RESEARCH ARTICLES

Didactic Migraine Education in US Doctor of Pharmacy Programs

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Objective. To compare didactic migraine education in doctor of pharmacy (PharmD) programs in the United States with the Headache Consortium's evidence-based migraine treatment recommendations.

Methods. A self-administered survey instrument was mailed to all 90 Accreditation Council for Pharmacy Education (ACPE) approved PharmD programs in the United States.

Results. Seventy-seven programs responded (86%) and 69 useable survey instruments were analyzed. Fifty-five percent of programs discussed the Consortium's guidelines, 49% discussed the selection of nonprescription versus prescription agents, 45% recommended a butalbital-containing product as migraine treatment, and 20% educated students about tools for assessing migraine-related debilitation. At least 50% of programs taught information consistent with the remaining Consortium recommendations.

Conclusion. Approximately half of the PharmD programs teach concepts about migraine headache treatment consistent with the US Headache Consortium's recommendations.

Keywords: pharmacy education, migraine, evidence-based, headache

INTRODUCTION

Among common pain conditions, headache causes the largest decrease in worker productivity in the United States, with a mean productive time loss of 3.5 hours per week.¹ Migraine headache is a chronic illness that affects approximately 30 million adults but remains underdiagnosed, misdiagnosed, and less than optimally treated.²⁻⁴ Migraine produces significant individual burdens in terms of pain, emotional distress, and impaired function.²⁻⁵ Direct medical expenses are \$2571 higher per person per year than in matched nonmigraine control subjects and cost society an estimated \$11 billion annually.⁶

Medication misuse is pervasive among migraine sufferers. Many patients futilely self-treat with nonprescription agents.^{2,3,7,8} Rarely effective and potentially harmful drugs such as butalbital-containing products and narcotics are widely prescribed.⁹⁻¹² Chronic daily headache affects 2% to 4% of the general population and up to 80% of individuals presenting to specialized headache centers with chronic daily headache are overusing acute agents.⁹ Headache is a frequent emergency department presentation, yet migraine therapy within emergency departments is dismal, including lack of diagnosis, dependence on nar-

cotics, low utilization of migraine-specific drugs, and few successful outcomes.¹³⁻¹⁷

Pharmacists are well positioned to advocate for constructive medication changes. Headache ranks among the main reasons people seek a pharmacist's assistance.⁷ Among community pharmacists, 85% report making between 1 and 5 nonprescription headache product suggestions daily, 12% make more than 6 recommendations daily, and 80% regard headache sufferers as important to their practice.¹⁸ However, PharmD candidates received only one 60-minute headache lecture and few headache clerkships are available.¹⁹ Furthermore, only 8% of pharmacists reported using evidence-based approaches to treat headache, while 59% reported being unfamiliar with evidence-based data.¹⁸ Our objective was to compare PharmD candidates' didactic migraine education to the recommendations of the US Headache Consortium's evidence-based migraine treatment guidelines.²⁰

METHODS

The Chicago College of Pharmacy's Internal Review Board approved this project. A cross-sectional, descriptive, self-administered survey instrument was used to collect data, and survey completion was considered participation consent. The study was conducted between July 1, 2008, and April 30, 2009. A census of all 90 ACPE-approved PharmD programs was the target population.²¹

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Data was collected via a mailed survey methodology following principles outlined by Dillman.²² In July 2008, a cover letter, survey form, and postage-paid return envelope were mailed to each programs' department head/chair of pharmacy practice listed in the American Association of Colleges of Pharmacy's 2007/2008 *Roster of Faculty & Professional Staff* booklet. We requested that the survey form be forwarded to the faculty member responsible for providing the migraine lecture in their therapeutics course. This faculty member was considered to be the "key informant" for the study.

Beginning in December 2008, each nonresponding program's department head/chair was contacted a second time via e-mail or phone call to identify the key informant. A combination of personal e-mails and phone calls was then used to contact the key informant, send the cover letter and survey instrument, and request that they participate in the study. In April 2009, a final reminder e-mail or phone call was made for any remaining nonrespondents, informing them that the study was coming to a close and again asking them to return a completed survey.

Demographic information was collected to help describe the respondents and categorize findings. Initial versions of the survey instrument were reviewed by 7 University of Minnesota survey research experts, 4 of whom held a license to practice pharmacy in the United States. For this review, particular attention was given to: (1) content of each question, (2) form of response to each question,

(3) wording for each question, (4) sequence of questions, and (5) physical characteristics of the survey form.

After completing the data collection, descriptive statistics were computed, and chi-square analysis was used to describe associations between demographic variables and responses to survey items. A significance level of 0.05 was used for statistical tests and computed using SPSS 16.0 statistical software (SPSS, an IBM Company, Chicago, IL).

RESULTS

Twenty-eight key informants returned their survey instruments in the postage-paid envelope, while 49 survey instruments were obtained as a result of follow-up e-mails or phone calls; thus, 77 key informants responded ($77/90 = 86\%$ of the target population). Sixty-nine usable survey instruments were analyzed ($69/77 = 89\%$ of responding programs, $69/90 = 77\%$ of the target population). Eight programs were excluded from analysis; 1 of this study's authors provided 2 programs' migraine lectures, 4 programs reported not offering a migraine lecture within their therapeutics course, and 2 programs reported that they utilized "student self-directed learning" and therefore lacked a formal migraine lecture.

Fifty-five percent of programs discussed the Consortium's guidelines, 49% explained the reason(s) for the selection of nonprescription agents versus prescription drugs, and 45% recommended butalbital-containing

Table 1. Key Informants' Responses to Survey Instrument Regarding Didactic Migraine Education in Doctor of Pharmacy Programs in the United States (n = 69)

Survey Question	Verbally Conveyed (%)	Written Handout (%)
1. Are the US Headache Consortium's evidence-based migraine treatment guidelines discussed?	55	77
2. Is the concept of stratified-care explained?	77	81
3. Is the concept of step-care explained?	65	74
4. Is information regarding the reason(s) for the selection of over the counter agents versus prescription agents explained?	49	70
5. Is the patient counseling point of limiting acute therapy use to 2 days or less per week explained?	74	78
6. Are the goals of acute migraine therapy explained?	88	97
7. Are the goals of preventive migraine therapy explained?	75	81
8. Are the indications for preventive migraine therapy explained?	87	90
9. Are patient-counseling points for preventive therapy explained?	65	75
10. Is the need for patients to maintain a headache diary discussed?	70	87
11. Are non-drug treatments discussed?	73	81
12. Are butalbital-containing products recommended as acute treatment for migraine attacks?	45	48
13. Are any tools that assess migraine-related debilitation discussed, for example, the Migraine Disability Assessment Scale (MIDAS) or the Headache Impact Test (HIT-6)?	20	32

products (Table 1). The therapeutics course's migraine lecture was provided to PharmD candidates during their first year for 3%, second year for 28%, third year for 65%, and "other" for 7%; 2 programs reported multi-year lectures (Table 2). The majority of therapeutics course's migraine lectures are provided to PharmD candidates during their third year by faculty members who have taught migraine for 0 to 4 years. Sixty-five percent of these faculty members hold a PharmD degree (first degree). Regarding the key informants' own residency training, 32% had undergone no residency training, while 52% had completed a 1-year residency and 16% had completed a 2-year residency (Table 2). Chi-square analysis revealed that residency training was statistically significant regarding an affirmative response to the 3 items presented in Table 3. No respondents reported completing a fellowship. No other significant relationships were identified.

Thirty-four programs submitted a copy of their migraine lecture handout (34/69 = 49% of those who returned useable survey instruments, 34/90 = 38% of the target population). Few programs commented on their de-

cision not to provide a handout; 1 stated that their handout was "too large" to mail, 1 stated that they were "uncomfortable" and another "unwilling" to share this information, and 1 stated their handout was currently unavailable due to a computer malfunction.

Seven programs answered "yes" to the survey question regarding listing the guidelines in their written handout, but did not cite the guidelines within their handouts. One program that answered "no" to this same survey question did list the guidelines in the "suggested reading" section of their handout. One handout cited the American Academy of Family Physician's migraine treatment guidelines.²³

Although methysergide was removed from the US market in 2002, 10 handouts listed this drug as treatment, while 2 handouts noted that methysergide was no longer commercially available; the remaining handouts made no mention of methysergide.²⁴ Of the 31 programs responding "yes" to recommending butalbital-containing products in their written handout, 6 noted in their handout that butalbital-containing drugs were not to be considered first-line therapy or that butalbital-containing products carried unique risks.

While only 20% of useable survey programs offered information about debilitation questionnaires (Table 1), 5 programs commented that as a result of the survey's question they intended to add this information in future lectures. Sixty-two programs reported that their students' had a required reading assignment, with the chapter in *Pharmacotherapy: A Pathophysiologic Approach*, listed by 49 programs (49/62 = 79%).

DISCUSSION

Improved migraine treatment is an important societal goal. Migraine remains an incapacitating condition that extracts an enormous toll from 30 million sufferers, their families, and their employers. Despite these burdens, the majority of migraineurs receive suboptimal care. Clearly, health care professionals should strive to improve migraine's diagnosis rate, ensure effective medication selection, reduce pain and debilitation, and ultimately decrease society's costs.

We recognize that evidence-based guidelines for any illness are not sacrosanct and that an individual patient's treatment needs may necessitate deviation from "evidence-based" recommendations. Still, these publications should serve prominently within PharmD candidates' education, particularly for society's most prevalent chronic illnesses such as diabetes, cardiovascular disease, asthma, and migraine. Other health care professionals (eg, physicians, nurses, physician assistants) are likely to use

Table 2. Demographics of Institutions and Key Informants Responding to a Survey Regarding Didactic Migraine Education in Doctor of Pharmacy Programs in the United States (n = 69)

	No. (%)
Program year migraine headache is taught ^a	
1	2 (3)
2	19 (28)
3	45 (65)
Other	5 (7)
Faculty member's experience teaching migraine	
0-4 years	42 (61)
5-10 years	18 (26)
More than 10 years	9 (13)
Faculty member degrees earned ^b	
BS Pharm	16 (23)
PharmD (first degree)	45 (65)
PharmD (post BS)	22 (32)
MS	3 (4)
PhD	1 (1)
MBA	1 (1)
Other	3 (4)
Faculty member residency training	
None	22 (32)
1-year residency	36 (52)
2- year residency	11 (16)

Abbreviations: BS = bachelor of science; PharmD = doctor of pharmacy; PhD = doctor of philosophy

^a Two programs reported multiyear lectures

^b Categories are not mutually exclusive

Table 3. Significant Differences in Pattern of Responses for Key Informants Categorized as Having or Not Having Residency and/or Fellowship Training^a

Item	Key Informants Not Having Residency and/or Fellowship Training (n = 22)	Key Informants Having Residency and/or Fellowship Training (n = 47)	P
Is information regarding the reason(s) for the selection of over the counter agents versus prescription agents explained?			
Written Handout (% Yes)	27	60	0.01
Verbally Conveyed (% Yes)	41	83	< 0.001
Is the patient counseling point of limiting acute therapy use to 2 days or less per week explained?			
Written Handout (% Yes)	50	85	0.002
Verbally Conveyed (% Yes)	45	92	< 0.001
Are patient counseling points for preventive therapy explained?			
Written Handout (% Yes)	46	75	0.02
Verbally Conveyed (% Yes)	50	87	0.03

^a Key informant was the faculty member responsible for providing the migraine lecture in their therapeutics course.

evidence-based guidelines; thus, pharmacists' familiarity with these publications can help foster informed interprofessional collaboration and ensure consistency of treatment goals.

Based on the results of this survey, opportunities exist to enhance the didactic migraine education provided to PharmD candidates. Approximately half of the PharmD programs are not citing any evidence-based migraine treatment guidelines. Several professional organizations have published their own migraine guidelines;^{23,25} yet the US Consortium has the only evidence-based document endorsed by multiple organizations, including 3 that are enmeshed in migraine treatment: the National Headache Foundation, the American Headache Society, and the American Academy of Neurology (Table 4). Therefore, we deem the US Consortium's guidelines as the preferred information source when educating pharmacy students. Additionally, the second edition of the Consortium's guidelines is in development, with publication expected in the near future (personal communication, Dr. Fred Freitag, US Headache Consortium authors' committee member, May 6, 2009). This publication will offer PharmD programs an opportunity to incorporate up-to-date evidence-based therapy.

Only half of the PharmD programs offered information regarding the reasons for the selection of nonprescription agents versus prescription products, despite pharmacists within community pharmacies being well-positioned to assist sufferers. Approximately 15 million people exclusively use nonprescription products as migraine treatment and a large percentage of these individ-

uals are poor candidates for nonprescription products.⁷ Expanded research and clinical use is warranted for questionnaires to assess headache sufferers seeking nonprescription agents.^{7,26-28} These efforts could increase the utilization of these tools and improve patient care. Several key informants noted that they will be incorporating discussion of questionnaires into their future lectures, and we hope other PharmD programs will adopt this change as well.

Three quarters of programs taught students to limit acute medication use, yet medication-induced chronic daily headaches affect millions of people, suggesting that in clinical practice this important information is not adequately conveyed to patients. Chronic daily headache could be completely prevented with improved patient education. We view helping patients reduce acute medication overuse, with the inherent increases in drug and nondrug preventive therapies, as among the most beneficial actions available for pharmacists to improve migraine care.

Table 4. Members of the US Headache Consortium

American Academy of Family Physicians
American Headache Society
American College of Emergency Physicians
American College of Physicians
American Society of Internal Medicine
American Osteopathic Association
National Headache Foundation

A national survey reported that among migraine sufferers, 6% are prescribed a butalbital-containing product and 11% a narcotic, a combined percentage almost equal to the 18% given migraine-specific triptan drugs.²⁹ We believe that this prevalence of butalbital-containing product prescribing is difficult to justify given the lack of data demonstrating the efficacy of butalbital-containing products; the consortium's guidelines state: "no randomized, placebo-controlled studies prove or refute efficacy for [butalbital-containing products] in the treatment of acute migraine headaches. ...based on concerns of over-use, medication overuse headache, and withdrawal, the use of [butalbital-containing products] should be limited and carefully monitored."³⁰ Furthermore, the use of butalbital-containing products and narcotics doubles the risk for episodic migraine to evolve into chronic daily headache.³¹ In clinical practice, problems associated with use of butalbital-containing products are so rampant that some headache-specialist physicians have proposed banning butalbital-containing products.³²

Almost half of the survey's key informants recommend butalbital-containing products as a possible migraine treatment. We suggest that they update their information to reflect the lack of documented efficacy for butalbital-containing products as well as their numerous risks. Regarding narcotics, headache specialists typically reserve these drugs for specific circumstances.^{20,33-35} We believe that the numerous negative narcotic consequences should also garner greater attention in pharmacy education.

Although pathophysiology data within the handouts was not systematically examined, a cursory review did not uncover any discussion about migraine's pathology consequences. An evolving body of evidence illustrates that migraine is a progressive disease with identifiable brain pathology, including dysfunction of inhibitory pain pathways within the cortex, brainstem hyperexcitability, and impaired iron homeostasis in the periaqueductal gray matter, all of which can contribute to the development of altered pain perception and chronic daily headache.³⁶⁻⁴⁰ Acute medication overuse is a factor that may facilitate this organic brain damage. Therefore, we believe more in-depth pathology information should be taught to pharmacy students, highlighting that medication misuse can be seriously detrimental to patients' health and emphasizing the need to avoid excessive acute medication consumption.

Although opportunities for improvement exist, survey results illustrate numerous positive conclusions about colleges' of pharmacy efforts to educate students. The majority of programs teach the model of stratified care, the goals of acute and preventive treatments, the indications for and counseling about preventive therapy, the use of diaries, and non-drug therapy options. Additionally,

this type of information was readily apparent in most of the handouts received. These ideas are consistent with the consortium's recommendations and we encourage all programs to strive to educate students about these treatment strategies. Interestingly, key informants with residency training were more likely to teach important information such as the reason(s) for selecting nonprescription versus prescription medications, limiting acute drugs, and preventive therapy instructions. These findings suggest that the additional residency training causes faculty members to emphasize less tangible but often essential treatment aspects, such as patient medication education.

Limitations

The results should be viewed in light of the study's limitations. Our examination found no significant differences between the 13 nonresponders and 77 responders in terms of geographic distribution or university type (private/public), although the possibility exists that some other unexamined factor caused nonresponse bias. We speculate that a combination of faculty turnover, apathy towards surveys, disinterest in the topic of headache, or time constraints accounts for the unreturned surveys. Whether the different methods utilized to obtain responses (original mailing versus follow-up phone calls/e-mail) or the time required to complete the instrument affected survey results is unknown.

Approximately half of the survey responders did not provide their handout; thus, this data is not robust because it failed to achieve the targeted 80% response rate.⁴¹ We were unable to discern a common explanation for not returning a handout.

A degree of responder error is inherent to all surveys and was evident in this study. For the purposes of calculating statistics, the data exactly as reported on the survey by the key informant was used, regardless of whether a discrepancy was identified. For example, several key informants reported that they discussed the guidelines in their written handout, but the guidelines were not listed within their handout. The extent to which responder error affected the results is not known. Additionally, although instructions included with the survey instrument specifically directed it to be completed by the key informant, the possibility exists that a non-key informant actually answered the survey's questions.

To avoid any real or perceived conflict-of-interest issues, 2 programs were excluded from analysis merely because this study's lead author provided their migraine lectures. If these 2 programs had been included in the statistical analysis, the results would have shifted towards greater compliance with the guidelines' recommendations since they are the basis of these migraine lectures.

Additionally, their inclusion would have increased the useable survey sample size.

CONCLUSIONS

Although the majority of PharmD programs teach information consistent with the US Consortium's recommendations, opportunities exist to improve didactic migraine education. Particular attention should be directed towards expanded dissemination of evidence-based care, the rational selection of nonprescription versus prescription products, risks of butalbital-containing products and narcotics, and tools to assess migraine-related debilitation.

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