



# Response to methadone maintenance treatment of opiate dependent patients with and without significant pain

Mark A. Ilgen<sup>\*,1</sup>, Jodie A. Trafton<sup>1</sup>, Keith Humphreys

Center for Health Care Evaluation, Department of Veterans Affairs Palo Alto Health Care System and Stanford University School of Medicine,  
795 Willow Road (MPD 152), Menlo Park, CA 94025, USA

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## Abstract

**Background:** Both clinicians and researchers have expressed doubt that opiate dependent patients with significant pain can be effectively treated in methadone maintenance treatment (MMT) programs; however, little research exists on this topic. Patients who report significant pain in the month preceding entry to MMT present with a distinct and more severe pattern of polysubstance use, medical and psychosocial problems than do those without pain. The present study investigated the 1-year treatment outcomes of MMT patients with opiate dependence and pain.

**Methods:** Analyses were based on a national sample of 200 patients presenting in MMT programs for treatment of opiate dependence. Substance use and related problems were measured at treatment entry and 12 months later. Patients reported pain severity over the month preceding treatment entry.

**Results:** Compared to patients without significant pain, patients who reported significant pain at baseline ( $n = 103$ ) showed similar substance-related functioning, but poorer psychosocial functioning at 1 year.

**Conclusions:** Patients with and without significant pain experience comparable reductions in substance use when provided with standard care in MMT programs. However, additional medical and/or mental health treatment is needed for their pain and other problems.

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## 1. Introduction

A large percentage of patients in methadone maintenance treatment (MMT) clinics have significant pain and a substantial proportion of these patients report that pain preceded any use of addictive substances (Brands et al., 2004; Jamison et al., 2000; Rosenblum et al., 2003; Trafton et al., 2004). Because patients with pain and opioid dependence may represent a unique subgroup of *pseudoaddicted* patients who primarily use substances in response to pain (Colpaert et al., 2001; Kupers and Gybels, 1995; Porter-Williamson et al., 2003; Weissman and Haddox, 1989), questions have been raised about the appropriateness of MMT for patients with pain. Specifically, some researchers and clinicians have asked if patients with pain benefit from being in MMT or whether they represent a misplaced or stigmatized

group being provided with an unhelpful treatment for lack of other options (Joranson, 1997; Tennant, 1996). In the present manuscript we compare the treatment outcomes of patients with and without significant pain in order to better inform the research and clinical care of opioid dependent patients with pain.

Previous cross-sectional research confirms the high prevalence of chronic pain problems in patients treated in MMT clinics (Jamison et al., 2000; Rosenblum et al., 2003). Estimates of the prevalence of chronic pain in MMT patients range from 37% with chronic moderate or greater pain (Rosenblum et al., 2003) to over 60% with chronic pain of any intensity (Jamison et al., 2000; Peles et al., 2005). Low back, leg pain, and headaches accounted for the majority of patients' primary pain complaints (Jamison et al., 2000). These studies found that pain was associated with greater medical and psychiatric problems and greater licit and illicit prescription medication use in patients receiving substance use disorder (SUD) treatment (Jamison et al., 2000; Rosenblum et al., 2003). More recent research indicates that patients with pain in MMT programs not

\* Corresponding author. Tel.: +1 650 493 5000x27575; fax: +1 650 617 2736.  
E-mail address: [mark.ilgen@med.va.gov](mailto:mark.ilgen@med.va.gov) (M.A. Ilgen).

<sup>1</sup> M.A.I. and J.A.T. contributed equally to the preparation of this manuscript.

only use pain medications inappropriately, but also show signs of severe polysubstance addiction. Specifically, Brands et al. (2004) found that 55.4% of patients at an MMT clinic reported chronic pain problems prior to beginning MMT. Approximately, 48% of clinic patients initially abused prescription opioids and 74% of these reported that their primary reason for starting opioid use was to reduce pain. However, even among patients who initially abused only prescription opioids, over 68% reported injection drug use and most used other substances (79% alcohol, 77% benzodiazepines, 48% cannabis and 50% cocaine).

In a previous study of opioid dependent patients enrolling in the VA Multisite Opiate Substitution Treatment (MOST) study, we found that over 50% of entering patients reported moderate or greater pain over the previous month (Trafton et al., 2004). The patients reporting pain had more severe physical and psychological problems and more severe substance use problems than the patients without pain. Compared to patients without pain, patients with pain used heroin, cocaine and alcohol at similar frequencies, but had higher rates of use of other potentially analgesic substances, including opioid medications, sedatives, and marijuana. Thus, when examined at treatment entry, patients in MMT clinics have both severe polysubstance use problems and a high prevalence of pain problems.

Together these studies suggest that patients with pain may exhibit a unique and severe pattern of polysubstance use and a greater tendency to consider their drug use as self-medication. Additionally, they have more severe and perhaps different medical and psychological problems. The distinctiveness of the clinical presentation of SUD patients with pain suggests that they may require a unique form of treatment in order to display favorable treatment outcomes.

To our knowledge, no one has longitudinally examined the response of patients with moderate to severe pain to addiction treatment. One study at an MMT clinic found that patients with pain received modified treatment, specifically higher daily methadone doses (Peles et al., 2005). Because recent research suggests that opioid maintenance is associated with decreased pain tolerance (Compton et al., 2000, 2001; Doverty et al., 2001), it is not clear whether pain drove the increase in dose or vice versa. Longitudinal data are needed to determine if patients who present to treatment with significant pain are prescribed higher doses of methadone than those without pain. Additionally, more data are needed on how treatment providers respond to patients with pain. Other data about the quantity and perceived quality of treatment provided to patients would help to better understand how pain influences clinical care.

Here, we examine whether previously described differences between patients with and without significant pain in the present sample influence their treatment and treatment outcomes over the course of a year. Specifically, we examine whether compared to patients who reported little or no pain upon entry to MMT, patients with significant pain (1) have worse substance use outcomes; (2) have worse health and psychosocial outcomes; and (3) utilize treatment differently to achieve reductions in substance use during the year following treatment entry.

## 2. Methods

### 2.1. Procedures

The present study is part of a larger investigation of differences in patient outcome based upon differences in treatment provision at VA clinics, the Multisite Opiate Substitution Treatment study (Humphreys et al., 2005). Patients were recruited from methadone maintenance treatment programs that were located in eight cities throughout the United States. Within each treatment program, the clinic staff explained the study to patients entering methadone maintenance treatment clinics. All patients completed written informed consent prior to participation. Patients then completed a structured interview with researchers by telephone at treatment entry and 12 months after the start of treatment. Additionally, patients' medical records were accessed for the duration of the study period to determine prescription practices and methadone dose levels.

### 2.2. Participants

The initial sample consisted of 251 veterans seeking methadone/levo-alpha-acetyl-methadol (LAAM) treatment between November 2000 and October 2001. Although 267 patients agreed to participate in the MOST study, only 251 provided valid data on baseline assessments of pain. Approximately 80% ( $n=200$ ) of these patients provided usable data at 1-year follow-up. Of the 20% of patients lost to follow-up, 29% were in treatment but not reachable, 6% died, and 10% were known to be in jail; we were unable to determine the whereabouts of the remaining 55% of these patients. Patients who dropped out of treatment but provided follow-up data (59% of those who dropped out) were included in the analysis.

### 2.3. Measures

#### 2.3.1. Addiction Severity Index (ASI; McLellan et al., 1992)

The ASI interview provides composite indices of alcohol, drug use, and psychiatric symptoms within the 30 days prior to assessment. These indices are widely used and have demonstrated sound psychometric properties (McLellan et al., 1992). In addition to the primary indices, the present study utilized data from individual items related to the number of days of use out of the last 30 for specific substances (i.e. heroin, alcohol, cocaine, cannabis, illicit prescription sedatives and illicit prescription analgesics).

#### 2.3.2. SF-36V Quality of Life Index (NOVA Research Company, 1989)

The SF-36V is a version of the SF-36 Quality of Life Index that has been validated for use in veteran populations (Kazis et al., 1999). It assesses quality of life, including problems with health, physical and emotional functioning, mood, pain and social functioning. Pain levels were determined by the SF-36V question "How much body pain have you experienced in the last 4 weeks?" Patients were classified as having no significant pain

( $n = 97$ ; 48.5%) if they reported no pain or indicated that their pain was “very mild” or “mild”. A total of 103 (51.5%) of the sample reported “moderate”, “severe” or “very severe” pain and were classified as having significant pain at baseline. A similar method of categorizing patients in the present sample was described by Trafton et al. (2004) and their analyses indicated that this method provides a meaningful discrimination between patients with and without significant pain at baseline and these categories were associated with different patterns of baseline substance use.

### 2.3.3. *The Client Satisfaction Questionnaire (CSQ; Attkisson and Zwick, 1982)*

The CSQ was used to obtain information about patients’ perceptions of the treatment experience. Patients were asked on the eight items to rate the extent to which the treatment met their needs on a four-point scale. The mean level of satisfaction across all of the items was used in the present manuscript. This measure has high internal consistency ( $\alpha = .96$  in the present sample) and has been found to predict treatment retention and treatment outcomes (Attkisson and Zwick, 1982).

### 2.3.4. *Dosing and other treatment information*

Opioid substitution treatment dosing records were obtained from each clinic. This provided daily dosing information, including medication and dosage received, for each day of the year following treatment entry for each patient. In cases where patients were treated with LAAM, LAAM dosages were converted to methadone equivalents, by dividing the LAAM dose by 1.69 for 72 h LAAM dosing schedules, or by 1.25 for 48 h dosing schedules. At participating clinics, LAAM was most commonly used in combination with methadone treatment to provide more consistent opioid substitution when daily dosing was not feasible or desired. Of the 200 subjects in this sample, 12% received at least one dose of LAAM in the course of their treatment, but only 2% received only LAAM and no methadone. From these data, mean dosage over the first year of treatment, maximum daily dosage received in the first year, number of days in treatment (i.e. the number of days from treatment entry to the last dose received in the first year of treatment), and the number of scheduled dosing days missed were calculated. Additionally, information on number and type of clinic visits was obtained from national VA databases.

## 2.4. *Data analyses*

Patients who reported significant pain were compared to those who did not in terms of their treatment utilization, treatment satisfaction and treatment compliance using analyses of variance (ANOVAs). Similarly, substance use and quality of life outcomes were compared using repeated measures ANOVAs. Finally, a series of regression equations were conducted predicting ASI drug composite score based on significant pain (no/yes), treatment-related variables (e.g. dose, satisfaction, etc.) and the interaction of pain and these treatment-related variables. These analyses were undertaken to determine if certain aspects of treatment were particularly important for patients with significant

pain. A comparison of pain scores at 1 year was done using an ANOVA.

Based upon the study sample size and group standard deviations (S.D.) at 1 year, our analyses are 80% powered to detect a difference of 0.044 in ASI drug composite score, a difference of approximately 2–3 days/month of problematic use of a single substance.

## 3. Results

### 3.1. *Description of the sample*

On average these patients were  $49.5 \pm 7.6$  (S.D.) years old and 99.0% were male. This racially diverse sample was 55.5% Black, 30.5% White, 12% Hispanic and 2.0% Native American with an average of  $12.6 \pm 1.9$  (S.D.) years of education. Approximately 10% of the sample was homeless and 4% reported living in a controlled environment (e.g. jail or inpatient treatment facility) prior to the start of treatment. The remainder of patients reported living with a partner or family (58%), with friends (4%) or alone (24%). In the 30 days prior to the start of treatment, 86% of patients reported heroin use and 16% used illicit prescription opiate medications (these categories were not mutually exclusive). Additionally, 46% used alcohol, 50% used cocaine, 21% used cannabis, and 10% used illicit prescription sedatives. Reported use of amphetamines, barbiturates, and hallucinogens was low (i.e. under 5%). In terms of historical use of opioids, 73.5% reported regular use of only heroin, 24% reported regular use of heroin and illicit prescription opioids, and 2.5% reported only regular use of illicit prescription opioids. For further comparisons of baseline characteristics of patients with and without pain see Trafton et al. (2004).

### 3.2. *Treatment received by patients with and without significant pain*

In general, patients with and without significant pain received similar treatment in these MMT programs (see Table 1). Specifically, the groups did not differ in terms of the rate of dropout, length of treatment, average dose of methadone provided, or total number of individual or group counselling visits. A trend was found towards lower ratings of satisfaction with treatment in pain patients compared to those without significant pain.

### 3.3. *Treatment outcomes of patients with and without significant pain*

Overall, patients decreased substance use over the year following entry into MMT. Days of heroin, alcohol, cocaine, illicit prescription opioid, and illicit prescription sedative use in the prior month all decreased significantly from baseline to 1-year follow-up (see Table 2). Cannabis use was not reduced in the year following entry into MMT. Specifically, at 1 year, overall substance use had declined to 14.7% of baseline levels for heroin, 56% for alcohol, 29% for cocaine, 11.7% for illicit prescription opioids, and 9% for sedatives, but cannabis use remained at 107% of baseline levels.

Table 1  
Treatment received by patients with and without significant pain

Aspect of treatment	Overall population	No pain ( <i>n</i> = 97)	Pain ( <i>n</i> = 103)	<i>F</i> , <i>p</i> -value
Number of days in treatment (range 3–365)	300.6 (114.6)	312.1 (105.3)	289.6 (122.3)	ns
Number of scheduled dosing days missed (range 0–365)	25.5 (46.6)	25.1 (44.4)	26.1 (49.5)	ns
Average dose in mg over the year of treatment (range 20–167 mg)	72.9 (26.6)	72.6 (25.7)	73.2 (27.6)	ns
Highest dose in mg over the year of treatment (range 20–257 mg)	85.4 (35.7)	83.1 (30.9)	87.2 (40.2)	ns
Total number of visits for SUD and psychiatric treatment (range 0–288)	46.8 (54.2)	49.2 (57.9)	44.4 (50.6)	ns
Satisfaction with treatment (range 10–32)	26.6 (6.1)	27.3 (5.7)	25.8 (6.4)	2.8, .098

As described previously, patients with pain at baseline reported greater use of illicit prescription opioids, sedatives and cannabis than patients who did not report significant pain (Trafton et al., 2004). Compared to patients who did not report significant pain at baseline, patients with pain showed similar reductions in heroin, alcohol, cocaine and illicit prescription sedative use and greater reductions in illicit prescription opioid use (Table 2). This group by time interaction was due to pain patients' greater use of illicit prescription opioids at treatment entry rather than to absolute differences in use of illicit prescription opioids 1 year later. There was no change in cannabis use in

patients with or without pain, however, patients with pain were more likely to use cannabis overall.

At 1-year follow-up, there was no significant difference in past 30 day use of heroin, cocaine, alcohol, illicit prescription sedative or opioid use between patients with and without pain at baseline by ANOVA ( $p > .10$  for all comparisons). There was a trend towards continued elevated cannabis use among patients who reported significant pain at baseline as compared to those without pain ( $p = .071$  by ANOVA).

Patients with pain reported more pain at the follow-up and poorer physical functioning across both time points. However,

Table 2  
Treatment outcomes of patients with and without significant pain

Outcome (substance-related outcomes)	Overall population		No pain ( <i>n</i> = 97)		Pain ( <i>n</i> = 103)		Significance tests		
	Intake	1 year	Intake	1 year	Intake	1 year	Time, <i>p</i> -value	Group, <i>p</i> -value	Time × group, <i>p</i> -value
ASI drug composite	0.30 (0.12)	0.10 (0.11)	0.29 (0.11)	0.10 (0.12)	0.30 (0.12)	0.10 (0.11)	398.6, <.001	ns	ns
ASI alcohol composite	0.09 (0.17)	0.06 (0.15)	0.09 (0.16)	0.06 (0.15)	0.09 (0.19)	0.06 (0.15)	4.92, <.028	ns	ns
Days of heroin use out of the last 30	22.4 (11.6)	3.3 (7.8)	23.0 (10.9)	3.5 (8.4)	21.9 (12.2)	3.1 (7.3)	397.2, <.001	ns	ns
Days of alcohol use out of the last 30	4.8 (8.9)	2.6 (6.3)	5.6 (9.5)	2.8 (6.3)	4.1 (8.3)	2.4 (6.3)	14.5, <.001	ns	ns
Days of cocaine use out of the last 30	6.1 (9.8)	1.8 (5.2)	6.8 (10.4)	2.2 (6.2)	5.5 (9.2)	1.4 (4.2)	39.5, <.001	ns	ns
Days of cannabis use out of the last 30	1.4 (4.7)	1.5 (5.5)	0.6 (2.3)	0.8 (4.3)	2.3 (6.2)	2.2 (6.4)	ns	6.0, <.015	ns
Days of illicit opiate use out of the last 30	1.7 (5.7)	0.2 (1.3)	0.8 (3.5)	0.0 (0.2)	2.5 (7.1)	0.3 (1.9)	12.8, <.001	6.4, .012	3.1, .082
Days of illicit sedative use out of the last 30	1.1 (4.5)	0.1 (0.4)	0.9 (4.0)	0.1 (0.6)	1.3 (5.0)	0.0 (0.3)	10.2, .002	ns	ns
Health status									
Pain severity		3.3 (1.5)		2.5 (1.5)		4.0 (1.2)		63.6, <.001	
Physical functioning	70.1 (31.6)	70.4 (30.7)	87.8 (16.7)	83.4 (24.1)	53.9 (33.4)	58.4 (31.3)	ns	67.1, <.001	8.3, .004
General health	59.4 (24.6)	58.0 (28.4)	68.9 (21.3)	68.3 (25.5)	50.8 (24.3)	48.8 (27.7)	ns	36.5, <.001	ns
Vitality	43.2 (25.6)	47.1 (25.4)	53.1 (24.4)	56.4 (23.6)	34.3 (23.3)	38.7 (24.1)	5.0, .026	37.1, <.001	ns
Social functioning	60.3 (31.9)	65.4 (31.9)	77.9 (26.9)	78.5 (25.8)	44.2 (27.3)	53.5 (32.3)	4.0, .047	83.5, <.001	3.2, .076
Mental health	54.7 (25.7)	62.4 (25.1)	63.8 (21.9)	69.8 (21.2)	46.6 (26.2)	55.7 (26.6)	19.1, <.001	27.3, <.001	ns

With the exception of results related to 1 year pain, all data presented are the results of repeated measures ANOVAs comparing changes over time from baseline to 1 year. Pain severity as measured by ratings on a scale from 1 (none) to 6 (very severe) at 1 year was compared using an ANOVA. All substance use data are self-reported from the ASI. ASI composite scores are expressed as a value between 0 and 1, with 0 being no current substance use problems and 1 being maximum current substance use problems. Frequency of use for each substance could range from 0 to 30 out of the last 30 days. Health status variables are standard validated composite scores from the SF-36V. SF-36V composites are expressed as a value between 0 and 100 with 0 representing worst possible health and 100 representing best possible health.

over time they reported a slight improvement in physical functioning whereas the patients without pain reported a slight worsening of physical functioning. Patients with pain reported poorer general health at both baseline and 1 year. All patients reported significant improvements in vitality over time, however, patients with significant pain at baseline remained lower on this measure at both time points. Patients with pain reported poorer social functioning at both time periods. However, there was a trend towards greater improvements in social functioning in patients with pain as compared to those without. Ratings of mental health improved over the course of treatment for all patients. However, patients with significant pain at baseline were lower on measures of mental health at both time periods than those without pain.

#### 3.4. Importance of different treatment factors in patients with and without pain

A series of regression analyses were conducted to examine the influence of pain at baseline on the relationship between the treatment factors outlined in Table 1 and ASI drug composite scores at 1 year. In all analyses, no significant interactions (i.e.  $p < .05$ ) were found between pain and the treatment factor to predict 1-year drug use. Thus, specific aspects of treatment, such as methadone dose or satisfaction with treatment, do not appear to be any more or any less important for patients with significant pain than they are for patients without significant pain.

#### 4. Discussion

Although pain is a common problem in patients who are treated for opioid dependence in MMT, patients with significant pain at baseline achieve similar substance-related outcomes to patients without significant pain. However, patients with pain at baseline continue to have more severe problems in other domains of functioning, such as mental health, at 1-year follow-up. Additionally, patients with pain receive similar counselling intensity, treatment duration and dose of methadone in MMT, and these aspects of treatment are equally important for achieving reductions in substance use in pain patients as compared to non-pain patients.

Clearly, pain is a significant problem in substance use disorder patients presenting for MMT, as indicated by the high prevalence of pain and the associated emotional, social and functional problems that negatively impact functioning and quality of life of patients with both chronic and other types of pain (Jamison et al., 2000; Peles et al., 2005; Trafton et al., 2004). Poorer psychosocial functioning was still evident for afflicted patients 1 year after starting MMT. Nevertheless, baseline pain severity did not predict poorer substance-related outcomes at 1-year follow-up. Thus, pain is a problem in and of itself, but it does not prevent patients from stopping inappropriate substance use when provided with an effective treatment for addiction.

To our knowledge, no one has explicitly compared the longitudinal treatment outcomes of opiate dependent patients with and without significant pain. Animal research and a few case studies in human subjects suggest that pain can drive greater use of potentially addictive medications and that treatment of

pain (e.g. with anti-inflammatory medications) reduces this pain-related substance use (Colpaert et al., 2001; Kupers and Gybels, 1995; Porter-Williamson et al., 2003; Weissman and Haddox, 1989). This pain-related substance use has been termed pseudoaddiction. However, this phenomenon is not well studied and the treatment implications are not clear. The results of Trafton et al. (2004) and those reported here suggest that pain may alter the presentation of SUDs at treatment entry in that patients with pain have a different pattern of substance use and associated psychosocial problems. Nevertheless, the present study suggests that addiction treatments are effective independent of initial pain status and the differing patterns of use associated with it. Thus, while further research on pain and opiate dependence is important, it is possible that this may not substantially influence addiction treatment outcomes and SUD treatment of patients with pain who are referred to MMT clinics.

A recent report that treatment providers administered higher doses of methadone to patients with chronic pain problems during the course of treatment raises the possibility that patients with pain require higher doses of medication to achieve reductions in substance use (Peles et al., 2005). In both our sample and in the MMT patients studied by Rosenblum et al. (2003) patients with pain received similar methadone dose. The discrepancy in these findings indicates treatment providers likely vary in their response to MMT patients with pain. Our findings suggest that substance-using patients with pain are appropriate for, and respond well to, methadone maintenance treatment without higher doses of medication or additional counselling.

Although the general pattern of the findings indicates that pain patients report similar SUD-related outcomes to non-pain patients, several exceptions deserve comment. First, pain patients report more cannabis use at both baseline and follow-up than do non-pain patients. This may represent an attempt to use cannabis for analgesic purposes in pain patients, or cannabis use may represent a separate SUD-related problem that is more common in pain patients than non-pain patients but was not adequately addressed by MMT. This second possibility is consistent with the general stability of cannabis use in the sample as a whole.

Despite the reduction in substance use in pain patients over the course of treatment, they continue to remain significantly impaired in other domains of functioning compared to patients without pain. Thus, pain in MMT patients not only reflects discomfort due to substance use, but it is a separate factor that is not significantly addressed by MMT for addiction. As predicted by clinical reviews (e.g. Scimeca et al., 2000), daily methadone administration for treatment of opioid dependence was not associated with an overall change in pain level at follow-up. Most subjects reported little to no change in pain over the course of the year: 32% reported identical pain levels at baseline and 1 year; and 70% reported pain levels within one point of their baseline level at 1 year. This suggests that reductions in pain level are not necessary to produce reductions in substance use in polysubstance-using patients in significant pain.

The continued physical and social problems in patients with pain may influence the perception of treatment benefits by both patients and providers. The fact that patients with pain remain

significantly impaired in other domains of functioning and continue to experience moderate or greater pain may explain their trend towards lesser satisfaction with treatment. Because MMT as an addiction treatment does not improve pain severity or psychosocial impairment that may be associated with pain, addiction providers may find these patients “difficult”. Even when their inappropriate substance use is properly addressed, these patients are apt to report more suffering and display diminished social and psychological functioning. Additional treatment for pain is necessary to address these comorbid problems. Unless patients receive effective treatment for both addiction and pain, both clinicians and patients may find treatment results less than ideal. Unfortunately, we do not have data on additional pain treatments or prescribed medications that patients may have received over the year. Thus, this observational study cannot provide data to guide future research on which pain treatments are effective for improving pain and pain-related psychosocial problems in this population. Future research should be directed towards identifying pain treatments that are effective in patients receiving MMT. However, treatment providers who are hesitant to provide MMT for patients with pain should note that, at this time, no evidence exists to support the assertion that pain is predictive of a poor response to MMT for inappropriate substance use. As currently provided, methadone maintenance treatment effectively reduces polysubstance use problems in opioid dependent patients, even among patients who report significant pain and associated psychosocial problems and illicit analgesic substance use. Substance use disorder treatment is useful for polysubstance-using patients with pain problems, even when pain levels are not reduced and pain is associated with abuse of analgesic substances.

Results of the present study should be interpreted with caution for several reasons. First, the low number of women may limit the generalizability of the findings. Additionally, information about level of pain in the last month was used to divide our sample into those with and those without significant pain. This represents only one of many ways to classify patients based on the presence or absence of significant pain. Future research on pain and methadone maintenance treatment outcomes would benefit from more-comprehensive assessments of pain and pain-related conditions. It is possible that different assessments and/or definitions of pain could influence the nature of the treatment outcomes observed. The generalizability of the present findings is weakened by a lack of data on the chronicity or type of pain measured. Additionally, additional information about baseline treatments for pain and/or pain-related conditions would help to strengthen future research. In order to maximize the sample size and to standardize the timing of assessments, all analyses utilized only self-report data. Although previous prior research in the present sample found similar outcomes with self-report and urine drug screens (Humphreys et al., 2005), it is possible that the use of different measures of substance-related outcomes could lead to different results.

Lastly, MMT is a very specialized, intensive and long-term treatment for substance use disorders and it is possible that patients with pain may have poorer substance use outcomes following less intensive treatments for SUD that do not include

daily contact and a medication component. Rosenblum et al. (2003) found that chronic pain was associated with illicit prescription substance use more often in patients receiving inpatient treatment for SUD than in patients receiving MMT. This could be related to the differences in treatment modality (medication-based versus drug-free) or to the fact that their MMT sample had been receiving addiction treatment for a longer period of time (58.5% of the MMT sample had been in treatment for more than 2 years, while 66.5% of the inpatient sample had been enrolled in treatment for less than 2 weeks). We found that, at treatment entry, pain was associated with increased use of illicit prescription opioid and sedative medications, but at a year following treatment this was no longer the case. This suggests that extended SUD treatment may break the association between pain and illicit prescription medication use.

Despite these limitations, the present study provides a first attempt to describe the response of patients with and without significant pain to an addiction treatment. In general, patients with significant pain display favorable substance-related responses but remain impaired on other measures of physical and psychosocial functioning. More work is needed to understand how to better address the pain-related physical and social problems commonly reported in SUD patients.

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