

Association Among Opioid Use, Treatment Preferences, and Perceptions of Physician Treatment Recommendations in Patients With Neck and Back Pain



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ABSTRACT

Objective: The purpose of this study was to explore the relationship between self-reported use of opioids by patients with neck and back pain and their demographics, pain characteristics, treatment preferences, and recollections of their physicians' opinions regarding treatment options.

Methods: We analyzed 2017 Gallup Poll survey data from 1680 US adults who had substantial spine pain in the past year and used logistic regression to explore the aforementioned relationships.

Results: Our multiple regression analysis indicated that adults with neck or back pain severe enough to have sought health care within the last year were more likely to have used opioids in the last year if they (in descending order of marginal impact) had pain that had lasted 1 year or less (adjusted odds ratio [OR] = 34.35, 90% confidence interval [CI] 17.56-74.32); concurrently used benzodiazepines (OR = 6.02, 90% CI 2.95-12.33); had Medicaid as an insurance source (OR = 3.29, 90% CI 1.40-7.48); indicated that they preferred to use pain medications prescribed by a doctor to treat physical pain (OR = 3.24, 90% CI 1.88-5.60); or were not college educated (OR = 1.83, 90% CI 1.05-3.25). Compared with patients aged 65 years and older, those aged 18 to 34 years were less likely to have used opioids in the past year (OR = 0.09, 90% CI 0.01-0.40, 0.50 for 95% CI). Respondents' perceptions of medical doctors' positive or negative opinions regarding a variety of neck and back pain treatment options were not significantly associated with opioid use.

Conclusions: Patients with neck and back pain who use opioids differ from those who do not use opioids in that they are more likely to have pain that is of shorter duration, to use benzodiazepines, to have Medicaid as an insurance source, and to prefer to use pain medications. Those characteristics should be considered when developing opioid use prevention strategies. (*J Manipulative Physiol Ther* 2018;41:175-180)

Key Indexing Terms: *Back Pain; Analgesics, Opioids; Patient Preference; Spine*

INTRODUCTION

In the United States, back and neck pain substantially contribute to disability¹ and are expensive to treat.² In the management of these common musculoskeletal conditions, there is great concern regarding the overuse of opioids and the ramifications. Studies have indicated that opioid

prescribing varies considerably across geographic locations in the United States,³ varies across providers in the same geographic location,^{4,5} and is common for patients with back pain (where longer-term opioid use was associated with higher psychological distress, unhealthy lifestyles, and health services use).⁶ Patients who initiate opioid use with long-acting agents are more likely to use opioids chronically,⁷ and patients with more subjective pain, low pain tolerance, comorbid psychopathologic conditions, and substance use disorders who are young and white are more likely to become addicted to prescription opioids.⁸

Therefore, strategies to avoid prescription opioid addiction include avoiding initial use of opioids.⁹ Contrasting characteristics and preferences of patients who use opioids to control pain with those who do not could provide insights into patient-level drivers of opioid use and might inform ways to avoid initial use. Although 2 studies have identified predictors of postoperative opioid use—including

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the relationship between “thermal pain and unpleasantness” and patient expectations immediately after cesarean section¹⁰ and the relationship among preoperative tobacco use, diagnosis of alcohol and substance use disorder, mood disorders, and pain syndromes (including neck and back pain) and persistent postoperative opioid use after surgical procedures¹¹—we found no studies that explicitly identified patient characteristics that predicted opioid use among back pain patients.

We sought to identify such patient characteristics. A recent nationally representative survey of US adults conducted by the Gallup Organization in the spring of 2017 found that 78% of US adults would prefer to use nondrug therapies before turning to prescription medication.¹² The purpose of this study was, using data from the Gallup survey, to explore the relationship between self-reported use of opioids by patients with neck and back pain and their demographic characteristics, pain characteristics, treatment preferences, and recollection of their physicians’ opinions regarding treatment options.

METHODS

The methods used to conduct the survey were similar to those described previously.¹³ Briefly, Gallup randomly invited 12 998 members from the Gallup Panel (a probability-based, longitudinal, demographically representative panel of more than 100 000 US adults who do not receive incentives for participation) to participate in the survey; 6305 (48.5% response rate) completed it. Of those, 1680 (27.7%) reported that they had had “neck or back pain that was significant enough that [they] saw a healthcare professional” within the last year. These respondents were asked about duration of pain, personal preferences and history regarding pain medications, recall of their physician’s opinions about different treatments for pain, and use of opioids for pain relief. Before conducting the analysis, we used respondents’ survey answers to define 2 categories of educational attainment level (less than college educated and college educated or more) and pain duration (1 year or less, or more than 1 year), and we combined their continuous age variable into 4 categorical variables (18-34, 35-49, 50-64, and 65 and older). Palmer College of Chiropractic funded the study and Palmer’s Institutional Review Board found the study exempt from further review (number X-2017-6-12-M).

We used SAS (Version 9.4; SAS Institute Inc., Cary, North Carolina) to conduct data analyses. We first conducted bivariate, binary logistic regressions to model of the use of opioids for pain relief with participants’ survey responses, wherein we examined 1 patient characteristic at a time, generating unadjusted odds ratios (ORs) with 90% confidence intervals (CIs; presented in parentheses). Then we used likelihood ratio tests and a manual stepwise

Table 1. Demographic Characteristics, Pain Characteristics, and Patient Treatment Preferences of Survey Respondents Who Had Neck or Back Pain Severe Enough to Have Sought Health Care Within the Past Year (*n* = 1680)

Variables	<i>n</i>	%
Demographic characteristics		
Male sex	789	47.0
Married	1107	66.1
White race	1411	90.7
Aged 18-34 y	127	7.6
Aged 35-49 y	324	19.3
Aged 50-64 y	683	40.7
Aged 65 y or older	543	32.4
Less than college education	942	56.6
Unemployed (including retired)	681	47.7
Underweight body mass index	9	0.6
Normal body mass index	374	23.5
Overweight body mass index	507	31.8
Obese body mass index	705	44.2
Has Medicaid for insurance	115	7.4
Income <\$35 000 per year	342	22.0
Pain characteristics		
Duration of 1 y or less	366	22.0
Pain occurred more than half of days in the last 6 mo ^a	73	29.4
Patient treatment preferences		
“I prefer to take pain medications prescribed by a doctor to treat physical pain” (vs “I prefer to try other ways to treat physical pain before taking pain medications prescribed by a doctor”)	443	26.5
Used opioids for pain control	82	4.9
Also took benzodiazepines for pain relief	46	2.7
Has never been to a chiropractor	386	23.1

^a Variable only available for 248 respondents; other variables missing from 0 to 132 respondents.

approach considering all explanatory variables with *P* values ≤ .10 in the bivariate results to produce a single multiple logistic regression model that retained all explanatory variables that had *P* values ≤ .10. We used profile-likelihood confidence intervals because they are

Table 2. *Unadjusted and Adjusted Odds Ratios of Using Opioids for Pain Control Among US Adults With Neck or Back Pain Severe Enough to Have Sought Health Care in the Past Year*

Variables	Unadjusted ORs			Adjusted ORs		
	OR	90% CI		OR	90% CI	
		Lower	Upper		Lower	Upper
Demographic characteristics						
Male sex	1.03	0.71	1.49			
Married	0.79	0.54	1.17			
White race	0.91	0.50	1.79			
Aged 18-34 y	0.12	0.01	0.46	0.09	0.01	0.40
Aged 35-49 y	0.93	0.57	1.50	0.68	0.33	1.36
Aged 50-64 y	0.62	0.40	0.95	0.55	0.30	1.02
Aged 65 y or older	Referent			Referent		
Less than college education	2.13	1.42	3.28	1.83	1.05	3.25
Unemployed (including retired)	1.40	0.93	2.11			
Normal body mass index	Referent			Referent		
Overweight body mass index	0.76	0.46	1.26			
Obese body mass index	0.79	0.50	1.26			
Has Medicaid for insurance	2.70	1.48	4.65	3.29	1.40	7.48
Income <\$35 000 per year	1.54	0.99	2.34			
Pain characteristics						
Duration of 1 y or less	14.20	9.16	222.77	34.35	17.56	74.32
Pain occurred more than half of days in the last 6 mo	1.68	0.88	3.16			
Patient treatment preferences						
"I prefer to take pain medications prescribed by a doctor to treat physical pain" (vs "I prefer to try other ways to treat physical pain before taking pain medications prescribed by a doctor")	2.96	2.03	4.31	3.24	1.88	5.60
Also took benzodiazepines for pain relief	17.55	10.20	29.91	6.02	2.95	12.33
Has never been to a chiropractor	2.04	1.37	3.01			
Physician opinions regarding treatment options: "I recall my physician having a positive opinion of ..."						
Taking prescription pain medications	1.34	0.90	2.03			
Using chiropractic care	0.87	0.56	1.34			
Using meditation, yoga, or tai chi	0.88	0.57	1.32			
Using acupuncture	1.11	0.68	1.75			
Using dietary supplements	0.88	0.59	1.29			

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Table 2. (continued)

Variables	Unadjusted ORs			Adjusted ORs		
	OR	90% CI		OR	90% CI	
		Lower	Upper		Lower	Upper
Physician opinions regarding treatment options: “I recall my physician having a negative opinion of ...”						
Taking prescription pain medications	0.64	0.27	1.30			
Using chiropractic care	0.94	0.46	1.75			
Using meditation, yoga, or tai chi	1.24	0.28	3.51			
Using acupuncture	0.67	0.16	1.86			
Using dietary supplements	0.31	0.07	0.85			
Nagelkerke R ²				0.42		
Hosmer-Lemeshow goodness-of-fit test				$\chi^2 = 9.1, 7 \text{ df}, P = .25$		

CI, confidence interval; df, degrees of freedom; OR, odds ratio.

robust to small cell sizes. We assessed model fit with the Hosmer-Lemeshow goodness-of-fit test.

We defined statistically significant findings as those with *P* values $\leq .10$ and report adjusted ORs with 90% CIs.

RESULTS

Adults with neck or back pain severe enough to have sought health care within the last year were primarily married (66%), white (91%), and aged 50 years or older (73%) and had less than a college education (57%; Table 1). Twenty-two percent had neck or back pain duration of 1 year or less, and 26% indicated they preferred to use pain medications prescribed by a doctor to treat physical pain. Eighty-two respondents (4.9%) reported using opioids for pain relief, and 23% had never been to a chiropractor.

Our bivariate logistic regression analysis indicated that respondents were statistically significantly more likely to have used opioids in the last year if they were not college educated; had Medicaid as an insurance source; had pain that had lasted 1 year or less; indicated that they preferred to use pain medications prescribed by a doctor to treat physical pain; concurrently used benzodiazepines; or had never been to a doctor of chiropractic (Table 2, unadjusted ORs). Respondents aged 18 to 34 years and 50 to 64 years were significantly less likely than those 65 years or older to use opioids. Respondents' perceptions of medical doctors' positive or negative opinions regarding a variety of neck and back pain treatment options were not significantly associated with opioid use, with the exception that respondents whose recollection that physicians had a negative opinion of using dietary supplements were significantly less likely to use opioids.

Our multiple logistic regression analysis was based on the 1509 respondents who had nonmissing data on all of the variables considered. The final model included age category, educational level category, Medicaid insurance status, pain duration category, medication treatment preference, concurrent use of benzodiazepine status, and college educated category. In order of decreasing marginal effects, results indicated that respondents were statistically significantly more likely to have used opioids in the last year if they had pain that had lasted 1 year or less (OR = 34.35 [17.56-74.32]); concurrently used benzodiazepines for pain relief (OR = 6.02 [2.95–12.33]); had Medicaid as an insurance source (OR = 3.29 [1.40-7.48]); indicated that they preferred to use pain medications prescribed by a doctor to treat physical pain (OR = 3.24 [1.88-5.60]); or were not college educated (OR = 1.83 [1.05-3.25]) (Table 2, adjusted ORs). This model also indicated that respondents aged 18 to 34 years were significantly less likely than those 65 years or older to use opioids (OR = 0.09 [0.01-0.40]). The Hosmer-Lemeshow goodness-of-fit test indicated that the model fit the data well (*P* = .25).

DISCUSSION

To help curb the opioid crisis, guidelines for nonpharmacologic and conservative treatment of back pain patients have been developed,¹⁴ and US adults appear to be open to such treatments.¹² However, questions remain regarding how to successfully implement such recommendations and findings within the health care delivery system for spine-related disorders. Although our findings are

associative and rely on self-report data, they raise the possibility that patients with neck and back pain who use opioids differ from those who do not use opioids in ways that might be considered when developing opioid use prevention strategies.

For example, if patient preference for pain medications is a modifiable factor in opioid use, it might be advisable to address treatment preferences through patient engagement in shared decision making to help stem the initial use of opioids. Although further study of the initial relationships we identified is warranted, if they hold, efforts to target patients with particular characteristics and frame relative risks and benefits of nonpharmacologic treatment alternatives may help engage patients in the decision-making process¹⁵ so that such alternatives are more palatable to patients as first steps in addressing their back and neck pain. Our findings suggest that targeting efforts might be most effective if they focused on patients who are aged 65 or older, have shorter-term spinal pain, desire medication treatment for pain relief, and use benzodiazepines and were constructed to be better understood by populations without a college education who are Medicaid insured.

Limitations

Our study has several limitations. First, it used self-report survey data that were obtained in a single year. Second, although the Gallup Organization is renowned for its survey research and reduces response bias by engaging respondents without alerting them as to the nature of the survey, our survey response rate was <50%. Third, only 27% of our sample had significant back or neck pain in the last 12 months, with only 5% reporting use of opioids for pain control; further, we were not able to distinguish whether reported use of opioids was prescribed or not. Fourth, because neck and back pain were not able to be distinguished in the analysis, results might be different if the 2 conditions were separately studied. Finally, regression models may be optimistic and specific to a particular study population; application to another sample may generate different results.

CONCLUSION

Our findings suggest that patients with neck and back pain who use opioids differ from those who do not use opioids in that they are more likely to have pain that is of shorter duration, to use benzodiazepines, to have Medicaid as an insurance source, and to prefer to use pain medications. Although additional study is warranted, this information should be considered when developing opioid use prevention strategies.

FUNDING SOURCES AND CONFLICTS OF INTEREST

Palmer College of Chiropractic funded the study. Dr. Goertz owns stock options in Prezacor, Inc, and provides consulting services to the American Chiropractic Association. She is also the CEO of Spine IQ. The other authors have no conflicts of interest to disclose. No other conflicts of interest were reported for this study.

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Practical Applications

- To help reduce initial opioid exposure, providers caring for patients with neck and back pain might explain downside risks of opioid initiation particularly to patients who are not college educated, have had a shorter duration of spinal pain, are concurrently using benzodiazepines, and express a preference to use medications to treat back pain.
- Alternative treatment modalities to pain medications might be emphasized as first-line treatments for back pain, in accordance with current guideline suggestions.
- Targeting interventions and shared decision-making efforts toward those at highest risk of opioid use may be an effective mechanism to reduce initial opioid exposure.

REFERENCES

1. U.S. Social Security Administration. Annual statistical report on the Social Security Disability Insurance program. 2014. Available at: http://www.socialsecurity.gov/policy/docs/statcomps/di_asr/2013/di_asr13.pdf. Accessed December 21, 2017.
2. Dieleman JL, Baral R, Birger M, et al. U.S. spending on personal health care and public health, 1996-2013. *JAMA*. 2016;316(24):2627-2646.
3. McDonald DC, Carlson K, Izrael D. Geographic variation in opioid prescribing in the U.S. *J Pain*. 2012;13(10):988-996.
4. Hanley K, Zabar S, Altshuler L, et al. Opioid vs nonopioid prescribers: variations in care for a standardized acute back pain case. *Subst Abuse*. 2017;38(3):324-329.
5. Hoppe JA, McStay C, Sun BC, Capp R. Emergency department attending physician variation in opioid prescribing in low acuity back pain. *West J Emerg Med*. 2017;18(6):1135-1142.
6. Deyo RA, Smith DH, Johnson ES, et al. Opioids for back pain patients: primary care prescribing patterns and use of services. *J Am Board Fam Med*. 2011;24(6):717-727.
7. Deyo RA, Hallvik SE, Hildebran C, et al. Association between initial opioid prescribing patterns and subsequent long-term use among opioid-naïve patients: A statewide retrospective cohort study. *J Gen Intern Med*. 2017;32(1):21-27.
8. Sehgal N, Manchikanti L, Smith HS. Prescription opioid abuse in chronic pain: A review of opioid abuse predictors and strategies to curb opioid abuse. *Pain Physician*. 2012;15(3 Suppl):ES67-ES92.
9. Weeks WB, Ventura J, Justice B, Hsu E, Milstein A. Multistakeholder recommendations for improving value of spine care: key themes from a roundtable discussion at the 2015 NASS Annual Meeting. *Spine J*. 2016;16(7):801-804.
10. Pan PH, Coghill R, Houle TT, et al. Multifactorial preoperative predictors for postcesarean section pain and analgesic requirement. *Anesthesiology*. 2006;104(3):417-425.
11. Brummett CM, Waljee JF, Goesling J, et al. New persistent opioid use after minor and major surgical procedures in U.S. adults. *JAMA Surg*. 2017;152(6):e170504.
12. Davis A. Americans open to drug-free pain treatment over opioids. Available at: <http://news.gallup.com/opinion/gallup/218762/americans-open-drug-free-pain-treatment-opioids.aspx>. Accessed December 21, 2017.
13. Weeks WB, Goertz CM, Meeker WC, Marchiori DM. Public perceptions of doctors of chiropractic: results of a national survey and examination of variation according to respondents' likelihood to use chiropractic, experience with chiropractic, and chiropractic supply in local health care markets. *J Manip Physiol Ther*. 2015;38(8):533-544.
14. Qaseem A, Wilt TJ, McLean RM, Forciea MA. Clinical Guidelines Committee of the American College of Physicians. Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. *Ann Intern Med*. 2017;166(7):514-530.
15. Edwards A, Elwyn G, Covey J, Matthews E, Pill R. Presenting risk information—a review of the effects of “framing” and other manipulations on patient outcomes. *J Health Commun*. 2001;6(1):61-82.