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Pain Characteristics and Pain Catastrophizing in Incarcerated Women with Chronic Pain

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Abstract

Chronic pain in incarcerated women is understudied and poorly described. Study objectives were to describe pain characteristics, correlates, and predictors in a convenience sample of incarcerated women with chronic pain. A survey packet that included the Brief Pain Inventory Short Form (BPI-SF) and the Pain Catastrophizing Scale (PCS) was distributed to all inmates at a state prison for women. Those who self-identified as having chronic pain 4 on a 0–10 numeric rating scale were invited to complete the survey. Demographics and medical and psychiatric diagnoses were abstracted by chart review. Participants (N=159) rated their current and average pain intensity as severe. Pain catastrophizing was found to predict average pain intensity and level of pain-related interference in functioning. Pain catastrophizing is treatable with behavioral intervention in the general population. Findings suggest that pain catastrophizing may be an important target for research and treatment in incarcerated women with chronic pain.

Keywords

Incarcerated; women; chronic pain; pain catastrophizing; underserved

Women suffer disproportionately from chronic pain.¹ Women are two to nine times as likely as men to acquire varied pain conditions,^{2–5} and gynecologic and many pelvic pain conditions are female-specific.^{6–8} Chronic pain is associated with lower quality of life,⁹ increased psychological distress,^{10–14} and substance use behavior^{15–18}—factors that are prevalent in the female offender population.^{19–24} Incarcerated women generally have more medical comorbidity than incarcerated men, suggesting greater likelihood for chronic pain.²⁵ One study found among Texas female inmates roughly 3% prevalence for chronic low back pain and about a 5% prevalence of arthritis.²⁵ Beyond this single report of these two pain conditions, the literature on global chronic pain in incarcerated women remains sparse, despite the importance of the topic to correctional health care providers and to this medically underserved population. Indeed, incarcerated women have high prevalence of particular diseases and health risk behaviors, and are less likely than others to have health insurance.^{26,27} The prison setting presents a unique opportunity to deliver needed health and behavioral services. Gaining a better understanding of the severity, impact, and psychosocial

predictors for chronic pain among incarcerated women may inform pain treatment needs in this at-risk population.

In 1976, the United States Supreme Court ruled that inmates in correctional facilities have a constitutional right to health care under the eighth amendment to the U.S. Constitution.²⁸ In the years since this ruling, the courts have generally affirmed the right of prisoners to be free of “deliberate indifference to their serious health care needs,”^[p.43] which has resulted in the development of case law and national standards regarding correctional health care.²⁹ In the ensuing years, three basic rights have emerged: the right to access to care, the right to care that is ordered, and the right to professional medical judgment.²⁹ Pressure from professional medical societies and especially from successful litigation led to the development of constitutional systems of health care in jails and prisons in the 1970s, and guidelines and national accreditation standards set forth by organizations such as the National Commission on Correctional Health Care (NCCHC) have fostered improved quality.²⁹

While empirical descriptions are lacking, in practice acute pain treatment for incarcerated women is similar to that delivered in community populations. The Oregon prison medical system is akin to a health maintenance organization (HMO) model, and therefore prisoners complaining of pain who are unable to manage their pain complaint with the over the counter analgesics available at no cost in their housing units can request medical care. They are generally triaged within 24 hours and seen by a nurse, who may determine that further evaluation and treatment from a provider is needed. Evaluation of chronic pain complaints generally requires obtaining the patient’s detailed history and physical exam as well as prior medical records. The nature of the pain (e.g., somatic, visceral, neuropathic) determines therapy. Adjunct therapy such as exercise and stretching is advised. Narcotic pain medication is seldom used in the prison system outside of acute pain treatment due to concerns over prior problematic drug abuse and potential diversion or extortion. The rapid complaint-to-treatment timeline and guaranteed access to care suggests that inmates enjoy excellent pain care. However, chronic pain differs from acute pain in important ways: chronic pain is not simply a medical problem, rarely is “cured” or healed, and medications alone are typically insufficient.

The International Association for the Study of Pain defines pain as an unpleasant sensory and an emotional experience associated with actual or potential tissue damage, or described in terms of such damage,³⁰ suggesting that emotions, coping skills, and psychosocial factors strongly contribute to the pain experience. While analgesic treatment may be helpful, particularly for acute pain, management of chronic pain is optimized with a multidisciplinary approach that includes pain psychology and physical therapy because both modalities work to improve patient function and increase patient self-efficacy, thereby decreasing feelings of helplessness. Pain psychology is not currently available in the Oregon prison system, and physical therapy is available on a very limited basis. Optimization of non-pharmacologic pain options are particularly important in populations with a high degree of comorbid substance abuse, such as incarcerated women.

To date, no published studies have described chronic pain characteristics and correlates in the female offender population. As such, the relatedness of chronic pain on aspects of

functioning and psychological experience are unknown. The lack of data speaks to the need for research to address chronic pain in incarcerated populations systematically.

Psychological experience is built into the definition of pain, and decades of research have shown that psychological factors strongly influence pain outcomes.^{11,12,31–35} One of the most potent psychological correlates for chronic pain is *pain catastrophizing*, which is defined as a cascade of negative cognitive and emotional responses to pain. Pain catastrophizing is a construct constituted of three factors: magnification of pain, rumination on pain, and feelings of helplessness over pain.^{11,12,31–35} Importantly, pain catastrophizing is associated with greater use of pain medication,³⁶ increased pain intensity^{9,37,38} and disability,^{9,37,38} and poor response to pain treatment.³⁹ While pain catastrophizing and its negative consequences for pain outcomes are well described for community-dwelling women with chronic pain,^{40–42} we found no studies to report on pain catastrophizing in incarcerated women. Pain catastrophizing may be of greater consequence for incarcerated women with chronic pain, given their risk for psychological comorbidity, lack of access to behavioral pain care, and their poor control over environmental factors in the prison setting.

Furthermore, incarcerated women are more likely to have a history of risk factors which—in community populations—are known to worsen the experience of chronic pain. Such risk factors include substance use disorder, anxiety, depression, and lower socioeconomic status.^{14,39,43} The current study aimed to investigate the relationships of several psychobehavioral variables in a convenience sample of incarcerated women with chronic pain. This study also aimed to describe the role of pain catastrophizing in incarcerated women with chronic pain. Gaining a better understanding of the psychobehavioral predictors for greater chronic pain intensity in incarcerated women would set the stage for improved psychobehavioral treatment. We expected to find that pain intensity, pain catastrophizing, age, and pain-related interference in function would positively correlate. Lastly, we hypothesized that pain catastrophizing would predict average pain intensity, controlling for pain-related interference in function and age.

Methods

Population studied

The population studied consisted of female inmates incarcerated at the Oregon state prison for women, the Coffee Creek Correctional Facility. The study was conducted in accordance with the guidelines of the Human Subjects Committee of the Institutional Review Board of Oregon Health & Science University, by the Oregon Department of Corrections, and by Coffee Creek Correctional Facility.

Procedures—In 2009 a study survey packet containing a brief introduction, the Brief Pain Inventory Short Form (BPI-SF) and the Pain Catastrophizing Scale (PCS) was distributed by prison staff to all female inmates (N=1,150). The brief survey introduction included a definition of chronic pain as being pain, regardless of intensity, lasting longer than three months. Women meeting this definition of chronic pain were invited to complete the survey at their convenience and return it to a confidential health services mailbox. Language in the survey indicated that by completing the survey participants were giving consent to have their

deidentified responses used for research purposes. No compensation was offered for completing the survey. Participants who returned their surveys also provided their prison identification number and their names.

A retrospective cross-sectional chart review for the study participants was conducted. Chart reviews were conducted by two study staff: a research assistant with a master's of science in nursing, and a doctoral-level clinical psychologist. Identifying information provided by the participants was used to access participants' medical records for data abstraction purposes. Data were abstracted using an abstraction form developed prior to the study. In addition to participants' age and race, pain type/location and pain diagnoses were abstracted from the medical section. Information regarding substance use disorder was abstracted from the initial medical receiving screening/medical history form and mental health intake record; diagnoses were made by a licensed mental health professional on prison staff using the diagnostic criteria from the *Diagnostic and Statistical Manual (DSM-IV)*. Psychiatric diagnoses included in DSM-IV regarding mood and anxiety disorder were made by a licensed clinical psychologist or professional counselor on prison staff; diagnoses were made either at the initial prison intake interview or during incarceration. Types of anxiety disorder (panic disorder, posttraumatic stress disorder, anxiety disorder—not otherwise specified) were collapsed into one anxiety disorder variable for the analyses.

Measures

The Brief Pain Inventory Short-Form (BPI-SF).⁴⁴ The BPI-SF is a self-report measure of pain intensity and pain interference widely used in pain research. Participants rate their current, worst, least and average pain intensities using an 11-point Numeric Rating Scale anchored by 0 = none and 10 = worst pain imaginable. The BPI-SF also assesses pain related interference with functioning. Participants rate the degree to which pain interferes with functioning in various life domains such as mood, walking and other physical activity, relations with others, life enjoyment and sleep. Items referring to “work” and “sex” were removed to fit the study population and setting. The combined mean of the interference items was used as a total pain interference score. In previous research, the BPI-SF has been shown to discriminate among pain intensity levels and to be sensitive to change over time.⁴⁴ Average pain intensity was examined as a continuous variable in the analyses.

The *Pain Catastrophizing Scale (PCS)*³³ is a 13-item scale that assesses three components of catastrophizing (pain magnification, helplessness, and rumination). Each item asks the person to rate her cognitive and emotional pain responses on a 0–4 scale with 0 being “not at all” and 4 being “all the time”. Cronbach's alpha value for the total PCS is excellent ($\alpha=0.95$). Test-retest reliability estimates for six weeks ($r=0.75$) and ten weeks ($r=0.70$) show strong test-retest reliability.⁴⁵ The PCS has been found to be related more to ratings of pain severity and pain interference than to ratings of negative affect;⁴⁶ however, moderate correlations between the PCS and pain indices suggest independence between the instruments. Pain catastrophizing was examined as a continuous variable in the analyses.

Participants and sample—Similar to other pain research,⁴⁷ our inclusion criterion for chronic pain was set for average pain intensity ≥ 4 on the BPI-SF Numeric Rating Scale

(0=10). We received 186 completed surveys (16.2% response rate); 27 were excluded due to lack of pain report (average pain level = 0; n = 14), or mild pain report (rated as 1–3 out of 10; n = 13). The final sample included 159 women with chronic pain. Medical charts were missing for 13 persons; however, race data for these people were accessible in electronic prison records. Despite lacking medical chart information for these 13 participants they were included in the study because they provided complete data for the primary study variables (pain catastrophizing, pain intensity, and pain-related interference). It was not possible to calculate a response rate for the study because the true number of women with chronic pain incarcerated at the facility is unknown.

Analytic approach—Descriptive statistics were conducted to yield means, ranges, and standard deviations for the variables measured (age, average pain intensity, worst pain intensity in past twenty-four hours, pain related interference, substance use disorder, pain catastrophizing, depression and anxiety). Pearson’s *r* was used to calculate correlation values (two-tailed) between the study variables. Multivariate regression was used to test our predictive models for average pain intensity. Results with a *p*-value .05 were considered significant. All statistical analyses were conducted using SPSS v. 17.0.

Results

The sample included 86.2% White (n=137), 5.7% American Indian (n=9), 4.4% Black (n=7), 1.9% Hispanic (n=3), 0.6% Asian women (n=1) and 1.3% women of unknown race (n=2). Mean age was 39.0 years (SD=11.47; range = 21–69). Table 1 provides additional sample characteristics. Musculoskeletal pain was the primary pain type (59.7%). Table 2 provides information regarding pain characteristics and pain catastrophizing.

Table 3 provides the Pearson’s *r* correlation for the study variables. Only pain catastrophizing ($r=0.422, p<.001$) and pain interference ($r=0.451, p<.001$) were significantly correlated with average pain intensity. These correlations were positive, as expected. Pain catastrophizing was negatively correlated with age ($r=-0.238, p=.010$) and pain-related interference in function ($r=0.60, p<.001$). In addition to pain catastrophizing, age was negatively correlated with substance abuse disorder ($r=-0.336, p<.001$), such that younger age is significantly related to substance use disorder.

Multivariate regression analysis was conducted to determine the predictive value of the independent variables on average pain intensity. Thus, we first fitted a model that included the following independent variables: age, depression, anxiety, substance use disorder, pain catastrophizing, and pain-related interference in function. Tolerance ranged between 0.634 and 0.981, demonstrating relatively low collinearity amongst all of the predictors. The overall model was significant, $F_{(6,101)}=6.745, p<0.001, R^2=.535, \text{Adjusted } R^2=0.244$. Only pain catastrophizing ($\beta=0.028, t=2.294, p=.024$) and pain related interference in function ($\beta=0.039, t=3.249, p=.002$) were significant. Therefore, we fitted a second and final model for average pain intensity with only these two significant predictors, along with age. We chose to control for age in the second model because of its positive association with pain in the extant literature, and because it quantified *current* participant age status (in contrast, depression, anxiety, and substance use disorder were historical variables). Results for this

final model are presented in Table 4. The overall model was significant $R=0.529$, $R^2=0.279$, Adjusted $R^2=0.259$, $F_{(3,110)}=13.83$, $p<.001$. Pain catastrophizing ($\beta=0.028$, $t=2.370$, $p=.020$) and pain-related interference in function ($\beta=0.039$, $t=3.379$, $p=.001$) were both significant predictors for average pain intensity, controlling for age.

Discussion

The goal of this study was to describe pain characteristics, correlates, and predictors for pain intensity in incarcerated women with chronic pain. The main finding of this study was that pain catastrophizing and pain-related interference in functioning significantly predicted average pain intensity for the sample of incarcerated women with chronic pain. This finding confirms prior work in non-incarcerated populations showing that cognitive and emotional responses to pain are strongly predictive of reported pain experience.^{48,49}

As expected, levels of average pain intensity were similar to those found for community-dwelling outpatient women seeking specialty pain care services.^{50,51} The sample mean for pain catastrophizing ($M=27.13$) was somewhat higher than means for both female-only and general outpatient samples in chronic pain clinics, where mean PCS scores were found to range from 21.38 to 26.23.^{50,52–55} This may be due to poorer health or to less effective coping skills in this population. Findings suggest that a significant number of incarcerated women are suffering from chronic pain without having access to chronic pain care. Behavioral pain care does not currently exist in the Oregon prison system, and we found no report to describe behavioral pain treatment in the larger U.S. prison system. However, behavioral interventions for pain may be particularly beneficial for incarcerated women given that two of the goals of behavioral interventions are to optimize psychological responses to pain and to minimize reliance on medications to manage symptoms.

Contrary to our hypotheses, neither age, depression, anxiety, nor substance use disorder was significantly predictive of average pain intensity. As in other research, age was negatively correlated with pain catastrophizing,⁵⁶ suggesting that younger women may be more likely to catastrophize and feel helpless about their pain. Age was also negatively correlated with substance abuse disorder. Although unknown, it is possible that early intervention for women with chronic pain may decrease pain catastrophizing and the influence of pain experience on substance abuse behaviors. In prospective studies, pain catastrophizing has been shown to predict level of prescribed opioid medication usage with greater catastrophizing being linked to greater usage of opioids.¹³

Prior work has demonstrated that anxiety and depressive symptoms positively correlate with pain intensity and pain catastrophizing.^{52,57} These findings were not replicated in the current study and divergent study methodology may explain this discrepant finding. Most studies measure current level of depressive and anxiety symptoms as a component of the study; the current study examined medical records for diagnosis at intake and thus provides historical data. We did not measure current level of symptoms for either depression or anxiety and thus this stands as a limitation of the study design. It is possible that some women were either treated for anxiety or depression, or their symptoms changed without such updates recorded in their medical record. Similarly, substance abuse disorder was a historical

variable that reflects intake diagnosis and not current behavior. In the main, incarcerated women do not have access to illicit substances and narcotic pain medications are prescribed to few patients and only on a short-term basis for acute pain. We acknowledge that findings from the study may be very different for persons who are *actively* using illicit substances. Future research may examine current status for anxiety, depression, and substance abuse to determine true associations with pain intensity and pain catastrophizing. For incarcerated women, such studies should be conducted at prison intake if substance use disorder is included in the study design.

Prior research has suggested that undertreated chronic pain is associated with substance abuse behavior and has been linked to first illicit drug use, maintenance of drug abuse, low completion rates for substance abuse programs, and recidivism.¹⁸ Indeed, results from several independent research groups show high rates of self-medication for pain among patients comorbid for drug abuse and chronic pain.^{15–17} Future research may examine predictors for chronic pain and self-medication in incarcerated women. Additionally, future research may quantify the rate of first drug use as self-medication for chronic pain in incarcerated women.

The response rate for the chronic pain survey was low. Few prison studies employ self-report designs solely and therefore comparison of response rates is difficult. Other health survey studies of incarcerated women have reported higher response rates (roughly 60%).^{58,59} However, these study designs included brief oral group announcements about the study, inmates were allowed to ask the researchers questions about the survey, and only inmates who attended the oral informational session were given surveys to complete. Response rates may also be bolstered when the surveys are administered during an interview.⁵⁹ So, the response rate for the current study likely represents an underreporting of the chronic pain in incarcerated women, given that inmates had no personal contact with any study staff. While it is possible that only those with the worst pain were motivated to complete the surveys, it is equally likely that those with greater depression or psychological distress were less likely to complete them. Despite the low response rate, we underscore the value of the current study in contributing to the sparse literature on chronic pain in incarcerated women. Indeed, more research is needed to determine the prevalence of chronic pain in incarcerated women.

To our knowledge, this study provides the first report specifically to describe chronic pain in terms of pain types, pain characteristics, and psychological and behavioral predictors for pain intensity in incarcerated women. Pain catastrophizing—a psychological construct—was found significantly to influence average pain intensity and pain-related functioning in this sample, and these findings dovetail with research on non-incarcerated samples. The current findings support additional research focused on examining and treating chronic pain in incarcerated women, and suggest that a behavioral intervention which uses pain psychology principles may be particularly beneficial in this population. Behavioral treatment for pain focuses on improving individuals' cognitive, emotional, and behavioral contributions to their pain experience.⁵² Group behavioral treatment for chronic pain has been shown to be efficacious in community populations in terms of reducing pain intensity, psychological distress, and pain medication usage.^{49,60–64} A strong overlap exists between substance abuse

and chronic pain, and people with pain and substance abuse are at risk for self-medicating their pain with illicit substances.^{17,18,65,66} The prison setting may provide a unique opportunity to deliver group behavioral pain treatment to incarcerated women who have chronic pain. Behavioral pain treatment would provide an alternative to pain medications, and may improve long term outcomes by reducing self-medicating behaviors following release from prison.

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Table 1

SAMPLE CHARACTERISTICS FOR CHART REVIEW (N = 146)

	Number (%)
Race/Ethnicity	
White	137 (86.2)
American Indian	9 (5.7)
Black	7 (4.4)
Hispanic	3 (1.9)
Asian	1 (0.6)
Unknown	2 (1.3)
Pain Type ^a	
Musculoskeletal	95 (65.1)
Abdominal	39 (26.7)
Migraine/headache	21 (14.3)
Pelvic	10 (6.8)
Fibromyalgia	5 (3.4)
Other	18 (12.3)
Substance Use Disorder Diagnosis ^a	
Types:	
Methamphetamine	56 (38.4)
Alcohol	44 (30.1)
Cannabis	39 (26.7)
Heroin	9 (6.2)
Cocaine (including crack)	24 (16.4)
Prescription opioids	14 (9.6)
Barbiturates	2 (1.4)
Amphetamines	8 (5.5)

^aCategories are not mutually exclusive.

Table 2**BRIEF PAIN INVENTORY SHORT FORM AND PAIN CATA STROPHIZING SCALE (N = 159)**

Brief Pain Inventory (0–10)	Mean (SD)
Average Pain Intensity	6.28 (1.43)
Current Pain Intensity	6.32 (1.91)
Least Pain intensity during previous 24 hours	4.99 (2.12)
Worst Pain intensity during previous 24 hours	7.87 (1.70)
Pain-related functional interference	
Mood	6.10 (2.31)
General activity	6.26 (2.55)
Walking	5.59 (2.97)
Relations with others	4.48 (3.02)
Life enjoyment	6.45 (2.58)
Sleep	7.34 (2.37)
BPI Total Interference Score	6.04 (1.99)
Pain Catastrophizing Scale	
Total Score	27.13 (11.82)
Rumination subscale	9.38 (4.22)
Magnification subscale	5.98 (3.15)
Helplessness subscale	11.77 (5.66)

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Table 3

CORRELATION MATRIX

	Age	Average Pain	Pain Catastrophizing	Pain Related Interference in Functioning	Substance Abuse	Depression	Anxiety
Age	1	-.142 .125	-.238* .010	-.036 .701	-.336** .000	-.008 .933	-.119 .201
Average Pain Intensity		1	.422** .000	.451** .000	.088 .323	-.033 .681	-.047 .557
Pain Catastrophizing			1	.601** .000	.144 .112	.016 .841	.063 .441
Pain Related Interference in Functioning				1	.043 .634	-.095 .246	-.057 .489
Substance Abuse					1	.154 .082	.160 .071
Depression						1	.147 .065
Anxiety							1

* p<.05

** p<.01

Table 4 MULTIPLE REGRESSION RESULTS FOR MODELS PREDICTING AVERAGE PAIN INTENSITY

Full Model	Unstandardized Coefficients		Standardized Coefficients		t	p-value
	B	Standard error	Beta			
Constant	4.703	.725			6.490	<.0001
Age	-.014	.011	-.109		-1.193	.236
Depression	.008	.226	.003		.037	.971
Anxiety	-.084	.229	-.031		-.366	.715
Substance Use Disorder	-.079	.292	-.024		-.270	.788
Pain Catastrophizing	.028	.012	.242		-.370	.020
Pain-Related Interference in Functioning	.039	.011	.337		3.379	.001