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Characterizing Pain and Associated Coping Strategies in Methadone and Buprenorphine Maintained Patients

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Abstract

Background—Chronic pain is common among patients receiving opioid maintenance treatment (OMT) for opioid use disorder. To aid development of treatment recommendations for coexisting pain and opioid use disorder, it is necessary to characterize pain treatment needs and assess whether needs differ as a function of OMT medication.

Methods—A point-prevalence survey assessing pain and engagement in coping strategies was administered to 179 methadone and buprenorphine-maintained patients.

Results—Forty-two percent of participants were categorized as having chronic pain. Methadone patients had greater severity of pain relative to buprenorphine patients, though both groups reported high levels of interference with daily activities, and participants with pain attended the emergency room more frequently relative to participants without pain. Only 2 coping strategies were being utilized by more than 50% of participants (over-the-counter medication, prayer).

Conclusions—Results indicate that pain among OMT patients is common, severe, and of significant impairment. Methadone patients reported greater severity pain, particularly worse pain in the past 24 hours, though interference from pain in daily activities did not vary as a function of OMT. Most participants with pain were utilizing few evidenced-based pain coping strategies. Increasing OMT patient access to additional pain treatment strategies is an opportunity for immediate intervention, and similarities across OMT type suggest interventions do not need to be customized to methadone vs. buprenorphine patients.

Keywords

buprenorphine; chronic pain; methadone; coping; opioid

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1. INTRODUCTION

In 2014, more than 11 million people abused and more than 2 million people sought treatment for heroin or a prescription pain reliever (Center for Behavioral Health Statistics and Quality, 2015). Maintenance on an opioid agonist medication like methadone or buprenorphine is a widely-used approach for the treatment of OUD, and rates of opioid maintenance treatment (OMT) entries have continued to increase, with more than 113,000 people initiating OMT treatment in 2012 (Substance Abuse and Mental Health Services Administration (SAMHSA), 2014). OMT with methadone and buprenorphine differ in meaningful ways. Methadone is a full mu-receptor agonist and a schedule II drug in the United States that is dispensed daily for the treatment of OUD from a regulated clinic setting. Buprenorphine is a partial agonist on the mu-opioid and ORL-1 receptors and partial antagonist on the kappa-opioid receptor, and a schedule III drug in the United States that can be prescribed from a physician's office setting on an intermittent basis (e.g., every 30 days). Evidence suggests that OMTs draw different types of patients. For instance, relative to methadone, buprenorphine-maintained patients are more likely to be male, employed, have health insurance, and may have less severe OUD (e.g., shorter use and treatment histories, less injection drug use; Sullivan et al., 2005; Fingerhood et al., 2014).

Chronic pain is a critical problem among many OMT patients. Up to 62% of OMT patients endorse chronic pain (Jamison et al., 2000; Rosenblum et al., 2003; Ilgen et al., 2006; Barry et al., 2008, 2009b; Dunn et al., 2014; Stein et al., 2015; Voon et al., 2015), compared to 30.7% in the general population (Johannes et al., 2010) and there is also growing evidence that OMT patients may have a different experience of pain relative to the general population. Many OMT patients show signs of opioid-induced hyperalgesia, a super-sensitivity to pain that is hypothesized to occur following extended exposure to opioid agonists (Brush, 2012). This has been best characterized among methadone-maintained patients (Compton et al., 2000, 2001 2008; Peles et al., 2011; Prosser et al., 2008) but has been observed among buprenorphine-maintained patients as well (Compton et al., 2001). In addition, a longitudinal study reported that pain emerged over time among 44.9% of OMT patients who endorsed no pain at entry to methadone treatment (Dhingra et al., 2015), suggesting that OMT may itself contribute to increased pain sensitivity, and evidence suggests that hyperalgesia may be evident for several months after OMT treatment cessation (Prosser et al., 2008; Wachholtz and Gonzalez, 2014). Methadone patients with chronic pain may also have elevated inflammatory markers (specifically IFN-γ), which could increase their sensitivity to pain (Dennis et al., 2014). Finally, the origin of pain in OMT patients is diverse in nature (Dunn et al., 2014), which makes following specific clinical practice guidelines for pain treatment challenging, as many guidelines are written for specific pain conditions (e.g., lower back pain, fibromyalgia).

OMT patients may also experience unique challenges regarding the treatment of their chronic pain. Concurrent chronic pain and OUD has been associated with more severe medical and psychiatric problems, misuse of illicit substances, and poorer retention in OMT (Berg and Brevik, 1998; Jamison et al., 2000; Stack et al., 2000; Rosenblum et al., 2003; Trafton et al., 2004; Potter et al., 2015), and providers may prioritize the treatment of OUD

in these patients, leaving the concurrent pain untreated (Berg et al., 2009). Opioid narcotic medications, which are first-line treatments for pain, may not be appropriate for OMT patients due to cross-tolerance (i.e., decreasing analgesic efficacy), or other medication interactions (e.g., increased risk of respiratory depression) in methadone patients or the antagonistic properties of buprenorphine. Many OMT patients report frustration with what they perceive to be inadequate treatment for their pain and that lack of treatment encourages them to use illicit opioids for pain relief (Karasz et al., 2004; St Marie, 2014). For instance, one study reported that 74% of methadone patients who had concurrent prescriptions for opioids to manage their pain had received those prescriptions from non-OMT providers (Nosyk et al., 2014). Thus, as a result of their pain not being addressed by their OMT providers, these patients may have put themselves at risk of relapse and overdose by seeking treatment on their own.

Given these complexities, it has been difficult to identify efficacious methods for treating concurrent pain in OMT patients. The first step towards identifying treatments is to understand OMT patient needs and current engagement in treatments. Previous characterizations of pain in OMT patients have been restricted to either methadone or buprenorphine-maintained patients, but not both. This study describes the results of a point-prevalence survey of chronic pain and coping strategies among patients maintained on methadone and buprenorphine for the treatment of OUD. The goal of this analysis is to identify opportunities for intervention that will help advance the treatment of pain among OMT patients, and to identify whether these strategies should be customized based upon OMT type.

2. METHODS

2.1 Participants

Participants were recruited between 4/20/2012 and 2/10/2014 from primary methadone (n=3 providers) and buprenorphine (n=5 providers) OMTs in the Baltimore MD area. Providers were selected based on their status as a dedicated OMT (vs. primary care or medical clinic) with a large (≥50) OMT patient population. Individuals who were under 18 or were not receiving methadone or buprenorphine maintenance for OUD were excluded. A total of 201 individuals completed the survey; of these 8 answered “yes” to the quality control question “Have you completed this survey before”; 7 endorsed only acute but not chronic pain; 5 provided inconsistent data that prevented classification into a chronic pain category; and 2 did not indicate their OMT type; resulting in a final sample size of 179. This study was approved by the Johns Hopkins IRB and a waiver of informed consent was obtained.

2.2 Study Procedures

Study staff members set up questionnaire stations and posted flyers in the OMTs that advertised a survey opportunity. Participants were compensated with $10 in cash or gift certificates, depending on clinic preference. To prevent participants from misrepresenting themselves for compensation, pain was not emphasized in any of the study advertising and participants were eligible to take the survey independent of current pain.

2.3 Study Measures

2.3.1. Demographic Questionnaire—Participants completed demographic, drug use, and past year pain treatment questions. Pain treatment was not operationalized and participants were not required to specify pain treatment type; therefore this item may represent a broad range of endorsements. Past 30-day self-reported illicit drug use and OMT dose were collected but omitted from the analyses due to a large portion of participants not answering those questions.

2.3.2. Medical Diagnoses—Participants were provided a list of 61 medical problems that may underlie pain and were asked to indicate lifetime diagnoses. Ailments were categorized into groups representing cancer, cardiac, communicable diseases, dental, diabetes, gastrointestinal, physical impairment, psychiatric illness, reproductive illnesses, and respiratory illnesses. Endorsement of any item in a category was dichotomized (yes/no) for analyses.

2.3.3. Brief Pain Inventory (BPI)—The BPI is a widely-used self-report instrument with good validity and reliability for the assessment of chronic pain severity and interference with daily life (Turk et al., 2003; Tan et al., 2004). Participants were asked whether they had experienced any pain today and whether that pain had existed for the past 3 months. To rule out exclusive opioid withdrawal-related pain, an item was included asking whether past 3-month pain was ONLY related to withdrawal; a total of 19 participants endorsed this item and were therefore categorized into the non-chronic pain group for analyses. To better operationalize the location of pain, participants were provided with a list of different body areas (e.g., upper back, lower back, legs) to select. Results from the BPI were summed into Severity and Total Interference summary scores (Dworkin et al., 2005). Individual severity items were also categorized as being mild (rating 0–4), moderate (rating 5–6), and severe (rating ≥7), consistent with recommendations for utilizing the BPI as a patient-reported outcome for clinical trials (Atkinson et al., 2010).

2.3.4 Coping Checklist—Participants completed the self-report coping checklist developed by Barry et al. (2009a, 2010, 2012). The checklist presents 20 different pain coping strategies and asked participants to endorse strategies used in the past 3 months with a goal of treating ongoing pain that is not related to opioid withdrawal. This time frame was selected to correspond with the BPI. A total score was derived for each participant by summing the total number of strategies utilized.

2.3.5 Subjective Opioid Withdrawal Scale (SOWS; Handelsman et al., 1987)—The SOWS is a self-report instrument that asks participants to rate their level of current opioid withdrawal on 16 symptoms using a 5-point Likert scale (Not At All to Extremely). The SOWS was administered to provide a point-prevalence assessment of acute opioid withdrawal.

2.3.6 Symptom-Checklist 10R (SCL-10R; Rosen et al., 2000)—The SCL-10R is a brief self-report instrument derived from the SCL-90 that provides an assessment of past 30-

day psychiatric functioning on a 5-point Likert (Not At All to Extremely). The SCL-10R was used to provide a point-prevalence assessment of current psychiatric impairment.

2.4 Data Analysis

The primary goal of this study was to characterize pain severity, pain interference, and current engagement in coping strategies among OMT patients. Participants were dichotomized into those endorsing past 3-month chronic pain (CP) versus those endorsing no chronic pain (NCP), based on their response to the first question of the BPI. Demographic, drug use variables, SOWS ratings, incidence of medical problems, SCL-10R ratings, and current pain treatment were compared across the CP and NCP groups using independent groups Analysis of Variance (ANOVAs) and t-tests for continuous variables and Fisher's exact tests for categorical variables. A logistic regression was used to evaluate whether receiving treatment for pain was significantly associated with OMT type, gender, and age, since OMT is the variable of interest and age/gender have been shown in previous studies to be associated with differential treatment resources (Rosenblum et al., 2003; Dunn et al., 2014).

Results from the BPI and coping checklist were evaluated within the CP group only and compared as a function of OMT type (methadone vs. buprenorphine). Linear regressions were used to evaluate associations between OMT type and the BPI Severity and Interference total scores, covarying for variables that differed across OMT groups. Participants were then categorized as meeting the threshold for mild, moderate, or severe pain for each of the four individual BPI Severity items and percent of participants in each severity group were compared as a function of OMT using chi-square analyses. Linear regressions were used to evaluate associations between total number of coping strategies and OMT type, covarying for variables that differed across OMT groups. Percent participants who endorsed individual coping strategies were compared as a function of OMT groups with chi-square analyses.

There was a low level of missing data for the variables evaluated so no statistical corrections were made. All statistical tests were conducted using SPSS (version 21), no corrections were made for multiple comparisons, and $p<.05$ was considered statistically significant.

3. RESULTS

3.1 Participants

Participants were 52.0% male, an average 45.9 years old, and 43.3% Caucasian (Table 1). Overall, 66.4% (n=119) of participants were receiving methadone and 33.5% (n=60) were receiving buprenorphine for treatment of their OUD; participants had been receiving OMT from their current clinic/provider for a mean (SD) of 5.25 (5.97) years. A total of 41.9% (n=75) of participants endorsed experiencing pain that existed for the past 3 months and was not exclusively opioid withdrawal-related pain, and were therefore categorized as patients with chronic pain (CP). CP participants were less likely than NCP participants to be Hispanic, and methadone participants were less likely than buprenorphine participants to have health insurance, were more likely to be an injection drug user and to have hepatitis C, and had been in OMT for a longer duration (Table 1).

Presence of chronic pain did not vary significantly as a function of OMT type, with 37.8% and 43.3% of methadone and buprenorphine participants endorsing chronic pain, respectively ($\chi(1)=0.78$, $p=0.87$). The mean SOWS rating (representing acute opioid withdrawal) across participants was 14.56 (13.88) (out of a maximum of 64), and mean (SD) withdrawal scores did not significantly vary across the CP and NCP groups (16.1 (14.3) vs. 13.4 (13.5), respectively, $t=-1.24$ (174), $p=.21$); or within the CP group as a function of methadone and buprenorphine (16.6 (13.7) vs. 15.1 (15.6), respectively, $t=4.22$ (73), $p=.67$).

CP participants, relative to NCP participants, reported experiencing a significantly higher incidence of diabetes (16% vs. 6%, $\chi(1)=5.04$, $p=0.02$), physical impairments (97% vs. 75%, $\chi(1)=12.1$, $p<.001$), psychiatric diagnoses (80% vs. 60%, $\chi(1)=8.34$, $p<.01$), reproductive problems (43% vs. 24%, $\chi(1)=6.97$, $p<.01$), and approached a higher incidence of respiratory (29% vs. 18%, $\chi(1)=3.02$, $p=0.06$) and GI problems (15% vs. 7%, $\chi(1)=3.03$, $p=0.07$). There were no significant differences in endorsement of cardiac, cancer, dental, and communicable diseases/problems. There were no significant differences in the prevalence of medical problems as a function of OMT type.

CP participants reported significantly more past year trips to a physician (4.67 vs. 1.51, respectively; $t(168)=-3.36$, $p<.001$) and to an emergency department (2.68 vs. 1.18, respectively; $t(173)=-2.30$, $p=.02$) relative to NCP participants. OMT site was not significantly associated with number of physician ($p=0.92$) or emergency room ($p=0.58$) visits. There were no significant differences in the number of participants from the CP and NCP groups who reported currently receiving treatment for pain (29.3% vs. 25.0%, respectively; $\chi(1)=0.52$, $p=0.32$), and logistic regression analyses revealed that receiving treatment for pain did not vary significantly as a function of OMT type ($p=0.95$), gender ($p=0.68$), or age ($p=0.63$).

3.2 BPI Ratings in CP participants receiving methadone and buprenorphine

Self-report ratings of pain location revealed few between-group differences. Methadone participants were significantly more likely to report pain in their stomach relative to buprenorphine patients (42% vs. 0%, respectively, $\chi(1)=9.13$, $p<.001$), and trended towards reporting higher levels of shoulder pain (40% vs. 20%, respectively, $\chi(1)=2.59$, $p=.09$). There were no significant differences in OMT type and reports of pain originating from the upper back, lower back, pelvis, hands, feet, head, legs, arms, or jaw.

The BPI Severity and Interference with daily activities total scores also revealed no significant between-group differences as a function of OMT type, though both methadone and buprenorphine groups reported mild to moderate levels on the Severity (5.7 (1.7) vs. 5.0 (2.8), $t(73)=1.47$, $p=.15$) and Interference (4.7 (2.2) vs. 4.5 (2.9), $t(73)=0.63$, $p=.53$) subscales, respectively. Individual Severity and Interference items also revealed no significant between-group differences as a function of OMT type (Table 2). Linear regression analyses of the total Severity score revealed a significant effect of IV drug use ($p=.04$) and a trend towards OMT type ($p=.06$), though no effects of duration in treatment, hepatitis C status, and health insurance were observed. IV drug use was highly correlated with OMT type in this model ($r=-.28$, $p<.001$). These results appear to be driven by differences in OMT status and severity ratings of Worst Pain ($p=.03$) in the past 24 hours.

OMT type was not significantly associated with severity ratings of Least Pain (p=.11), Average Pain (p=.19), or Pain Now (p=.063). No significant associations were observed between total Interference scores and any of these variables. Participants rated pain as interfering ≥40% of the past 24 hours on the majority of items (concentrating, general activity, mood, normal work), and >50% on 3 items (enjoyment of life, sleep, and walking).

Analysis of the percent of CP participants within the methadone and buprenorphine groups who were classified as having mild, moderate, or severe pain revealed the methadone group was more likely to rate their Average Pain in the Past 24 hours as moderate pain, whereas the buprenorphine group was more likely to rate that same pain as mild (Table 2). Nonsignificant trends in this same direction were also observed for Worst Pain and Least Pain in the past 24 hours (Table 2).

3.3 Coping Strategies in CP participants receiving methadone and buprenorphine

CP participants reported utilizing a mean (SD) of 4.8 (2.9) coping strategies (Table 3), and total coping strategies did not vary significantly as a function of OMT type, duration in treatment, health insurance, injection drug use, and Hepatitis C status. Examination of individual coping strategies also revealed no significant differences between the CP and NCP groups regarding use of opiate medications, non-opiate prescription medications, benzodiazepines, acupuncture, counseling, meditation, self-help, yoga, hypnosis, herbal remedies, ice therapy, physical therapy, massage, chiropractor, and other miscellaneous strategies (Table 3). Only over-the-counter medications and prayer were endorsed as being used by more than 50% of the participants to treat their pain, and 55% (11/20) of the strategies queried were used by fewer than 25% of participants.

4. DISCUSSION

This study reveals that a large percentage of patients receiving methadone or buprenorphine for the treatment of OUD experience chronic pain that is of significant severity and which interferes with daily activities. The majority of OUD participants who were living with chronic pain in this study reported using only over-the-counter medications to manage their pain, which may not produce high magnitude effects on pain and can themselves result in health consequences following extended exposure. These participants reported high levels of pain despite being chronically maintained on an opioid agonist, and did not report high levels of utilization of strategies that have been recommended for treating pain in non-OMT groups. Methadone patients reported greater severity pain, particularly worse pain in the past 24 hours, though interference from pain in daily activities did not vary as a function of OMT. Results did not appear to be better explained by acute opioid withdrawal, psychiatric functioning, other variables that differed as a function of OMT (e.g., health insurance, lifetime intravenous drug use, hepatitis C status, or duration in OMT), or OMT site. These outcomes replicate previous studies by demonstrating a high level of pain-related impairment among OMT patients, and extend previous literature by comparing pain among methadone and buprenorphine-maintained patients.

Methadone patients in this study reported greater pain originating from their stomach relative to buprenorphine patients, which may be due to the fact that methadone is a full

opioid agonist that can produce constipation. On the BPI, methadone patients endorsed higher ratings of worst pain severity and more methadone patients rated their average pain at a moderate level, relative to buprenorphine patients. Overall, however, there were relatively few differences in pain ratings between the groups, and methadone and buprenorphine patients endorsed the same level of interference in their daily life from pain. The Severity and Interference ratings observed in the methadone group in this study are consistent with those reported in previous studies (Dhingra et al., 2013; Dunn et al., 2014).

Only 29.3% of CP participants reported currently receiving treatment for their pain and CP participants were also significantly more likely to report using high cost services such as emergency room visits relative to NCP participants (2.68 vs. 1.18 visits in the past year). Emergency room visits are expensive, so this form of pain treatment may result in substantial costs from a public health perspective. In contrast, the majority of the CP participants reported low engagement in conventional treatments for pain that could potentially circumvent the need to use the emergency room for pain treatment, and that could reduce public health costs. For instance, inspection of Table 3 reveals that only two strategies were endorsed by more than 50% of participants with chronic pain (e.g., over-the-counter medications and prayer), and that other treatment approaches that are frequently endorsed for use in non-OUD populations (e.g., opiate medications, counseling, physical therapy) were not utilized. It is also important to consider the relative efficacy of the different coping strategies. For instance, though prayer was endorsed by >50% of the CP group, it is not expected to yield a high magnitude effect on pain and therefore may not be a useful endorsement. Few participants endorsed prescriptions from pain medications, which may represent providers concerns regarding the potential for these medications to promote relapse to illicit drug use. Buprenorphine and methadone's pharmacological actions can also block the effects of additional opioids, which renders this approach generally ineffective for these patients. Nevertheless, the levels of endorsement seen here are consistent with previous reports that independently evaluated past 7-day coping strategy utilization in methadone and buprenorphine-maintained participants (Barry et al., 2009a, 2010, 2012; Dhingra et al., 2013). Our study did not assess the reason for low engagement in coping activities, which could include lack of knowledge and lack of financial resources, and additional research on this topic would be critical to help address this gap in treatment.

The low utilization of coping strategies provides a potential target for immediate intervention. There are numerous approved and empirically-supported methods for managing pain, and evidence from this and other studies suggests these strategies are under-utilized in OMT patients. Persistent chronic pain has been associated with poor OMT response (Berg and Brevik, 1998; Jamison et al., 2000; Stack et al., 2000; Rosenblum et al., 2003; Trafton et al., 2004), so there is value in identifying methods for increasing coping strategy utilization. This may include regularly screening patients for pain and providing referrals for treatment, partnering with local pain treatment providers, or supporting training for OMT staff deliver pain treatments and offer specialized groups (Barry et al., 2014). Developing methods to prescribe pain medications with known abuse liability (e.g., opioids, benzodiazepines) is also warranted. Finally, despite the lack of controlled trials, research has begun to suggest that buprenorphine may be a superior strategy for OMT patients with concurrent pain. For example, retrospective chart reviews indicate that OMT patients who

were switched from full opioid agonists to buprenorphine reported reductions in pain (Daitch et al., 2012, 2014) and that OMT patients with pain who were converted to buprenorphine reported decreases in pain, though 58% of that sample left the study due to adverse reactions to buprenorphine (Rosenblum et al., 2012). The data presented here also suggested differential pain severity between methadone and buprenorphine patients, which add to growing evidence of differential pain outcomes following methadone and buprenorphine treatment and support further research on this topic.

A strength of this study is that participants were sampled from 8 different treatment providers, which minimized the likelihood that any one clinic had unique characteristics or pain treatment approaches that erroneously drove the results. The study also had several limitations. First, buprenorphine-maintained patients were more difficult than methadone patients to recruit due to their infrequent visit schedules, which resulted in a larger sample of methadone-maintained patients. Second, data regarding illicit drug use and OMT dose were not considered accurate enough for analyses, which prevented an evaluation of whether these established correlates of pain were evident in this sample (Jamison et al., 2000; Peles et al., 2005; Dhingra et al., 2013). Third, results represent a point-prevalence assessment of pain, which could be influenced by acute pain and/or opioid withdrawal symptomology, and precludes an evaluation of changes in pain ratings over time. Fourth, buprenorphine patients may have prioritized clinic visits when pain was more severe. Fifth, some items were not operationally defined for participants. Sixth, sample size differences between OMT groups may have left some variables underpowered to detect an effect. Finally, all results were based on self-report ratings, which are prone to bias and prevents an assessment of whether pain was associated with treatment-level variables like retention, status in treatment, and urinalysis outcomes.

There is an ethical imperative to provide treatment to patients suffering from pain. The fact that a large number of OMT patients have concurrent pain that is of high severity and interferes with daily activities highlights a critical and dire need for research to identify methods to increase access to pain coping strategies in this population. These results can help inform OMT providers of the incidence and severity of chronic pain in their patients, and encourage development of methods and resources to link OMT patients with efficacious pain treatments. This may include regularly screening patients and providing referrals for pain treatment, partnering with local pain treatment providers, or supporting training for OMT staff to deliver treatments and offer specialized groups. Additional empirical evaluations are needed to assess differences in pain severity among methadone and buprenorphine-maintained patients, evaluate the potential for coprescribing medications that treat pain but have abuse liability, and examine longitudinal changes in pain and OMT outcomes to provide additional support for the integration of pain treatment within OMT settings.

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Highlights

- Many opioid maintenance treatment (OMT) patients report chronic pain that is of significant severity and interference in their life
- Most OMT patients with concurrent chronic pain are utilizing few evidenced-based pain coping strategies
- Methadone patients reported greater severity pain, though interference from pain in daily activities did not vary as a function of OMT.

Table 1

Participant Characteristics

	Total Sample	Chronic Pain			No Chronic Pain			p-values[a]	
	(N=179)	Total (N=75)	Methadone (N=49)	Buprenorphine (N=26)	Total (N=104)	Methadone (N=70)	Buprenorphine (N=34)	Pain	OMT[b]
Age (yrs)	45.9 (10.3)	45.9 (10.4)	46.7 (11.3)	44.5 (8.7)	45.9 (10.1)	45.4 (10.2)	47.1 (10.0)	0.67	0.89
Male (%)	51.9	51.4	46.8	60.0	52.5	53.7	50.0	0.99	0.75
Caucasian (%)	43.3	44.6	47.9	38.5	41.4	42.4	39.4	0.78	0.52
Hispanic (%)	3.0	0.0	0.0	0.0	5.9	5.8	6.1	**0.04**	0.99
Never Married (%)	54.9	52.0	57.1	42.3	57.8	53.6	66.7	0.45	0.99
Employed (%)	17.2	20.0	16.3	26.9	14.4	11.4	20.6	0.57	0.32
Health Insurance (%)	89.0	93.3	91.1	96.2	84.7	84.2	85.3	0.87	**0.02**
HIV (%)	15.1	17.6	12.5	26.9	12.6	8.7	20.6	0.44	0.34
Hepatitis C (%)	44.0	47.3	52.1	38.5	40.6	41.8	38.2	0.39	**0.03**
Injection Drug User (%)	64.5	64.0	73.5	46.2	65.0	69.6	55.9	0.99	**0.01**
Duration in OMT (yrs)	5.2 (5.9)	4.8 (5.5)	5.5 (5.6)	3.5 (4.8)	5.6 (6.3)	6.2 (6.8)	4.2 (5.1)	0.47	**0.03**
SOWS Score (range 0–64)	14.8 (13.9)	16.08 (14.3)	16.6 (13.8)	15.1 (15.5)	13.4 (13.5)	15.1 (13.8)	9.9 (12.2)	0.19	0.14
SCL-10R Total Score (range 0–40)	10.1 (10.0)	10.9 (10.0)	11.2 (9.5)	10.9 (11.0)	9.2 (10.0)	9.9 (10.5)	7.9 (9.1)	0.19	0.49

Values represent Mean (Standard Deviation) unless otherwise noted.

[a] Results based on Fisher's exact tests for categorical variables and ANOVAs for continuous variables

[b] OMT= opioid maintenance treatment type (methadone vs. buprenorphine)

Table 2

Brief Pain Inventory Outcomes

	Chronic Pain			
	Total (N=75)	**Methadone (N=49)**	**Buprenorphine (N=26)**	**p-value**
Brief Pain Inventory (all ranges 0–10)				
Severity Total Score	5.05 (2.13)	5.75 (1.66)	4.99 (2.79)	0.15
Worst past 24 hours [a]	6.77 (2.10)	7.08 (1.67)	6.19 (2.68)	*0.08*
Mild (%)	13.3	8.2	23.1	*0.08*
Moderate (%)	21.3	22.4	19.2	0.50
Severe (%)	65.3	69.4	57.7	0.22
Least past 24 hours[a]	4.61 (2.66)	4.94 (2.40)	4.00 (3.03)	0.15
Mild (%)	50.7	42.9	65.4	*0.053*
Moderate (%)	24.0	30.6	11.5	*0.056*
Severe (%)	25.3	26.5	23.1	0.49
Average past 24 hours[a]	5.64 (2.22)	5.81 (1.70)	5.35 (2.99)	0.39
Mild (%)	24.3	14.6	42.3	**<.01**
Moderate (%)	43.2	54.2	23.1	**0.01**
Severe (%)	32.4	31.3	34.6	0.46
Pain Now[a]	4.92 (2.59)	5.18 (2.29)	4.42 (3.06)	0.23
Mild (%)	41.3	36.7	50.0	0.19
Moderate (%)	32.0	34.7	26.9	0.34
Severe (%)	26.7	28.6	23.1	0.41
Interference Total Score	4.74 (2.46)	4.87 (2.24)	4.49 (2.84)	0.53
Appetite	3.31 (2.94)	3.38 (2.81)	3.19 (3.23)	0.80
Concentrating	4.73 (2.97)	4.93 (2.66)	4.35 (3.49)	0.41
Enjoyment of life	5.00 (3.12)	5.12 (2.82)	4.77 (3.68)	0.64
General activity	4.64 (2.62)	4.78 (2.28)	4.38 (3.21)	0.54
Mood	4.54 (2.92)	4.59 (2.64)	4.46 (3.46)	0.86
Normal work	4.63 (3.02)	4.88 (3.07)	4.16 (2.95)	0.34
Relations with other people	3.85 (3.07)	3.96 (2.99)	3.65 (3.25)	0.68
Sleep	5.36 (3.25)	5.47 (3.27)	5.15 (3.25)	0.69
Walking	5.02 (2.86)	5.30 (2.76)	4.48 (3.02)	0.24

Values represent Mean (Standard Deviation) unless otherwise noted. Independent group t-tests for continuous variables, chi-squares for dichotomous variables

[a] Mild=0–4, Moderate=5–6, Severe=≥7

Table 3

Coping Outcomes

	Chronic Pain		
	Total (N=75)	**Methadone (N=49)**	**Buprenorphine (N=26)**
Coping Strategies			
Total Number (Mean (SD); range 0–20)	4.83 (2.92)	5.20 (3.11)	4.11 (2.43)
Type (% endorsing)			
Over-the-counter medications	68.9	64.6	76.9
Prayer	56.8	60.4	50.0
Exercise	47.2	47.8	46.2
Stretching	42.7	40.8	46.2
Counseling	37.5	44.7	24.0
Heat Therapy	30.7	30.6	30.8
Meditation	30.1	34.0	23.1
Opiate medications	28.8	36.2	15.4
Self-help	25.3	30.6	15.4
Non-opiate prescription medications	23.0	27.1	15.4
Massage	20.3	20.8	19.2
Ice Therapy	17.3	16.3	19.2
Benzodiazepines	13.5	16.7	7.7
Physical Therapy	12.3	16.7	4.0
Acupuncture	9.5	10.4	7.7
Herbal remedies	8.5	8.7	8.0
Other	8.1	10.4	3.8
Chiropractor	5.3	8.2	0.0
Yoga	4.1	6.4	0.0
Hypnosis	1.3	2.0	0.0

No significant differences observed within the CP group between the methadone and buprenorphine participants for any item