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Distress Intolerance and Prescription Opioid Misuse Among Patients With Chronic Pain

R. Kathryn McHugh,[*,†] Roger D. Weiss,[*,†] Marise Cornelius,[‡] Marc O. Martel,[‡,§] Robert N. Jamison,[†,‡,§] and Robert R. Edwards[†,‡,§]

**Division of Alcohol and Drug Abuse, McLean Hospital, Belmont, Massachusetts.*
Departments of [†]Psychiatry and [§]Anesthesiology, Harvard Medical School, Boston, Massachusetts.
[‡]Pain Management Center, Brigham and Women's Hospital, Chestnut Hill, Massachusetts.

Abstract: **The risk for misuse of opioid medications is a significant challenge in the management of chronic pain. The identification of those who may be at greater risk for misusing opioids is needed to facilitate closer monitoring of high-risk subgroups, and may help to identify therapeutic targets for mitigating this risk. The aim of this study was to examine whether distress intolerance—the perceived or actual inability to manage negative emotional and somatic states—was associated with opioid misuse in those with chronic pain. A sample of 51 participants prescribed opioid analgesics for chronic back or neck pain were recruited for a 1-time laboratory study. Participants completed measures of distress intolerance and opioid misuse, and a quantitative sensory testing battery. Results suggested that distress intolerance was associated with opioid misuse, even controlling for pain severity and negative affect. Distress intolerance was not associated with pain severity, threshold, or tolerance, but was associated with self-reported anxiety and stress after noxious stimuli. This study found robust differences in distress intolerance between adults with chronic pain with and without opioid medication misuse. Distress intolerance may be a relevant marker of risk for opioid misuse among those with chronic pain.**

Perspective: ***This study demonstrated that distress intolerance was associated with opioid misuse in adults with chronic pain who were prescribed opioids. Distress intolerance can be modified with treatment, and thus may be relevant not only for identification of risk for opioid misuse, but also for mitigation of this risk.***

Key words: *Opioids, opioid misuse, chronic pain, distress tolerance.*

Although many individuals with chronic pain are able to adhere to a prescribed opioid analgesic regimen, a significant percentage of chronic pain patients receiving long-term opioid therapy will misuse their medication.[3,50] This presents a significant challenge to providers trying to manage chronic pain while mitigating the risk of opioid misuse and its adverse consequences (eg, the development of opioid use disorder). The ability to identify patients at greater risk for opioid misuse would allow for closer monitoring of this subgroup, and may provide targets for intervention to reduce medication misuse. Accordingly, much research in this area has focused on identifying risk factors for opioid misuse.

A history of a substance use disorder consistently appears to confer risk for opioid medication misuse.[1,9,15,34] Support is mixed for a wide range of other variables, such as younger age, history of legal problems, and presence of mood disorders.[47] Optimal prediction may require consideration of multiple risk variables; multivariable screening tools have been developed that have enhanced the ability to detect those at risk.[7,9,23] Although much progress has been made in identifying risk factors, the ability to predict those who will misuse their medication remains limited,[10] and the mechanisms underlying this increased risk remain largely unknown.

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Address reprint requests to R. Kathryn McHugh, PhD, McLean Hospital, Proctor House 3 MS222, 115 Mill Street, Belmont, MA 02478. E-mail: kmchugh@mclean.harvard.edu
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Understanding risk at the mechanistic level yields the ability to not only identify those in need of closer monitoring, but potentially to intervene to reduce the likelihood of misuse. The identification of mechanisms underlying elevated risk—particularly those that can be mitigated with intervention—is crucial to improving our understanding of prescription opioid misuse and to developing and refining prevention and treatment strategies.

Distress intolerance, an important vulnerability factor in substance use disorders,[4,6,32] is a particularly strong candidate for such a mechanism. Distress intolerance is defined as the perceived or actual inability to handle aversive somatic or emotional states. Importantly, distress intolerance is modifiable with behavioral interventions,[30] and treatments designed to reduce distress intolerance have shown preliminary efficacy for those with substance use disorders,[2,5] including opioid-dependent patients.[39,46] The overarching aim of this study was to examine distress intolerance as a potential mechanism underlying prescription opioid misuse in patients with chronic pain.

The perception that one cannot tolerate distress motivates a wide range of behaviors intended to quickly avoid or escape distress, such as avoidance,[18,48] risk-taking,[26] substance use,[4,6] and nonsuicidal self-injury.[36] Such seemingly diverse "quick-fix" behaviors share the ability to provide strong, proximal negative reinforcement. For those who are highly intolerant of distress, a strategy that provides rapid relief may be particularly reinforcing,[38] and become relied upon to the exclusion of more adaptive behaviors. Consistent with this perspective, distress intolerance is associated with the use of highly reinforcing substances, such as nicotine[4] and heroin,[32] and is associated with using substances to cope with negative emotional states.[20,52]

Among those with chronic pain, the inability to tolerate pain and emotional responses to pain may motivate opioid use (beyond that prescribed) to provide rapid relief from these states. Greater motivation to seek rapid relief from opioids may increase risk for misusing opioids, and may maintain problematic opioid use over time. Indeed, individuals with chronic pain who have greater sensory[16] and cognitive[28] reactivity to pain are at elevated risk for prescription opioid misuse. Greater psychiatric severity and negative affect also appear to increase risk for misuse in this population.[49] Taken together, this research suggests that those with chronic pain who misuse their opioids exhibit higher levels of distress in general, as well as heightened reactivity to that distress, both of which may be reflective of poor regulation of these states.

The primary aim of this study was to examine whether distress intolerance was associated with opioid misuse among individuals with chronic pain who were receiving long-term opioid treatment. We hypothesized that participants with higher distress intolerance would be more likely to misuse opioids. In a secondary aim, we examined the association between distress intolerance and pain sensitivity, pain threshold, and subjective pain intensity. This exploratory aim examined whether elevations in distress intolerance were reflective of heightened reactivity to noxious stimuli.

Methods

Participants

The study sample was recruited from the pain management clinic of a large, urban academic hospital. Patients receiving treatment at the clinic were recruited via posted advertisements and mailings from research staff. Patients were eligible for the study if they met the following criteria: 1) age 18 to 70 years; 2) presence of chronic back pain (defined as >3 months of pain, at an average severity of ≥4 on a 0–10 scale); and 3) current prescription for an opioid analgesic medication for pain. Exclusion criteria for this study included variables contraindicated for the psychophysical testing or other study procedures, including: 1) presence of an active infection; 2) significant arm or shoulder pain (due to potential interference with performance on study computer tasks); 3) history of myocardial infarction or other serious cardiovascular condition (due to potential contraindication with psychophysical testing procedures); 4) other acute major psychiatric or medical condition that would interfere with the ability to engage in the experimental session (eg, current significant impairment in the ability to engage in tasks requiring sustained attention; no participants were excluded for this reason); and 5) current peripheral neuropathy, active vasculitis, or severe peripheral vascular disease. Interested individuals completed a screening procedure with a member of the study staff to determine eligibility; those who met eligibility criteria were then scheduled for an informed consent meeting.

A sample of 51 participants (24 women) were enrolled in the study. The mean age was 54.6 years (SD = 8.4). Most of the sample self-identified race as Caucasian (72.5%), followed by African American (19.6%), other (3.9%), Asian (2%), and American Indian or Alaskan Native (2%). A small proportion (3.9%) self-identified as Hispanic or Latino/Latina. Educational attainment was heterogeneous: 3.9% completed less than high school, 15.7% completed high school, 35.3% completed some college, 35.3% completed college, and 9.8% completed a graduate degree.

Procedures

All study procedures were approved by the McLean Hospital institutional review board. After provision of informed consent, participants completed a battery of self-report measures. Study staff then administered a behavioral measure of distress intolerance and a psychophysical testing battery (see the Psychophysical Testing section for description); the order of these 2 procedures was randomly assigned to control for potential order effects.

Measures

Accurately defining prescription opioid misuse among those receiving opioid treatment is challenging because

of potential overlap between substance use disorder symptoms and appropriate use of prescribed opioids (eg, tolerance, withdrawal). In this study, we used a multiple source method to maximize the likelihood of accurately detecting opioid misuse, consistent with previous studies.[21] Specifically, 2 measures of opioid misuse were administered. The Current Opioid Misuse Measure[8] is a 17-item self-report measure of prescription opioid misuse. The Current Opioid Misuse Measure has shown strong sensitivity and specificity for the identification of opioid misuse.[8] Internal consistency reliability in the current sample was strong (α = .86). The Addiction Behaviors Checklist[51] is a 20-item measure of addiction-like behaviors that was developed to measure prescription opioid addiction in chronic pain patients. The Addiction Behaviors Checklist, which has shown strong validity and interrater reliability in a longitudinal study,[51] was assessed via chart review to assess the presence of any of these behaviors as reported by the treating physician. Because not all participants would have seen a physician within the past 30 days, but all had seen a physician within the past year, visits were examined over a 1-year period to ensure that these data could be collected for all participants. This chart review was completed independently by 2 study staff members. These ratings were then compared for reliability; discrepancies were discussed with a senior member of the study staff (RRE).

For the purpose of this study, we defined opioid misuse using the following criteria: 1) a score above the validated clinical cutoff on the Current Opioid Misuse Measure ($\geq$9), 2) $\geq$3 addictive behaviors on the Addiction Behaviors Checklist, or 3) evidence in the medical chart of a positive urine drug screen for a nonprescribed opioid or illicit drug in the past 30 days.

Pain severity was measured using the self-report Brief Pain Inventory,[11] a widely used measure of pain severity that has shown strong construct validity and internal consistency reliability in chronic pain samples.[17,45] In the current sample, the internal consistency reliability was strong for the pain severity subscale (α = .82).

Distress intolerance was measured using self-report and behavioral measures. Both methods were used because of evidence that these methods measure different facets of distress intolerance. Specifically, behavioral measures of distress intolerance allow for the measurement of intolerance of specific domains of distress, such as frustration, whereas self-report measures allow for a more general assessment of distress intolerance.[31,42]

The Distress Intolerance Index[33] is a 10-item self-report measure of distress intolerance that was derived from an analysis of previously validated measures, including the Anxiety Sensitivity Index,[40] the Distress Tolerance Scale,[41] and the Frustration Discomfort Scale.[19] Each item (for example, "I can't handle feeling distressed or upset.") is rated on a 5-point scale with responses reflecting the degree to which each statement describes the respondent (ranging from "very little" to "very much"). Possible scores range from 10 to 50, with higher scores representing more distress intolerance. The Distress Intolerance Index has shown strong internal consistency reliability and strong concurrent validity with behavioral measures of distress intolerance,[31] and sensitivity to changes in treatment.[30] Internal consistency in the current sample was strong (α = .85).

The Computerized Mirror Tracing Persistence Task (Strong, Lejuez, Daughters, Marinello, Kahler, and Brown: The Computerized Mirror Tracing Task Version 1. Unpublished Manual, 2003) is a computer-based distress intolerance measure. The task entails tracing the shape of a star using the computer's mouse, with the feedback from the mouse reversed to replicate the effect of tracing a mirror image. This task is designed to be highly challenging and provides negative feedback (a loud buzz) after each error, which reliably induces frustration. Thus, continuing to engage in the task requires persistence toward a goal-driven behavior, while tolerating this frustration. Participants are given the opportunity to discontinue or quit at any time; this time to discontinuation (ie, behavioral persistence) is used as an index of distress intolerance. Participants were provided with a monetary incentive to enhance motivation to persist at the task. All participants were informed that if they were among the top performers on the task that they would be entered into a raffle to receive a $40 gift card to a local vendor. In fact, all participants were entered into the raffle so as to not differentially compensate those with higher functioning in this domain; this element of deception was reviewed during a standard debriefing.

Psychophysical Testing

A brief Quantitative Sensory Testing session was also conducted. All procedures were noninvasive, tissue nondamaging, and have been frequently used in previous studies of patients with chronic pain.[12] Verbal ratings of current clinical pain (on a 0–100 scale, "no pain" to "the most intense pain imaginable") were obtained before psychophysical testing, and were reassessed periodically throughout the session. Current anxiety ratings (also on a 0–100 scale, with the anchors "no anxiety" to "severe anxiety") were collected periodically throughout the session.

Mechanical pain thresholds were evaluated using a digital pressure algometer (Somedic; Sollentuna, Sweden). Pressure pain thresholds were determined bilaterally at 2 anatomic locations; the belly of the trapezius muscle and the metacarpophalangeal joint of the thumb. Two trials were performed bilaterally at each site (for a total of 8 trials). In each trial, mechanical force was applied by an experimenter using the .5-cm^2 probe; pressure was increased at a steady rate of 30 kPa until the subject indicated that the pressure was "first perceived as painful."

Mechanical temporal summation was determined using weighted pinprick simulators. Temporal summation involves psychophysical testing of the increase in pain across a series of repeated, identical noxious stimuli; it is often used as an index of pain sensitization, or endogenous pain-facilitatory processes. The lowest-force simulator that produced a painful sensation with a single stimulus (128 or 256 mN for most subjects) was then

used to apply a series of 10 stimuli to the skin on the intermediate section of the middle finger at a rate of 1 per second. Participants reported a pain intensity rating (on a 0–100 scale, "no pain" to "the most intense pain imaginable") for the first, fifth, and 10th stimulus. A rating of any ongoing aftersensation pain was obtained at 15 seconds after the application of the final stimulus.

Finally, we assessed responses to noxious cold with repeated cold pressor tasks. Each cold pressor task involved immersion of the participant's right hand in a circulating cold water bath (maintained at 4°C). Participants completed a series of 3 trials, with the first 2 consisting of immersions of the right hand for 30 seconds, with 2 minutes between immersions. The third and final cold pressor task involved an immersion of the right hand lasting until a participant reached pain tolerance (or a 3-minute maximum). During each task and after the task, participants rated perceived cold pain intensity on a 0 to 100 scale.

During the first 2 cold pressor tasks, conditioned pain modulation was also assessed during the cold water immersion. Conditioned pain modulation is a noninvasive test of endogenous pain-inhibitory systems using a heterotopic noxious conditioning stimulation paradigm. During each cold pressor task, pressure pain threshold was determined on the contralateral (left) trapezius muscle. Conditioned pain modulation was quantified as the percent change in pressure pain threshold during the cold pressor task compared with baseline pressure pain threshold on the left trapezius. In general, if an individual's endogenous inhibitory systems are working effectively, an increase in pressure pain threshold during a concurrent cold pressor task is expected.[35]

Data Analysis

Participants with and without opioid misuse were compared on sociodemographic and clinical variables using t-tests and χ^2 tests. Variables for which significant differences were detected between groups were included as covariates in the analysis of the main study aims. The Mirror Tracing Persistence Task, like other behavioral persistence measures, can exhibit ceiling effects; thus, these data were screened to determine whether a continuous or dichotomous (did the participant persist or not) definition was the most appropriate data analytic approach.

The association between distress intolerance and opioid misuse was tested using a series of logistic regressions, with opioid misuse status as the dependent variable. Because of the association between pain severity and opioid misuse,[22] and the link between younger age and substance use and misuse,[43] these variables were included in the model to control for their potential effect on opioid misuse status. Additionally, negative affect was included as a second step in the model because of its partial overlap with distress intolerance[24] and its link to opioid misuse in chronic pain patients.[27] Because distress intolerance and negative affect are moderately correlated, collinearity diagnostics were calculated for regression models.

Finally, we examined the association between distress intolerance and pain responsivity during psychophysical testing. Subjective pain ratings, pain threshold, and pain tolerance during the testing protocol were first examined for skewness and univariate outliers to determine the appropriate statistical approach. Associations between these variables and self-report and behavioral distress intolerance measures were assessed using correlations (for continuous variables) and independent samples t-tests (for dichotomous variables). Nonparametric tests were used for any variable with evidence of significant skewness.

A sample of 50 participants were selected for this preliminary investigation, which provided more than sufficient degrees of freedom to obtain an estimate of the association between distress intolerance and quantitative outcomes (psychophysical testing outcomes and continuous results from the Current Opioid Misuse Measure), and a preliminary estimate of the effect of distress intolerance on opioid misuse status.

Results

Of the 51 participants in the study, 31 met criteria for opioid misuse. There were no significant differences between those with and without opioid misuse on sociodemographic variables (Table 1). These groups also did not report significant differences in pain severity ($t_{49} = -.18$, $P = .86$).

Four participants did not complete the Mirror Tracing Persistence Task because of software error. The Distress Intolerance Index and Mirror Tracing Persistence Task were modestly, but significantly correlated ($r = -.31$, $P = .03$). This finding is consistent with previous studies that suggest that these measures capture overlapping, but somewhat distinct constructs.[29] However, the behavioral data exhibited a substantial ceiling effect, with 42.6% of participants persisting for the full duration of the computer tracing task. Thus, a dichotomous definition of distress intolerance was used for the Mirror Tracing Persistence Task (ie, persist to completion of the task or discontinue before completion).

Distress Intolerance and Opioid Misuse

Fig 1 shows the Distress Intolerance Index scores according to opioid group. Of note, the Distress Intolerance Index was also associated with the degree of opioid misuse measured continuously using the Current Opioid Misuse Measure ($r = .52$, $P < .001$), suggesting that higher levels of distress intolerance were associated with more severe opioid misuse.

Table 2 shows the results from the logistic regression predicting opioid misuse status. This model indicated a strong association between the Distress Intolerance Index and opioid misuse (B = .15, standard error [SE] B = .05, $P = .002$, odds ratio = 1.16, 95% confidence interval = 1.05–1.28). This association was slightly mitigated when controlling for negative affect (B = .11, SE B = .05, $P = .04$, odds ratio = 1.12, 95% confidence interval = 1.01–1.23); however, negative affect was not

Table 1. Sociodemographic and Clinical Characteristics According to Opioid Misuse Group

	Opioid Misuse			
Variable	Yes (n = 31)	No (n = 20)	t/χ^2	P
Mean age (SD), y	53.39 (8.87)	56.40 (7.37)	1.26	.21
Female sex, %	45.16	50.00	.11	.74
Non-Hispanic/Latino ethnicity, %	96.00	91.67	*	1.00
Race, %			2.33	.68
Caucasian	74.19	70.00		
African American	19.35	20.00		
Other	6.45	10.00		
Education, high school or less, %	15.00	22.58	*	.72
Mean COMM score (SD)	15.52 (7.26)	4.25 (2.14)	−6.73	<.001
Mean PANAS Negative Affect score (SD)	16.17 (6.53)	11.21 (3.12)	−3.09	.003

Abbreviations: COMM, Current Opioid Misuse Measure; PANAS, Positive and Negative Affectivity Scales.
NOTE. Test statistic for continuous variables is t, for categorical variables χ2.
*Fisher exact test used because of small cell sizes.

significant in this model. Examination of collinearity statistics suggested that collinearity was within an acceptable range according to established standards.[44]

The Current Opioid Misuse Measure also includes a number of items that measure affect (eg, anger) that may partially overlap with distress intolerance. Thus, to rule out the possibility that the association between opioid misuse status and distress intolerance was inflated because of partial measure overlap, we reran the regression analysis using only the 8 items on the Current Opioid Misuse Measure that directly measure medication-related behaviors. This regression also controlled for age, pain severity, and negative affect. The results indicated a strong and significant association between distress intolerance and opioid misuse behaviors (B = .26, SE B = .09, t = 2.96, P = .005).

Persistence on the Mirror Tracing Persistence Task was not significantly associated with opioid misuse status (B = .37, SE B = .75, P = .63). The absence of a link between the Mirror Tracing Persistence Task and opioid misuse is consistent with studies that have linked self-reported distress intolerance to self-reported symptoms, and stronger links between behavioral measures and behavioral outcomes (eg, treatment dropout, early lapse in smokers).[4,14] Accordingly, in an exploratory analysis we examined the association between the presence or absence of any behavior on the Addiction Behaviors Checklist and persistence on the Mirror Tracing Persistence Task. Results of the χ^2 test did not reach statistical significance (χ^2 = 3.06, P = .08); however, this may have been attributable to the small sample size (n = 47). Those who discontinued the Mirror Tracing Persistence Task (n = 27) were more than twice as likely to exhibit at least 1 misuse behavior on the Addiction Behaviors Checklist (Fig 2).

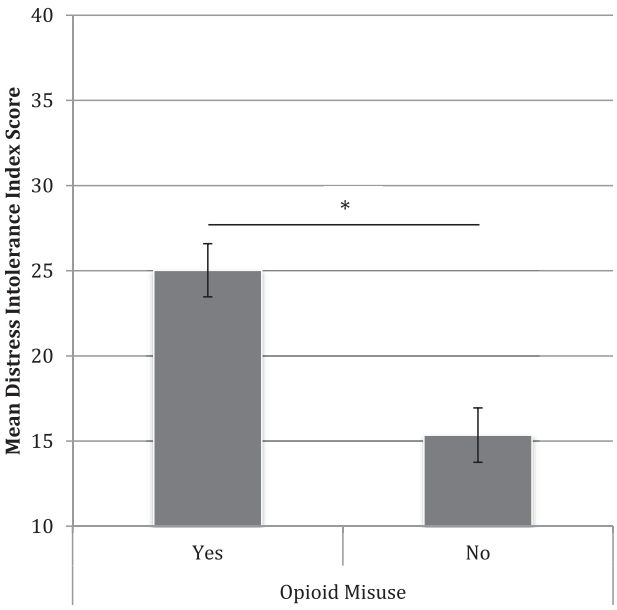

Figure 1. Distress intolerance according to opioid misuse group (*P < .001).

Psychophysical Testing

The Distress Intolerance Index was not significantly associated with pain threshold, pain tolerance, or conditioned pain modulation (all Pearson and Spearman correlations < .30 and not significant). The Distress Intolerance Index was modestly associated with maximum pain rating during the cold pressor test (Spearman ρ = −.32, P = .03), but not with pain ratings at 30, 60, or 90 seconds after the task or subjective pain ratings to mechanical pain stimuli. However, Distress Intolerance Index score was significantly associated with anxiety ratings throughout the psychophysical testing, including stress and worry before testing (r = .46, P = .001, r = .45, P = .001, respectively), and anxiety during (r = .37, P = .009), and after testing (r = .34, P = .02).

Groups on the basis of the Mirror Tracing Persistence Tasks outcomes (persist to completion or discontinue) were compared on psychophysical testing outcomes, and no significant differences were found between these groups on any subjective pain ratings, pain threshold, or pain tolerance variables (Table 3). Although those who did not persist had higher ratings on all

Table 2. Logistic Regression Predicting Opioid Misuse Status

Variable	B	SE for B	OR	95% CI (Lower)	95% CI (Upper)	P
Age	−.06	.05	.94	.85	1.04	.26
BPI pain severity	.00	.05	1.00	.91	1.10	.97
PANAS Negative Affect	.16	.14	1.17	.89	1.54	.23
Distress Intolerance Index	.11	.05	1.12	1.01	1.23	.04

Abbreviations: OR, odds ratio; CI, confidence interval; BPI, Brief Pain Inventory; PANAS, Positive and Negative Affectivity Scales.

affective variables, these did not reach statistical significance (*P*s ranged from .20 to .61).

Discussion

Better understanding of the factors that place people with chronic pain at risk for misusing opioid medications is sorely needed. In particular, the identification of mechanisms that contribute to this risk has the potential to provide treatment targets, with the ultimate goal of mitigating risk in this vulnerable population. Our study found that self-reported distress intolerance—an important vulnerability factor for maladaptive avoidance and escape behaviors—was significantly associated with opioid misuse in a sample of chronic pain patients. In this cross-sectional study, for every 1-unit increase on the Distress Intolerance Index, the likelihood of being in the opioid misuse group was 12% higher. Of note, the association between distress intolerance and opioid misuse remained strong and significant even when removing any affective items from the Current Opioid Misuse Measure.

A behavioral measure of intolerance of distress, in contrast, was not associated with opioid misuse. It is possible that this disparity reflects differences in distress intolerance on the basis of the type of distress (for the Mirror Tracing Persistence Task, frustration). Previous studies have suggested that intolerance of particular types of distress is more relevant to some outcomes and in some populations than others.[32,42] Of note, previous studies of opioid-dependent participants have reported strong differences in frustration intolerance between those who are and are not dependent on opioids.[32] In this study, frustration intolerance does not appear to distinguish opioid misuse in a population prescribed opioids; however, an exploratory analysis provided some indication that this measure was associated with physician-reported opioid misuse behaviors. Further study of this relationship in larger sample sizes is needed.

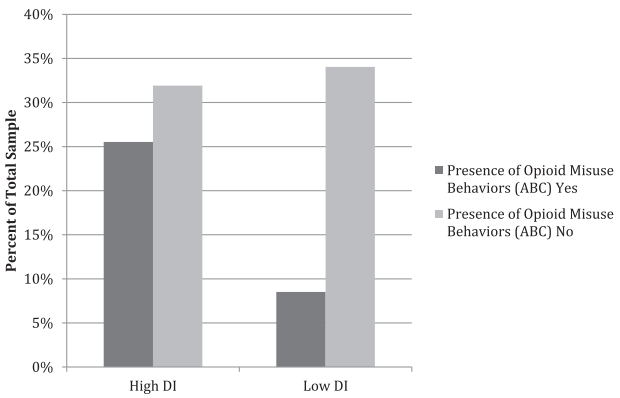

Figure 2. Behavioral distress intolerance and presence of opioid misuse behaviors. Abbreviations: ABC, Addiction Behaviors Checklist; DI, distress intolerance.

Distress intolerance was not associated with greater pain responsivity, including pain threshold, tolerance, or sensitivity. This suggests that distress intolerance is not simply reflective of an elevated sensory response to pain. Distress intolerance was associated with greater pain-related anxiety, consistent with the perspective that this construct reflects a reactivity to distress that is separate from the distress itself. This is consistent with the literature on anxiety sensitivity—a variable closely related to distress intolerance—which is defined as fear of somatic and cognitive symptoms of anxiety.[40] Anxiety sensitivity has been widely studied in clinical and nonclinical pain samples, and is strongly linked to affective responses to pain (eg, fear of pain), with only modest aggregate associations with pain severity, threshold, and tolerance.[37] Taken together, these findings suggest that distress sensitivity and tolerance may amplify affective reactivity to pain, and thus may be important targets for mitigating the emotional effect of pain.

Distress intolerance is targeted extensively in cognitive-behavioral therapies. Although this is a relatively stable, trait-like construct,[13,25] it can be modified with treatment.[2,5,30] Interventions for distress intolerance include building adaptive responses to distressing emotional states, and rehearsing awareness and tolerance of these states without resorting to an escape behavior. Further research on the prospective association between distress intolerance and opioid misuse is needed to determine whether this is a therapeutic target that may be useful in chronic pain populations. Importantly, distress intolerance may be a risk factor for developing opioid misuse, and a maintaining factor that continues misuse over time (and may be worsened as a result of chronic opioid use). Longitudinal studies are needed to identify the nature of this relationship and the temporal sequencing of the effect of distress intolerance on opioid misuse in this population.

The association between the self-report and behavioral measures of distress intolerance in this study was significant, but modest. This is consistent with the literature suggesting low concordance between behavioral and self-report measures of distress intolerance.[29] There are several possible explanations for this difference between methods of measurement. One

Table 3. Psychophysical Responses According to Mirror Tracing Persistence Task Performance

	Mirror Tracing Persistence			
Variable	Discontinued (n = 26)	Completed (n = 19)	Z	P
Mechanical pain				
Trial 1	12.25 (12.57)	10.74 (16.45)	−.96	.34
Trial 5	16.46 (16.21)	13.34 (19.67)	−.99	.32
Trial 10	20.12 (20.74)	14.79 (21.84)	−1.00	.32
CPM	124.64 (24.90)	120.12 (18.27)	−.32	.75
CP				
Maximum pain	77.34 (22.28)	69.36 (22.22)	−1.39	.16
Pain 30 seconds after CP	10.19 (21.42)	15.44 (23.58)	−1.25	.21
Pain 60 seconds after CP	6.06 (18.20)	5.47 (15.06)	−.54	.59
Pain 90 seconds after CP	5.29 (17.18)	1.67 (4.46)	−.27	.79
Pressure Pain Threshold				
Thumb	396.12 (164.98)	454.60 (121.80)	−1.27	.21
Trapezius	466.40 (237.46)	599.25 (224.96)	−1.90	.07
CP Tolerance	54.91 (50.46)	63.36 (61.40)	−.50	.62

Abbreviations: CPM, conditioned pain modulation; CP, cold pressor.
NOTE. Results are presented as mean (SD) unless otherwise specified.

possibility, with growing support in the literature, is that distress intolerance varies on the basis of the type of distress. For example, intolerance of anger/frustration may be distinct from intolerance of anxiety. Several studies have supported this hypothesis, reporting stronger concordance between behavioral and self-report measures that capture the same type of distress.[31,42] Rival hypotheses, such as the possibility that perceived and actual intolerance reflect related, but distinct, processes should also be considered in future studies.

There are several limitations to the current study. First, the study relied on self-report and chart review methods to define opioid misuse. Although we collected multiple data sources, consistent with previous studies,[21] the use of a clinician interview and/or urine toxicology screening for all participants would have further strengthened our study design. Second, because of a ceiling effect with the behavioral distress intolerance task, the power to detect differences in this outcome was limited. Future studies in larger samples are needed to examine effects on the behavioral level. We cannot rule out the contribution of method effects to these results (ie, correlated error variance among self-report measures); however, the association between distress intolerance and opioid misuse remained significant even when controlling for negative affect (also assessed using self-report). Moreover, the association between distress intolerance and anxiety, but not pain ratings during the psychophysical testing session is consistent with the hypothesized mechanism of distress intolerance (ie, amplified emotional reactivity to distress). Psychiatric disorders were not assessed in this study. Although controlling for negative affect in the analyses should mitigate the effect of psychiatric disorders to some extent, future studies should also control for the potential effect of psychiatric disorders on this association. Finally, the study design was cross-sectional, and temporal precedence (and causality) can therefore not be established. Previous longitudinal studies have reported that distress intolerance predicts outcomes over time[4,13]; studies investigating whether distress intolerance predicts opioid misuse in patients initiating opioid medications are needed to determine whether distress intolerance may serve as a valuable prognostic variable for those initiating opioid therapy.

Conclusions

This cross-sectional study of chronic pain patients found a strong association between distress intolerance and opioid misuse. Notably, this association remained significant when controlling for negative affect, which has been previously linked to misuse in this population. Distress intolerance has been widely linked to maladaptive avoidance and escape behaviors and is an important treatment target for these disorders. Future research examining the prospective link between distress intolerance and opioid misuse is needed to determine whether this may be an important intervention target in this population to mitigate risk of medication misuse.

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