain; however, research has only measured fear of injury indirectly through other constructs (eg, fear of illness and fear of movement). The current study tested fear of injury as an independent contributor to pain-related anxiety and impairment. Patients ($n = 78$; 37% women) in a work-hardening treatment program for chronic low back pain completed self-report measures of pain-related anxiety, anxiety sensitivity, fear of injury, current pain, and impairment. Behavioral measures of impairment included lifting capacity, treatment outcomes, and days absent from treatment. Structural equation modeling tested the role of fear of injury within contemporary theory. Fit for the theoretical model was excellent and superior to an alternative model. Variance accounted for in pain-related anxiety by fear of injury, anxiety sensitivity, and current pain was 64%, while pain-related anxiety and current pain predicted 49% of variance in latent impairment. Fear of injury directly predicted pain-related anxiety ($\beta = .42$) and indirectly predicted impairment through pain-related anxiety ($\beta = .19$). Fear of injury may warrant theoretical and clinical consideration as an important contributor to pain-related anxiety and impairment; however, research is needed to explore how it may be causally related with other constructs.

Perspective: *Fear of injury directly predicts pain-related anxiety and indirectly predicts self-reported and behavioral impairment. Fear of injury may warrant inclusion in contemporary theories of chronic pain. Clinicians may benefit from considering the construct in interventions for chronic pain.*

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Key words: *Fear of injury, chronic pain, fear-avoidance, pain-related anxiety, anxiety sensitivity.*

Pain-related anxiety following injury is believed to cause avoidance of behaviors that could elicit further pain, even after musculoskeletal damage appears to have healed.^{6,60} Avoidance reduces functional activities (eg, exercise) and facilitates the progression of acute pain into chronic pain, furthering the perceived need to avoid situations that could seemingly worsen an injury.^{32,60} A substantial body of literature demonstrates that anxiety sensitivity, defined as the fear of anxiety-related sensations (eg, increased

heart rate, racing thoughts) and associated potential consequences (eg, heart attack, panic attack),⁴⁶ is also a vulnerability factor for the development of chronic pain.⁸ Anxiety sensitivity amplifies anxiety by creating a vicious cycle in which symptoms of anxiety precipitate and worsen further anxiety.⁴⁶ Anxiety sensitivity is believed to amplify pain-related anxiety and resulting avoidance because pain is frequently associated with symptoms of anxiety (eg, increased heart rate).^{6,8}

Theorists posit that most fears are logically reducible to more fundamental fears including anxiety sensitivity, fear of negative evaluation, and fear of injury.⁴⁶ Fear of injury may contribute to the maintenance of chronic pain and disability alongside anxiety sensitivity by exacerbating pain-related anxiety.^{56,59,61} Specifically, individuals who interpret injury (or re-injury) as unbearable or catastrophic may perceive pain as evidence of a new injury or worsening of a present injury. Fear of injury may also amplify the perceived need to avoid behaviors that could be painful,^{57,59} perpetuating pain and

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disability. Fear of injury is characterized by feared consequences (eg, limited mobility, long-term pain and disability, and work absenteeism resulting from injury) that are theoretically distinct from appraisals and behaviors associated with pain-related anxiety (eg, thinking pain is terrifying, avoidance).^{42,56} Moreover, research indicates that the fear of injury construct is distinct from pain-related anxiety and anxiety sensitivity^{42,56}; however, direct examination of fear of injury in the context of chronic pain remains scant. Most available research investigates fear of injury indirectly (eg, assumed as measured by fear of movement)^{50,57,59,61} or integrated with fear of illness,⁵⁶ precluding conclusions regarding the independent role of fear of injury. Several researchers have underscored the need to explore fear of injury in the context of chronic pain and associated functional impairment.^{7,16,26,29,55,56} Such explorations could extend models of chronic pain^{7,32,61} by elucidating whether fear of injury plays a distinct role in pain-related anxiety and functional impairment and if the construct warrants attention in clinical applications, like chronic pain treatments targeting pain-related anxiety,^{9,59} anxiety sensitivity,^{23,62} and fear of movement.⁴¹

The current study was designed to examine the contribution of fear of injury, as an independent construct, to pain-related anxiety and functional impairment in people with disabling chronic low back pain. Chronic low back pain represents one of the most frequent types of chronic pain, is frequently associated with functional impairment, and is a leading cause of work absenteeism.^{2,24} Fear of injury and anxiety sensitivity were expected to directly predict pain-related anxiety and indirectly predict functional impairment through pain-related anxiety.^{6,56} Functional impairment was indexed by several distinct methods (ie, self-reported functioning, return to work, days absent from treatment, and lifting capacity) to extend beyond the almost exclusive use of self-report measures in this area. Moreover, structural equation modeling (SEM) was utilized to test the role of fear of injury within contemporary theoretical formulations. The design allowed for a robust test of construct validity and of contemporary theoretical models of chronic pain, and it explored whether these models should include fear of injury within their parameters.

Methods

Participants

The current study included 78 patients (37% women) with chronic low back musculoskeletal pain resulting from motor vehicle or workplace accidents. The patients were receiving treatment in a 6-week tertiary care multidisciplinary work-hardening program sponsored by a third-party payer. The treatment program involved real or simulated job-specific activities that were progressively graded in terms of difficulty throughout treatment. The treatment program adopted a biopsychosocial model designed at improving biomechanical, neuromuscular, cardiovascular, and psychosocial functioning with the ultimate goal of patients returning to work. Patients

ranged in age from 22 to 59 years ($M = 40.60$; $SD = 9.28$), had a median education level of high school completion or equivalent, and reported experiencing chronic low back pain for an average of 20 months ($SD = 54$ months). Patients were still employed during the program but were not performing their job duties due to their injuries. All patients underwent a multidisciplinary assessment process to ensure their appropriateness for participation in the program. Patients completed a demographic questionnaire and a battery of self-report measures prior to participating in the program and as part of the clinical assessment. Patients were not asked to provide consent for their data to be used in research because data were collected for clinical purposes. Use of the archival data was approved by the University Research Ethics Board.

Measures

Pain Anxiety Symptoms Scale-20 (PASS-20)³⁷

The PASS-20 is a 20-item revision of the original 40-item PASS and assesses pain-related anxiety (eg, "Pain sensations are terrifying," "I worry when I am in pain"). Items are rated using 6-point Likert scales anchored from 0 (never) to 5 (always). The PASS-20 has been demonstrated as internally consistent and as correlating highly with the original version.³⁷ Factorial invariance for the PASS-20 has been demonstrated in clinical and nonclinical samples.^{1,21} Internal consistency for the PASS-20 in the current study was excellent ($\alpha = .95$).

Anxiety Sensitivity Index (ASI)⁵⁴

The ASI is a 16-item measure assessing the tendency to fear anxiety-related sensations based on the belief that they have harmful consequences (eg, "It scares me when I become short of breath"). Items are rated on 5-point Likert scales ranging from 0 (very little) to 4 (very much). The validity and reliability of the ASI have been well documented,^{44,45} and the measure has been used frequently when examining the relationship between anxiety sensitivity and pain.⁴³ Internal consistency for the ASI in the current study was excellent ($\alpha = .94$).

Illness/Injury Sensitivity Index-Revised (ISI-R)¹⁹

The ISI-R is a revision of the original Illness/Injury Sensitivity Scale⁵³ and utilizes 9 items to assess for fear of illness (5 items; eg, "I worry about becoming physically ill") and injury (4 items; eg, "The thought of injury terrifies me"). Items are rated on 5-point Likert scales ranging from 0 (agree very little) to 4 (agree very much). Internal consistency and convergent validity for the ISI-R have been demonstrated in previous studies.¹⁸ Only the ISI-R injury subscale was included in the current study and was utilized as the measure of fear of injury. Internal consistency for the ISI-R injury was excellent ($\alpha = .89$).

McGill Pain Questionnaire Pain Rating Index (PRI)⁴⁰

The PRI comprises 20 groups of adjectives describing pain (eg, sharp, piercing) that are assigned a rank value (eg, first word scored as 1, second word scored as 2). Patients are

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