

Pain Medication Use in Patients with Type 2 Diabetes: NHANES 2005-2018

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Background

- Epidemiologic studies indicate that patients with diabetes are more likely to have certain pain conditions compared to those without diabetes
 - Peripheral neuropathy (26-50%)
 - Arthritis (52%)
 - Certain types of cancer
 - Chronic low back pain (19.8%)

-Dahlhamer J et al. Prevalence of chronic pain and high-impact chronic pain among adults - United States, 2016. MMWR Morb Mortal Wkly Rep. 2018;67(36):1001-6
-National Diabetes Statistics Report. Centers for Disease Control and Prevention 2020.
-Szablewski L. Diabetes mellitus: influences on cancer risk. Diabetes Metab Res Rev. 2014;30(7):543-53
-Hassoon A, et al. Chronic low-back pain in adult with diabetes: NHANES 2009-2010. J Diabetes Complicat. 2017;31(1):38-42
-Pop-Busui R et al. Diabetic neuropathy: a position statement by the American Diabetes Association. Diabetes Care. 2017;40(1):136-54
-Piva SR et al. Links between osteoarthritis and diabetes: implications for management from a physical activity perspective. Clin Geriatr Med. 2015;31:67-87. viii

Guideline Recommendations for Pain Management

- American Diabetes Association (2017)- Peripheral Neuropathy
 - Pregabalin, duloxetine
 - Tramadol and tapentalol (opioids) in refractory cases
- American College of Rheumatology (2019)- Osteoarthritis (+/- diabetes)
 - Nonpharmacological approaches (physical therapy, etc.)
 - Topical or oral NSAIDs and steroid injections
 - No opioids except tramadol after multiple treatment failures
- American College of Physicians (2017)- chronic low back pain (+/- diabetes)
 - Nonpharmacological approaches (physical therapy, etc.)
 - Tramadol as second-line option
 - Other opioids only after multiple treatment failures

Research Gap/ Rationale

- Despite the higher prevalence of certain pain conditions in those with diabetes, no population-based studies examining the overall use or quantity of pain medication in patients with diabetes exist
 - Opioid crisis was declared a public health emergency in 2017 and impact in risks of dependence, long-term use, overdose, and addiction
 - Patients with diabetes with comorbidities including renal disease may have additional risks for adverse drug reactions (NSAIDs)



Study Objective

- To examine and compare trends in the use of pain medications (overall and by drug category) among adults with and without type 2 diabetes



Methods: Data Source and Inclusion Criteria

- National Health and Nutrition Examination Survey (NHANES)
 - Cross-sectional survey
 - Non-institutionalized civilian population in the United States
 - Questionnaire, physical examination, and laboratory data
 - Home interviews and standardized physical examinations in mobile centers
- Study cohort
 - Adults diagnosed with diabetes at 20 years of age or older
 - 2005-2018 biannual survey waves



Methods: Study Outcomes

1. Overall Use of Any Pain Medication:

- Self-reporting use of any of the following drug class within 30 days of the survey interview
 - Opioids
 - Gabapentinoids
 - Prescription non-steroidal anti-inflammatory drugs (NSAID)
 - Serotonin norepinephrine reuptake inhibitors (SNRI)
 - Skeletal muscle relaxants
 - Prescription headache treatment

2. Use of individual drug classes (see above)

3. Use across survey waves, 2005-2018



Methods: Statistical Analysis

- Survey weighted- logistic regression models
 - Dependent variable: Use of medications (yes/no)
 - Independent variables: diabetes status (yes/no)
- Medication use quantification:
 - Percent use of pain medications among adults by diabetes status (yes/no)
 - Odds of being on pain medication among those with diabetes compared to those without diabetes (crude and adjusted odds ratios and 95% confidence intervals)
 - Adjusted OR covaribles: sociodemographics, clinical history, and diabetes-specific parameters
- All estimates are nationally representative



Results

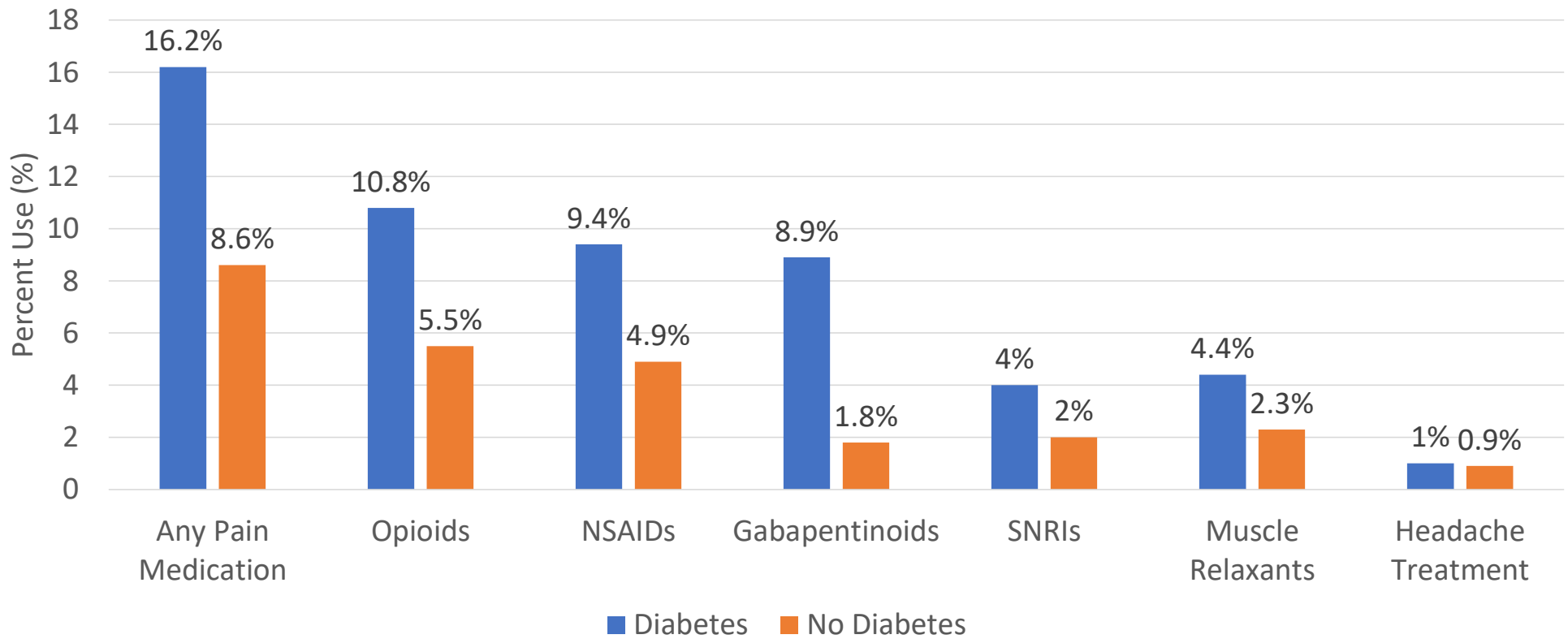
Cohort Characteristics

Table 1. Characteristics Among Adults With And Without Diabetes

	Diabetes N=4893	No Diabetes N=33682	p-value
Age			
<=44	466 (11.9)	16113 (50.1)	<0.0005
45-64	2130 (46.8)	10606 (34.1)	
65+	2297 (41.3)	6963 (15.8)	
Male	2518 (50.7)	16166 (47.8)	0.02
Female	2375 (49.3)	17516 (52.2)	
Hispanic	1366 (15.0)	8401 (14.1)	<0.001
NH White	1646 (60.0)	14416 (67.3)	
NH Black	1355 (15.9)	6962 (10.9)	
Other	526 (9.1)	3903 (7.7)	
Some college +	747 (19.7)	7940 (30.2)	<0.001
High School grad or less	4139 (80.3)	25698 (69.8)	
Insurance- yes	4291 (90.2)	25989 (81.5)	<0.0005
Insurance- no	600 (9.8)	7642 (18.5)	
Body Mass Index Level			<0.0005
<=24.99 (under/normal)	621 (11.3)	10087 (32.2)	
25-29.99 (Overweight)	1333 (26.5)	10765 (33.6)	
>=30 (Obese or higher)	2638 (62.2)	11073 (34.2)	
History of smoking- yes	2430 (50.5)	14628 (44.1%)	<0.001
none	2462 (49.5)	19027 (55.9)	
History of arthritis- yes	2383 (48.4)	7833 (22.7)	<0.0005
None	2497 (51.6)	25782 (77.3)	
History of cancer- yes	738 (17.2)	2865 (9.1)	<0.0005
None	4148 (82.8)	30793 (90.9)	
Glycohemoglobin A1C,%		n/a	n/a
>= 7% (not at goal)	2241 (47.9)		
<7% (at goal)	2252 (52.1)		
Diabetes Duration		n/a	n/a
<=5 years	1726 (38.2)		
6-10 years	1087 (22.9)		
>=11 years	2080 (38.9)		



Overall Pain Medication Use and By Drug Class



Overall Pain Medication Use and By Drug Class and Across Survey Waves

- Any pain medication use:
 - Higher among patients with diabetes
 - cOR: 2.04 (95% CI 1.79, 2.33), aOR: 1.26 (95% CI 1.09, 1.47)
 - Use of any pain medication did not change significantly across survey waves.
- Opioid use:
 - Higher among patients with diabetes
 - cOR: 2.08 (95% CI 1.73, 2.49), aOR: 1.29 (95% CI 1.06, 1.57)
 - Use of opioids did not change significantly across survey waves.
 - Highest drug class used overall regardless of diabetes status.

Overall Pain Medication Use and By Drug Class and Across Survey Waves

- Gabapentinoid use:
 - Higher among patients with diabetes
 - cOR: 5.36 (95% CI 4.47, 6.42); aOR: 2.73 (95% CI 2.27, 3.30)
 - Increased over time from 2.3% to 13.9% ($p < 0.05$).
 - Third highest drug class used overall, but highest of all in 2017-2018 .
- Prescription NSAID use:
 - Higher among those with diabetes
 - cOR:1.99 (95% CI 1.70, 2.32), aOR:1.11 (95% CI 0.93, 1.31)
 - Use remained stable across survey waves.
- SNRIs, muscle relaxant, and headache treatment use was significantly higher among those with diabetes in crude OR but lost significance in adjusted analyses.

Limitations

- Over the counter pain medication use (oral, topical) for pain management was not captured in this study
- Duloxetine and tri-cyclic antidepressant use was not examined in this study because these agents may be prescribed for either depression or pain management.
- Non-pharmacological pain management interventions prior to or as adjunct to pharmacological interventions in study participants is not captured by NHANES
- Medication indication data is not available in NHANES



Conclusions

- First nationally-representative pharmacoepidemiologic study evaluating pain medication use trends in patients with type 2 diabetes
- Use of pain medications is higher among those with diabetes than those without this condition
- Despite clinical guideline recommendations and opioid crisis awareness, opioid use was very prevalent and most prevalent among those with diabetes
- Gabapentinoid use has increased over time and has become widely used
- Prescription NSAID use was not as high although it is recommended as 1st line for arthritis pain management. NSAIDs should not be used in comorbid diabetes and hypertension.
- Awareness among providers of these prescribing patterns is important. Future clinical guidelines (ADA) must provide evidence-based recommendations on how to safely manage nociceptive pain in the diabetes population.



ARTICLE



Trends in Pain Medication Use in Patients With Type 2 Diabetes: NHANES 2005–2018

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ABSTRACT

The aim of this research was to compare pain medication use trends among adults with and without type 2 diabetes in the US. This cross-sectional study used data of adults with and without (type 2) diabetes from the National Health and Nutrition Examination Survey waves 2005–2018. Use of pain medication including opioids, prescription nonsteroidal anti-inflammatory drugs, gabapentinoids, serotonin norepinephrine reuptake inhibitors, skeletal muscle relaxants, and headache treatment agents was compared by diabetes status and within select social determinants of health and clinical factors. Adults with type 2 diabetes were twice as likely to be prescribed pain medications compared to those without a diabetes diagnosis (16.2% vs 8.6%). Females and those with a history of smoking or arthritis were more likely to be on pain medications. Opioid use was the most prevalent regardless of diabetes status, and use was twice as high among those with diabetes (10.8% vs 5.5%). Patients with type 2 diabetes in the US are twice as likely to be prescribed pain medications overall as well as opioids compared with those without diabetes. Clinical guideline recommendations are necessary to find pharmacologic and nonpharmacologic nociceptive pain management specific for patients with diabetes.

ARTICLE HISTORY

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KEYWORDS

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