

BRIEF REPORT

Opioid Education and Prescribing Practices

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Background: Lack of training among health care providers (HCPs) to safely prescribe opioids is a contributing factor to the opioid crisis. Training and other resources have been developed to educate providers about safe and appropriate opioid prescribing practices.

Method: The national survey was conducted with 2000 HCPs representing primary care physicians (PCPs), including family practice, general practice, and internal medicine; specialists (SPs); physician assistants (PAs); and nurse practitioners (NPs), a mix of primary care and specialists. This survey examined exposure to opioid educational information and opioid prescribing.

Results: PCPs reported prescribing opioids for chronic pain to significantly more patients compared with other HCP groups. PCPs (89.8%) and NPs (85.5%) reported significantly greater exposure to opioid educational information compared with both SPs (71.9%) and PAs (78.8%). Overall, HCPs had limited knowledge about abuse-deterrent formulations, but PCPs had greater knowledge than other groups. HCPs had an increased likelihood of prescribing opioids to fewer patients in the last 3 months relative to the prior 12 months if they worked in a state or county clinic vs a solo or group practice type (adjusted odds ratio [AOR] = 1.97; 95% confidence interval [CI], 1.12–3.49) and were exposed to more opioid educational information during the last 12 months (AOR = 1.19; 95% CI, 1.06–1.32).

Discussion: HCPs' exposure to opioid educational information was associated with less opioid prescribing for chronic pain. Findings indicated a difference in exposure and knowledge gaps across provider groups. More information is needed on the content of opioid educational information provided to HCPs. (J Am Board Fam Med 2021;34:802–807.)

Keywords: Abuse-Deterrent Formulations, Health Personnel, Healthcare Providers, Opioid Education, Opioids, Physician's Practice Patterns, Prescribers, Primary Care Physicians, Primary Health Care, Surveys and Questionnaires

Introduction

In October 2017, the Federal Response to the Opioid Crisis¹ discussed 2 major problems leading to the opioid crisis: the rise in opioid analgesic prescriptions and lack of health care provider training to prescribe opioids safely. In response, several federal agencies developed resources and trainings to educate health care providers (HCPs) about safe and appropriate prescribing practices. The Centers for Disease Control and Prevention (CDC)

developed the Guideline for Prescribing Opioids for Chronic Pain² and offers continuing education credits to providers for completing trainings related to guideline implementation and prescription drug monitoring programs (PDMP).^{3–4} Similarly, the Substance Abuse and Mental Health Services Administration offers trainings to increase knowledge and skills related to opioid use disorders and medication-assisted treatment.⁵ The Food and Drug Administration (FDA) supports the goal of reducing inappropriate prescribing by approving abuse-deterrent formulations (ADFs) and requires opioid manufacturers to make training available to providers treating patients with pain through a Risk Evaluation and Mitigation Strategy.^{6–7}

Aside from a few studies that examined the implementation of the CDC guideline and similar educational interventions in a limited number of ambulatory care settings,^{8–10} there is a lack of national data about HCPs' exposure to opioid educational information. This study examined exposure to opioid educational

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information, opioid prescribing, and related measures using a nationally representative survey of HCPs.

Methods

Sample

The online national HCP survey was conducted with 2000 HCPs representing primary care physicians (PCPs), specialists (SPs), physician assistants (PAs), and nurse practitioners (NPs). PCPs were from family practice, general practice, internal medicine specialties, and SPs from cardiology, dermatology, endocrinology, neurology, obstetrics/gynecology, oncology, ophthalmology, psychiatry, rheumatology, and urology. NPs and PAs included a mix of primary care and specialists. The sample was randomly drawn from WebMD's Medscape subscriber network, stratified by HCP group, and designed to yield target numbers of completed interviews per group. Eligible HCPs practiced in an office-based setting and spent at least 50% of their time providing patient care. Physicians were required to be American Medical Association-validated physicians. NPs and PAs were required to have prescribing authority in their state. Honorariums of \$50 and \$60 were provided for survey completion. Institutional review boards of each author's institution approved the study.

Measures

Survey measures were developed using a multi-stage process, including an expert review, cognitive interviews, and a pretest. The survey assessed knowledge, attitudes, and practices in multiple domains, including prescription drug promotions, clinical trials, FDA policies, and opioids. Data presented in this article focuses on opioid questions. Key measures included the number of patients prescribed opioids for chronic pain, exposure to opioid educational information, recall of opioid prescription drug promotions, and knowledge of ADFs.

Data Collection

The survey was administered between October and November 2019. Participants received an initial e-mail about the survey with a link to the screener. Eligible HCPs were sent the survey within 24 hours of completing the screener. Response rates were calculated based on the American Association of Public Opinion Research¹¹ standards. Seventy-five percent of the initial e-mails were never opened by the provider, resulting in a low overall response rate, ranging

between 3–6% across the 4 HCP groups. However, the extended interview response rates (completed interviews/eligible screeners) were over 90% across all groups.

Nonresponse bias analysis was conducted to compare respondents and nonrespondents on known characteristics for the screener and survey. A high cutoff ($P < .20$) was used to test for significant differences for response rate bias considerations. At this level, differences were found in primary specialty, geographic region, race, and age groups. These differences were adjusted for by raking, a proportional fitting technique for calibrating sample weights using external data for population estimates. Raking was conducted to national totals from 2 separate data sources, the National Ambulatory Medical Care Survey (NAMCS) restricted data (https://www.cdc.gov/nchs/data/ahcd/Availability_of_NAMCS_and_NHAMCS_Restricted_Data.pdf) and the American Community Survey (ACS) public use microdata sample (<https://www.census.gov/programs-surveys/acs/microdata.html>). Both data sources provide national estimates on the 4 HCP groups. For the survey, weights were computed for each completed interview to correct unequal selection probabilities, differential response rates, and coverage. The weights were used to ensure distributions by HCP characteristics matched national benchmarks for PCPs, SPs, NPs, and PAs. Weights were developed for gender, age groups, and the 4 U.S. Census Regions based on external totals from national surveys (NAMCS and ACS). In addition, external totals were used to develop weights for specialty and practice sizes for PCPs and SPs.

Analyses

Analyses were conducted using SPSS Version 25 complex samples module and utilized Taylor Series variance computations to account for weighting and sample design correctly. χ^2 and Benjamini-Hochberg (BH) procedures were used to examine differences across HCP groups. Logistic regression was conducted to examine the likelihood of prescribing opioids to fewer patients at 3 months relative to 12 months ago. Predictors included exposure to opioid educational information during the last 12 months, the number of patients prescribed opioids for chronic pain during the last 3 months, recall of opioid prescription drug promotion, ADF knowledge score, HCP group, provider demographics, and practice type.

Table 1. Characteristics of Survey Respondents

	Unweighted (N = 2,000)				Weighted (N = 348,269)			
	Type of Health Care Provider Group							
	PCPs	SPs	PAs	NPs	PCPs	SPs	PAs	NPs
Total n by group	700	600	350	350	104,576	107,408	59,539	76,746
	%	%	%	%	%	%	%	%
Sex								
Male	60	66	25	8	66	70	28	10
Female	40	34	75	92	34	30	72	90
Race/Hispanic identity*								
Hispanic	8	5	6	3	7	6	6	4
White	65	66	82	81	66	70	82	80
Black	2	2	3	6	3	2	2	6
Asian	20	23	5	5	20	18	6	6
Other	5	5	3	5	4	4	3	5
Age, years								
Less than 35	13	11	33	18	4	2	42	23
35–44	29	30	35	30	21	19	28	26
45–54	26	26	17	21	31	31	16	21
55–64	21	23	12	23	30	28	10	22
65 or older	10	12	3	8	15	20	4	8
Type of practice								
Private solo or group practice	60	78	62	50	72	82	61	52
Freestanding clinic/urgent care center	9	6	13	13	7	5	13	12
Non-federal government clinic	5	4	4	7	4	2	4	7
Federal government clinics	3	2	5	4	2	2	5	4
Health maintenance organizations	6	3	3	6	3	2	4	6
Community health centers	9	3	7	13	5	4	7	13
Other	7	5	6	8	6	3	6	8
Number of years in practice								
Less than 5	15	12	29	26	7	5	33	27
5–10	21	22	27	28	13	13	27	29
11–15	13	13	15	14	13	11	13	13
16–20	14	13	13	11	15	18	12	10
More than 20	37	39	16	22	53	53	16	21
Number of prescriptions in a typical week								
Less than 35 prescriptions	13	33	24	29	16	33	25	29
35–65 prescriptions	21	29	29	30	20	25	28	29
66–125 prescriptions	27	22	26	22	26	24	28	22
More than 125 prescriptions	39	15	21	19	38	18	19	20
Number of patients in a typical week								
Less than 40 visits	9	8	11	16	13	11	11	17
40–79 visits	33	36	42	51	34	36	41	50
80–119 visits	40	31	35	23	35	28	35	23
120 or more visits	18	26	13	10	18	26	14	11

NPs, nurse practitioners; PAs, physician assistants; PCPs, primary care physicians; SPs, specialists.

*Asian, Black, Other, and White race categories are Non-Hispanic.

Results

Table 1 shows the unweighted and weighted characteristics of the sample.

PCPs reported prescribing opioids for chronic pain during the last 3 months to significantly more

patients compared with other HCP groups. When asked if the number of patients prescribed opioids for chronic pain in the last 3 months was the same, less, or more relative to 12 months ago, PCPs were significantly more likely to report “less” (Table 2). Most

Table 2. Patients Prescribed Opioids and Exposure to Opioid Educational Information by Health Care Provider Group

	Type of Health Care Provider Group			
	PCPs	SPs	PAs	NPs
Patients prescribed opioids for chronic pain during past 3 months (%)*,†				
None	24.5	69.4	50.0	52.6
1–5 patients	25.5	16.4	24.4	26.0
6–10 patients	19.0	5.5	8.5	5.6
11–20 patients	13.7	3.0	6.2	6.4
21 or more patients	15.6	4.3	9.0	8.2
Don't know/not sure	1.6	1.4	1.8	1.2
Patients prescribed opioids past 3 months versus 12 months (%)*,†				
Less	43.8	24.5	26.1	26.5
Same	54.2	74.5	70.8	70.6
More	2.1	1.0	3.2	2.9
Sources for opioid educational information (%)*				
Hospital or conference presentations‡	41.7 ^a	33.8 ^c	27.0 ^d	40.9 ^b
Online presentations or webinars	42.5 ^b	33.2 ^d	39.3 ^d	51.8 ^a
Sponsored event	7.3	5.0	5.4	7.6
Medical journals [¶]	59.9 ^a	40.9 ^b	53.4 ^a	58.8 ^a
Prescribing information/REMS materials [¶]	24.5 ^a	15.2 ^b	18.8	25.1 ^a
Promotional materials [¶]	8.9	5.4 ^b	8.8	11.6 ^a
Other information sources	6.5	2.6	5.5	5.5
Exposure to opioid educational information during the past 12 months [#]				
Mean**	1.91 ^a	1.36 ^c	1.58 ^b	2.01 ^a
95% CI	1.80–2.02	1.04–1.49	1.45–1.72	1.88–2.16
%exposed**	89.8 ^a	71.9 ^c	78.8 ^b	85.5 ^a
Recall of opioid promotions ^{††}				
Mean**	1.64 ^b	1.16 ^c	1.63 ^b	1.82 ^a
95% CI	1.53–1.75	1.04–1.28	1.51–1.75	1.71–1.93
ADF knowledge score ^{‡‡}				
Mean**	1.91 ^a	1.23 ^c	1.49 ^b	1.48 ^b
95% CI	1.78–2.04	1.09–1.37	1.34–1.64	1.34–1.63

ADF, abuse-deterrent formulations; BH, Benjamini-Hochberg procedure; CI, confidence interval; NPs, nurse practitioners; PAs, physician assistants; PCPs, primary care physicians; REMS, Risk Evaluation and Mitigation Strategy; SPs, specialists.

* χ^2 tests using the Agresti logit uniform association model were first conducted across the 4 groups, followed by pairwise comparisons using the BH procedure.

†PCPs were significantly different from NPs, PAs, and SPs, BH $P < .01$.

‡a > c > d and b > d, BH adjusted, $P < .05$.

|| a > b > d and a > c, BH adjusted, $P < .05$.

¶ a > b, BH adjusted $P < .05$.

#A global measure of exposure to opioid educational information was created by summing the “yes” responses for each source of opioid educational information. Means represent the average exposure per group. “% exposed” represents the percentage of respondents in each health care provider group that read at least 1 opioid educational material or attended 1 opioid educational event.

**a > b > c, BH adjusted, $P < .05$.

††“Yes” responses to questions about seeing prescription drug promotions in the last 6 months related non-opioid analgesics, medication-assisted treatment for opioid deterrence, and opioid reversal agents were combined to create an overall recall measure of prescription drug promotions.

‡‡Correct responses to 5 ADF questions were summed to create a total ADF knowledge score.

HCPs reported exposure to opioid educational information during the last 12 months. However, PCPs (89.8%) and NPs (85.5%) reported significantly greater exposure compared with both SPs (71.9%) and PAs (78.8%). Medical journals, online presentations/webinars, and hospital/conference presentations were the most frequent sources for opioid educational information. Knowledge of ADFs was generally low across all HCP groups, with correct responses to the 5 individual ADF questions ranging from 9.1% to 55.3%. PCPs had a significantly higher ADF knowledge score compared with other HCP groups. NPs reported significantly greater recall for opioid prescription drug promotion compared with other HCP groups (Table 2). Resources mentioned as most helpful by HCPs for supporting safe and effective opioid prescribing included continuing education (79.5%) and state resources (eg, PDMPs, state-required coursework; 58.5%).

Logistic regression findings indicated that HCPs had an increased likelihood of prescribing opioids to fewer patients in the last 3 months relative to prior 12 months if they worked in a state or county clinic versus a solo or group practice type (adjusted odds ratio [AOR]=1.97; 95% confidence interval [CI], 1.12–3.49), had prescribed opioids to more patients with chronic pain during the last 3 months (AOR = 1.35; 95% CI, 1.23–1.49), and were exposed to more opioid educational information during the last 12-months (AOR = 1.19; 95% CI, 1.06–1.32) (Table 3). Compared with PCPs, SPs (AOR=0.61; 95% CI, 0.43–0.87), NPs (AOR=0.68; 95% CI, 0.47–0.99), and PAs (AOR=0.69; 95% CI, 0.48–1.01) had a decreased likelihood of prescribing opioids to fewer patients.

Discussion

The opioid landscape continues to evolve, with several states enacting legislation that places limits on opioid prescribing and mandates continuing medical education requirements for opioid prescribers.¹² Similarly, health systems encourage HCP compliance through clinical decision support tools and integrating information from PDMP.¹³ Policy changes at the state and health system levels help strengthen education and training initiatives developed by federal agencies. Over 90% of HCPs in the current study practiced in a state with some continuing education requirements, and the vast majority ranked continuing education as the most helpful resource for supporting safe and effective opioid prescribing.

Table 3. Logistic Regression Model for Likelihood of Prescribing Opioids for Chronic Pain to Fewer Patients at 3 Months Relative to 12 Months Ago*

Predictors	Adjusted Odds Ratio (95% CI)	P value
Number of patients prescribed opioids for chronic pain in last 3 months	1.36 (1.23–1.49)	.001
ADF knowledge score [†]	0.99 (0.90–1.09)	.812
Exposure to opioid educational information in last 12 months [‡]	1.19 (1.06–1.32)	.002
Recall of opioid promotion [¶]	1.08 (0.90–1.22)	.240
Health care providers		
SPs	0.61 (0.43–0.87)	.006
PAs	0.69 (0.48–1.01)	.056
NPs	0.68 (0.47–0.99)	.042
PCPs	Reference	
Race/ethnicity [¶]		
Hispanic	1.27 (0.72–2.23)	.407
Asian	1.27 (0.86–1.88)	.228
Black	1.08 (0.46–2.53)	.861
Other	1.12 (0.60–2.08)	.726
White	Reference	
Practice type		
Clinics/urgent care centers	0.84 (0.55–1.29)	.433
Non-federal government clinics	1.97 (1.12–3.49)	.021
Federal government clinics	0.67 (0.34–1.31)	.237
Health maintenance organizations	0.82 (0.45–1.49)	.512
Community health centers	0.87 (0.56–1.35)	.533
Other	0.70 (0.43–1.15)	.158
Solo/group practice	Reference	
Sex		
Male	1.23 (0.93–1.63)	.140
Female	Reference	
Age	1.01 (0.99–1.02)	.062

ADF, abuse-deterrent formulations; CI, confidence interval; NPs, nurse practitioners; PAs, physician assistants; PCPs, primary care physicians; SPs, specialists.

*The outcome variable is based on responses to the question: Is the number of patients you prescribed opioids for chronic pain in the past 3 months relative to 12 months ago, the same, less, or more. Response options same and more were combined and compared to less.

[†]Correct responses to 5 ADF questions were summed to create a ADF knowledge score.

[‡]Exposure to opioid educational information was created by summing “yes” responses for each source of opioid educational information.

[¶]“Yes” responses to questions about seeing prescription drug promotions in the last 6 months related non-opioid analgesics, medication-assisted treatment for opioid deterrence, and opioid reversal agents were combined to create an overall recall measure of prescription drug promotions.

[¶]Asian, Black, Other, and White race categories are Non-Hispanic.

The current study is important as it provides national estimates for HCPs' exposure to opioid educational information. Findings also suggest some differences across provider groups, with SPs having the least exposure to opioid educational information. Consistent with other research,¹⁴ the current study found that PCPs prescribed opioids to more patients compared with other provider groups. PCPs were also more likely to report a reduction in opioid prescribing over time, greater exposure to opioid educational information, and more knowledge about ADFs, indicating greater awareness of opioid recommendations more broadly. Study findings provide some evidence that exposure to opioid educational information may help reduce opioid prescribing.

There are several limitations in this study. Study response rates were low. To address this, raking to national survey totals corrected for differences observed in the screener. For the survey, weights were computed for each completed interview to correct unequal selection probabilities, differential response rates, and coverage. Study results are limited to self-reported data. As with most self-reported data, there is the potential for social desirability bias. In particular, HCPs may underreport the number of patients prescribed opioids or over-report exposure to opioid educational information. We also have limited information on the content of educational information. Further research into this aspect could inform the efforts of the various stakeholders in this space. HCPs overall had limited ADF knowledge, which might suggest one area to target educational efforts.

To see this article online, please go to: <http://jabfm.org/content/34/4/802.full>.

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