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Training Experiences Regarding Pain Management, Addiction, and Drug Diversion of Dentists enrolled in the National Dental Practice Based Research Network

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Abstract

Background: The purpose of this study was to describe dentists' training experiences relevant to pain management, addiction, and prescription opioid drug diversion and examine associations between these training experiences and dentists' opioid prescribing practices.

Methods: A web-based, cross-sectional survey was conducted among practicing dentist members of the National Dental Practice-Based Research Network (PBRN; N=822). The survey assessed pain management prescribing practices and training experiences related to pain management and

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Authors McCauley, Leite, Fillingim, and Brady designed the study and wrote the protocol. Authors Reyes, Meyerowitz, Gordan, Rindal, Gilbert, and the National Dental PBRN Collaborative Group provided feedback on the study protocol. Author McCauley conducted the literature searches and provided summaries of the previous research studies. Author McCauley conducted the statistical analysis, with advisement on the analysis plan from Authors Gilbert and Meyerowitz. Author McCauley wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

assessment for addiction and drug diversion. Survey data were linked with National Dental PBRN Enrollment Questionnaire data regarding practitioner demographics and practice characteristics.

Results: The majority of dentists (67%) reported prior training in pain management; however, a minority of dentists reported prior training regarding identification and assessment of drug abuse or addiction (48%) or identification of prescription drug diversion (25%). The majority of training experiences across all topics occurred through continuing dental education participation. Dental school training relevant to pain management, addiction, and identification of drug diversion was more prevalent among more-recent dental school graduates. Training experiences were associated with prescribing practices.

Conclusions: Results suggest that across multiple levels of training, many dentists are not receiving training specific to addiction assessment and identification of drug diversion. Such training is associated with greater consistency of risk mitigation implementation in practice.

Keywords

Opioid; Opioid Education; Opioid Prescribing; Dentists

INTRODUCTION

Medical prescribers' contribution to the initiation and maintenance of the epidemic has been well documented.^{1,2} Many individuals who go on to develop opioid use disorders, including those individuals who ultimately transition to heroin use, report that early exposure to opioids was through a legitimate prescription or a prescription shared from family or friends.²⁻⁴ This risk is particularly highlighted among adolescents and young adults: a combination of medical and non-medical opioid use in adolescents, as well as adolescent non-medical use in isolation, have been associated with elevated risk for substance use disorder symptoms in adulthood.⁴

Opioids account for nearly one-third of prescriptions issued by dentists and dentists prescribe a notable volume of immediate release opioids, accounting for an estimated 12% of annual immediate release opioid prescriptions.⁵⁻⁹ Prior research suggests that a majority (80%-90%) of patients report having unused medication leftover from their post-procedural dental prescription.¹⁰ Dental opioid prescribing is particularly frequent for adolescent patients, a group at increased risk for misuse.¹¹⁻¹⁴ Furthermore, research suggests that dentists do not regularly implement recommended risk mitigation strategies - including screening for prescription drug abuse/misuse, querying a prescription drug monitoring program (PDMP), and providing thorough patient education regarding safe use, storage, and disposal when prescribing opioid medications for pain management.^{7,15,16}

Increasing attention has been given to the importance of training in pain management and addiction in medical schools, medical residency programs, and continuing education initiatives.¹⁷⁻²¹ The current study presents findings from a national survey of dental practitioners with the aims of: (1) describing training experiences relevant to pain management, addiction, and drug diversion; (2) identifying the relevance of various training

resources to dentists' prescribing practices; and, (3) examining associations between training experiences and dentists' prescribing practices.

METHODS

Participants

This study was conducted in partnership with the National Dental PBRN, a consortium of dental practices and dental organizations focused on improving the scientific basis for clinical decision-making.²² Detailed information about the network is available on its web site (<https://www.nationaldentalpbrn.org>). The Institutional Review Board (IRB) at the lead investigator's institutions and IRBs associated with the Network approved this project. A total of 1,428 network members were randomly selected and invited to participate in this cross-sectional survey study. Inclusion/exclusion criteria are discussed in detail in a prior publication.¹⁶

Survey

The development and test/retest reliability of this survey are detailed in a previous publication.¹⁶ The final survey was administered online via Research Electronic Data Capture (REDCap), and consisted of 137 potential items (publicly available at <http://nationaldentalpbrn.org/study-results/reducing-prescription-opioid-misuse-dental-provider-intervention-development-survey.htm>). Survey data were paired with practitioner and practice characteristics from the network's Enrollment Questionnaire items. Enrollment Questionnaire items had documented test/re-test reliability and were adapted from previous work in a practice-based study of dental care (publicly available at <http://nationaldentalpbrn.org/study-results/>).

Survey Recruitment Methodology

Study recruitment took place between August 29, 2016 and December 5, 2016. Dentists received an invitation email explaining the study and inviting them to participate using a unique electronic link to the questionnaire and were sent up to 5 reminders via email and phone. Dentists who had not completed the survey within a 10-week timeframe were considered non-respondents. Dentists were offered a \$50 remuneration code for their participation.

Statistical Analysis

The following variables were examined for their association with the extent of training experiences: (1) decade in which dentist graduated from dental school; (2) specialist training (yes/no); (3) any advanced general dentistry training (yes/no); (4) frequency of prescribing opioids; (5) frequency of recommending NSAIDs or acetaminophen in combination with prescribing opioids; (6) frequency of recommending NSAIDs; (5) frequency of recommending acetaminophen; (7) frequency of PDMP use; (8) consistency of educating patients regarding risks associated with opioids; and, (9) self-rated knowledge regarding the risks of addiction, misuse, and diversion associated with prescription opioids. In order to be asked questions regarding PDMP use, dentists had to indicate holding a current DEA license to prescribe controlled substances.

For these analyses, *prior training experiences* were assessed by asking, “Have you received training in (pain management, addiction, drug diversion),” with answer responses of “yes (1)” and “no (2).” *Extent of Prior Training* was assessed with the subsequent question “How much instruction did you receive.” Answer options were presented in a Likert scale and included: none (0), less than 2 hours (1), half-day instruction/seminar (2), full-day instruction/seminar (3), multi-day instruction/seminar (4), and semester/quarter of instruction or more (5). Dentists were asked to rate “how valuable each of the following resources has been in giving you information about controlled substance prescribing” on a scale that included: very valuable (1), somewhat valuable (2), not valuable (3), and do not use this source for information about controlled prescribing (4).

Prescribing was assessed by asking dentists, “In the past 6 months, when patients have needed medication for pain management, for how many patients have you: recommended NSAIDs, recommended acetaminophen, prescribed an opioid only, or prescribed an opioid and recommended OTC medication.” Answer options ranged from none (1) to all patients (7). *Prescription Drug Monitoring Program (PDMP) Use* variable summed items regarding frequency of checking the PDMP prior to any opioid prescription, prior to prescribing to high-risk patients, prior to prescribing to new patients, and prior to prescribing refills. Lower scores (range: 4 to 28; Mean=13.8; Median=14) on this item represented more-frequent use of the PDMP. *Patient Education* variable summed items for frequency of educating patients regarding risks, side effects, secure storage, disposal, and non-medical use risks associated with opioid medication. Lower scores (range: 5 to 35; Mean=21.7; Median=23) on this item represented more-consistent provision of patient education. Finally, dentists were also asked “How would you rate your level of knowledge regarding the risks of addiction, misuse, and diversion (intentional and unintentional) associated with prescription opioids?” Answer options included: very knowledgeable (1), somewhat knowledgeable (2), and not very knowledgeable (3).

All data were consolidated in an SPSS database for analysis. Frequency distributions and descriptive statistics were figured for all outcome variables of interest. Associations of practitioner- and practice-level characteristics, as well as self-reported opioid prescribing practices, with extent of training related to pain management, addiction, and drug diversion were examined with Pearson bivariate correlation or one-way ANOVA analyses, as appropriate.

RESULTS

Survey Participation

Of the 1,428 dentists invited to participate, a total of 822 (58% of invited) dentists completed the survey. Among dentists not completing the survey, the majority did not ever access the survey (508 of 606). A minority accessed but did not complete (49 of 606), had provided an inactive email address on their enrollment questionnaire (33 of 606), explicitly refused participation (10 of 606), or no longer met eligibility criteria at the time of survey deployment (6 of 606). Descriptive information about participating dentists (N=822) and their respective practice characteristics are presented in Table 1. Additional information comparing survey completers to non-completers are reported in more detail elsewhere.¹⁶

Training Experiences

The majority of dentists (n=549, 67%) reported prior training in pain management; however, a minority of dentists reported prior training regarding identification and assessment of drug abuse or addiction (n=393, 48%) or identification of prescription drug diversion (n=206, 25%). Results regarding the frequency and timing of these training experiences are presented in Table 2. Resources providing information about controlled substance prescribing are presented in order of their value to dentists in Table 3.

We examined extent of training as a function of the decade in which dentists reported graduating from dental school (Figures 1-4 in Appendices). The percent of dentists receiving any training in pain management (χ^2 [1, N=820]=0.13, p=.72) and identification of drug diversion (χ^2 [1, N=820]=0.08, p=.78) did not statistically differ as a function of graduating prior to (versus in or after) 2010; however, those graduating in or after 2010 (63%) were significantly more likely to report participating in any training related to addictions (χ^2 [1, N=820]=6.0, p=.01) than those graduating prior to 2010 (47%). The percent of dentists who reported receiving training related to pain management, addiction assessment, or identification of prescription drug diversion as a part of the dental school curricula steadily increased from 1980 (and prior) to 2010 (and later).

Associations Between Training Experiences and Practice Characteristics and Behaviors

A greater extent of training in pain management strategies was significantly associated with specialist training [F(1,804)=24.7, p<.001], higher frequency of recommending NSAIDs in combination with opioid prescribing (r=0.113, p<.01), higher frequency of recommending NSAID/acetaminophen use in isolation (r=0.08, p<.05), higher consistency of educating patients regarding their opioid prescription and its risks (r=-0.18, p<.01), and higher self-rated knowledge regarding risks associated with abuse and diversion (r=0.19, p<.01).

A greater extent of training regarding the identification/assessment for drug abuse and addiction was significantly associated with more-consistent provision of patient education (r=-0.24, p<.01), and higher self-rated knowledge regarding risks associated with abuse and diversion (r=-0.31, p<.01).

A greater extent of training regarding identification of prescription drug diversion was significantly associated with higher frequency of PDMP use (r=-0.11, p<.05), higher consistency of educating patients regarding their opioid prescription and its risks including diversion (r=-0.25, p<.01), and higher self-rated knowledge regarding risks associated with abuse and diversion (r=-0.24, P=.01). Negative correlations are due to coding for the PDMP use variable, such that lower scores reflect more consistent/higher frequency PDMP use.

DISCUSSION

This national survey study presents findings regarding the opioid prescribing practices of active dentists and training experience relevant to acute pain management, assessment of addiction, and identification of prescription drug diversion within their practice. This work is particularly timely given the broad national impact of opioid abuse and overdose and the

identification of dentists as leading licit sources of immediate release opioids, particularly among adolescents and young adults.^{8,11,23,24}

The low training prevalence in identification of diversion is consistent with findings from a smaller, statewide survey of dentists that found that 28% reported prior training experiences and - also similar to the current findings - those training experiences were associated with differences in practice behaviors.⁷ Whereas the increase in training among more-recent graduates appears to be at least partially driven by the notable integration upsurge of these topics into dental school training curricula, it is worth note that even among dentists graduating in or after 2010, few received training pertinent to addiction (less than 50%) and diversion (less than 20%). That 75% of dentists had no training related to identification of diversion is particularly concerning given data indicating that the majority of individuals who misuse prescription opioids often get them from family and/or friends.²⁻⁴ Importantly, the current study found that training experiences were associated with self-reported prescribing practices. All training experiences were associated with increased provider report of knowledge of risks of addiction, misuse, and diversion (intentional and unintentional) associated with prescription opioids. These findings support recent efforts by the American Dental Association promoting mandatory training their recent policy statement on opioids.²⁵

This study has limitations that should be noted. Recruitment for this study was supported by the National Dental PBRN infrastructure and resulted in a 59% response rate among eligible invited dentists. Previous analyses from the network have demonstrated that network practitioners, although diverse, have much in common with the profession at large (e.g., representation of race, gender, ethnicity, number of offices, percentage of patients with insurance coverage, number of operatories, patient visits per week).^{26,27} Findings from several network studies document that network dentists report patterns of diagnosis and treatment that are similar to patterns of non-network dentists.²⁸⁻³⁴ However, dentists who enroll in the Network may still be different from non-enrollees in ways that we've not measured. All data were cross-sectional, self-reported, and retrospective in nature, subjecting them to potential bias. No objective prescribing data were collected; however, dentists' self-report of prescribing practices in the current study generally correspond with objective reports of dental opioid prescribing.⁸ Systemic factors that were not assessed by the current survey could have influenced the findings of this study.

Overall findings suggest that many dentists do not receive training specific to addiction assessment and identification of drug diversion, despite such training being associated with greater consistency of risk mitigation implementation in practice.

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Figure 1. Pain Management Training.

Percent of dentists graduating within an indicated decade who endorsed various levels of training regarding pain management strategies.

Figure 2. . Addiction Training.

Percent of dentists graduating within an indicated decade who endorsed various levels of training regarding identification, and assessment of drug abuse or addiction.

Figure 3. Diversion Training.

Percent of dentists graduating within an indicated decade who endorsed various levels of training regarding identification of prescription drug diversion.

Figure 4. Dental School Training Experiences.

Decade of dental school graduation and percent of dentists reporting receipt of training regarding pain management, addiction assessment, and diversion identification as part of their dental school curricula.

Table 1.

Descriptive results regarding dentists and their respective practices (N=822)

Variable	Frequency	Percent of Total Sample
Practitioner Sex		
Male	582	70.8%
Female	231	28.1%
Practitioner Ethnicity		
Hispanic	42	5.2%
Non-Hispanic	771	93.8%
Practitioner Race		
White or Caucasian	660	80.3%
Black or African American	39	4.7%
American Indian or Alaskan Native	3	0.4%
Asian	80	9.7%
Native Hawaiian or Pacific Islander	2	0.2%
Other	29	3.5%
Practitioner Type		
General Practitioner	635	77.3%
AEGD	67	8.2%
GPR	155	18.9%
FAGD	84	10.2%
MAGD	31	3.8%
Other Advanced Training	127	15.5%
Any Advanced General Training ⁺	343	41.7%
Specialist	187	22.7%
Practice Type		
Private Practice	647	78.7%
Managed Care Organization	64	7.8%
Public Health/Community/Government	46	5.6%
Academic Setting	58	7.1%
Specialty Training		
Endodontist	59	7.2%
Periodontist	74	9.0%
Prosthodontist	28	3.4%
Oral and Maxillofacial Surgeon	27	3.3%
Practitioner Network Region		
Western	132	16.1%
Midwest	96	11.7%
Southwest	177	21.5%
South Central	134	16.3%
South Atlantic	134	16.3%
Northeast	149	18.1%

Variable	Frequency	Percent of Total Sample
Practice Location ^a		
Inner City of Urban Area	119	14.5%
Urban (not inner city)	229	27.9%
Suburban	357	43.4%
Rural	112	13.6%
Year of Dental School Graduation		
Before 1980	145	17.6%
1980-1989	267	32.5%
1990-1999	179	21.8%
2000-2009	165	20.1%
2010 or Later	64	7.8%

AEGD: Advanced Education in General Dentistry; GPR: General Practice Residency; FAGD: Fellowship in the American Academy of General Dentistry; MAGD: Master in the Academy of General Dentistry.

⁺ Dentists could endorse having completed multiple advanced general dentistry trainings, therefore the sum of dentists endorsing AEGD, GPR, FAGD, MAGD, and other advanced training (464) is not reflective of the total number of general dentists reporting any advanced training in general dentistry (343).

^a When assessed for correlation with training experiences, practice location was dichotomized into “Rural” and “Non-Rural” practice location.

* Variables that do not sum to 100% reflect missing data.

Table 2.

Dentists' (N=822) self-reported training experiences regarding pain management (pain), identifying and assessing for drug abuse or addiction (addiction), and identification of prescription drug diversion (diversion).

	Pain	Addiction	Diversion
How much training			
None	273 (33%)	429 (52%)	616 (75%)
< 2 Hours	70 (8.5%)	98 (11.9%)	68 (8.3%)
Half-Day	116 (14.1%)	102 (12.4%)	52 (6.3%)
Full-Day	105 (12.8%)	71 (8.6%)	37 (4.5%)
Multi-Day	93 (11.3%)	58 (7.1%)	21 (2.6%)
Semester/Quarter	149 (18.1%)	54 (6.6%)	22 (2.7%)
When was training *			
Dental School	265 (32.2%)	136 (16.5%)	53 (6.4%)
Residency	176 (21.4%)	85 (10.3%)	27 (3.3%)
Specialty Training	105 (12.8%)	56 (6.8%)	25 (3.0%)
CDE **	423 (51.5%)	324 (39.4%)	183 (22.3%)

* Dentists could endorse receiving training during any of the timeframes listed; categories are not mutually exclusive.

** CDE = Continuing Dental Education. Training frequencies do not sum to 100% due to some individuals selecting "other" as a response.

Table 3.

Dentists' impressions regarding the value of information about controlled substance prescribing provided by practice resources.

	Very	Somewhat	Not	Do Not Use
Work Experience	610 (74%)	201 (25%)	7 (1%)	4 (<1%)
CDE *	456 (56%)	332 (40%)	11 (1%)	23 (3%)
Colleagues	297 (36%)	433 (53%)	54 (7%)	38 (4%)
Journal Articles	255 (31%)	482 (59%)	50 (6%)	35 (4%)
Internet	154 (19%)	483 (59%)	102 (12%)	83 (10%)
Reference Books	158 (19%)	425 (52%)	114 (14%)	125 (15%)
Drug Manufacturers	95 (12%)	370 (45%)	223 (27%)	134 (16%)
Internship/Residency/Fellowship	255 (31%)	185 (23%)	44 (5%)	338 (41%)

*
CDE = Continuing Dental Education