

**BRIEF REPORT**

# Predicting Risk for Opioid Misuse in Chronic Pain with a Single-Item Measure of Catastrophic Thinking

Julie Lutz, MS, Richard Gross, PhD, Dustin Long, PhD, and Stephanie Cox, PhD

**Background:** Chronic pain patients are frequently treated with opioid medications in primary care, where brief measures of risk for opioid misuse have great utility. Catastrophic thinking is a clinically relevant and potentially modifiable factor associated with several chronic pain outcomes, including risk for opioid misuse. This study examined the utility of a single-item measure of pain-related catastrophizing in predicting risk of opioid misuse.

**Method:** 119 chronic pain patients completed the Coping Strategies Questionnaire catastrophizing item, Pain Catastrophizing Scale (PCS), and Screener and Opioid Assessment for Patients with Pain—Revised (SOAPP-R). Area under the receiver operator curve (AUC) and linear regression were used to examine predictive utility of the catastrophizing item.

**Results:** The catastrophizing item demonstrated a fair ability to discriminate those with high risk for opioid misuse on the SOAPP-R (AUC = 0.74), whereas the PCS demonstrated good discrimination (AUC = 0.85). The single item alone accounted for 30% of variance in SOAPP-R scores.

**Conclusion:** A single question assessing pain catastrophizing has utility for predicting risk for opioid misuse. In addition, it provides the primary care provider with information on a potentially modifiable risk factor that can be addressed within the context of a brief clinical visit. (J Am Board Fam Med 2017; 30:828–831.)

**Keywords:** Behavioral Medicine, Mental Health, Pain Management, Substance Abuse

Primary care physicians (PCPs) face many challenges in managing their patients with chronic pain. For patients being considered for long-term opioid therapy, these challenges include assessing, understanding and mitigating the risk of patients misusing or abusing opioids. Although numerous demographic and historic factors such as history of substance abuse, legal problems, and presence of mood disorder have been associated with increased

risk<sup>1</sup>, these variables offer little for the PCP in terms of potential risk mitigation. For example, the Opioid Risk Tool, a frequently-used opioid risk assessment measure, screens for family and personal history, age, trauma, and psychological diagnosis.<sup>2</sup> Although risk is quantified, the PCP is left with no direction how risk might be reduced to allow safe prescribing. Psychological factors have also been associated with increased risk and offer some advantage in understanding the specific and potentially modifiable mechanisms that underlie risk. In particular, pain-related catastrophizing has been identified as an important variable; it has been associated with increased risk of opioid misuse<sup>3,4</sup>, as well as a number of pain-related outcomes often associated with opioid misuse such as depressed mood and disability.<sup>5</sup> Pain catastrophizing has been conceptualized as an exaggerated negative reaction or response to pain, which may include rumination on pain, magnification of the pain experience or consequences of pain, and feelings of helplessness.<sup>6</sup>

This article was externally peer reviewed.

Submitted 13 March 2017; revised 12 May 2017; accepted 15 May 2017.

From the Department of Psychology (JL), Department of Behavioral Medicine & Psychiatry (RG, SC), West Virginia University, Morgantown, WV; Department of Biostatistics, University of Alabama at Birmingham, Birmingham, AL (DL).

**Funding:** none.

**Conflict of interest:** none declared.

**Corresponding author:** Richard Gross, PhD, Department of Behavioral Medicine & Psychiatry, West Virginia University, 930 Chestnut Ridge Road, Morgantown, WV 26505-2854 (E-mail: rgross@hsc.wvu.edu).

The association between catastrophizing and risk for opioid misuse persists when accounting for depression and anxiety, as well as pain severity.<sup>3</sup> Catastrophic thinking is also associated with risk for opioid medication misuse among chronic pain patients who have a history of substance use disorder.<sup>4</sup> In addition, catastrophizing has been shown to be associated with craving for opioid medications, even after accounting for depression, pain severity and duration, patient history of substance use problems, and opioid dosage.<sup>7</sup>

In primary care settings where long-term opioids are prescribed and decisions are made regarding appropriate course of treatment, a brief measure of catastrophizing would have great utility in both assessing for risk of misuse and identifying a potential target for strategies to decrease risk by addressing a patient's fears and maladaptive beliefs. Jensen and colleagues<sup>8</sup> developed a single-item pain catastrophizing measure from the Coping Strategies Questionnaire (CSQ; which contains subscales addressing strategies such as catastrophizing, ignoring, and engaging in activities) to provide a clinically useful tool which retained good psychometrics. This item was selected by Jensen and colleagues based on its performance on validity indices. The aim of the current study was to further examine this single item in comparison with another well-established measure of catastrophizing, and to assess its utility in predicting risk for opioid misuse.

## Method

### *Participants*

The sample consisted of 119 chronic pain patients at an Appalachian university medical center, referred by physicians for an assessment of their qualifications and risk factors for long-term opioid treatment. The mean age of participants was 52.0 years (SD = 11.4), and the sample was 54.6% male. This study was approved by the West Virginia University Institutional Review Board.

### *Measures*

#### *CSQ—Catastrophizing*

A single item was used from the CSQ, stating, "When I feel pain . . . It is terrible and I feel it is never going to get any better."<sup>7</sup> Responses range from 0 ("never") to 6 ("always").

#### *Pain Catastrophizing Scale*

The Pain Catastrophizing Scale (PCS) is a 13-item measure of pain-related catastrophizing that describes thoughts and feelings that an individual may have when they are in pain.<sup>6</sup> The PCS has been widely used, and yields good convergent validity.<sup>6</sup> Higher scores are indicative of higher levels of catastrophizing.

#### *The Screener and Opioid Assessment for Patients with Pain—Revised*

The Screener and Opioid Assessment for Patients with Pain—Revised (SOAPP-R) is a 24-item measure of risk for opioid medication abuse.<sup>9</sup> The SOAPP-R demonstrates good internal consistency, specificity, and sensitivity in identifying individuals with elevated risk for medication misuse.<sup>9</sup> Scores of 22 or greater suggest high risk for opioid medication misuse.

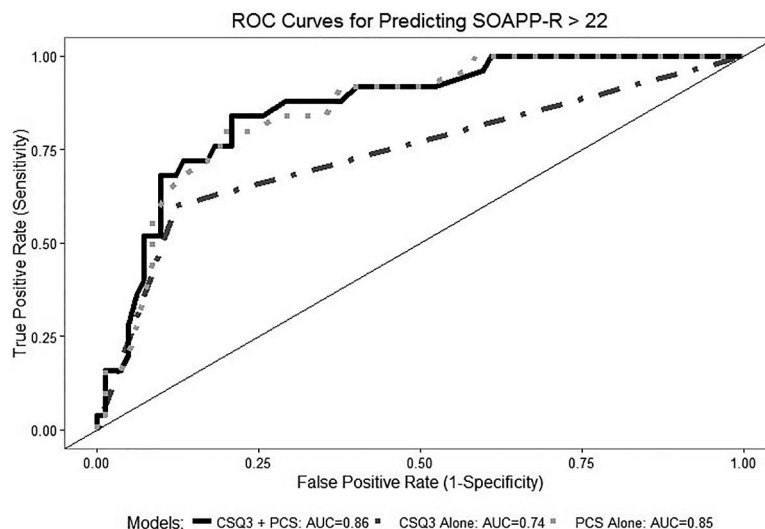
### *Analyses*

Logistic regression was performed to estimate area under the receiver operator curve (AUC) values for the CSQ catastrophizing item and PCS in predicting elevated risk for opioid medication misuse (ie, scores >22 on the SOAPP-R). Multiple linear regression was performed to estimate  $R^2$  and partial  $R^2$  values to examine predictive utility of both the CSQ catastrophizing item and PCS.

### *Results*

Six participants (5% of the sample) were missing data on the CSQ catastrophizing item or SOAPP-R, resulting in a sample size of 113. The AUC of the catastrophizing item for high-risk scores on the SOAPP-R was 0.74, which suggests that the item demonstrates a fair ability to discriminate those with elevated risk for opioid misuse and those without elevated risk. This is compared with an AUC of 0.85 for the PCS, which shows that the PCS demonstrates a good ability to discriminate those with and without elevated risk for misuse. Combined, use of both the catastrophizing item and the PCS yielded an AUC of 0.86 (with 6 additional participants missing data on the PCS, resulting in a sample size of 107). See Figure 1 for the full receiver operator curves (ROC) discriminating those with and without elevated risk for misuse based on the catastrophizing item and the PCS.

**Figure 1. Receiver operator curves (ROCs) predicting high risk for medication misuse on the Screener and Opioid Assessment for Patients with Pain–Revised (SOAPP-R) (scores > 22) from the Coping Strategies Questionnaire (CSQ) catastrophizing item alone, Pain Catastrophizing Scale (PCS) alone, and both CSQ and PCS. AUC, Area under the receiver operator curve.**



The AUC analysis of the catastrophizing item alone was used to examine possible cutoff scores. Youden’s J index is often used to select the cutoff that has the highest balance of sensitivity and specificity.<sup>10</sup> Using a cutoff of 5 or greater for the catastrophizing item resulted in the largest J index with a sensitivity of 55.6% and specificity of 88.4%. However, we argue that sensitivity is particularly important for this item, due to the relative importance of identifying as many of those who are at greater risk for opioid misuse and the absence of any harm associated with addressing catastrophizing even in those who are not at particularly elevated risk of opioid misuse. In this case, a cutoff of 3 on this item may have more utility, with a sensitivity of 81.4% and specificity of 46.5%. Clinicians may use whichever cutoff is consistent with their particular aims.

In regression, the catastrophizing item accounted for a significant amount of variance in predicting SOAPP-R score,  $F(1111) = 47.36, P < .001$ . The  $R^2$  value for the catastrophizing item predicting continuous scores on the SOAPP-R was 0.30, showing that this single item accounts for 30% of variance in SOAPP-R scores. In combination, the PCS and catastrophizing item account for 45% of the variance in SOAPP-R scores,  $F(2104) = 42.78, P < .001$ . However, when both the catastrophizing item and the PCS are both entered to predict SOAPP-R scores, the partial  $R^2$

for the CSQ item is 0.014. This suggests that this item does not demonstrate great incremental validity in combination with the PCS (ie, utility in predicting SOAPP-R scores above and beyond the variance accounted for by the PCS).

## Discussion

Findings suggest that the single catastrophizing item has utility for predicting risk for opioid medication misuse among chronic pain patients in primary care. Though it does not provide incremental benefit above and beyond the PCS, the single item may be used more naturally and efficiently within the context of the clinical interview itself. Using this single question, physicians may quickly identify those at increased risk for opioid misuse and implement strategies to mitigate risk.

Risk for opioid medication misuse is a complex issue for PCPs treating patients with chronic pain. Whereas comprehensive evaluation of risk is ideal and beneficial in decision making regarding prescribing<sup>11</sup>, there are often strict time constraints or limitations in access to resources than can be preventive to completing such comprehensive evaluations. In some situations, very brief screening tools can be particularly beneficial in quickly identifying individuals who are good candidates for interventions or who require further evaluation. Pain-related catastrophizing has been shown to be associ-

ated with higher ratings of pain intensity, negative emotional states and thoughts, and greater risk for opioid misuse<sup>3,6</sup>, and is an area in which PCPs or integrated psychologists can intervene to mitigate risk for opioid misuse. For example, a PCP may identify patients who are prone to catastrophizing with this measure, and intervene by providing education regarding the nature of the patient's chronic pain complaint and providing reassurance that pain does not signal ongoing damage or injury. The PCP can further make recommendations about the importance of continuing functional activities, activity pacing, and limiting avoidance. These interventions may serve to reduce pain related distress and thereby reduce the patient's potential to misuse medications.

This study has a few limitations. First, the sample is from a behavioral medicine department, rather than primary care. Though there is likely some generalizability across these medical settings, further research confirming the utility of this measure in a primary care sample is important. Second, because this is a single-item measure, it is not possible to assess for internal reliability. In addition, at this time, we could collect only 1 measurement and could not assess test-retest reliability or sensitivity to change. Future research can use multiple times of measurement to examine reliability and sensitivity to change as providers intervene to decrease catastrophizing. This study provides a valuable first step in confirming that a single-item measure can be validly used to quickly screen for modifiable risk factors for opioid misuse. It also points to the ongoing need for further research on opioid risk assessment tools and mitigation strategies.

## Conclusion

The single-item catastrophizing measure demonstrates utility as a very brief screener of risk and

possible areas for risk mitigation in time-limited settings such as primary care.

To see this article online, please go to: <http://jabfm.org/content/30/6/828.full>.

## References

1. Turk DC, Swanson KS, Gatchel RJ. Predicting opioid misuse by chronic pain patients: A systematic review and literature synthesis. *Clin J Pain* 2008;24:497–508.
2. Webster LR, Webster RM. Predicting aberrant behaviors in opioid-treated patients: Preliminary validation of the Opioid Risk Tool. *Pain Med* 2005;6:432–442.
3. Martel MO, Wasan AD, Jamison RN, Edwards RR. Catastrophic thinking and increased risk for prescription opioid misuse in patients with chronic pain. *Drug Alcohol Depend* 2013;132(1–2):335–341.
4. Morasco BJ, Turk DC, Donovan DM, Dobscha SK. Risk for prescription opioid misuse among patients with a history of substance use disorder. *Drug and Alcohol Dependence* 2013;12(1–3):193–199.
5. Arnow BA, Blasey CM, Constantino MJ, et al. Catastrophizing, depression and pain-related disability. *Gen Hosp Psychiatry* 2011;33:150–156.
6. Sullivan MJL, Bishop SR, Pivik J. The Pain Catastrophizing Scale: Development and validation. *Psychological Assessment* 1995;7:524–532.
7. Martel MO, Jamison RN, Wasan AD, Edwards RR. The association between catastrophizing and craving in patients with chronic pain prescribed opioid therapy: a preliminary analysis. *Pain Med* 2014;15:1757–1764.
8. Jensen MP, Keefe FJ, Lefebvre JC, Romano JM, Turner JA. One- and two-item measures of pain beliefs and coping strategies. *Pain* 2003;104:453–469.
9. Butler SF, Fernandez K, Benoit C, Budman SH, Jamison RN. Validation of the Revised Screener and Opioid Assessment for Patients with Pain (SOAPP-R). *J Pain* 2008;9:360–372.
10. Youden WJ. Index for rating diagnostic tests. *Cancer* 1950;3:32–35.
11. Vargovich AM, McNeil DW, Foley KP, Sperry J. Impact of a psychological opioid-risk evaluation on opioid prescribing in primary care. *Fam Med* 2016;48:538–545.