A population-based survey of chronic pain and its treatment with prescription drugs

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ABSTRACT

Chronic pain is a common reason for medical visits, but prevalence estimates vary between studies and have rarely included drug treatment data. This study aimed to examine characteristics of chronic pain and its relation to demographic and health factors, and factors associated with treatment of pain with opioid analgesics. A chronic pain module was added to the 2007 Kansas Behavioral Risk Factor Surveillance System (response rate = 61%). Data on prevalence, duration, frequency, and severity of chronic pain, demographics, and health were collected from a representative sample of 4090 adults 18 years and older by telephone. Logistic regression was used to examine the association of both chronic pain and opioid use with demographic and health factors. Chronic pain was reported by 26.0% of the participants and was associated with activity limitations (adjusted odds ratio [AOR] = 3.6, 95% confidence interval [95% CI] 2.8–4.5), arthritis (AOR = 3.3, 95% CI 2.6–4.0), poor mental health (AOR = 2.0, 95% CI 1.4–2.8), poor overall health (AOR = 1.9; 95% CI 1.5–2.5), and obesity (AOR = 1.6; 95% CI 1.2–2.0). Of the 33.4% of people with pain who use prescription pain medication, 45.7% took opioids, including 36.7% of those with mild pain. Chronic pain affects a quarter of adults in Kansas and is associated with poor health. Opioid analgesics are the mainstay of prescribed pharmacotherapy in this group, even among those reporting mild pain.

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1. Introduction

Chronic pain is defined by the International Association for the Study of Pain as "pain that persists beyond normal tissue healing time, which is assumed to be 3 months" [21]. The true burden of chronic pain in the United States is hard to estimate because few studies have been conducted in the United States, and most research has focused on episodic pain, which includes both acute and chronic pain [22,27,34], or on patients rather than the general population [10,15,19]. Variations in the definition of chronic pain have further complicated the issue. *Chronic* has been defined as being present 6 months or more in the past year [10,16,19,26,32] or as lasting at least 3 months [15,29]. Some definitions include pain of all severity levels [19], while others require the pain interfere with activities of daily living [15]. Because of these issues, estimates of chronic pain have ranged from 11% [12] to 55% [4] and have varied between and within countries [19].

Recommendations for aggressively treating chronic noncancer pain have spurred a growing consensus that opioid therapy is appropriate for some patients with such pain [1,2]. As a result, the prescription volume of opioids has increased by an order of magnitude over the last 15 years [11], despite recent concerns that long-term opioid use does not consistently alleviate chronic noncancer pain and is associated with serious health risks [5,24,13]. However, data on the prevalence of opioid use among people with chronic pain are still limited, particularly in the United States, and especially for moderate to severe pain, the primary indication for their use [9]. From 1999 to 2002, 4.2% of US adults reported use of opioid analgesics for pain within the past month [27], but this usage was for both acute and chronic and mild to severe pain. Opioids were prescribed to 22% of adults with pain in Canada [26] and 12% in Denmark [16]. A recent study found that 20.8% of adults in Utah had been prescribed an opioid in the last year. Of these, 29.1% of prescriptions were for long-term pain; the percentage of people with chronic pain who use opioid analgesics was not reported [30]. In aggregate, no prevalence measures of prescription opioid usage in a US population with chronic pain have been published.

With the increase of opioid prescribing, opioid abuse has increased in the United States and abroad [17]. The large increase in opioid prescribing has been associated with a parallel increase in overdoses and other serious consequences of opioid abuse [11]. It is unclear whether the patterns of opioid abuse match the patterns of use for pain, partially because of the limited epidemiology of opioid use for chronic pain.

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To address these limitations, we analyzed population-based data on the prevalence of chronic pain and the medications used to treat it from the 2007 Kansas Behavioral Risk Factor Surveillance System. These data allowed us to examine characteristics of chronic pain, such as duration, frequency, and intensity, as well as its relation to sociodemographic and health factors; and to better characterize factors associated with treatment with opioid analgesics.

2. Methods

2.1. Procedures

The Behavioral Risk Factor Surveillance System (BRFSS) is a nationally representative random-digit dial survey that uses a disproportionate stratified random sampling method to select a representative sample of noninstitutionalized adults aged 18 years or over. Interviews are conducted via a computer-assisted telephone interviewing system. BRFSS data are collected monthly during the interviewing period. Questions are asked on a range of subjects concerned with the leading causes of death, including cigarette smoking, alcohol consumption, physical activity, self-assessed health status, health insurance, diabetes, smoke alarms, seat belt use, and women's health issues. The BRFSS is conducted by the US Centers for Disease Control and Prevention in collaboration with state health departments, and all states use a standard core questionnaire. States can supplement the core questionnaire with optional modules or add questions relevant to the priorities of the state. Detailed descriptions of surveillance system data are available elsewhere [20]. The BRFSS system has good data quality, and when compared to census data, BRFSS data are shown to have minimal bias [25,28].

Data for this study are from the 2007 Kansas BRFSS. The response rate in 2007 was 61.9%. The complete questionnaire is available online (http://www.kdheks.gov/brfss/index.html). In 2007, Kansas administered a state-designed chronic pain module (Table 1), which included questions on the duration, frequency, severity, and treatment of pain. Chronic pain was defined as a "yes" response to the question, "Do you suffer from any type of chronic pain, that is, pain that occurs constantly or flares up frequently?" All questions allowed "Don't know/not sure" and "Refusal to answer" as options. Other variables examined include physical health (ie, "Would you say that in general your health is: Excellent, Very good, Good, Fair, Poor"), mental health (ie, "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?" with ≥14 being considered poor), activity limitations (ie, "Are you limited in any way in any activities because of physical, mental, or emotional problems?"), arthritis (ie, "Have you ever been told by a doctor . . . that you have some form of arthritis?"), health insurance status, body mass index, and physical activity (ie, "During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?"). Race/ethnicity was not analyzed as an associated variable because of the small numbers of some racial/ethnic groups; 86.7% of respondents in the sample self-reported as white from a list of options used on the core BRFSS.

The sample size for this study was 4090. All estimates presented were weighted by demographic characteristics and by selection probabilities so that results were representative of Kansans aged 18 years or older. SAS software, version 9.0, was used for analyses to account for the complex sampling design. The study was approved by the Kansas Department of Health and Environment Institutional Review Board.

Table 1
Questions in the chronic pain module in the 2007 Kansas Behavioral Risk Factor Surveillance System.

Question	Responses
Do you suffer from any type of chronic pain, that is, pain that occurs constantly or flares up frequently?	1 = Yes 2 = No
How long have you been experiencing this type of pain?	1 = Less than 3 mo 2 = 3 to 6 mo 3 = 7 to 12 mo 4 = Over 1 y to 3 y 5 = Over 3 y to 5 y 6 = Over 5 y to 10 y 7 = Over 10 y
About how often do you experience this pain?	1 = It's constant, always there 2 = At least once a day 3 = At least once a week 4 = Not every week but at least once a month 5 = Less often
Using a 0 to 10 scale, where 0 means no pain at all and 10 means the worst pain imaginable, how severe would you say your pain has been on average over the past 3 mo?	0–10 Pain scale
Have you ever seen or talked to your doctor about your pain?	1 = Yes 2 = No
What did the doctor say was the cause of this pain?	1 = Migraine 2 = Cancer 3 = Arthritis 4 = Shingles (PHN) 5 = Sciatica/slipped disc/spondylosis 6 = Diabetes 7 = Muscle pain 8 = Accident/injury 9 = Neuropathic pain 10 = Other (specify) 11 = Doctor didn't say/doctor didn't know
How satisfied are you with how your doctor is helping you manage your pain?	1 = Very satisfied 2 = Satisfied 3 = Dissatisfied 4 = Very dissatisfied
What kind of medication are you currently taking to treat your pain?	1 = Prescription medication only 2 = Over-the-counter medication only 3 = Both prescription and over-the-counter medication 4 = Not treating your pain with medication
What types of prescription medication are you taking for your pain?	1 = Anti-inflammatory drugs such as ibuprofen or naproxen 2 = Analgesic such as Paracetamol 3 = Celebrex, Vioxx, or Bextra 4 = Narcotic pain reliever such as OxyContin, Percocet, or Vicodin 5 = Prescription topical patch 6 = Prescription topical cream 7 = Prescription aspirin or Tylenol 8 = Other (specify)

2.2. Analysis

We calculated weighted prevalence estimates for each of the questions in the chronic pain module. We classified pain severity scores as mild (1–4), moderate (5–6), or severe (7–10) on the basis of the literature [3,31]. For the question that asks which prescription medication the participant is taking to treat pain, the "other" option was recoded in 55 instances where it was clear that the response fell into one of the predesignated categories but was not recognized as such by the interviewer.

The association between chronic pain and health and demographic factors was assessed with logistic regression. Health factors included were mental health status, general health status, activity limitations, body mass index, arthritis, and level of physical activity. We calculated ORs and 95% CIs for the association between each factor and chronic pain, and we then constructed a final logistic regression model. Competing models were assessed on the basis of goodness of fit, and all variables entered in the final model were statistically significant ($P < .01$ or better).

We determined the prevalence of the various prescription medication categories and examined whether severity and frequency of pain were associated with opioid use. We also calculated crude ORs and 95% CIs for the associations between health and demographic factors and opioid use for pain, comparing those who were prescribed opioids for their pain to all others with chronic pain.

2.3. Results

Just over half of the adults were women (51.1%), and 71.8% were married or part of an unmarried couple (Table 2). Chronic pain was reported by 26.0% of Kansans. Among those with chronic pain, 52.6% reported that they had experienced this pain for over 5 years, and 71.0% reported that the pain occurred at least daily. The most common cause of pain was arthritis (31.3%; Table 2). Satisfaction with pain management was reported by 83.5%. A third of people with chronic pain reported current use of a prescription medication to treat their pain. The occurrence of chronic pain by level of severity followed a roughly normal distribution (Fig. 1). On a scale of 1 to 10, with 10 designating most severe, the mean pain severity reported was 5.2, which falls within the range of moderate pain (5–6). Mild pain was reported by 40.4% of those with chronic pain.

Eleven health and demographic variables were associated with chronic pain in unadjusted analyses (Table 3). There was no association between insurance status and chronic pain. In the final logistic regression model, only 6 demographic and health factors were independently associated with chronic pain: age (AOR = 0.99; 95% CI 0.98–0.99); having activity limitations (AOR = 3.6; 95% CI 2.8–4.5); having arthritis (AOR = 3.3; 95% CI 2.6–4.0); having 14 or more days of poor mental health in a month (AOR = 2.0; 95% CI 1.4–2.8); having fair or poor overall health (AOR = 1.9; 95% CI 1.5–2.5); and being obese as compared to underweight/normal (AOR = 1.6; 95% CI 1.2–2.0).

Of the third of all adults with chronic pain who reported current prescription medication use, 45.7% used narcotic pain relievers (opioid analgesics), making it the most common pain medication (Table 4). This group represented 4.0% of the total adult population of Kansas. Of the different categories of medications reported, we found significant differences in the prevalence of use among pain severity levels only for COX-2 inhibitors (Kruskal–Wallis χ^2 = 6.1, $P = .048$) and opioids (Kruskal–Wallis χ^2 = 8.6, $P = .01$). Opioids were the only class of drugs significantly associated with pain severity in a linear trend (test for trend: $Z = -2.9$, $P < .01$) (Table 4). Among opioid users, 20.5% reported mild pain, 30.7% reported moderate pain, and 48.8% reported severe pain. The average pain severity rating for opioid users was 6.4 compared to 4.9 for those with pain who were not using opioids. After we controlled for sex, age, education, income, and marital status, those adults with severe pain were 4.5 times as likely (95% CI 2.6–7.9) to use opioids as those with mild pain, while those with moderate pain were not significantly more likely to use opioids than those with mild pain (AOR = 1.7; 95% CI 1.0–2.9). Additionally, after controlling for the demographic variables, those adults who stated that the pain was "always there" were almost 4 times more likely (AOR = 3.7; 95% CI 2.4–5.7) to be using an opioid than those adults who experienced their pain less frequently. There was no significant difference in satisfaction with treatment between people who were

Table 2
Descriptive characteristics of the Behavioral Risk Factor Surveillance System sample, Kansas, 2007.[a]

Variable	Unweighted frequency (n = 4090)	Weighted percentage	95% Confidence interval
Sex			
Male	1557	48.9	47.0–50.8
Female	2533	51.1	49.2–53.0
Age, y			
18–24	127	8.1	6.8–9.7
25–34	464	23.3	21.4–25.3
35–44	621	17.7	16.4–19.2
45–54	845	19.3	18.0–20.7
55–64	869	14.0	13.1–15.1
65–74	542	8.5	7.8–9.3
75+	622	9.0	8.2–9.8
Education			
Less than high school, high school graduate, or GED	1479	35.3	33.5–37.1
Some college	1128	28.0	26.3–29.8
College graduate	1477	36.7	34.9–38.5
Income			
<$50,000	1596	50.3	48.3–52.4
$50,000 and up	1606	49.7	47.6–51.7
Marital status			
Married/unmarried couples	2552	71.8	70.0–73.5
Divorced/separated	552	8.4	7.6–9.4
Widowed	596	6.7	6.1–7.3
Never married	382	13.1	11.6–14.8
Overall health			
Excellent to good	3430	86.9	85.7–88.1
Fair or poor	645	13.1	11.9–14.3
Mental health			
<14 d poor mental health	3809	92.8	91.8–93.8
⩾14 d poor mental health	281	7.2	6.2–8.2
Activity limitations			
No	970	81.4	80.0–82.7
Yes	3109	18.6	17.3–20.0
Arthritis			
Not diagnosed	2590	71.7	70.2–73.3
Diagnosed with arthritis	1490	28.3	26.7–29.8
Body mass index			
Underweight or normal	1375	34.6	32.8–36.5
Overweight	1429	36.7	34.8–38.6
Obese	1137	28.7	26.9–30.4
Physical activity			
Recommended level	1797	49.0	47.0–50.9
Insufficient	1564	39.8	37.9–41.6
No activity	569	11.3	10.2–12.4
Chronic pain			
No	2929	74.0	72.3–75.6
Yes	1151	26.0	24.4–27.7
Among those reporting chronic pain (n = 1151)			
Pain type			
Arthritis	364	31.3	27.9–34.7
Accidents/injury	100	12.6	9.8–15.4
Sciatica/slipped disc/ spondylosis	67	7.2	5.3–9.2
Migraine	22	3.0	1.5–4.5
Muscle pain	22	2.2	1.2–3.2
Neuropathic pain	25	2.1	1.2–3.0
Other/unknown	320	41.5	34.4–48.6
Pain duration			
<3 mo	38	4.0	2.7–5.8
3–6 mo	60	4.7	3.5–6.4
7–12 mo	49	4.0	2.9–5.5
1–3 y	218	19.4	16.6–22.6
4–5 y	166	15.2	12.9–17.9
6–10 y	227	21.5	18.6–24.7

(continued on next page)

Table 2 (continued)

Variable	Unweighted frequency (n = 4090)	Weighted percentage	95% Confidence interval
>10 y	395	31.1	28.0–34.4
Pain frequency			
Constant	476	37.2	33.9–40.6
Once a day	379	33.8	30.5–37.3
Once a week	164	17.2	14.4–20.4
Once a month	95	9.6	7.6–12.1
Less often	23	2.2	_[b]
Pain severity			
Mild (1–4)	429	40.4	36.9–44.0
Moderate (5–6)	395	34.0	30.7–37.4
Severe (7–10)	301	25.6	22.6–28.8
Consulted doctor			
Yes	1018	85.7	82.7–88.2
No	139	14.3	11.8–17.3
Satisfaction with pain management			
Very satisfied	304	28.5	25.3–32.0
Satisfied	539	55.0	51.1–58.8
Dissatisfied	103	12.4	9.9–15.4
Very dissatisfied	25	4.1	_[b]
Medications			
Prescription only	272	20.2	17.7–23.0
Over the counter only	481	43.1	39.6–46.7
Both	178	13.7	11.5–16.2
None	222	23.0	19.8–26.4

[a] Weighted N for Kansas population is 2,020,798.
[b] The 95% confidence intervals were not reported; cell size ⩽25.
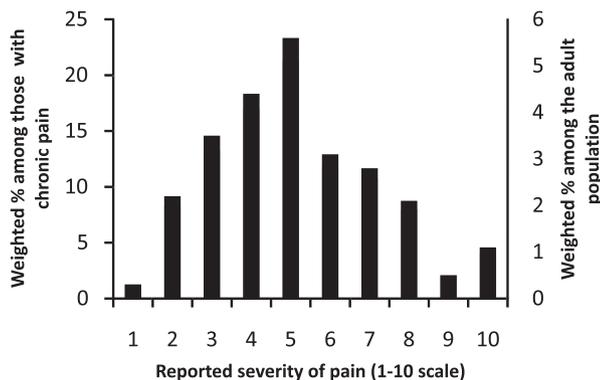

Fig. 1. Prevalence of chronic pain by severity, Kansas, 2007.

treating their pain with opioids and those who were not (χ^2 = 0.99, P = .32).

Finally, we examined the association of prescription opioid use with demographic and health factors among those with chronic pain (Table 5). We were unable to calculate a final adjusted logistic regression model for the association between health and demographic factors and opioid use as a result of sample sizes too small to produce reliable estimates; thus, only crude ORs were calculated. There were no differences in opioid use for demographic characteristics. Body mass index was also not associated with prescription opioid use. Five health indicators were strongly associated with prescription opioid use among those with chronic pain: having poor overall health (odds ratio [OR] = 3.5; 95% CI 2.4–5.3); having activity limitations (OR = 3.3; 95% CI 2.2–5.2); having arthritis (OR = 2.2; 95% CI 1.4–3.4); having 14 or more days of poor mental health in a month (OR = 2.2; 95% CI 1.4–3.7); and engaging in no physical activity relative to getting the recommended amount of physical activity (OR = 2.5; 95% CI 1.5–4.0). Other health factors, such as binge drinking, smoking status, and coverage by health insurance, were also considered, but they were not found to be substantial contributors to associations with chronic pain or opioid use.

3. Discussion

We found that over a quarter of the Kansas population had chronic pain. Of those, more than half had pain for over 5 years, 7 in 10 experienced the pain at least daily, and a quarter experienced severe pain. In adjusted analyses, chronic pain was more common among people with activity limitations, arthritis, poor mental health, poor physical health, and obesity. There was also a small but significant decline in pain as age increased. Eight in 10 were satisfied with their pain management, and a third took prescription medications to treat the pain. Of those taking prescription medications to treat pain, 34.5% took anti-inflammatory drugs and 45.7% took opioid analgesics, including 36.7% of those with mild pain. Opioid use was associated with poor physical health, poor mental health, activity limitations, arthritis, and physical inactivity. With the exception of age and obesity, every variable associated with a higher prevalence of pain was also associated with a greater likelihood of taking opioids for that pain in the unadjusted analyses.

The prevalence rate of 26% for chronic pain falls in the middle of the range found in other studies, and it is similar to a prevalence figures seen in a number of studies [16,17,19,22,26,27,32]. Our study is unique in that we were able to characterize the duration and frequency of pain, finding that a large proportion of chronic pain is protracted and occurs daily. Our study found a higher rate of "severe" pain than most previous studies [15,22,39]; however, previous studies that report pain severity did not use validated cut points [3,31] in a pain scale to grade pain.

Our study also found that 83.5% of persons with chronic pain reported that they were satisfied or very satisfied with their pain management. This finding might come as a surprise to some pain practitioners, but it is comparable to reports from other countries [7,26] and clinic-based settings [23]. We also found that satisfaction levels did not differ between opioid users and nonopioid users, consistent with data from Denmark [17].

Unlike findings in previous studies, which may or may not have controlled for other variables, our study found that female sex [15,19], older age [15–17,26,32], marital status [16,17,32], education [16,17,32], and lower income [16,17,22,26,32] were not independent risk factors for chronic pain once other variables were included in the model. In fact, our study demonstrated a slight decline in the prevalence of chronic pain with increasing age. A line of research suggests that certain types of pain increase through middle age and then begin to decrease starting around age 65 as a result of physiologic and psychological changes [18,38]. A recent study demonstrated decreasing pain for women after age 65 [32], and further analysis of our data suggested that rates began decreasing in that same age period. It is also interesting to note that though we found no association between chronic pain and having insurance, a recent study found large differences in opioid prescribing practices between private and public insurance suggesting that prescribing decisions may not always be based solely on patient reports of pain [35].

In line with previous studies, we found that persons with chronic pain have poorer physical and mental health [16,17,19,32,33,35,39] and are more likely to have activity limitations [16,17,19,22,32,34], but such reported associations might be expected if people feel that they are in poorer health or are disabled because of their pain. Consistent with a large population-based study from Denmark, we found that obesity was a risk factor for pain [16,17,32]. In the United States, another BRFSS study demonstrated that obesity was associated with activity difficulty

Table 3
Association of chronic pain with demographic and health factors, Kansas, 2007.[a]

Variable	Unweighted frequency	Weighted percentage[b]	Crude OR (95% CI[c])	Final model OR (95% CI)
Overall health				
Excellent to good	799	21.8	Referent	Referent
Fair or poor	350	54.7	4.3 (3.5–5.4)[*]	1.9 (1.5–2.5)[*]
Mental health				
<14 d poor mental health	952	23.5	Referent	Referent
⩾14 d poor mental health	169	53.0	3.7 (2.7–5.0)[*]	2.0 (1.4–2.8)[*]
Activity limitations				
No	563	18.7	Referent	Referent
Yes	587	58.4	6.1 (5.1–7.4)[*]	3.6 (2.8–4.5)[*]
Arthritis				
Not diagnosed	448	17.4	Referent	Referent
Diagnosed with arthritis	697	47.2	4.2 (3.6–5.0)[*]	3.3 (2.6–4.0)[*]
Body mass index				
Underweight or normal	315	22.3	Referent	Referent
Overweight	377	23.1	1.0 (0.8–1.3)	1.1 (0.9–1.4)
Obese	423	34.9	1.9 (1.5–2.3)[*]	1.6 (1.2–2.0)[*]
Physical activity				
Recommended level	457	24.1	Referent	
Insufficient	426	25.0	1.0 (0.9–1.3)	
No activity	226	38.0	1.93 (1.5–2.5)[*]	
Sex				
Male	393	23.0	Referent	
Female	758	28.9	1.4 (1.1–1.6)[*]	
Age (continuous)	–	–	1.0 (1.0–1.0)	0.99 (0.98–0.99)[*]
Education				
Less than high school, high school graduate, or GED	437	28.7	Referent	
Some college	361	29.3	1.0 (0.8–1.3)	
College graduate	352	21.0	0.7 (0.5–0.8)[*]	
Income				
<$50,000	651	30.7	Referent	
$50,000 and up	372	21.7	0.6 (0.5–0.7)[*]	
Marital status				
Married or unmarried couple	678	24.8	Referent	
Divorced/separated/widowed/never married	465	29.0	1.2 (1.0–1.5)	

[a] Weighted N for those with chronic pain in Kansas = 525,127.
[b] Percentage of participants with each characteristic that reported having chronic pain.
[c] OR = odds ratio; 95% CI = 95% confidence interval.
[*] Statistically significant.

Table 4
Prevalence of drug class by pain severity among people using prescription pain medications, Kansas, 2007.

Drug class	Overall %[a]	Mild pain, %[b]	Moderate pain, %	Severe pain, %
Anti-inflammatory drugs (eg, ibuprofen)	34.5	37.5	40	30.8
Analgesics (eg, paracetamol)	3.9	4.9	7.3	0.8
COX-2 inhibitors (eg, Celebrex)[c]	8.8	12.2	5.3	8.8
Opioid analgesic (eg, OxyContin)[c,d]	45.7	36.7	41.2	57
Prescription topical patch	2.1	0.5	2.1	3.2
Prescription topical cream	0.7	0	0	0.9
Prescription aspirin or Tylenol	5.8	3	8.6	5.1
Other	14	18.3	14.6	10.4
Any prescription medication	100	100	100	100

[a] Percentages add to more than 100 because some people reported using more than one type of medication. Weighted N for those with prescription medications for chronic pain in Kansas = 175,723.
[b] Pain severity (1–10): mild pain = 1–4; moderate pain = 5–6; severe pain = 7–10.
[c] Significant differences between severity levels: COX-2 inhibitors (Kruskal–Wallis $\chi^2 = 6.1$, $P = .048$) and opioids (Kruskal–Wallis $\chi^2 = 8.6$, $P = .01$).
[d] Test for trend: $Z = -2.9$, $P < .01$.

because of pain [34], and a study from Utah demonstrated a significant association between obesity and prescription painkiller overdose deaths [8].

The 2 most common drug classes prescribed to those with chronic pain were found to be, in order, opioid analgesics and anti-inflammatory drugs. This is the reverse of the ranking in Canada, where persons with chronic pain were prescribed opioids half as much as anti-inflammatory drugs in 2001 [26]. Opioid analgesics were the only drug class in our study that demonstrated a positive association with severity of pain, a trend consistent with their indication for moderate to severe chronic pain [9].

The other associations we found with opioid analgesic use are generally consistent with the literature. Like the present study, which found a strong association between poor mental health and opioid prescriptions, a recent study of medical examiner records found an association between mental illness and overdose

Table 5
Opioid use and demographic/health factors among those with chronic pain, Kansas, 2007.[a]

Variable	Unweighted frequency[b]	Weighted percentage[c]	Crude odds ratio (95% confidence interval)
Overall health			
Excellent to good	85	10.2	Referent
Fair or poor	102	28.5	3.5 (2.4–5.3)[*]
Mental health			
<14 d poor mental health	142	13.3	Referent
≥14 d poor mental health	44	25.6	2.2 (1.4–3.7)[*]
Activity limitations			
No	50	8.7	Referent
Yes	137	24.2	3.3 (2.2–5.2)[*]
Arthritis			
Not diagnosed	51	10.2	Referent
Diagnosed with arthritis	135	20.0	2.2 (1.4–3.4)[*]
Body mass index			
Underweight or normal	50	14.7	Referent
Overweight	53	14.0	0.9 (0.6–1.6)
Obese	81	17.1	1.2 (0.7–1.9)
Physical activity			
Recommended level	53	11.6	Referent
Insufficient	73	15.8	1.4 (0.9–2.3)
No activity	57	24.5	2.5 (1.5–4.0)[*]
Sex			
Male	57	15.2	Referent
Female	131	15.3	1.0 (0.7–1.5)
Age (continuous)	–	–	1.0 (1.0–1.0)
Education			
Less than high school, high school graduate, or GED	75	16.9	Referent
Some college	63	15.1	0.9 (0.6–1.4)
College graduate	50	13.2	0.7 (0.5–1.2)
Income			
<$50,000	99	17.8	Referent
$50,000 and up	40	11.6	0.6 (0.4–1.0)
Marital status			
Married or unmarried couple	96	13.4	Referent
Divorced/separated/ widowed/never married	91	19.2	1.5 (1.0–2.3)

[a] Weighted N for those with chronic pain in Kansas = 525,127.
[b] Among participants reporting opioid use.
[c] Percentage of participants with each characteristic who report chronic pain and opioid use.
[*] Statistically significant.

deaths due to opioid analgesics [36], while a study that used administrative data found a similar association [6]. Opioids are prescribed more often to Medicare patients with arthritis than they are prescribed for other types of chronic pain [33], consistent with the association between arthritis and opioid prescriptions in our study.

Our study confirmed findings from other countries that suggest that 80% to 90% of opioid users report moderate to severe pain and that the mean pain severity score for those with chronic pain is higher for people who use opioids than not, suggesting that they are being reserved to some extent for more serious pain [17,26]. On the other hand, the large fraction of those with mild chronic pain being treated with opioids might indicate overuse of the drugs in some patients. Without longitudinal data, however, it cannot be determined whether those with mild pain who use opioids were being treated for mild pain or had more severe pain before their treatment began.

Overall, the 83.5% pain management satisfaction rate and the high prevalence of opioid use (4% of Kansans and 15% of those with chronic pain) in the current study suggest that opioids are not being underprescribed in Kansas, despite the fact that Kansas uses less opioid per capita than most other states [37]. However, it also suggests that opioids might be overprescribed in other states, a situation that may be both avoidable and risky, given the accumulating literature on the lack of efficacy of opioids for treatment of chronic, nonmalignant pain [5,24], and the proven risks associated with their long-term use such as hepatotoxicity, abuse, and overdose death [5,8,11,13,17,24,36].

This study is subject to 4 limitations. First, the data are derived from self-reports of pain as well as from self-reports of physical and mental health, making comparisons across participants less reliable; on the other hand, pain management is largely based on a patient's subjective reports of pain frequency and the severity and reduction of the pain with treatment. Second, respondents may not have accurately categorized the types of prescription drugs that they were taking. Third, as mentioned previously, because the data are derived from a cross-sectional survey, it is unclear whether the respondents are describing their pain before or after treatment. Longitudinal data would allow examination of changes in the severity of pain associated with the initial prescription and continued use of opioids. Fourth, the survey asks about opioid usage, but not the frequency, duration, or formulation of the prescriptions. Thus, it is possible that many of those who use opioids used it as needed or formulated with nonopioid analgesics. Finally, while BRFSS is a nationally representative survey, the chronic pain module was administered by Kansas only; thus, results can be generalized only to Kansas. Future studies may want to assess characteristics and treatment of chronic pain on a national level because Kansans are composed of a largely homogenous racial population, and differences exist in experiences of chronic pain and prescription pain medication use among racial/ethnic groups [29]. Moreover, the population of Kansas is more rural than that of most states [14], and rural populations generally have lower incomes, lower education levels, and higher unemployment rates and may be more likely to engage in blue-collar work, all variables associated with chronic pain [4].

Chronic pain is so common that it might be considered part of the human condition. Fortunately, if adults in the rest of the United States have experiences similar to those of adults in Kansas, most people are satisfied with treating chronic pain with over-the-counter medication or with no medication at all. For others, prescription drugs may be necessary, and such drugs should be available. However, given the side effects and risks associated with opioids, it might not be appropriate for them to be the mainstay of prescription treatment for chronic pain.

Conflict of interest statement

The contents of this article are solely the responsibility of the authors and do not necessarily represent the official views of the US Centers for Disease Control and Prevention or the Kansas Department of Health and Environment. None of the authors has any relevant financial interest in this article. The authors have no conflicts of interest. This work was accomplished entirely using internal funding supplied by the Centers for Disease Control and Prevention.

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