

Factors associated with frequent or daily use of prescription opioids among adults with chronic pain in the United States

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Abstract

Objectives: We aimed to estimate utilization rates of prescription opioids among adults with chronic pain in the United States (US) and identify factors associated with the frequent or daily use of prescription opioids.

Methods: This was a case–control analysis of the 2019 National Health Interview Survey of adults.

Results: Over 50.2 million adults in the US reported chronic pain in the past 3 months, but only 10.5% of this group said they used prescription opioids frequently or daily to manage their pain. Adults with chronic pain were significantly more likely to use opioids if they had incomes below the federal poverty level (15.7%), relied on public health insurance (14.8%), had been hospitalized in the past year (17.8%), or rated their health as fair or poor (18.4%). The highest rates of opioid use were reported among adults with severe (24.4%) or moderate disability (18.9%).

Conclusions: Approximately 5.3 million adults use prescription opioids frequently or daily to manage chronic pain. These individuals should receive regular clinical assistance to manage their pain, including medication management and, when appropriate, referral to evidence-based treatment programs for opioid use disorder.

Keywords

Chronic pain, prescription opioid use, pain management, case–control analysis, opioid use disorder, population health

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Introduction

Chronic pain, defined as pain experienced on most or all days during the previous 3 months, affects roughly one in five American adults.¹ More than a third of this population reports “high-impact chronic pain” that frequently or constantly limits life and/or work activities.² Chronic pain has major detrimental impacts on quality of life, sleep, mental health, activities of daily living, healthcare expenditures, work productivity, and even life expectancy.^{3,4} Medical treatment for chronic pain often involves analgesic medications, including prescription opioids.⁵ A wide range of non-pharmacologic therapies are also used, including physical therapy, occupational therapy, rehabilitation, chiropractic manipulation, therapeutic massage, movement therapies, and psychological interventions like cognitive behavioral therapy, meditation, self-management training, and peer support.⁶

In the United States (US), the treatment of chronic pain has become deeply entangled with public health concerns regarding opioid addiction and overdose.⁷ Accounts of the opioid epidemic mostly began in the mid-1990s, with “a confluence of well-intentioned efforts to improve pain management by doctors, and aggressive—even fraudulent—marketing by pharmaceutical manufacturers.”⁸ Opioid prescribing rates surged in the 2000s and early 2010s,⁹ accompanied by a jump in overdose rates.¹⁰ In response, state governments enacted a variety of regulations restricting opioid prescribing,¹¹ the Centers for Disease Control issued national guidelines,¹² and in 2017, the Department of Health and Human Services declared the opioid epidemic a national public health emergency.¹³ There is some evidence that the per capita number of opioid prescriptions has declined with enactment of these policy measures,¹⁴ but US opioid overdose deaths have continued to

rise, now driven mainly by increased illicit use of fentanyl.¹⁵

Throughout the opioid epidemic, limited public health data on opioid use among people with chronic pain has hindered responsive policy development.¹⁶ National health surveys have included questions about chronic pain symptoms^{17,18} or questions about prescription opioid use,¹⁹ but not both. The 2019 National Health Interview Survey (NHIS) was the first US population survey querying respondents about their recent experience with chronic pain as well as their recent use of prescription opioids to manage this pain.²⁰ In the present analysis, we used data from this survey to estimate utilization rates of prescription opioids among US adults with chronic pain and identify factors associated with frequent or daily use of prescription opioids.

Methods

Data source – the 2019 National Health Interview Survey (NHIS)

The 2019 NHIS is an annual household health survey conducted by the National Center for Health Statistics (2019 survey, codebook, and statistical code available at www.cdc.gov/nchs/nhis/2019nhis.htm). The NHIS provides nationally representative data on key health-related population attributes, health insurance coverage, and access and utilization of healthcare services for all non-institutionalized Americans. The 2019 NHIS Sample Adult Survey included 31,997 adults (aged 18 years or older).

Study sample

Ethical approval was not applicable for this study because the US Department of Health and Human Services does not require consent for secondary analyses of deidentified survey data under Exemption 45 CFR 46.104(d)(4).

We used the standard survey research definition of chronic pain, now codified in the International Classification of Diseases 11th Revision (ICD-11), to define our study sample.²¹ The chronic pain sample included 7184 respondents who said that they had experienced pain most days ($n=2609$) or every day ($n=4575$) during the past 3 months. The sample with no chronic pain included a total of 24,120 respondents who said that they never had pain ($n=12,042$), or only had pain some days ($n=12,078$).

Dependent variable: use of prescription opioids

The 2019 NHIS Sample Adult Survey asked a sequence of increasingly specific questions about prescription opioid use, including:

- In the past 3 months, have you taken any opioid pain relievers prescribed by a doctor, dentist, or other health professional? (yes, no)
- In the past 3 months, did you take a prescription opioid to treat long-term or chronic pain, such as low back pain or neck pain, frequent headaches or migraines, or joint pain or arthritis? (yes, no)
- If yes, how often did you take a prescription opioid for chronic pain? (some days, most days, every day)

We first compared overall rates of opioid use in the past 3 months between adults with and without chronic pain. We then conducted a series of logistic regression analyses among adults with chronic pain, identifying respondents engaged in active management of chronic pain with prescription opioids (i.e., frequent or daily use).

Statistical analyses

The reporting of this study conforms to the Strengthening the Reporting of Observational Studies in Epidemiology

(STROBE) guidelines.²² We calculated the point prevalence rates for different types of prescription opioid use in the past 3 months among adults with and without chronic pain, adjusting for the complex survey design of the NHIS with SAS SURVEYFREQ (SAS Institute Inc., Cary, NC, USA). We then used SAS SURVEYLOGISTIC to calculate the adjusted and unadjusted odds of using prescription opioids most days or every day among adults with chronic pain, controlling for the following population attributes: age group (18–34, 35–44, 45–54, 55–64, 65–74 years, 75 years or older); sex (male, female); race and ethnicity (Hispanic or Latinx, non-Hispanic White, non-Hispanic Black, non-Hispanic other); family income (below federal poverty level, 100% to 199% of federal poverty level, at or above 200% of federal poverty level); health insurance status (private insurance only, public insurance, uninsured); hospitalization (no hospital stays in past year, one or more hospital stays in past year); self-assessed health (fair or poor health, good, very good, or excellent health); high-impact chronic pain (pain frequently or constantly limits life and/or work activities, pain does not limit or only sometimes limits life and/or work activities); disability severity, based on performance in the six functional domains seeing, hearing, communicating, remembering/concentrating, performing self-care, walking/climbing steps (cannot perform one or more functions, a lot of difficulty with one or more functions, some difficulty with one or more functions, no difficulty with any function).

Results

Approximately 50.2 million American adults reported frequent or daily pain over the previous 3 months, compared with an estimated 194.4 million adults who reported no pain or only occasional pain (Table 1).

Overall rates of opioid use during the previous 3 months were significantly

Table 1. Use of prescription opioids in the previous 3 months by noninstitutionalized adults with and without chronic pain in the United States, 2019.

In the past 3 months . . .	Adults without chronic pain		Adults with chronic pain	
	Est. N (millions)	%	Est. N. (millions)	%
Total	194.4	79.5%	50.2	20.5%
How often did you have pain?				
Never	100.5	51.7%		
Some days	93.9	48.3%		
Most days			18.7	37.2%
Every day			31.5	62.8%
Have you taken any opioid pain relievers prescribed by a doctor, dentist, or other health professional?				
Yes	5.7	2.9%	11.0	22.0%
No	188.6	97.1%	39.2	78.0%
Did you take a prescription opioid to treat long-term or chronic pain, such as low back pain or neck pain, frequent headaches or migraines, or joint pain or arthritis?				
Yes	1.5	0.8%	7.6	15.2%
No	192.8	99.2%	42.6	84.8%
How often did you take a prescription opioid for long-term or chronic pain?				
Some days	1.0	0.5%	2.4	4.7%
Most days	0.1	0.1%	0.9	1.9%
Every day	0.3	0.2%	4.3	8.6%

Data source: 2019 Sample Adult Survey, National Health Interview Survey (NCHS, 2020).

higher for adults with chronic pain than for those without (22.0% vs. 2.9%, Rao–Scott $\chi^2=2,300$, $p<.001$). This difference was even more pronounced when we focused on use of opioids specifically to manage chronic pain (15.2% vs. 0.8%, Rao–Scott $\chi^2=2,869$, $p<.001$).

Our regression models focused solely on adults with chronic pain, identifying factors associated with active management of chronic pain using prescription opioids (i.e., frequent or daily use). Frequent or daily use of prescription opioids varied by age, income, insurance coverage, hospitalization, disability severity, high-impact pain, and self-assessed health status (Table 2). There were no significant differences by race or ethnicity. Women with chronic pain (11.8%) were more likely to use prescription opioids frequently or daily than men (9.0%), but sex was not a significant predictor in our multinomial regression model. Rates of frequent or daily opioid

use were lowest among adults aged 18–34 years (3.2%), peaked in adults aged 55–64 years (14.2%), and declined to 10.4% among respondents aged 75 years or older.

Adults with incomes below the federal poverty level had higher rates of prescription opioid use (15.7%) than those with incomes more than twice the poverty level (7.6%). We found the same results among respondents who relied on public health insurance programs like Medicaid and Medicare (14.8%) compared with those who had private insurance coverage (5.3%) or no insurance coverage (4.0%). Adults with chronic pain who were hospitalized one or more times in the previous year had higher rates of opioid use (17.8%) than respondents who had not been hospitalized (8.9%). The same was true in a comparison of respondents with fair or poor self-assessed health and those who self-reported good or excellent health (18.4% vs. 5.6%). The highest rates of

Table 2. Factors associated with frequent or daily prescription opioid use in the past 3 months to manage chronic pain among noninstitutionalized adults with chronic pain in the United States, 2019.

Population attributes	Adults with chronic pain		Use of opioids most days or every day to manage chronic pain		Logistic regression model odds ratios [†]	
	Est. N (millions)	%	Est. N (millions)	%	UAOR (95% CI)	AOR (95% CI)
Total adults with chronic pain	50.2		5.3	10.5%		
Age, y						
18–34	6.8		0.2	3.2%	Reference	
35–44	6.5		0.5	7.4%	2.4 (1.2–4.7)	2.4 (1.2–4.7)
45–54	9.0		1.1	12.4%	4.2 (2.2–8.1)	3.6 (1.9–6.7)
55–64	11.9		1.7	14.2%	5.0 (2.6–9.4)	3.4 (1.8–6.4)
65–74	8.9		1.0	11.5%	3.9 (2.0–7.4)	1.9 (1.0–3.7)
75 or older	7.0		0.7	10.4%	3.5 (1.8–6.7)	1.4 (0.7–2.8)
Sex						
Male	22.6		2.0	9.0%	Ref.	
Female	27.6		3.2	11.8%	1.3 (1.1–1.6)	1.3 (1.0–1.6)
Race and Ethnicity						
Non-Hispanic White	36.8		3.8	10.3%	Ref.	
Hispanic/Latinx	5.3		0.6	10.6%	1.0 (0.7–1.4)	0.9 (0.6–1.3)
Non-Hispanic Black	5.5		0.7	11.9%	1.2 (0.9–1.6)	0.9 (0.7–1.3)
Non-Hispanic other	2.6		0.3	10.0%	1.0 (0.6–1.7)	0.8 (0.5–1.5)
Annual income						
Family income ≥ 200% of federal poverty level	30.7		2.3	7.6%	Ref.	
100%–199% of federal poverty level	11.5		1.7	14.6%	2.1 (1.7–2.6)	1.1 (0.8–1.4)
Income below federal poverty level	8.1		1.3	15.7%	2.3 (1.8–2.8)	1.3 (1.1–1.7)
Insurance coverage						
Private only	17.2		0.9	5.3%	Ref.	
Public	28.0		4.2	14.8%	3.1 (2.3–4.1)	2.2 (1.6–3.0)
Uninsured	5.0		0.2	4.0%	0.7 (0.4–1.2)	0.5 (0.3–1.0)
Hospitalization in past 12 months						
No hospital stay	41.2		3.7	8.9%	Ref.	
Overnight hospital stay	9.0		1.6	17.8%	2.2 (1.8–2.8)	1.5 (1.2–1.9)

(continued)

Table 2. Continued.

Population attributes	Adults with chronic pain		Use of opioids most days or every day to manage chronic pain		Logistic regression model odds ratios [†]	
	Est. N (millions)	Est. N (millions)	%	UAOR (95% CI)	AOR (95% CI)	
Self-assessed health						
Good, very good, or excellent	30.9	1.7	5.6%	Ref.		
Fair or poor	19.3	3.5	18.4%	3.8 (3.2–4.6)	1.9 (1.5–2.3)	
Disability severity						
None (no difficulty with functions)	13.4	0.5	3.7%	Ref.		
Mild (some difficulty with functions)	23.5	2.2	9.2%	2.7 (2.0–3.7)	1.7 (1.2–2.4)	
Moderate (a lot of difficulty with functions)	11.6	2.2	18.9%	6.2 (4.5–8.4)	2.1 (1.5–3.0)	
Severe (cannot perform functions)	1.7	0.4	24.4%	8.7 (5.2–14.4)	3.0 (1.7–5.5)	
Pain limits life and/or work activities						
Never or some days	31.9	1.9	5.8%	Ref.		
Most days or all days	18.3	3.4	18.7%	3.8 (3.1–4.6)	2.1 (1.7–2.6)	

Data source: 2019 Sample Adult Survey, National Health Interview Survey (NCHS, 2020).

[†]Significant adjusted and unadjusted odds ratios in bold; model fit ($-2 \log L$) = 33.4.

CI, confidence interval; UAOR, unadjusted odds ratio; AOR, adjusted odds ratio; Ref., referent.

opioid use were reported among adults with severe (24.4%) or moderate disability (18.9%), followed by those with high-impact chronic pain (18.7%).

Discussion

Chronic pain is widespread in the US population, but our study showed that only 10.5% of noninstitutionalized adults with chronic pain used prescription opioids daily or almost every day in 2019. As expected, this behavior is concentrated among high-need subgroups, i.e., adults with high-impact pain, severe disabilities, and/or poor health. Broadly speaking, these adults are receiving de facto long-term opioid therapy (defined as an opioid treatment course of more than 90 days).²³ It is important to note that the NHIS data are retrospective, and like other surveys of this type, the data are subject to multiple sources of bias, including recall bias and social desirability.²⁴

The NIH Pathways to Prevention Program recommends that patients receiving long-term opioid therapy complete regular physician visits (at least every 3 months) to assess changes in pain and function, evaluate the risk of harm or misuse, and monitor and adjust medication dosage using morphine milligram equivalent calculations.²⁵ Individuals who present with signs or symptoms of opioid use disorder should receive continued assistance with medication management and referral to appropriate, evidence-based addiction treatment programs, such as those involving suboxone or methadone-assisted therapies.²⁶

Critics like Nadeau, Wu, and Lawhern suggest that “strong measures are being taken to restrict prescription opioid use without consideration of the vast cost of inadequately treated chronic pain, whether measured in terms of human suffering and degraded quality of life or in terms of the literal costs of healthcare and lost

productivity.”²⁷ In other words, clinicians need to pay close attention to the treatment needs of the estimated 44.6 million adults with chronic pain who are not regularly using prescription opioids, as well as the 5.3 million who are.

For the large and growing population of American adults with chronic pain, access to safe, affordable, and efficacious treatment is an urgent public health priority. The risks of long-term prescription opioid therapy are now widely recognized, but opioids remain a valuable tool for the treatment of chronic pain; patient and provider adherence to clinical guidelines can minimize this risk and improve treatment efficacy.²⁸ Additional research is needed to determine the relative efficacy of different pharmacologic and non-pharmacologic treatments for chronic pain.

Declaration of conflicting interests

The authors declare that there is no conflict of interest.

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