Prevalence and Characteristics of Chronic Pain Among Chemically Dependent Patients in Methadone Maintenance and Residential Treatment Facilities

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Context Little is known about the prevalence and characteristics of chronic pain among patients with different types of chemical dependency.

Objectives To estimate the prevalence and to examine the characteristics of chronic severe pain in chemically dependent populations receiving methadone maintenance or inpatient residential treatment.

Design, Setting, and Participants Representative samples of 390 patients from 2 methadone maintenance treatment programs (MMTPs) and 531 patients from 13 short-term residential substance abuse treatment (inpatient) programs, all in New York State, were surveyed in late 2000 and early 2001.

Main Outcome Measure Prevalence of chronic severe pain, defined as pain that persisted for more than 6 months and was of moderate to severe intensity or that significantly interfered with daily activities.

Results Chronic severe pain was experienced by 37% of MMTP patients (95% confidence interval [CI], 32%-41%) and 24% of inpatients (95% CI, 20%-28%; $P=.03$). Pain of any type or duration during the past week was reported by 80% of MMTP patients and 78% of inpatients. Among those with chronic severe pain, 65% of MMTP patients and 48% of inpatients reported high levels of pain-related interference in physical and psychosocial functioning. Among MMTP patients, correlates of chronic pain in a multivariate model were age (odds ratio [OR], 2.08; 95% CI, 1.17-3.70), chronic illness (OR, 1.88; 95% CI, 1.07-3.29), lifetime psychiatric illness (OR, 1.77; 95% CI, 1.06-2.97), psychiatric distress (OR, 1.63; 95% CI, 1.22-2.18), and time in treatment (OR, 2.23; 95% CI, 1.06-4.68). Among inpatients, the correlates of chronic pain were race (blacks vs whites: OR, 0.52; 95% CI, 0.31-0.90; Hispanics vs whites: OR, 0.48; 95% CI, 0.24-0.95), drug craving (OR, 2.78; 95% CI, 1.54-5.02), chronic illness (OR, 2.17; 95% CI, 1.37-3.43), and psychiatric distress (OR, 1.36; 95% CI, 1.03-1.81). Among those with chronic severe pain, inpatients were significantly more likely than MMTP patients to have used illicit drugs, as well as alcohol, to treat their pain complaint (51% vs 34%, $P=.005$) but were less likely to have been prescribed pain medications (52% vs 67%, $P=.01$).

Conclusions Chronic severe pain is prevalent among patients in substance abuse treatment, especially MMTP patients. Pain is associated with functional impairment and correlates of pain vary with the population. Self-medication for pain with psychoactive drugs appears especially problematic among substance users who enroll in drug-free treatment programs. Substance abuse treatment programs need to develop comprehensive and structured pain management programs.

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ALTHOUGH THE RELATIONSHIPS between chronic pain disorders and the diverse types of chemical dependency are certain to be complex and clinically relevant,[1] there have been few studies that directly explore these phenomena. Pain is likely to be highly prevalent in populations with chemical dependency, and it is possible that unrelieved pain could encourage a variety of adverse outcomes, such as illicit drug use, use of nonprescribed pain medication, or the negative medical and psychosocial effects associated with continued drug-seeking behavior.[2] It is also possible that a drug abuse history could encourage the clinical misattribution of pain complaints to the addictive disorder and lead to poor quality of care.[3-5] These potential outcomes highlight the need for studies that assess the frequency, characteristics, impact, and treatment of pain in chemically dependent patients.

The prevalence of chronic pain in individuals with chemical dependency is likely to be at least as high as in the general population. A review of 15 population-based surveys of chronic pain reported prevalences that varied from 2% to 40% and cautiously estimated popu-

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lation prevalence at 10%.[6] An international survey of 25 916 patients in primary care centers revealed an overall pain prevalence of 22% and a prevalence in the United States of 17% (Seattle, Wash).[7] This prevalence suggests that more than 70 million US adults have chronic pain.

Limited epidemiological data suggest that pain may be even more prevalent in chemically dependent populations, that the experience of pain may interact with substance use disorders in complex ways, and that pain is poorly managed in the clinical setting. A study of 248 patients receiving methadone recorded a pain prevalence of 61.3% and observed that those with pain had more medical and psychiatric problems, and used more prescribed and nonprescribed medications, than those without pain.[8] Studies of chemically dependent patients with pain associated with serious medical illnesses found that pain therapy is often provided in a manner contrary to published guidelines.[9,10]

Existing studies of pain in chemically dependent individuals were not designed to distinguish the subpopulation of patients with chronic pain disorders severe enough to be clinically relevant. To draw meaningful conclusions about the complex relationships between pain and the behaviors associated with drug abuse, information about pain severity and other characteristics must be considered. Using an operational definition of chronic pain (defined as pain that persisted for >6 months and was of moderate to severe intensity or that significantly interfered with daily activities), we conducted a study to determine pain prevalence in 2 distinct populations: patients receiving methadone maintenance for opioid addiction and patients who had recently enrolled in a short-term residential treatment program, primarily for treatment of alcohol or cocaine dependence.

METHODS

Setting and Procedures

Data were collected from patients receiving methadone who were being treated at 1 of 3 clinics housed within the same building and operated by a large methadone maintenance treatment program (MMTP) in Brooklyn, NY, and patients in a hospital-based MMTP in Manhattan, NY. These programs followed federal methadone treatment admission protocols that require an opioid-dependent diagnosis and an addiction history of at least 1 year.[11] Data were also collected in 13 public short-term inpatient rehabilitation programs operated throughout the state of New York. The mean length of stay in these inpatient programs is 3½ weeks. Most patients are admitted because of current alcohol or cocaine dependence or both, and all had a lifetime diagnosis of alcohol abuse or dependence. The institutional review board of the National Development and Research Institutes approved the research protocol and oral informed consent was obtained from the study patients.

Sample size was not predetermined. As many cases as possible were recruited within the study sites. A power analysis was performed by using the logistic regression module of the PASS 2002 program (NCSS Statistical Software, Kaysville, Utah). Results showed that, for a desired power of 80% and $\alpha = .05$, we could reliably detect odds ratios (ORs) for binary predictors between 1.89 and 2.34 for the MMTP sample and 1.73 and 2.07 for the inpatient sample. Detectable ORs were smaller when there was less redundancy between one predictor and other predictors and larger when there was more redundancy.

The Brooklyn MMTP patients were randomly recruited based on the weekly urine collection schedule for all patients. Data collection was performed during the first 2 weeks of March 2001 and continued until data had been obtained from at least 30% of the MMTP population at that site. All patients at the Manhattan MMTP were recruited because of the smaller number of patients at that site. Data collection at the Manhattan site occurred between September 20 and October 30, 2000. Of the MMTP patients approached for the survey, 153 of 229 (67%) agreed to participate.

Inpatients were enrolled between October 11 and November 29, 2000. For each inpatient program, data were collected on 1 or more (up to 4) consecutive days. A total of 545 of 604 (90%) eligible patients completed the survey.

The protocol was designed to allow flexibility in the procedure for questionnaire completion. Depending on the resources of the site or on respondent preference, the questionnaire was either read by a study aide in a group setting, self-administered in a group setting supervised by a study aide, administered in a face-to-face interview, or self-administered.

Study Instruments

The questionnaire included no identifying information and patients were instructed not to indicate their names on the form. Specific items captured demographic information and history related to substance abuse; substance abuse treatment; pain severity, type, duration, and life interference; general health; and the use of medications to treat pain. Most items required a yes or no answer or a response on a numeric rating scale. In an effort to reduce missing data, the questionnaire was brief (typically completed in <10 minutes). Skip patterns were not used (ie, patients were instructed to answer all questions whether or not they had pain). The questionnaire was pilot tested in an inpatient program and in a focus group of needle exchange clients to improve its content validity.

Pain severity was measured with a numeric scale (no pain = 0 to pain as bad as you can imagine = 10) adapted from the Brief Pain Inventory (BPI).[12] Patients were asked to indicate the severity of their pain at its worst during the past week.

The extent to which pain interfered with various domains of functioning was assessed using the pain interference BPI subscale. The 7-item subscale measures pain interference in different domains, such as walking, sleep, and social relationships, by using numeric scales (pain does not interfere = 0 to pain completely interferes = 10). This subscale has been extensively validated, and

a relationship between overall pain interference (mean scores of the 7 items) and worst pain severity has been empirically confirmed.[13]

Psychiatric distress was measured with a 6-item validated version of the widely used Symptom Checklist-90 (SCL-90).[14,15] None of the 6 psychiatric distress items referred to somatic symptoms. Lifetime psychiatric illness was determined by asking respondents if they had ever been diagnosed with a mental health or psychiatric disorder.

A checklist was used to record drugs, including alcohol, that were used during the patient's last week of active use. Drug craving was measured on a numeric scale (no urge to use=0 to uncontrollable urge to use=10).

Checklists also were used to record chronic illnesses, use of pain medications, and visits to physicians for a pain complaint. Three categories of pain medications were assessed: medications prescribed by a physician, over-the-counter (OTC) medications, and illicit "street" drugs used to treat pain. Use of street drugs was defined as "Illegal drugs, alcohol, or medications that you got on the street or from friends or family for the purpose of treating a physical pain." Use of pain medications and physician visits were coded "yes" if the event had occurred within the past 3 months. As a statistical control for withdrawal pain, patients were asked to report how often they "felt pain due to drug or alcohol withdrawal or drug/alcohol hunger." Responses could range from 0 (not at all or less than 1 day) to 3 (5-7 days).

Statistical Analysis

To operationally define a subpopulation of patients with chronic pain that was relatively likely to be clinically significant, an index of "chronic severe pain" was defined as a score of 5 or higher on the BPI item "worst pain in the past week" or of 5 or higher on the BPI pain interference scale, and pain duration for at least 6 months. Our operational definition was based on a cross-national study that indicated that a pain intensity rating of 5 or greater on a 0- to 10-point scale was the pain score at which a significant accumulation of functional deficits in multiple domains is reported.[13]

Most of the statistical procedures represent separate but parallel analyses conducted for MMTP patients and inpatients. Using the operational definition of chronic severe pain, we calculated pain prevalence and the prevalences of covariates of interest for each of the 2 study samples. To present percentages and more interpretable ORs, the withdrawal pain variable was recoded so that the highest value represented 3 to 7 days and the rating scales that had more than 4 data points (eg, the 11-point scales) were collapsed into a fewer number of categories. Bivariate analysis (χ^2 test) was used to examine the relationships between respondent characteristics and chronic pain. This method closely followed the strategy used by Galea et al.[16] We also used χ^2 analysis to compare patients with and without chronic severe pain for physician contact and use of pain medications. Rates of pain medication use by MMTP patients and inpatients with chronic severe pain also were compared. To identify characteristics uniquely associated with chronic severe pain, variables correlated with pain ($P<.10$; 2-tailed) in the bivariate analyses were entered into a multivariate logistic regression model; forced method of entry was used to retain all selected variables in the model. Adequacy of the 2 models was determined with the Hosmer-Lemeshow goodness-of-fit test[17] and by examining the estimated SEs of the parameters and the estimated coefficients.

Although missing data were uncommon for any specific variable (ranging from 0%-10% of cases) and did not influence the bivariate analyses, exclusion of patients with any missing data from the multivariate logistic regression analysis would have substantially decreased the number of cases for analysis. To avoid this problem, we used a hot-deck data imputation procedure that replaces the missing data with a value from a similar completed case.[18,19] The imputation procedure was done using the software R[20] and other analyses were performed using SPSS Version 11.0 (SPSS Inc, Chicago, Ill). Statistical significance for all outcomes was set at $P<.05$.

RESULTS

Patient Characteristics

Patients were excluded from the analysis if missing data precluded the designation of chronic severe pain. Eight of the 153 patients recruited from the Manhattan MMTP, 18 of the 263 patients from the Brooklyn MMTP, and 14 of the 545 inpatients were excluded for this reason.

The mean (SD) age of the MMTP patients (n=390) was 43 (9.4) years; 38% were women, 25% were white, 36% were black, and 33% were Hispanic. The 3 most frequently reported primary or secondary problem substances used were heroin (88%), alcohol (77%), and cocaine (34%). The mean (SD) methadone dose was 78.2 (45.0) mg/d. More than half (58.5%) had been enrolled in methadone treatment for more than 2 years.

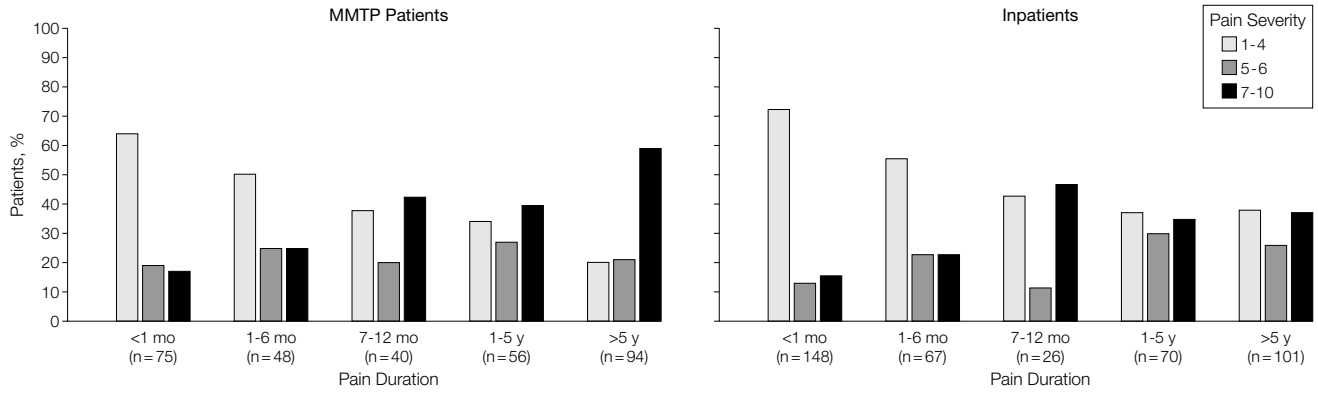
Among inpatients (n=531), the mean (SD) age was 36 (9.1) years; 20% were women, 44% were white, 31% were black, and 16% were Hispanic. The 3 most frequently reported primary or secondary problem substances used were alcohol (74%), cocaine (54%), and heroin (15%). Approximately two thirds (66.5%) had been enrolled in their inpatient program for fewer than 2 weeks.

Pain Prevalence, Characteristics, and Impact

The prevalence of chronic severe pain among MMTP patients was 37% (95% confidence interval [CI], 32%-41%). There was no difference in pain prevalence between the Brooklyn and the Manhattan programs (38% vs 35%, respectively, $P=.64$). The prevalence of chronic pain among those in the inpatient program was 24% (95% CI, 20%-28%). The difference between the groups was significant ($P=.03$).

Most of the patients in each of the study samples reported some type of pain during the past week (MMTP, 80%; inpatients, 78%). Sixty-one percent of these MMTP patients had

Figure 1. Pain Severity and Duration Among MMTP Patients and Inpatients



MMTP indicates methadone maintenance treatment program. MMTP patients with any pain (313/390 [80%]) and inpatients with any pain (412/531 [78%]) include chronic severe pain as well as any pain in the past week. Pain severity was measured on the Brief Pain Inventory item "pain at its worst" in the past week.

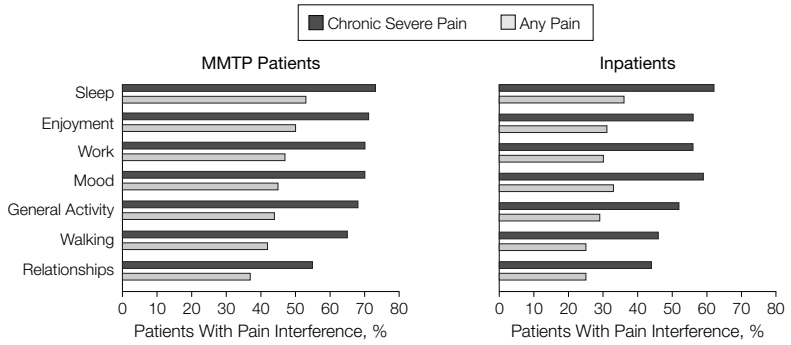
pain for more than 6 months, 48% had pain for 1 year or longer, and 30% had pain for more than 5 years. Among the inpatients, 48% had pain for more than 6 months, 42% had pain for 1 year or longer, and 24% had pain for more than 5 years.

Among those with pain of any type, pain severity varied. The "worst pain" scale from the BPI was divided into categories that meaningfully depict mild, moderate, and severe pain on the basis of pain interference with function[13]: mild pain, 1-4; moderate pain, 5-6; and severe pain, 7-10. Among MMTP patients with any pain for any duration, the percentage with moderate to severe pain was 60% (188/313); severe pain was reported by 38% (119/313). Among inpatients with any pain for any duration, the percentage with moderate to severe pain was 47% (193/412) and the percentage with severe pain was 27% (110/412).

Although pain severity was a criterion for categorizing the groups with clinically significant chronic severe pain (37% of the MMTP patients and 24% of the inpatients), severity also varied among these patients. Severe pain was reported by 66% (94/143) of these MMTP patients and 57% (73/128) of these inpatients. All of these chronic pain patients had pain for at least 6 months.

Among patients with any pain (80% MMTP; 78% inpatients), pain severity and pain duration were correlated ($r=0.36$, $P<.001$ for MMTP patients and $r=0.28$, $P<.001$ for inpatients) (FIGURE 1). This association between pain duration and severity was particularly strong among MMTP patients, especially when the lowest and highest pain duration categories were compared. For MMTP patients with less than 1 month of pain (n=75), the percentages with mild, moderate, and severe pain severity were 64%, 19%, and 17%, respectively. Among MMTP patients reporting more than 5 years of pain (n=94), pain severity was reported as mild (20%), moderate (21%), and severe (59%).

Figure 2. Pain Interference Among MMTP Patients and Inpatients



MMTP indicates methadone maintenance treatment program. Data are patients reporting a score of 5 or higher on the Brief Pain Inventory "interference" item, scored from 0 (does not interfere) to 10 (interferes completely).

The degree to which pain interfered with various domains of functioning was evaluated with the BPI pain interference scale. The mean of the scores on the 7 items in this scale provides an overall measure of interference. Among those with any pain for any duration, a mean score of 5 or higher was reported by 125 of 313 (40%) MMTP patients and 95 of 412 (23%) inpatients. Among those with chronic severe pain, 93 of 143 (65%) MMTP patients and 61 of 128 (48%) inpatients had a mean score of 5 or higher. Pain-related interference with sleep was the greatest problem (eg, 73% for MMTP patients with chronic pain), followed by interference in affect (mood, enjoyment), physical activity (walking, general activity), and social relationships (FIGURE 2). Pain-related interference with work must be interpreted cautiously because most patients were not employed at the time of the survey.

Correlates of Chronic Severe Pain

In bivariate analyses, the variables that were associated ($P<.10$) with chronic severe pain in the MMTP sample were withdrawal pain, age, chronic illness, psychiatric diagnosis, psychiatric distress, pain as a reason for first using drugs, drug craving, and time in treatment (TABLE 1). There was no significant difference in mean (SD) methadone dose between MMTP patients with and without chronic pain (82.0 [45.2] mg/d vs 76.0 [44.9] mg/d, respectively; $t_{359}=1.21$, $P=.23$).

The variables associated with chronic severe pain in the inpatient sample were similar, but not identical, to those associated with pain in the MMTP sample. There were significant correlations between chronic severe pain and withdrawal pain, sex, race, chronic illness,

Table 1. Bivariate Associations Between Respondent Characteristics and Chronic Severe Pain Among MMTP Patients and Inpatients

	MMTP (n = 390)			Inpatient (n = 531)		
Variable	No. of Respondents (% With Chronic Severe Pain)*	OR (95% CI)†	*P* Value	No. of Respondents (% With Chronic Severe Pain)*	OR (95% CI)†	*P* Value
Withdrawal pain						
Not at all/<1 d	271 (32.8)	1.00	<.001	345 (18.8)	1.00	<.001
1-2 d	48 (33.3)	1.02 (0.53-1.96)		53 (34.0)	2.22 (1.18-4.16)	
3-7 d	42 (71.4)	5.12 (2.50-10.46)		90 (41.1)	3.01 (1.83-4.95)	
Age, y						
18-39	122 (28.7)	1.00	.009	352 (24.1)	1.00	.92
40-46	118 (35.6)	1.37 (0.80-2.37)		111 (24.3)	1.01 (0.61-1.66)	
≥47	135 (44.4)	1.99 (1.18-3.34)		60 (23.3)	0.96 (0.50-1.82)	
Sex						
Male	239 (35.1)	1.00	.49	416 (22.6)	1.00	.07
Female	145 (38.6)	1.16 (0.76-1.78)		106 (31.1)	1.55 (0.97-2.48)	
Race						
White	97 (40.2)	1.00	.60	232 (29.7)	1.00	.04
Black	138 (34.1)	0.77 (0.45-1.32)		166 (18.1)	0.52 (0.32-0.85)	
Hispanic	127 (34.6)	0.79 (0.46-1.36)		82 (19.5)	0.57 (0.31-1.06)	
Other	27 (44.4)	1.19 (0.50-2.81)		48 (27.1)	0.88 (0.44-1.76)	
Chronic illness						
No	122 (20.5)	1.00	<.001	350 (18.3)	1.00	<.001
Yes	263 (43.7)	3.02 (1.82-4.98)		159 (36.5)	2.57 (1.68-3.91)	
Psychiatric distress‡						
Low (0-0.33)	160 (23.1)	1.00	<.001	148 (13.5)	1.00	<.001
Moderate (0.34-1)	107 (29.2)	1.91 (1.11-3.27)		188 (22.9)	1.90 (1.06-3.39)	
High (1.01-3)	100 (60.0)	4.99 (2.90-8.59)		175 (34.3)	3.34 (1.90-5.88)	
Psychiatric diagnosis						
No	247 (28.3)	1.00	<.001	407 (20.6)	1.00	<.001
Yes	112 (52.7)	2.82 (1.77-4.47)		112 (37.5)	2.31 (1.47-3.62)	
Pain as reason first using drug						
No	266 (32.7)	1.00	.008	437 (22.7)	1.00	<.001
Yes	84 (48.8)	1.96 (1.19-3.23)		67 (41.8)	2.45 (1.44-4.18)	
Drugs used in past 3 mo, No.						
None (reference for MMTP)	156 (42.9)	1.00	.39	NA	NA	.02
1 (reference for inpatient)	123 (27.6)	0.51 (0.31-0.84)		201 (19.4)	1.00	
2	62 (38.7)	0.84 (0.46-1.53)		174 (20.7)	1.08 (0.65-1.80)	
≥3	49 (36.7)	0.77 (0.40-1.50)		156 (34.0)	2.14 (1.32-3.46)	
Drug craving§						
None (0)	122 (31.1)	1.00	.05	173 (15.0)	1.00	<.001
Low (1-4)	111 (34.2)	1.15 (0.67-1.99)		205 (19.5)	1.37 (0.80-2.36)	
High (5-10)	123 (43.1)	1.67 (0.99-2.83)		149 (40.9)	3.92 (2.31-6.65)	
Time in treatment, MMTP/inpatient						
<7 mo/<3 wk	58 (22.4)	1.00	.002	330 (23.3)	1.00	.74
7-24 mo/≥3 wk	103 (31.1)	1.56 (0.74-3.29)		166 (24.7)	1.08 (0.70-1.67)	
>24 mo/NA	227 (42.7)	2.58 (1.32-5.05)		NA	NA	

Abbreviations: CI, confidence interval; MMTP, methadone maintenance treatment program; NA, not applicable; OR, odds ratio.
*Numbers may not sum to 390 for the MMTP sample or 531 for the inpatient sample because not all respondents answered all questions.
†Odds ratios are presented for descriptive purposes. Significance was determined with the χ^2 test; Mantel-Haenszel was used for ordinal variables with 3 or more categories.
‡Psychiatric distress was measured with a 6-item version of the Symptom Checklist. Scale range is 0 to 3.
§Drug craving was measured on a numeric scale from 0 (no urge to use) to 10 (uncontrollable urge to use).

psychiatric diagnosis, psychiatric distress, pain as a reason for first using drugs, multiple drug use, and drug craving.

Among MMTP patients, the relationship between chronic severe pain and having any chronic illness was similar whether or not arthritis was included as an illness criterion ($r=0.22$, $r=0.24$; both $P<.001$). Among inpatients, however, the correlation between chronic severe pain and chronic illness changed from $r=0.20$ ($P<.001$) when arthritis was included as an illness criterion to $r=0.09$ ($P=.08$) when arthritis was removed. That is, arthritis contributed to the correlation between chronic pain and chronic illness to a greater extent among the patients admitted for residential treatment than for the MMTP patients. For both the MMTP and inpatient samples, the correlation between arthritis and chronic pain was significant (both $r=0.30$, $P<.001$).

Multivariate Analysis: Predictors of Chronic Severe Pain

The variables that were associated ($P<.10$) with pain in the bivariate analysis were entered into the multiple regression model (TABLE 2). In the MMTP sample, the significant ($P<.05$) predictors of chronic pain were age, presence of chronic illness, psychiatric diagnosis, psychiatric distress, and time in treatment. The significant predictors of chronic pain in the inpatient sample were race, presence of chronic illness, drug craving, and psychiatric distress (Table 2).

The adequacy of the 2 multivariate models was supported with nonsignificant results from the Hosmer-Lemeshow goodness-of-fit test ($P=.24$ for MMTP sample; $P=.87$ for inpatient sample) and the absence of problems related to collinearity or overfitting.

Physician Visits

Among MMTP patients, those with chronic severe pain were significantly more likely than those without pain to have visited a physician during the prior 3 months for any reason (75% vs 55%, $P<.001$) or specifically for a pain complaint (60% vs 36%, $P<.001$). Among the inpatients, however, the proportion that visited physicians during the prior 3 months did not vary with pain. Seventy-three percent of the inpatients with chronic severe pain and 73% of those without pain visited a physician for any reason, whereas 52% with pain and 45% without pain visited a physician for a specific pain complaint ($P=.13$).

Use of Pain Medication

In the MMTP sample, patients with chronic severe pain were significantly more likely to have been prescribed analgesic drugs than those without chronic severe pain and to have taken OTC medications for pain (FIGURE 3). There was no difference between those with and without chronic severe pain in the use of illicit drugs to treat a pain complaint. In contrast, inpatients with chronic severe pain were significantly more likely than those without chronic severe pain to have used illicit drugs to self-medicate. Although inpatients with chronic severe pain also were more likely to use OTC medications than those without it, there was no difference between those with or without chronic severe pain in the proportion prescribed an analgesic.

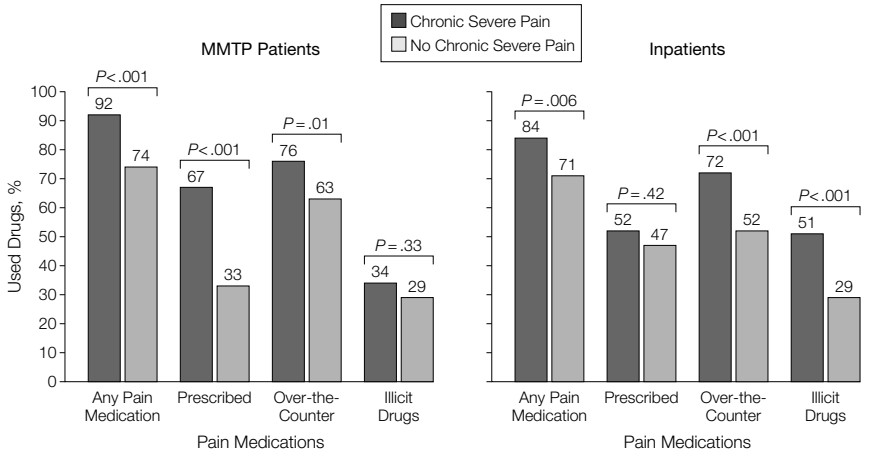
Among those with chronic severe pain, MMTP patients were significantly more likely than inpatients to have been prescribed pain medications by a physician during the past 3 months (67% vs 52%, $P=.01$). Among MMTP patients with chronic severe pain, the most frequently prescribed analgesics were opioids (47%), most often codeine, methadone, oxycodone, and hydro-

Table 2. Adjusted Characteristics Associated With Chronic Severe Pain

Variable*	Odds Ratio (95% CI)†	
	MMTP (n = 390)	Inpatient (n = 531)
Withdrawal pain	1.30 (0.90-1.87)	1.17 (0.88-1.57)
Age, y		
<40	1.00	
40-46	1.30 (0.72-2.36)	
≥47	2.08 (1.17-3.70)	
Female sex		1.24 (0.73-2.11)
Race		
White		1.00
Black		0.52 (0.31-0.90)
Hispanic		0.48 (0.24-0.95)
Other		0.66 (0.30-1.46)
Drugs used in past 3 mo, No.		
1		1.00
2		1.11 (0.64-1.94)
≥3		1.61 (0.94-2.77)
Pain as reason for first using	1.36 (0.80-2.30)	1.79 (0.99-3.26)
Craving		
None	1.00	1.00
Low	1.31 (0.73-2.35)	1.05 (0.58-1.87)
High	1.72 (0.97-3.06)	2.78 (1.54-5.02)
Chronic illnesses	1.88 (1.07-3.29)	2.17 (1.37-3.43)
Psychiatric diagnosis	1.77 (1.06-2.97)	1.45 (0.87-2.42)
Psychiatric distress	1.63 (1.22-2.18)	1.36 (1.03-1.81)
Months in treatment		
<7	1.00	
7-24	1.56 (0.70-3.47)	
>24	2.23 (1.06-4.68)	

Abbreviations: CI, confidence interval; MMTP, methadone maintenance treatment program.
* "Withdrawal pain" was entered as an ordinal measure as shown in Table 1. "Psychiatric distress" was entered as a continuous measure with values ranging between 0 and 3 (including nonintegers in that range). Odds ratios for both variables describe the expected change in the odds associated with a single unit change on these scales.
†Only variables from each sample with $P<.10$ in the univariate analysis were entered in the respective multivariate equation. The MMTP and inpatient variables are not identical because some variables only met the inclusion criteria for 1 of the samples.

Figure 3. Drugs Used for Pain in the Past 3 Months



MMTP indicates methadone maintenance treatment program.

codone (TABLE 3). The most frequently prescribed drugs for inpatients with chronic severe pain were nonsteroidal anti-inflammatory drugs (22%). Only 17% of the inpatients had been prescribed opioids for pain. Codeine (with and without acetaminophen), hydrocodone, and oxycodone were the most frequently prescribed opioids (Table 3).

Use of OTC drugs by those with chronic severe pain did not vary between the groups (75% MMTP vs 72% inpatient, $P=.49$). Among both samples, ibuprofen was the most frequent, acetaminophen the second most frequent, and aspirin the least frequent OTC drug used in the past 3 months.

As noted, among those with chronic severe pain, the use of an illicit drug to treat pain during the prior 3 months was significantly more likely to be reported by inpatients than by MMTP patients (51% vs 34%, $P=.005$). The illicit drugs most frequently used to treat pain by inpatients with chronic severe pain were alcohol (35%), cocaine (29%), opioids (26%), and marijuana (26%). Among MMTP patients with chronic severe pain, the most frequently used illicit drugs were opioids (30%).

COMMENT

Pain was very prevalent in representative samples of 2 distinct populations with chemical dependency, and chronic severe pain was experienced by a substantial minority of both groups. Methadone patients differed from patients recently admitted to a residential treatment center in numerous ways and had a significantly higher prevalence of chronic pain (37% vs 24%). Although comparisons with other studies of pain epidemiology are difficult to make because of methodological differences, the prevalence of chronic pain in these samples is in the upper range reported in surveys of the general population.[6,7] The prevalence of chronic pain in these chemically dependent patients also compares with that in surveys of cancer patients undergoing active therapy, approximately a third of whom have pain severe enough to warrant opioid therapy.[21,22]

There is great variability in the experience of pain. Although some patients expressed relatively little impairment in function or life enjoyment as a result of their pain, others appeared to be significantly compromised. Relatively high scores on the various items of the BPI pain interference scale were reported by 55% to 73% of MMTP patients and 44% to 62% of inpatients with severe chronic pain, respectively. Data of this type may be helpful in clarifying unmet needs and the changes that would be necessary in the health care system to address these needs.

Consistent with findings from surveys of the general population[7] and a prior survey of MMTP patients,[8] chronic pain was associated with both physical and psychiatric illness. Among inpatients, however, psychiatric illness was not a predictor of chronic pain in the multivariate analysis, suggesting that the association between psychiatric illness and chronic pain among inpatients could be explained by other correlates of chronic pain, such as chronic illness, drug craving, and psychiatric distress.

Many chronic illnesses are painful and an association between physical illness and pain was expected. The differences between patient samples, however, illustrate the complexity of these medical factors. Among the inpatients, the association between illness and pain was largely explained by arthritis. In contrast, the exclusion of arthritis as a criterion for chronic illness did not attenuate the association between chronic illness and chronic pain among MMTP patients. It is possible that this finding is explained by a higher prevalence of HIV/AIDS among MMTP patients, which may be associated with painful chronic illness of more diverse types.[23] Additional studies are needed to clarify the important disease-related factors that may lead to chronic pain in populations with chemical dependency.

Given the large variation in populations with chemical dependency, the relationships between pain and substance abuse also are likely to be highly complex. In our study, there was greater evidence for an association between substance use and chronic pain among inpatients than among MMTP patients. Among inpatients, there were significant bivariate relationships between chronic pain and pain as a reason for first using drugs, multiple drug use, and drug craving. In the multivariate analysis, only drug craving remained significantly associated with chronic pain. Not surprisingly, inpatients with pain were significantly more likely than those without pain to attribute the use of alcohol and other illicit drugs, such as cocaine and marijuana, to a need for pain control. These results suggest that chronic pain contributes to illicit drug use behavior among persons who were recently using alcohol and/or cocaine. Inpatients

with chronic pain visited physicians and received legitimate pain medications no more frequently than those without pain, raising the possibility that undertreatment or inability to access appropriate medical care may be a factor in the decision to use illicit drugs for pain.

Although MMTP patients were significantly more likely than inpatients to report chronic pain, and almost a quarter reported that pain was one of the reasons for first using drugs, there was relatively little evidence that pain was associated with current levels of substance abuse. In the multivariate analysis, the associations between chronic pain and the substance abuse behaviors observed in the bivariate analysis (pain as a reason for first using drugs and drug craving) were not sustained. Moreover, the bivariate associations that were found in the inpatient group between chronic pain and multiple drug use, and between pain and the use of illicit drugs to treat pain complaints, were not identified among MMTP patients.

The reasons that abuse behaviors were associated with pain in the inpatients but not the MMTP patients are unknown. Studies are needed to evaluate more fully the range of potential variables that may mediate this relationship.

The association between race and chronic pain among inpatients was unexpected given the variable findings of prior pain studies. For example, a study that compared black vs white women with rheumatoid arthritis found no difference in pain severity between the 2 groups,[24] whereas a postoperative pain study observed that patients of European descent reported significantly less severe pain than blacks or Hispanics.[25] The absence of an association between chronic pain and race among the MMTP sample suggests that other factors may have accounted for the significant association between these 2 variables in the inpatient sample. Inpatients were more diverse in their drug use patterns (eg, alcohol, cocaine, or both), had recently enrolled in substance abuse treatment, and were recruited across a broader geographical area. Methadone patients had been admitted to treatment because of a single drug use disorder (opioid dependence), were recruited in an urban setting, and were likely to have been in treatment for an extended period.

The undertreatment of pain is a significant concern in populations with chemical dependency. In painful disorders for which there is a broad consensus about the role of opioid therapy, specifically cancer and AIDS-related pain, studies have documented that this treatment commonly diverges from accepted guidelines.[9,10] Undertreatment is far more challenging to assess when a broad consensus concerning optimal treatment approaches does not exist. It would be difficult, therefore, to determine the extent to which the pain and functional impairments experienced by patients in this study relate to inadequate pain management. However, given the number of barriers identified as potential reasons for inadequate pain management, it is appropriate to raise concerns about undertreatment and to investigate it further.[5,8,26,27] The barriers are complex and may involve institutional practices, inadequate training and skills of clinicians, lack of access to health care, reluctance of physicians to prescribe opioids to individuals with a history of chemical dependency (espe-

Table 3. Drugs Used for Pain in the Past 3 Months by Patients With Chronic Severe Pain*

Drug	No. (%) of Patients		*P* Value
	MMTP	Inpatient	
Prescribed drugs	n = 139	n = 126	
Any	93 (67)	65 (52)	.01
Opioids	65 (47)	21 (17)	<.001
Codeine plus acetaminophen	33 (24)	14 (11)	.005
Methadone	32 (23)	3 (2)	<.001
Codeine	15 (11)	8 (6)	.20
Hydrocodone	13 (9)	8 (6)	.24
Oxycodone	13 (9)	5 (4)	.12
Meperidine	8 (6)	NA	NA
Morphine	3 (2)	3 (2)	.73
Fentanyl	1 (1)	0	.34
Other	1 (1)	4 (3)	.34
NSAIDs	18 (13)	28 (22)	.047
Other	17 (12)	19 (15)	.39
Over-the-counter drugs	n = 139	n = 124	
Any	104 (75)	89 (72)	.49
Ibuprofen	64 (46)	61 (49)	.61
Acetaminophen	49 (35)	42 (34)	.81
Aspirin	26 (19)	19 (15)	.47
Other	15 (11)	7 (6)	.21
Illicit ("street") drugs	n = 138	n = 123	
Any	47 (34)	63 (51)	.005
Any opioids	41 (30)	32 (26)	.51
Heroin	35 (25)	21 (17)	.10
Methadone	21 (15)	10 (8)	.08
Codeine	10 (7)	15 (12)	.11
Propoxyphene	6 (4)	11 (9)	.07
Meperidine	6 (4)	NA	NA
Other	6 (4)	11 (9)	.07
Diazepam	11 (8)	17 (14)	.13
Cocaine	11 (8)	36 (29)	<.001
Alcohol	11 (8)	43 (35)	<.001
Marijuana	4 (3)	32 (26)	<.001
Other	7 (5)	7 (6)	.83

Abbreviations: MMTP, methadone maintenance treatment program; NSAIDs, nonsteroidal anti-inflammatory drugs.
*Sample sizes differ among the 3 drug categories due to missing data. Items listed as not applicable (NA) were not included on the checklist. Patients could have reported taking more than 1 drug in a category.

cially opioid addiction), and reluctance on the part of the chemically dependent person to seek medical care because of stigma or fear of relapse.

Although the association between time in methadone treatment and chronic severe pain in our multivariate model is unexplained, it underscores the chronicity of pain complaints among MMTP patients and the necessity of long-term management of pain in an important segment of this population. In laboratory studies using experimentally induced pain, MMTP patients have been shown to have lower pain thresholds compared with matched controls (persons with no history of substance abuse or dependence), cocaine abusers, and former heroin users not receiving opioid agonist therapy.[28,29] The findings of lower pain threshold and higher chronic pain prevalence emphasize the need for competent pain assessment and management in this population.[29]

Our study had several important limitations. Given the lack of instruments that have been validated, that are brief and multidimensional, and that have proven utility in populations with chemical dependency, our questionnaire had only face, content, and factorial validity. Factor analysis performed with the BPI pain severity and interference items yielded the 2 expected factors (data are available from the author). The development of validated questions in this area would be useful research. At minimum, our results require replication in future work. This study did not include a standardized measure of withdrawal pain. However, participants in our focus group reported that they were able to distinguish withdrawal pain from other types of pain. Chronic pain is typically localized and persists, although with varying degrees of severity, for long periods of time.[30] Withdrawal pain is short-lived, not localized, and, in the case of opioid withdrawal, is reported as causing flu-like symptoms.[31,32] Inclusion of withdrawal pain as a covariate in the multivariate analysis also helped to distinguish withdrawal pain from chronic pain.

The brevity of the questionnaire, which was needed to encourage a good response, precluded collection of much important information. Additional studies need to clarify pain syndromes, provide additional data about pain characteristics, evaluate the impact of pain on physical and psychosocial functioning, and explore the relationship between pain and drug abuse, including first use and relapse. Studies also are needed to evaluate pain treatment in chemically dependent populations and determine the extent to which access to care and other factors implicate undertreatment as a cause of unrelieved pain.

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