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Pain moderates changes in psychological flexibility but not substance use symptoms during substance use disorder treatment

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ABSTRACT

Pain-related problems frequently complicate substance use disorder (SUD) course and prognosis. However, it is unclear if the negative outcomes associated with co-occurring pain are due to its link with greater SUD severity, disruption of SUD treatment processes, or connection to a third psychological process. The current study modeled the longitudinal effects of pain during a 4-week intensive outpatient treatment (IOP) on SUD symptoms and limited psychological flexibility (PF), a common feature of psychological well being that is commonly restricted in both SUD and pain patients. After controlling for initial severity of SUD symptoms, current pain level at treatment intake moderated change in a subcomponent of PF, values commitment, but not SUD symptoms during the IOP. During the treatment, pain level also limited improvement in PF but not self-reported SUD symptoms. Targeting additional increases in psychological flexibility surrounding commitment to values during SUD treatment may help improve outcomes among patients who began treatment with significant pain symptoms.

1. Introduction

Pain-related problems frequently complicate substance use disorder (SUD) course, prognosis, and treatment. SUD patients with both actue and chronic pain problems report more extensive drug use histories, greater severity of drug and alcohol problems, and more co-morbid psychiatric symptom sequelae than those without significant pain (Jakubczyk et al., 2015; Potter et al., 2008; Witkiewitz et al., 2015a, 2015b). Further, those in pain are less likely to attend or complete SUD treatment and reductions in pain predict lower risk of relapse following treatment (Jakubczyk et al., 2016). Co-morbidity of these conditions is also problematic due to the increasing prevalence of prescription pain medication abuse (Dworkin et al., 2007; Huang et al., 2006). Despite these complications, mixed evidence has made it difficult to determine how pain operates as a risk during SUD treatment (Caldeiro et al., 2008). First, significant levels of pain may predict poor SUD treatment response indirectly via its association with severity of SUD symptoms (i.e., higher mean-levels of SUD behavior) and/or psychiatric distress rather than having a direct influence on the rate of SUD symptom remission during treatment. Alternatively, pain may both directly disrupt key change processes in effective reduction of SUD symptoms wherein pain attenuates the typical rate of symptom remission. Finally, a third, independent psychological process related to both pain and SUD symptom severity may potentiate poor SUD treatment response. Studying how pain moderates the effective reduction of psychological problems during SUD treatment will elucidate strategies for combating pain's role as a prognostic risk factor.

1.1. Pain and SUD treatment prognosis

Pain may have both direct and indirect effects on SUD symptoms during treatment. First, the immediate pain relief following substance use may both enhance the rewarding properties of a substance (Leknes et al., 2011) and compel ongoing use of substances to "self-medicate" states of physical and psychological distress (Khantzian, 1997). During treatment sessions, acute pain may co-opt cognitive resources vital for processing information (Attree et al., 2003; Crombez, 1998; Crombez et al., 1998; Dick et al., 2002) and impede the frequency and accuracy of behavioral practice (Crombez et al., 1997; Harman and Ruyak, 2005). Additionally, pain has been shown to amplify hopelessness and negative affect during the early phases of SUD recovery (Bair et al., 2003; Samwel et al., 2006; Witkiewitz et al., 2015a, 2015b). These proximal cognitive, behavioral and emotional effects of pain during treatment may underlie the poor outcomes associated with concurrent pain and SUD.

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However, the established link between pain and severe substance use obscures the nature of these effects. While pain may play a direct role in attenuating treatment effects, the disparity may actually be due to the severity of SUD rather than any direct psychological effects of pain itself. Some studies have been unable to confirm a link between pain and SUD treatment outcomes (Ilgen et al., 2006). Studies that have established a link between pain and SUD treatment outcome (Caldeiro et al., 2008) typically focus on recovery of psychosocial functioning rather than SUD symptoms remission specifically. Controlling for the initial level of SUD symptom severity in order to identify how pain uniquely effects prospective adaptation during SUD treatment will be an important next step. Additionally, it will be vital to identify psychological factors that are common to both SUD and pain-related problems that may be implicated in treating their co-occurrence.

1.2. Pain and psychological processes during SUD treatment

One common psychological feature of SUD and pain-related problems that may independently account for negative clinical outcomes is psychological flexibility (PF). Generally, PF is described as the maintenance of contact with the present moment to facilitate behavior that is aligned with ones values (Hayes and Duckworth, 2006; Kashdan and Rottenberg, 2010). A high degree of PF related to SUD reflects an ability to manage the psychological symptoms of pain or other distress while continuing to make behavioral choices in alignment with personal values (e.g., reducing substance use; Hayes and Duckworth, 2006). Alternatively, a low degree of PF leads to avoidance and/or rigidity regarding difficult psychological experiences like pain and a decrease in behavioral choices that are aligned with personal values (e.g., relapse in substance use; Hayes and Duckworth, 2006). As mitigation of distress and other negative experiences is a primary objective, those with low PF are more likely to engage in maladaptive coping behaviors in an effort to eliminate or reduce distress quickly (i.e., substance abuse) rather than practicing acceptance or alternative coping that supports personal values (Thompson and McCracken, 2011).

Numerous cross-sectional studies have confirmed independent links between limited PF, pain, and SUD. More importantly, longitudinal increases in PF have also been associated with effective management of pain, recovery from SUD and general increases in psychological well-being (Kashdan and Rottenberg, 2010; McCracken and Morley, 2014; McCracken and Vowles, 2014). However, research has yet to evaluate the extent to which pain and SUD co-morbidity influences improvement in PF during SUD treatment. Understanding this relationship will be a vital step toward first understanding pain's influence as a risk for poor treatment outcome and ultimately leveraging PF for the psychological treatment of SUD and its common co-morbidity with pain.

To investigate the influence of pain on treatment outcomes, we evaluated the relationship between self-reported pain along with SUD symptoms and PF during a 4-week IOP for SUD. Given the typical increases in PF during psychological intervention for SUD and that pain is associated with greater SUD severity, we hypothesized that pain would disrupt normative treatment processes by reducing typical gains in PF over and above the influences of initial SUD severity.

2. Methods

2.1. Treatment setting

Data were collected through outcome assessments completed at intake and discharge by patients of an IOP for SUDs at a VA hospital in the Midwest. The program consisted of intensive abstinence-based treatment over the course of 3–4 weeks to stabilize symptoms related to significant SUD. Patients were required to attend 9–11 h of a structured, evidence-based group therapy curriculum per week, in addition to routine medical and psychiatric care appointments and one hour per week of individual case management. All patients were provided a preset, structured group curriculum and patients did not have flexibility in the curriculum. Groups provided were open to continuous enrollment and adapted from manualized protocols of cognitive behavioral therapy (CBT; DeMarce et al., 2014), mindfulness-based relapse prevention (Bowen et al., 2010), motivational enhancement therapy (MET; Miller, 2014), and twelve-step facilitation (TSF; Nowinski et al., 1999). While these approaches were expected to generally improve PF, changes in PF were not a specific goal for the IOP. Groups were facilitated by licensed clinical social workers and

Table 1
Demographic and clinical characteristics of the treatment sample.

	%
Age	
18–44	39.3%
45	60.7%
Sex	
Male	92.9%
Race	
African American	19.8%
Caucasian	78.1%
Other	2.1%
Employment	
Full-time	5.3%
Part-time	1.8%
Retired	8.8%
Disabled	44.9%
Unemployed (seeking work)	35.0%
Other	4.2%
Marital Status	
Single	42.4%
Married	15.2%
Divorced	32.2%
Other	10.2%
Residential Status	
Own Residence	42.4%
Cohabiting	29.7%
Transitional Housing	5.3%
Homeless	17.3%
Other	4.6%
Unknown	0.7%
Referral Source	
Inpatient (Mental Health)	27.4%
Outpatient Substance Use Clinic	28.8%
Emergency Department	2.8%
Self	0.8%
Other	40.2%
Comorbidities	
(% in Moderate to Severe Range)	
Generalized Anxiety	37.3%
Post-traumatic Stress Disorder	88.8%
Major Depression	52.9%
Average number of comorbidities	1.83

Percentages for clinical symptoms reflect those in the moderate to severe range as designated by the measures used. Average number of comorbidities reflects an average of the sum of those meeting this clinical threshold for the measures included.