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Brief Research Report

Relationship Between Opioid Analgesic Prescription and Unemployment in Patients Seeking Acupuncture for Chronic Pain in Urban Primary Care

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Abstract

Objective. The widespread use of opioid analgesics to treat chronic nonmalignant pain has contributed to the ongoing epidemic of opioid-related morbidity and mortality. Previous studies have also demonstrated a relationship between opioid analgesic use and unemployment due to disability. These studies have been limited to mainly white European and North American populations. The objective of this study is to explore the relationship between opioid analgesic use for chronic nonmalignant pain in an urban, mainly black and Hispanic, low-income population. **Design.** This is a cross-sectional observational study. **Setting.** Subjects were recruited from six urban primary care health centers. **Subjects.** Adults with chronic neck, back, or osteoarthritis pain participating in an acupuncture trial were included. **Methods.** Survey data were collected as a part of the Acupuncture Approaches to Decrease Disparities in Pain Treatment two-arm (AADDOPT-2) comparative effectiveness trial. Participants completed a baseline survey including employment status, opioid analgesic use, the Brief Pain Inventory, the global Patient Reported Outcomes Measurement Information Systems quality of life measure, the Patient Health Questionnaire-9 (PHQ-9), and demographic information. A multivariable logistic regression model was built to examine the association between opioid analgesic use and unemployment. **Results.** Opioid analgesic use was associated with three times the odds of unemployment due to disability while controlling for potential confounders, including depression, pain severity, pain interference, global physical and mental functioning, and demographic characteristics. **Conclusions.** This study adds to the growing body of evidence that opioid analgesics should be used with caution in chronic nonmalignant pain.

Key Words: Opioid; Narcotic; Chronic Pain; Osteoarthritis; Low Back Pain; Disability; Unemployment

Introduction

Chronic pain affects an estimated 15–30% of the population [1,2] and accounts for a large volume of outpatient visits [2–4]. The widespread use of prescription opioid analgesics to treat chronic nonmalignant pain has contributed to the ongoing epidemic of opioid-related morbidity and mortality [5–7]. Randomized controlled trials of opioids demonstrate good short-term effect on pain and function in patients with nonmalignant pain [8]. There has been longstanding debate about whether opioids are beneficial for chronic nonmalignant pain, particularly in terms of improved physical functioning [9,10]. Some studies have found that patients with chronic nonmalignant pain who respond well to opioid therapy also have improved functional status, at least in the short term [11,12]. Other studies have failed to find a positive effect on function even when analgesia is achieved [13–15]. Many of these studies had a short duration of follow-up.

Patients who use chronic opioid analgesics for nonmalignant pain have high levels of unemployment and depression and poor quality of life [16–19]. Observational studies have found that the use of opioid analgesics for low back pain is associated with chronic work loss, independently of pain severity, injury severity, and initial disability [20–22]. It is unclear whether opioid analgesic use is a marker of higher levels of pain, which are related to disability and unemployment, whether unemployment itself increases opioid analgesic use, and whether opioid analgesic use independently increases disability and unemployment rates. However, the high level of disability and unemployment in patients using chronic opioid analgesics raises concerns about the efficacy of opioids to improve functional status or return to work [18,19,23–25].

Racial and ethnic minority patients experience a higher prevalence of chronic pain [2], more disability related to pain [26], and less adequate treatment [27,28]. On the other hand, recent increases in opioid prescriptions have affected predominantly white communities [29], and the literature on the relationship between opioid analgesic use and unemployment has been explored mainly in Caucasian populations in the United States and Europe [16,17,19–21,30]. Physicians are less likely to prescribe opioids for racial and ethnic minority patients [31–33], and opioid prescribing is more common in rural areas [34–36]. It is unknown whether the association between opioid analgesic prescription and unemployment due to disability is also present in urban ethnic minority populations. The Acupuncture Approaches to Decrease Disparities in Pain Treatment (AADDOPT-2) two-arm comparative effectiveness trial presents an opportunity to explore this association in a population of urban, mainly ethnic and racial minority patients undergoing acupuncture treatment for chronic nonmalignant pain. We aimed to explore the relationship between opioid analgesic use and unemployment due to disability while controlling for the effects of pain severity, sociodemographic characteristics, and depression on this relationship.

Methods

Participants

This is a cross-sectional observational study of baseline data collected as a part of the AADDOPT-2 comparative effectiveness trial. AADDOPT-2 randomized 765 patients between March 2015 and August 2017 to assess whether acupuncture for chronic pain delivered in a group setting is as effective as individual acupuncture in a low-income, underserved, mainly black and Hispanic patient population at risk for health disparities. Patients were recruited from six urban primary care health centers. Eligible patients were at least 21 years old, had chronic pain lasting three or more months due to osteoarthritis, or chronic neck or back pain, were able to provide consent in English or Spanish, and were available for up to 24 weeks. Patients with pain due to cancer were excluded. The Albert Einstein College of Medicine Institutional Review Board (IRB) approved this study protocol (IRB No. 2014-4192).

Measures

The initial research interview was performed after consent to participate in the trial had been obtained but before randomization, three weeks or less before the first session. Interviews were conducted by phone by trained bilingual research assistants. The main outcome of interest for this analysis was employment status, which was collected by asking participants "What is your current working status?" Response options included working full-time, working part-time, unemployed, retired, unable to work due to disability, homemaker, other, and "don't know." This outcome was dichotomized as "unable to work due to disability" vs all other responses. Patients who reported that they were retired were excluded from the analysis.

The predictor variable, opioid medication use, was assessed using two questions. The first question was "Do you have a prescription from a health care provider for one or more of the following opioid (narcotic) pain medications?" The researcher then read the following options including both generic and trade names: codeine (Tylenol 3 or Tylenol 4), fentanyl (Duragesic), hydrocodone (Vicodin), oxycodone (Percocet, OxyContin), oxymorphone (Opana), propoxyphene (Darvon), hydromorphone (Dilaudid), meperidine (Demerol), methadone, morphine (Kadian, MS Contin), or "I do not have a prescription for any of these medications." The second question was "During the past week, on how many days did you take one or more doses of your opioid pain medications?" Patients were categorized as opioid analgesic users if they reported use of any opioid medication for the first question AND they reported a nonzero number for the second question.

Sociodemographic information included age, gender, race, ethnicity, preferred language, household income, nationality, marital status, and number of dependent children. Participants were also asked whether they received household income support. Options listed by the interviewer included Welfare of General Public Assistance; WIC: Supplemental Food Program; Food Stamps; Unemployment Insurance; Housing Support; Child Support; SSI or SS retirement, Disability or Survivor's Benefit; Payments for Providing Foster Care; No Income Support; or I Don't Know. This was asked separately from the primary outcome measure of current working status. Level of education and health insurance status were also collected.

The initial interview consisted of several established measures with good reliability, all of which have been validated for use in Spanish-speaking populations. These included the Brief Pain Inventory: Short Form (BPI),

which is the primary outcome measure for the parent trial [37]. It includes four pain scales, measuring "pain on average" during the past week, "pain at its worst" during the past week, "pain at its least" during the past week, and "pain right now." It also includes a validated seven-item scale measuring the extent to which pain interferes with function, including activity, mood, sleep, work, and life enjoyment.

Quality of life was assessed with the 10-item global Patient Reported Outcomes Measurement Information Systems (PROMIS) [38]. Depressive symptoms were assessed with the Patient Health Questionnaire-9 (PHQ-9) measure [39].

Analysis

Associations between sociodemographic variables, pain, quality of life and depression measures, and unemployment due to disability were assessed using chi-square or Fisher exact tests for categorical variables and Student *t* tests for continuous variables. The $\alpha = 0.05$ level of significance was used. To test the association between opioid analgesic use and unemployment due to disability, a multivariable logistic regression model was built with unemployment due to disability as the outcome. Variables associated with opioid analgesic use with a *P* value of $\alpha = 0.10$ or less in the bivariate association analysis were also included in the model as covariates.

Results

Of the 765 patients who enrolled in the trial and completed baseline interviews, 150 patients were excluded because they reported being retired. An additional 11 patients were excluded due to missing data on opioid analgesic use. Participants who used opioid analgesics (N = 136) were more likely to be born in the United States (64.7% vs 46.8%, $P = 0.002$), to be male (25.0% vs 17.1%, $P = 0.04$), and to speak English as their primary language (84.3% vs 76.6%, $P = 0.02$). Opioid analgesic use was not associated with race or ethnicity (Table 1).

Participants who used opioid analgesics reported poorer function on the PROMIS global mental health measure (9.91 vs 11.66, $P < 0.001$). They also reported poorer global physical health (PROMIS score 8.98 vs 10.13, $P < 0.001$). Opioid analgesic use was associated with more symptoms of depression as measured by the PHQ-9 (11.31 vs 8.65, $P < 0.001$). Participants who used opioid analgesics reported greater pain interference (7.30 vs 6.07, $P < 0.001$) but not greater baseline pain severity (7.22 vs 6.89, $P > 0.05$) (Table 2).

Participants who used opioid analgesics were more likely to be unable to work due to disability (73.5% vs 39.3%, $P < 0.001$) and to receive social security income (SSI/SSD; 59.6% v 37.2%, $P < 0.001$) (Figure 1). When controlling for potential confounders in multivariable analysis, patients who used opioid analgesics had three times the odds of being unable to work due to disability compared with nonusers (odds ratio = 3.080, $P < 0.001$) (Table 3).

Table 1. Associations between opioid pain medication use and sociodemographic characteristics (N = 604)

Characteristic	Opioid Use (N = 136), No. (%)	No Opioid Use (N = 468), No. (%)	*P* Value
Age, mean (SD), y	50.9 (9.7)	51.1 (12.2)	0.88
Gender			
Female	102 (75.0)	388 (82.9)	0.04
Male	34 (25.0)	80 (17.1)	
Education			
≤ High school	75 (55.1)	253 (54.1)	0.82
≥ Some college	61 (44.9)	215 (45.9)	
Race			0.83
American Indian/Native	8 (6.1)	24 (5.3)	
Pacific Islander/Native Hawaiian	0 (0.0)	1 (0.2)	
Black/African American	49 (37.4)	150 (33.2)	
White	19 (14.5)	59 (13.1)	
Multiracial	18 (13.7)	60 (13.3)	
Asian	2 (1.5)	7 (1.5)	
Other	35 (26.7)	151 (33.4)	
Ethnicity			0.26*
Hispanic or Latino	76 (55.9)	288 (61.7)	
Non-Hispanic	60 (44.1)	175 (37.5)	
Don't know	0 (0.0)	4 (0.9)	
Marital status			0.25
Married or living with partners	33 (24.3)	137 (29.3)	
Others	103 (75.7)	330 (70.7)	
Preferred language			0.02*
English	102 (84.3)	351 (76.6)	
Spanish	18 (14.9)	107 (23.4)	
Other	1 (0.8)	0 (0.0)	
Born in the United States			<0.01
No	48 (35.3)	249 (53.2)	
Yes	88 (64.7)	219 (46.8)	

*Fisher exact test.

Discussion

In this population of low-income, primarily racial and ethnic minority chronic nonmalignant pain patients in an urban setting, opioid analgesic use was associated with three times the odds of unemployment due to disability. Eriksen et al. found a comparable magnitude association in a cross-sectional study comparing 228 chronic pain patients on opioid medication with 1,678 similar pain patients not on medication in Denmark; the odds ratio for employment was 0.37 in that study [19]. This finding suggests that this association is robust, even in populations that may have less access to opioid analgesics overall.

Previous studies have suggested that depression is an important mediator of the relationship between pain, opioid analgesic use, and poor functional status [40],

and pain intensity and depression are independently associated with unemployment in chronic pain patients [30]. However, in this population, even when controlling for pain intensity, pain interference, depression, and global mental and physical health, the association between opioid analgesic use and unemployment remained large and significant.

The main limitation of this study is that it is a cross-sectional observational study. It was not possible to determine the direction of hypothesized causal relationships. For example, unemployment itself may lead to increased opioid analgesic use if patients are less concerned about interference of medication with work activities or if unemployment leads to greater rumination on pain symptoms [35]. This is likely to explain the larger association found in this study compared with prospective studies that link opioid prescribing and future disability and eliminate the possibility of reverse causality [21]. In our study, the temporal relationship between opioid analgesic prescription and unemployment could not be established. Given the cross-sectional nature of the current study and the lower odds ratio of ~2 reported in the prospective study by Franklin et al. [21], our reported odds ratio of 3 is likely an overestimation of the true relationship. However, although increasing unemployment is associated with increases in opioid prescription rates, these associations are small and unlikely to fully explain the large associations found in both cross-sectional and prospective studies [41]. Another limitation is that there may be misclassification of the outcome of disability. Specifically, about 19% of patients excluded from this study because they identified as "retired" were under 65 years of age. Some of these patients may have, in fact, chosen to retire due to disability. However, this is

Table 2. Associations between opioid pain medication use and measures of pain severity, quality of life, and depression (N = 604)

Characteristic	Opioid Use (N = 136), Mean (SD)	No Opioid Use (N = 468), Mean (SD)	*P* Value
Pain severity*	7.22 (1.70)	6.89 (1.89)	0.0712
Pain interference†	7.30 (2.16)	6.07 (2.73)	<0.0001
PHQ-9 score‡	11.31 (5.99)	8.65 (6.05)	<0.0001
PHQ-9 categories, No. (%)			0.0007
0–4	16 (11.9)	132 (28.6)	
5–9	43 (32.1)	144 (31.2)	
10–14	32 (23.9)	93 (20.1)	
15–19	30 (22.4)	69 (14.9)	
≥20	13 (9.7)	24 (5.2)	
PROMIS global physical health§	8.98 (2.50)	10.13 (2.81)	<0.0001
PROMIS global mental health¶	9.91 (3.54)	11.66 (3.86)	<0.0001

PHQ-9 = Patient Health Questionnaire-9; PROMIS = Patient Reported Outcomes Measurement Information Systems.

*Scale of 0 = no pain to 10 = worst pain imaginable.

†Scale of 0 = no interference to 10 = completely interferes.

‡Scale of 0–27, with higher scores indicating greater depression.

§Answer to the question "In general, how would you rate your physical health?" with the following answer categories: 5 = excellent, 4 = very good, 3 = good, 2 = fair, and 1 = poor.

¶Answer to the question "In general, how would you rate your mental health, including your mood and your ability to think?" with the following answer categories: 5 = excellent, 4 = very good, 3 = good, 2 = fair, and 1 = poor.

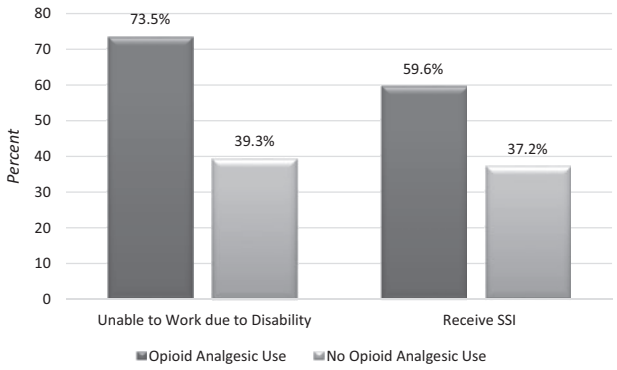

Figure 1. Association between opioid pain medication use and unemployment due to disability and receipt of social security insurance (SSI; $P < 0.01$ for both comparisons).

Table 3. Logistic regression analysis of association between opioid pain medication use and unemployment due to disability (N = 604)

Parameter	Estimate	SE	OR	95% CI for the OR		*P* Value
Intercept	−0.9518	1.2265				0.44
Opioid medication use	1.1249	0.2589	3.080	1.854	5.116	<0.01
Age	0.0519	0.0102	1.053	1.032	1.075	<0.01
Gender	−0.1452	0.1356	0.748	0.440	1.273	0.28
Pain severity	0.0624	0.0739	1.064	0.921	1.230	0.40
Pain interference	0.0629	0.0570	1.065	0.952	1.191	0.27
PHQ-9 score	0.0184	0.0240	1.019	0.972	1.068	0.44
Global physical health	−0.1828	0.0595	0.833	0.741	0.936	<0.01
Global mental health	−0.1199	0.0409	0.887	0.819	0.961	<0.01
Language*	0.0776	0.2874	1.081	0.615	1.898	0.79
Born in the United States	0.0696	0.2442	1.072	0.664	1.730	0.79

CI = confidence interval; OR = odds ratio; PHQ-9 = Patient Health Questionnaire-9.

*English vs Spanish and other.

unlikely to change the overall association between opioid analgesic use and disability.

As in other observational studies, the possibility exists that opioid analgesic use is a consequence of increased pain severity, and that pain severity is actually the proximate cause of disability and unemployment. However, in this population, there was a small and nonsignificant difference in pain severity between opioid analgesic users and nonusers, and pain intensity was not associated with unemployment due to disability in the multivariable analysis. The possibility remains that pain severity would be greater in opioid analgesic users in the absence of these medications; however, mitigating the pain intensity does not appear to increase the likelihood of return to work.

These findings are troublesome given the high prevalence of opioid prescribing among disabled Medicare and Medicaid beneficiaries [42,43]. Future large-scale prospective studies that follow patients from the initiation of opioid analgesic use should be undertaken to evaluate long-term functional and employment outcomes over time. Nonetheless, this study adds to the growing body of evidence that opioid analgesics should be used with caution in chronic nonmalignant pain.

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