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Catastrophic thinking and increased risk for prescription opioid misuse in patients with chronic pain

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ABSTRACT

Background: As a consequence of the substantial rise in the prescription of opioids for the treatment of chronic noncancer pain, greater attention has been paid to the factors that may be associated with an increased risk for prescription opioid misuse. Recently, a growing number of studies have shown that patients with high levels of catastrophizing are at increased risk for prescription opioid misuse.
Objective: The primary objective of this study was to examine the variables that might underlie the association between catastrophizing and risk for prescription opioid misuse in patients with chronic pain.
Methods: Patients with chronic musculoskeletal pain ($n = 115$) were asked to complete the SOAPP-R, a validated self-report questionnaire designed to identify patients at risk for prescription opioid misuse. Patients were also asked to complete self-report measures of pain intensity, catastrophizing, anxiety, and depression.
Results: Consistent with previous research, we found that catastrophizing was associated with an increased risk for prescription opioid misuse. Results also revealed that the association between catastrophizing and risk for opioid misuse was partially mediated by patients' levels of anxiety. Follow-up analyses, however, indicated that catastrophizing remained a significant 'unique' predictor of risk for opioid misuse even when controlling for patients' levels of pain severity, anxiety and depressive symptoms.
Discussion: Discussion addresses the factors that might place patients with high levels of catastrophizing at increased risk for prescription opioid misuse. The implications of our findings for the management of patients considered for opioid therapy are also discussed.

1. Introduction

Over the past decade, there has been a substantial rise in the use of opioids for the treatment of chronic noncancer pain. Despite the potential benefits of opioid therapy, long-term opioid use may lead to a number of adverse outcomes, including prescription opioid misuse and addiction (Ballantyne, 2010; Banta-Green et al., 2009a; Compton, 2008; Edlund, 2011; Jamison et al., 2010; Morasco et al., 2013; Sullivan et al., 2010). Prescription opioid misuse, which refers to the use of opioids in a manner other than prescribed, has become a significant concern for clinicians prescribing opioids (Banta-Green et al., 2009b; Compton, 2008; Jamison et al., 2011; Sehgal et al., 2012). Because of these concerns, many investigators have turned their attention to the factors that may be associated with an increased risk for prescription opioid misuse in patients with chronic pain.

A number of demographic and background variables have been found to be associated with an increased risk for prescription opioid misuse in patients with chronic pain, including young age and history of substance abuse (Edlund et al., 2007a; Michna et al., 2004; Ives et al., 2006; Morasco and Dobscha, 2008; Morasco et al., 2013; Schieffer et al., 2005). Pain-related variables, such as self-reports of pain severity, have also been found to be associated with an increased risk for prescription opioid misuse, with patients reporting high levels of pain being at greater risk for opioid misuse than patients reporting low levels of pain (Adams et al., 2004; Grattan et al., 2012; Jamison et al., 2009; Morasco et al., 2013). In a recent study, it has also been found that patients with high levels of experimental pain sensitivity (i.e., hyperalgesic patients) are at greater risk for prescription opioid misuse than patients with low levels of pain sensitivity (Edwards et al., 2011a).

Associations have also been found between psychological factors and risk for prescription opioid misuse. For example, several

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studies have found that patients with psychiatric disorders are at greater risk for prescription opioid misuse (Dersh et al., 2008; Grattan et al., 2012; Turk et al., 2008; Wasan et al., 2007). Patients scoring high on measures of negative affect such as anxiety (Edlund et al., 2007b; Morasco et al., 2013; Schieffer et al., 2005; Wasan et al., 2007; Wilsey et al., 2008) and depression (Edlund et al., 2007a; Grattan et al., 2012; Morasco et al., 2013; Wasan et al., 2007) have also been found to be at increased risk for prescription opioid misuse. Finally, an increasing number of studies have shown that patients high in pain catastrophizing, a negative and pessimistic orientation toward pain, are at increased risk for prescription opioid misuse (Edwards et al., 2011a; Ferrari et al., 2012; Jamison et al., 2009; Morasco et al., 2013). Patients who are high in catastrophizing tend to ruminate about pain, to magnify the threat value of pain, and to experience feelings of helplessness when in pain (Edwards et al., 2006; Keefe et al., 2000; Sullivan et al., 2001). In a recent study conducted among patients with chronic pain, Morasco et al. (2013) found that pain catastrophizing was associated with an increased risk for prescription opioid misuse even after controlling for patients' demographic variables, substance use disorder (SUD) status, and depressive symptoms.

To date, little is known on the specific mechanisms by which catastrophizing may lead to an increased risk for prescription opioid misuse. One possibility is that patients with high levels of catastrophizing are at increased risk for prescription opioid misuse because they experience high levels of clinical pain. Another possibility is that patients with high levels of catastrophizing are at increased risk for prescription opioid misuse due to heightened basal pain sensitivity, or alterations in central pain processing. Finally, it is possible that high catastrophizers are at increased risk for prescription opioid misuse due to high levels of negative affect. Past research has shown that catastrophizing is associated with heightened levels of pain severity (for a review, see Sullivan et al., 2001), pain sensitivity (for a review, see Quartana et al., 2009), and negative affect (for a review, see Edwards et al., 2011b).

The primary purpose of the present study was to examine the mechanisms that might underlie the association between catastrophizing and risk for prescription opioid misuse in patients with chronic pain. In this study, a sample of patients with chronic musculoskeletal pain were asked to complete the SOAPP-R (Butler et al., 2008), a self-report questionnaire designed to identify patients at risk for prescription opioid misuse. Analyses examined the potential role of patients' pain severity, pain sensitivity, and negative affect as mediators of the association between catastrophizing and risk for prescription opioid misuse. Follow-up analyses examined the unique (i.e., independent) influence of catastrophizing on risk for prescription opioid misuse.

2. Methods

2.1. Participants

Participants were 115 patients recruited from the Pain Management Center at Brigham and Women's Hospital (BWH). Patients with a diagnosis of spinal pain, with or without radicular symptoms, and who had been experiencing pain for at least 6 months were invited to participate. Patients were excluded if they had a diagnosis of cancer or other malignant disease, or had cognitive limitations that precluded providing self-report data. Patients were also excluded if they had any active substance use disorder (SUD). Patients with an active SUD were excluded given current clinical practice guidelines and principles at the BWH Pain Center regarding the management of patients with an active SUD. Patients with an active SUD are generally referred to a local addiction treatment facility before undergoing pain treatment at the Pain Center, and before being eligible for study participation.

2.2. Procedure and measures

All procedures were approved by the Partners Institutional Review Board at BWH. Upon arrival at the laboratory, participants signed a consent form, provided demographic information, and reported whether or not they were currently taking any prescription opioid medication. Patients' reports of medication were verified by a research assistant after the study session using the electronic medical record system. In addition to providing demographic and medication use information, participants were asked to complete self-report questionnaires (see below) prior to undergoing a series of standardized psychophysical pain testing procedures.

2.2.1. Screener and Opioid Assessment for Patients with Pain-Revised. The SOAPP-R (Butler et al., 2008) is a 24-item screening questionnaire validated for patients with chronic pain, and designed to assess patients' risk for prescription opioid misuse. SOAPP-R items are rated from 0 (never) to 4 (very often) (e.g., *How often have you felt consumed by the need to get pain medication*?). The SOAPP-R has been shown to have good reliability and predictive validity. The SOAPP-R has been shown to be a significant predictor of prescription opioid misuse outcomes derived on the basis of other instruments, such as the Prescription Drug Use Questionnaire (PDUQ) and the Prescription Opioid Therapy Questionnaire (POTQ) (Butler et al., 2008, 2009). Multi-center prospective studies have also shown that the SOAPP-R is a significant predictor of patients who will actually turn out to misuse opioid medication, as measured by physicians' ratings of opioid misuse or by urine toxicology screens (Akbik et al., 2006; Butler et al., 2004, 2008, 2009).

2.2.2. Brief Pain Inventory. The Brief Pain Inventory (BPI; Tan et al., 2004) was used as a measure of pain severity associated with patients' musculoskeletal pain condition. On the BPI, patients are asked to rate their current level of pain on a numeric rating scale (NRS) with the endpoints 0 (no pain) and 10 (extreme pain). Patients are also asked to rate the degree to which pain interferes with their physical and emotional functioning on a NRS, with the endpoints 0 (does not interfere) and 10 (completely interferes). The BPI has been shown to be a reliable and valid measure of pain severity and pain interference among patients with chronic pain (Jamison et al., 2009; Tan et al., 2004; Wasan et al., 2009).

2.2.3. Pain Anxiety Symptoms Scale. The Pain Anxiety Symptoms Scale (PASS; McCracken and Dhingra, 2002) was used as a measure of pain-related anxiety. The PASS is a 20-item self-report questionnaire in which participants make ratings about anxiety on a six-point Likert scale ranging from 0 (never) to 5 (always). The PASS has been shown to be a reliable and valid measure of pain-related anxiety in patients with chronic pain (McCracken et al., 1992; McCracken and Dhingra, 2002; Roelofs et al., 2004).

2.2.4. Beck Depression Inventory. The Beck Depression Inventory (BDI-II; Beck et al., 1996) was used as a measure of depressive symptomatology. The BDI consists of 21 items describing various symptoms of depression, and respondents choose statements that describe how they have been feeling over the past two weeks. Responses are summed to yield an overall index of depressive symptoms. The BDI has been shown to be a reliable and valid index of depressive symptoms in patients with pain (Poole et al., 2006; Sullivan and Stanish, 2003; Vowles et al., 2004).

2.2.5. Pain Catastrophizing Scale. The Pain Catastrophizing Scale (PCS; Sullivan et al., 1995) was used as a measure of catastrophic thinking about pain. The PCS contains 13 items describing different thoughts and feelings that individuals may experience when they are in pain. Participants are asked to reflect on past painful experiences and to indicate the degree to which they experienced each of 13 thoughts or feelings when experiencing pain, on a 5-point scale from (0) not at all to (4) all the time. Responses are summed, and higher scores reflect higher levels of pain catastrophizing. Several studies in patients with pain have supported the reliability and the validity of the PCS as a measure of catastrophic thinking (Edwards et al., 2006; Keefe et al., 2003; Peters et al., 2005; Sullivan et al., 2001). In patients with pain, high scores on the PCS have been found to be associated with a wide range of negative pain-related outcomes, including heightened pain severity (Edwards et al., 2006; Sullivan et al., 2001), post-surgical pain intensity (Khan et al., 2011; Sullivan et al., 2009), and pain-related disability (Edwards et al., 2011b; Keefe et al., 2000; Sullivan et al., 2001).

2.2.6. Pain sensitivity. Pain sensitivity was assessed using quantitative sensory testing (QST). In the laboratory, QST typically involves the administration of calibrated noxious stimuli and the assessment of participants' pain responses using a visual analogue scale (VAS). QST methods are commonly used to assess inter-individual differences in somatosensory function and pain sensitivity (Arendt-Nielsen and Yarnitsky, 2009; Edwards et al., 2005; Fillingim and Lautenbacher, 2004; Greenspan et al., 2011; Yarnitsky and Pud, 2004).

During the QST session, patients were seated comfortably in a reclining chair for approximately 30 min while they underwent brief thermal pain threshold assessment. Thermal stimuli were delivered using a contact thermode (Medoc Advanced Medical Systems, Ramat Yishai, Israel). Thermal assessment included sampling of warmth and cool thresholds, followed by heat pain thresholds (HPThs) and cold pain thresholds (CPThs). Consistent with previous studies (Edwards et al., 2008, 2011a; Fillingim et al., 2004), thermal stimuli were delivered on the ventral forearm using an ascending method of limits, with a rate of temperature change of .5 °C/s. Patients were instructed to verbally report when the thermal stimulus first became painful (i.e., pain threshold). Patients' pain thresholds were recorded by the experimenter, who was sat next to patients throughout the QST session.