Relations Among Psychopathology, Substance Use, and Physical Pain Experiences in Methadone-Maintained Patients

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Objective: Differences in psychiatric distress and substance use (licit and illicit) were examined in methadone maintenance treatment (MMT) patients with a variety of pain experiences.

Method: Parametric and nonparametric statistical tests were performed on data obtained from 150 patients currently enrolled in MMT. Assessments were carried out at the 3 opioid agonist treatment programs operated by the APT Foundation, New Haven, Connecticut. Participants were recruited between March 2007 and March 2008.

Results: In comparison to MMT patients reporting no pain in the previous week, those with chronic severe pain (CSP) (ie, pain lasting at least 6 months with moderate to severe pain intensity or significant pain interference) exhibited significantly higher ($P < .01$) levels of depression, anxiety, somatization, overall psychiatric distress, and personality disorder criteria but reported comparable rates of substance use. A third group, ie, non-CSP MMT patients reporting some pain in the past week, differed significantly ($P < .05$) from the other 2 pain groups on somatization and global psychiatric distress but reported comparable rates of substance use.

Conclusions: Pain-related differences in psychiatric problems exist in MMT patients and may have implications for program planning and outreach efforts.

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The prevalence of chronic pain among patients in methadone maintenance treatment (MMT) is high: Estimates range from 37% with chronic severe pain[1] (CSP) to more than 60% with chronic pain of any intensity.[2] Counselors report difficulty treating MMT patients with chronic pain, in part due to these patients' co-occurring psychiatric symptoms.[3] Additionally, persistent pain is commonly reported among patients leaving inpatient detoxification, and it is associated with long-term substance use following treatment.[4] Although there is a paucity of empirically supported treatment approaches for treating chronic pain in MMT, the treatment of co-occurring psychiatric disorders has been found to improve pain and functional outcomes in nonaddicted patients with chronic pain.[5] Thus, an enhanced understanding of the psychiatric correlates that accompany chronic pain in MMT patients may be useful as a first step in developing effective treatment strategies for these patients.

The extent to which MMT patients with chronic pain (ie, physical pain lasting at least 6 months) have different psychiatric profiles from those with pain that does not meet the threshold for chronic pain status is currently unclear. Studies examining the psychiatric correlates of pain in MMT typically divide patients into 2 groups: chronic pain patients versus nonchronic pain patients, and they have documented higher levels of general psychiatric distress and lower levels of general functioning in the former (as compared to the latter) group.[1,2,6] However, this approach does not differentiate between nonchronic pain patients with and without pain. Recent studies in individuals with substance use disorders suggest the usefulness of distinguishing those with and those without pain in the previous week.[7,8]

An improved understanding of the psychiatric correlates of a variety of pain patients could help resource and program planning for MMT programs. Consequently, following the typology described by Sheu et al,[8] the present study compared the psychiatric correlates of pain among MMT patients with: (1) CSP (ie, pain lasting at least 6 months with moderate to severe pain intensity or significant pain interference); (2) "some pain" ([SP] ie, pain reported in the previous week but not CSP); and (3) "no pain" ([NP] ie, no pain reported in the past week and no CSP).

Given that chronic pain (1) is most frequently associated with depressive disorders, anxiety disorders, somatoform disorders, and personality disorders among nonaddicted individuals[9]; (2) is related to higher levels of depressive symptoms among opioid-dependent patients seeking inpatient detoxification[10] and among patients with substance use disorders seeking a range of treatments[11,12]; and (3) has been linked to personality disorders, anxiety, and depression among patients suspected of nonmedical use of prescription opioids who were seeking prescription opioid medication

For Clinical Use

- In comparison to methadone-maintained patients with no recent pain, those with chronic severe pain report significantly higher levels of depression, anxiety, somatization, overall psychiatric distress, and personality disorder criteria.
- Clinicians should consider assessing and addressing pain (recent and chronic) and associated psychopathology among methadone-maintained patients.

refills at an emergency department,[13] we hypothesized that, in comparison to methadone patients without pain, those with CSP would exhibit higher levels of depression, anxiety, somatization, and personality disorder criteria. We also examined whether self-reported past week use of psychoactive substances (alcohol and tobacco), illegal drugs (cannabis, cocaine, and heroin), and nonmedical use of prescription drugs (opioids, amphetamines, and benzodiazepines) differed among pain groups.

METHOD

Participants

Participants were 150 patients (85 men and 65 women) aged 19 to 61 years (mean = 41.5 years; SD = 10.2 years) who were enrolled in MMT for at least 6 months (mean = 46.7 months, SD = 54.5 months) at 1 of the 3 opioid agonist treatment programs operated by the APT Foundation, Inc, a private not-for-profit community-based organization located in New Haven, Connecticut, that had a census of approximately 1,500 patients at the beginning of data collection. Patients were predominantly white (58%), male (57%), never married (53%), and unemployed (43%) or disabled (29%). A majority had at least a high school level of education (68%). All reported at least 1 prior MMT episode (mean = 2.1, SD = 1.7).

Procedures and Measures

Participants were self-selected in response to study fliers posted at the Legion, Park, and Orchard clinics of the APT Foundation, Inc. While the APT Foundation, Inc, has a primary care clinic that offers routine and specialty medical care (eg, HIV, hepatitis), it began offering specialty pain diagnostic and treatment services only after the completion of this study. Participants were recruited between March 2007 and March 2008. All patients who spoke with a research assistant agreed to participate and completed the survey. Participants were blind to the specific aims of the study. Fliers indicated that the study "aims to better understand patients' experiences and treatments needs." Research assistants administered the questionnaire packet (measures described below) after describing the study, including potential risks and benefits of study participation. Participants were compensated $10 for study participation. This study, involving the use of survey data without identifiers, was presented to the Human Investigations Committee at APT and Yale University School of Medicine and was exempted from review per United States Department of Health and Human Services regulation 45 CFR 6.101(b)(2). Consequently, participants were not required to provide a written informed consent.

Brief Symptom Inventory 18. The Brief Symptom Inventory 18 (BSI-18)[14] is an 18-item instrument, designed to screen for psychiatric disorders, that contains 3 subscales: depression, somatization and anxiety, and a total global severity index (GSI) score. Respondents rate items using a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely); these raw scores are then converted to area T scores (M = 50, SD = 10) to facilitate interpretation. T scores ≥ 63 (90th percentile) are clinically significant.[14] In this study, participants' raw scores were converted to T scores using the BSI-18 community sample norms.[14] The BSI-18 has been utilized in studies with a variety of community and medical samples, including those with pain and substance-related disorders.[15–17]

Iowa Personality Disorder Screen. The Iowa Personality Disorder Screen (IPDS)[18] is an 11-item semi-structured interview that assesses respondents' characteristic thoughts and feelings. A subset of 7 items has demonstrated good sensitivity (79%) and specificity (86%) for identifying individuals diagnosed with a personality disorder in a mixed sample of nonpsychotic spectrum inpatients and outpatients.[18] Using the 7-item subset, scores of 3 or more are clinically significant.[18] The IPDS has been used in studies using a variety of psychiatric samples, including those with substance-related disorders.[19,20]

Respondents provided information about pain, including the duration of their current pain episode. On an 11-point scale (0–10), they also rated 3 facets of pain experienced in the past 7 days (ie, "pain at its worst," "pain at its least" and "typical level of pain"). In addition, they completed 3 pain interference items (scored on a scale from 0 to 10) from the Brief Pain Inventory[21,22] that assessed the extent to which their pain in the last 7 days had interfered with their "everyday life," "normal work," and "relationships with other people." Respondents' answers to these items were used to classify them into one of 3 pain groups: (1) CSP (ie, pain lasting at least 6 months with moderate-to-severe pain intensity or significant pain interference) consistent with previous reports,[1,8] respondents who had pain lasting at least

Table 1. Comparison of No Pain, Some Pain, and Chronic Severe Pain Groups on Pain Characteristics, BSI-18 Scores, and IPDS Scores

	Pain Group									
	No Pain (n = 35)		Some Pain (n = 59)		Chronic Severe Pain (n = 56)		Statistical Test		Analysis of Covariance With Age as a Covariate	
	Mean	SD	Mean	SD	Mean	SD	t (df = 113)	P	F (df = 1,112)	P
Pain intensity in past 7 days										
Worst pain intensity	NA	NA	6.7	2.7	8.8	1.4	5.43	< .001	21.89	< .001
Least pain intensity	NA	NA	3.0	2.2	4.9	2.2	4.59	< .001	15.64	< .001
Typical pain intensity	NA	NA	4.3	2.3	6.7	2.0	5.90	< .001	27.11	< .001
Pain interference in past 7 days										
Life interference	NA	NA	3.4	2.9	6.7	2.3	6.84	< .001	27.09	< .001
Work interference	NA	NA	3.3	3.0	6.1	3.2	4.92	< .001	15.09	< .001
Relationship interference	NA	NA	2.3	2.9	4.1	3.7	2.97	.004	5.23	.007
							F (df = 2,147)	P	F (df = 2,146)	P
BSI-18 (T scores)[a]										
Depression	52.8[b]	10.7	58.3	10.1	61.6[b]	10.7	7.71	.001	8.07	< .001
Somatization	50.5[b]	9.1	57.5[b]	10.5	64.9[b]	7.4	27.78	< .001	26.43	< .001
Anxiety	50.1[b,c]	10.0	58.9[b]	10.3	61.5[c]	11.8	12.53	< .001	12.72	< .001
Global Severity Index	52.3[b]	10.9	60.2[b]	9.4	64.6[b]	9.2	17.63	< .001	17.66	< .001
IPDS[d]										
11-item	2.5[b,c]	2.0	4.3[b]	2.9	4.4[c]	2.8	6.73	.002	7.55	.001
7-item	1.9[b,c]	1.4	3.3[b]	2.2	3.3[c]	1.9	7.30	.001	7.98	.001

[a]For BSI-18 T Scores, > 62 = clinical threshold.
[b,c]Scale scores with the same superscripts differ significantly from each other at $P < .05$ for 2-tailed tests using Scheffé post hoc test; scales without superscript do not differ significantly from other scales in that row.
[d]For the 7-item IPDS, ≥ 3 = clinical threshold.
Abbreviations: BSI = Brief Symptom Inventory, IPDS = Iowa Personality Disorder Screen, NA = not applicable.

6 months and who scored 5 or higher on the item pertaining to the worst level of pain intensity in the last 7 days or on any of the items relating to pain interference in the last 7 days were considered to exhibit chronic severe pain; (2) SP (ie, pain reported in past week but not CSP); and (3) NP (ie, no pain reported in the past week and no CSP).

Respondents also provided information about (1) demographics (age, sex, race/ethnicity, employment status, educational level, relationship status); (2) past-week use of psychoactive substances (alcohol and tobacco) and illegal drugs (cannabis, cocaine, heroin) and nonmedical use of prescription drugs (opioids, amphetamines, benzodiazepines); and (3) MMT characteristics (months enrolled, number of different treatment episodes, current methadone dose).

Data Analysis

Group differences in demographic, pain, psychiatric, and substance use variables were examined using analyses of variance (ANOVAs) for continuous data and Pearson χ^2 tests for frequency data. Since the 3 pain groups differed significantly on age, we performed analyses of covariance (ANCOVAs) to control for age on comparisons involving continuous data. When ANOVA models revealed significant differences among the 3 pain groups, we performed post hoc comparisons using the conservative Scheffé method to further examine these differences. We performed the Bonferroni correction when comparing pain groups on ratings involving continuous data. Statistical significance was set at $P < .05$.

RESULTS

Demographic Characteristics

Among the 150 respondents, 24% were in the NP group, 39% in the SP (but not CSP) group, and 37% in the CSP group. Whereas sex, race/ethnicity, employment status, educational level, and relationship status did not vary by pain group (ie, NP, SP, CSP), the 3 groups differed significantly by age ($F_{2,147} = 4.94$, $P < .05$). Scheffé post hoc analyses revealed that participants with chronic severe pain were significantly older (mean age = 44.8 years) than those with some pain (mean age = 39.0 years, mean difference = 5.8 years, 95% CI = 1.1–10.3, $P < .01$, 2-tailed test). Although the mean age of the CSP group, on average, was numerically higher than that of the NP group (40.6 years), this difference was not statistically significant ($P = .15$).

Pain Characteristics

As shown in Table 1, the SP and CSP groups differed on each of the pain characteristics assessed—even after controlling for age. These group differences remained statistically significant after the application of a Bonferroni correction for multiple comparisons (.05 ÷ 6 = .008). In comparison to the SP group, the CSP group reported significantly higher worst pain intensity, least pain intensity, typical pain intensity, and interference with everyday life, work, and relationships—all pertaining to the last 7 days. While 14% (n = 8) of the SP group reported that they had pain for at least 3 months, none of the SP group reported pain lasting 6 months or longer.

Psychiatric Characteristics

As summarized in Table 1, the 3 groups differed on all 3 BSI-18 subscales (ie, depression, somatization, and anxiety) and on the overall BSI-18 scale (ie, global severity index [GSI]). These group differences remained statistically significant after controlling for age using ANCOVAs and following the application of a Bonferroni correction for multiple comparisons ($.05 \div 6 = .008$). Scheffé post hoc tests indicated that, in comparison to the NP group, the CSP group had higher depression ($P < .005$), somatization ($P < .001$), anxiety ($P < .001$), and GSI ($P < .001$) scores, and the SP group had higher somatization ($P < .005$), anxiety ($P < .005$), and GSI ($P < .005$) scores. Scheffé post hoc tests also indicated that the CSP group had higher scores on somatization ($P < .001$) and GSI ($P < .05$) than the SP group.

As summarized in Table 1, the 3 groups differed on both the 7-item and 11-item versions of the IPDS. These group differences remained statistically significant after controlling for age using ANCOVAs and after the application of a Bonferroni correction for multiple comparisons ($.05 \div 6 = .008$). Scheffé post hoc tests indicated that, while the CSP and SP groups had comparable scores on the 7-item and 11-item versions of the IPDS in comparison to the NP group, the CSP and SP groups had significantly higher scores on the 7-item ($P < .005$ and $P < .005$, respectively) and 11-item ($P < .005$ and $P = .007$, respectively) versions.

Although our primary focus was the examination of differences on BSI-18 and IPDS mean scores, we provide the following descriptive data to assist in the clinical interpretation of our findings. When we used a T score cutoff of 62 for the 4 BSI scales, χ^2 analyses revealed significant differences for the NP, SP, and CSP groups on clinically elevated somatization (6% vs 39% vs 75%, respectively; $P < .001$), anxiety (17% vs 41% vs 52%, respectively; $P < .005$), and GSI (17% vs 41% vs 63%, respectively; $P < .001$). While, in comparison to the CSP group (48%), numerically fewer members of the NP (26%) and SP (39%) groups endorsed clinically elevated depression, this difference did not reach statistical significance ($P = .10$). In addition, when we used the cutoff of ≥ 3 on the 7-item version of the IPDS, χ^2 analyses revealed significant differences ($P < .01$) for the NP, SP, and CSP groups on clinically elevated personality disorder criteria (31% vs 58% vs 66%, respectively).

Substance Use and MMT Characteristics

The pain groups reported comparable levels of psychoactive substance use, illegal drug use, and nonmedical use of prescription drugs in the past week. Daily tobacco use and past-week alcohol use were endorsed by 88.7% and 27.3% of participants, respectively. The most frequently endorsed illicit substances used in the past week were cocaine (25.3%), cannabis (11.3%), heroin (10.7%), and nonmedical use of benzodiazepines (10.7%). While none of the participants reported nonmedical use of buprenorphine or amphetamines in the past week, 1 endorsed past week nonprescribed methadone use, and 4 (2.7%) reported nonmedical use of prescription opioid medications.

The pain groups did not differ significantly on months enrolled in MMT, number of MMT episodes, or current methadone dose. Participants were enrolled for a mean duration of 46.7 months in MMT, had a mean number of 2.1 episodes of MMT, and were maintained on a mean dose of 90.5 mg of methadone.

DISCUSSION

Similar to previous studies of MMT patients, CSP was prevalent. In fact, our New Haven sample had an identical rate (37%) of CSP to that reported by a prevalence study of chronic pain among MMT patients in New York City.[1] Together, these 2 findings suggest stability in the prevalence of CSP among MMT patients (at least in Northeast urban locations), since our study used similar criteria to define CSP.

Multiple similarities were observed across pain groups; eg, similarly substantial proportions of NP, SP, and CSP groups reported tobacco, alcohol, and cocaine use in the past week; these findings suggest that use of these substances—in particular daily tobacco use—may be an important target for resource and program planning in MMT programs, irrespective of patients' pain status. These findings support those previously reported in MMT patients documenting high rates of tobacco, alcohol, and cocaine use.[23,24] In addition, chronic pain status was not associated with increased use of other substances, including illicit drugs and nonmedical use of prescription amphetamines, benzodiazepines, and opiates. While rates of use did not differ across pain groups, it will be important to determine in future research the extent to which the meanings and motivations of use differ: eg, chronic pain patients may be, in large part, using substances to alleviate their pain and/or to manage their elevated psychiatric symptomatology.

Our hypotheses that, in comparison to the NP group, the CSP group would be more likely to exhibit higher levels of depression, anxiety, somatization, and personality disorder criteria received strong support in this study. Whereas previous reports of chronic pain in MMT have documented higher levels of general psychiatric distress and lower levels of general functioning in the former (as compared to the latter) group,[1,2,6] our findings specify discrete psychiatric domains that distinguish MMT patients with CSP from those who have not experienced pain in the past week. Similar to recent findings on opioid-dependent patients seeking inpatient detoxification,[10] the presence of chronic pain in this study was associated with increased levels of depression. Our findings of elevated depression, anxiety, somatization, and personality disorder criteria among the chronic pain group may in part explain MMT counselors' reported difficulty treating these patients,[3] emphasize the importance of multidisciplinary assessment and treatment in addressing chronic pain, and point to discrete psychiatric disorders that

may be important for providers to address when treating these patients. We note that 48%–75% of the subjects with CSP scored above the clinical cutoff on several psychiatric measures.

Our findings suggest that MMT clinicians and program managers should consider monitoring and addressing the clinical needs of patients with some pain in addition to those with chronic pain (ie, physical pain lasting at least 6 months). Participants who reported pain in the last week were more likely to endorse clinically elevated levels of somatization, anxiety, and personality disorder criteria than those without pain. Taken together, our findings suggest that those with pain (either SP or CSP) are more likely to exhibit psychopathology than those without pain; in turn, the CSP group is more likely than the SP group to report psychopathology. To our knowledge, these findings have not been reported in previous published studies of MMT patients, and they merit further research attention. In particular, our finding that a higher proportion of the CSP group (75%), in comparison to the SP and NP groups (39% and 6%, respectively), endorsed clinically significant levels of somatization suggests that somatization may be an important factor in distinguishing these 2 groups.

Several potential limitations are worth noting. Participants were drawn from 3 opioid agonist treatment programs operated by 1 organization in a particular geographic region; thus our findings may or may not generalize to other MMT programs. For example, some MMT programs may have specialty pain management programs. However, this limitation is muted since, as discussed above, some of our results are very similar to previous studies of chronic pain among MMT patients. Although our study attempted to differentiate between nonchronic severe pain patients with "some pain" and those with "no pain" based on the presence or absence of pain in the past week, the SP group comprises individuals with differing pain durations, some of whom may have pain related to withdrawal symptoms. Future research in this area may benefit from further dividing the SP group into subgroups based on varying pain durations and pain genesis.

Our study did not employ formal diagnostic assessments of psychiatric disorders, and no independent assessment of patients' pain or substance using status was conducted. Instead, the focus of our study was screening for potential Axis I (mood, anxiety, and somatoform) and Axis II disorders. A comprehensive assessment of psychiatric disorders would not only better define the sample with regard to psychological problems, it would also further elucidate the mental health needs of MMT patients with a variety of pain experiences. Given that comprehensive pain management services for MMT patients with chronic pain will most likely require a multidisciplinary approach, future research in this area might benefit from an examination of interventions that are designed to address pain directly (eg, medications and somatic treatments) in addition to further examination of co-occurring psychiatric disorders. In addition to patient self-report of drug use, future studies in this area might also benefit from urine toxicology findings. Also, since our sample was self-selected in response to a study flier, the extent to which study participants may have had different characteristics from MMT patients who did not respond to the flier is unclear.

Despite these limitations, the current study represents an important investigation of differences in the characteristics of MMT patients with a variety of pain experiences. The present study is among the first to systematically examine depression, somatization, anxiety, and personality disorder criteria in MMT patients with pain. Previous published studies have typically employed measures tapping general psychiatric distress,[1] relied on retrospective chart reviews,[6,25] or used nonspecified interview questions to assess psychiatric disturbance.[2] The findings of differences in the psychiatric characteristics of patients among pain groups have implications for resource and program planning in MMT programs (eg, increased psychiatric services targeting co-occurring psychopathology).

Drug names: buprenorphine (Buprenex, Subutex, and others), methadone (Methadose and others).
Disclosure of off-label usage: The authors have determined that, to the best of their knowledge, no investigational information about pharmaceutical agents that is outside US Food and Drug Administration–approved labeling has been presented in this article.
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For the CME Posttest for this article, see pages 1333–1334.

