

RESEARCH ARTICLES

Drug Information Questions Posed to Community Pharmacy Advanced Practice Experience Students

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Objective. To document drug information questions received by students during community pharmacy advanced practice experiences (CPAPEs) in order to categorize the types of inquiries received and to identify the references used and the student-reported usefulness of those resources.

Methods. Fifty-one CPAPE students were asked to document 10 drug information questions on a standard form, indicating the references used and the usefulness of that resource. The data were entered into a database.

Results. Most of the 272 inquiries documented concerned prescription medications and were initiated by patients (55%) or pharmacists (35%). Adverse events (n = 78) and pharmacotherapy (n = 73) were the most frequent question classifications encountered. The most common references cited were *Micromedex* (Thompson Scientific and Health Care Group, Greenwood Village, Co), *Drug Facts and Comparisons* (Facts and Comparisons, St. Louis, Mo), and package inserts. Although *Micromedex* and package inserts were found useful in 71% and 64% of inquiries, respectively, *Drug Facts and Comparisons* was deemed not useful 53% of the time.

Conclusions. Several of the most useful references identified by students may not be readily available at community pharmacy sites. Student documentation revealed that the most common inquiries regarded adverse effects and pharmacotherapy. *Micromedex*, *Drug Facts and Comparisons*, and package inserts were the references most frequently cited by students.

Keywords: Community pharmacy, clerkship, drug information, advanced practice experience

INTRODUCTION

The American Association of Colleges of Pharmacy (AACP) Center for the Advancement of Pharmaceutical Education (CAPE) Advisory Panel on Educational Outcomes includes the provision of drug information to health care professionals and the public as one of the many outcomes pharmacy graduates should have mastered upon completion of the curriculum.¹ Due to their accessibility, community pharmacists receive numerous drug information questions from patients. Therefore, the ability to evaluate a health-related inquiry and provide an appropriate response to the requestor in a community pharmacy setting is an essential skill to develop. Faculty members should ensure that students are provided with the opportunity to develop this practice-based outcome during components of the didactic and experiential curricula.

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To address this, the Albany College of Pharmacy Community Pharmacy Advanced Practice Experiences (CPAPEs) require students to document drug information requests.² This activity allows students to practice the desired CAPE outcome while enhancing their documentation skills. It also enables preceptors and experiential education faculty members to review activities occurring at the practice site for quality assurance purposes.

Previous studies describing drug information inquiries and resources commonly used in the community pharmacy setting employed survey techniques to determine the types of inquiries received, and/or preceded the availability of electronic drug information resources.³⁻⁶ These data are limited to older publications from the 1970s to 1990s. As community pharmacy practice and drug information resources have advanced since that time, a more current evaluation of drug information inquiries and resources is needed to guide faculty members when developing a curriculum to adequately prepare pharmacy graduates and to identify the drug information resource needs of community pharmacy experi-

Table 1. Origin of Inquiry

	Patient	Pharmacist	Health Care Professional [†]
Total number of requests (%) [*]	146 (55)	92 (35)	27 (10)
Question category [‡]			
Prescription	86	70	24
OTC	33	2	0
Herbal	26	12	1
Disease information	20	9	3

* Requestor type not documented for 7 questions.

[†] Includes medical doctor, registered nurse, physician assistant, and nurse practitioner.

[‡]Requests could include more than one question category.

essential sites. Therefore, the objectives of the present study were to determine the types of drug information questions received by students during CPAPE, to identify the most common drug information resources used by the students, and to determine the student-reported usefulness of those resources.

METHODS

A documentation form was developed by reviewing examples provided by drug information centers and a drug information textbook, in addition to the personal experiences of the authors as pharmacy practice faculty practicing in community pharmacy.⁷ The form was piloted using 50 drug information questions previously documented by CPAPE faculty members and students. Upon revision, the final form included requestor information, background information, question category, question classification, search notes, resources used, and the response. (The form is available upon request from the author.) Requestors included patients, caregivers, pharmacists, or other health care providers. Questions were categorized as “prescription,” “over-the-counter (OTC),” “herbal,” or “disease-related information.” The classifications used were expanded from a published documentation tool.⁷ The format allowed students to check more than one question category or classification based on the inquiry. For example, a question involving a potential drug-interaction between a prescription and an OTC (nonprescription) product would require both categories to be checked. Students used a Likert scale to rate the usefulness of each resource (0 = not useful, 1 = minimally useful, 2 = very useful).

For the 2001–2002 academic year, 51 students were asked, as part of the rotation goals and objectives, to document a minimum of 10 drug-information requests received during their 5-week CPAPEs at 7 sites. Three

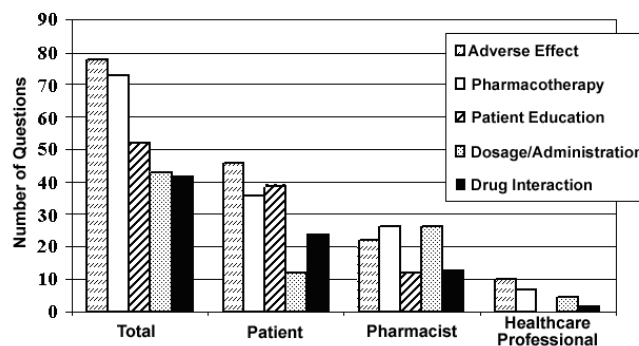


Figure 1. Question classification by requestor type. Health care professional includes medical doctor, registered nurse, physician assistant, and nurse practitioner. The requestor type was not documented for 7 questions listed under total.

faculty members served as primary preceptors for 1 chain pharmacy, 1 grocery chain pharmacy, and 2 independent pharmacy sites. Volunteer pharmacists who have undergone a 12-hour training program served as preceptors at the remaining 3 chain locations. The training program, offered to all pharmacists from any CPAPE site, contained 3 hours of drug information skills, including the methods used to answer drug information inquiries and the drug information resources available to students and preceptors either online, on site at the College library, or via the College Web site.⁸ The form is introduced to preceptors during the program; however, detailed instructions on how to complete the form were not provided. Preceptors were asked to review the forms for completeness and accuracy. As this was an observational study, students and preceptors were not provided with specific training on how to complete the form. The inquiries were entered into a Microsoft Access database by the authors.

RESULTS

Two hundred seventy-two questions were documented by 45 of the 51 students. Six student-preceptor teams did not submit inquiries. The majority of inquiries involved prescription medications and were initiated by patients (55%) or pharmacists (35%) (Table 1). Physicians and other health care professionals did not frequently contact these community pharmacy sites for information. The requestor type was not documented for 7 inquiries.

Adverse effects and pharmacotherapy were the most frequent classification of questions asked (Figure 1). Patients were most likely to ask questions related to adverse events of medications (n = 46) and request patient education information (n = 39). Pharmacists most often requested dosage and administration information from the students (n = 26). Other health care professionals inquired about adverse events (n = 10) and pharmacotherapy (n =

Table 2. Frequency of Resources Used and Usefulness of Resource

Reference	Number of Times Accessed	Usefulness of Resource, n (%)		
		Not useful	Minimally Useful	Very Useful
<i>Micromedex</i>	130	38 (29)	31 (24)	61 (47)
<i>Drug Facts and Comparisons</i>	77	41 (53)	17 (22)	19 (25)
Package Inserts	61	22 (36)	12 (20)	27 (44)
Literature Search	54	21 (39)	16 (30)	17 (31)
Website	52	25 (48)	5 (10)	22 (42)
<i>Drug Information Handbook</i>	50	22 (44)	10 (20)	18 (36)
Other*	143			

*Refers to the combined total for all other possible resources listed on the form.

Table 3. Usefulness of Resources for Most Frequent Question Classifications

Reference	Adverse Effect*			Pharmacotherapy*			Patient Education*		
	not useful	minimally useful	very useful	not useful	minimally useful	very useful	not useful	minimally useful	very useful
<i>Micromedex</i>	13 (28)	13 (28)	21 (44)	9 (26)	8 (23)	18 (51)	10 (42)	5 (21)	9 (37)
<i>Drug Facts and Comparisons</i>	13 (57)	6 (26)	4 (17)	12 (63)	4 (21)	3 (16)	7 (70)	2 (20)	1 (10)
Package Inserts	8 (32)	3 (12)	14 (56)	0 (0)	4 (36)	7 (64)	1 (25)	0 (0)	3 (75)
Literature Search	7 (35)	7 (35)	6 (30)	5 (30)	7 (40)	5 (30)	3 (25)	7 (58)	2 (17)
Website	5 (72)	1 (14)	1 (14)	11 (50)	4 (18)	7 (32)	6 (32)	2 (11)	11 (57)
<i>Drug Information Handbook</i>	5 (33)	2(13)	8(54)	5 (63)	2 (25)	1 (12)	1 (50)	0 (0)	1 (50)

* results listed as number (%) for rankings of each individual reference used for that question classification

7). Table 2 identifies the most frequently used references and their usefulness as ranked by the students. The usefulness of references for the 3 most common question classifications is presented in Table 3. *Micromedex* (Thompson Scientific and Health Care Group, Greenwood Village, Co), was the most frequently cited reference (n = 130) and was deemed useful 71% of the time, particularly for adverse events and pharmacotherapy (72% and 74%, respectively). *Drug Facts and Comparisons* (Facts and Comparisons, St. Louis, Mo), was commonly referred to (n = 77) but found not useful 53% of the time. Students frequently referred to package inserts (n = 61) and found them useful in 64% of instances. Although computerized literature searches were conducted, the students did not always deem them as useful. Documentation of the specific primary literature search engine was not required on the form; however, students had access to PubMed through the College Web site. Although, general Web sites were not regularly accessed, results indicate various internet sites were useful for obtaining patient education material. Although students were asked to document the Web sites they used on the form, this information was not entered into the database.

DISCUSSION

Student documentation revealed that the most common inquiries regarded adverse effects and pharma-

cotherapy. These results differ from those found in previous studies, which used various methods to determine the types of inquiries received by pharmacists in the community pharmacy setting. Responses from a survey of 162 Louisiana community pharmacists indicated the most frequent inquiries involved primarily over-the-counter (nonprescription) medications followed by adverse reactions.³ This study, however, relied on pharmacist recall and used a Likert scale to indicate the frequency of inquiries received (1 = never received, 5 = very often received).

During a 6-month study period in 28 Utah pharmacies, the most common type of inquiry recorded was for the appropriate use or dose of a medication, followed by identification of a drug product or contents.⁴ Of the pharmacies involved in the study, 68% of the inquiries documented came from 9 pharmacies located in medical clinics. In addition, 52% of requestors were physicians. Both of these factors may have impacted the nature of the inquiries received and explain the variance from the present study.

The Drug Information Service at the University of Connecticut Health Center reported the drug information requests received by their center from community pharmacists in Connecticut over a 40-month period.⁵ Of the 750 requests documented, 265 (35.3%) involved drug identification requests and 121 (16.1%) regarded infor-

mation on therapeutic use. These results may differ from those presented in this paper because questions may have been posed to the Center only after pharmacists had exhausted the resources at their site.

The present study may also differ from the data previously reported as it reports inquiries made to and documented by students, rather than inquiries made to and documented by pharmacists, and only represents those questions the students documented, thereby introducing a potential bias. The lower number of inquiries than expected may have been the result of students not documenting all questions at the time they were received, or the result of preceptors reducing the number of inquiries students were required to document. Detailed training was not provided to preceptors or students regarding use of the form. This might have impacted the results because classifications such as "pharmacotherapy" could have different meanings to different individuals. A review of the inquiries documented found that students generally indicated the pharmacotherapy classification when answering inquiries related to the selection of an appropriate agent for a particular condition, when researching an alternative treatment option, when cost, adverse effects, or allergies were a concern, or when comparing the efficacy of 2 or more agents for the management of a particular condition.

Few studies are available describing the resources used in the community pharmacy setting. Those that are available document pharmacist use, not student use, and precede the advent of modern electronic resources, making comparisons to the present study difficult. However, some similarities were found. *Micromedex*, *Drug Facts and Comparisons*, and package inserts were the references most frequently cited by students. Two previous studies that surveyed community pharmacists used Likert scales and pharmacist recall to indicate how often they perceived they referred to each text.^{3,6} Survey results in the study by Rae et al revealed that *Drug Facts and Comparisons*, the *United States Pharmacopeia-Dispensing Information* (United States Pharmacopeia, Rockville, Md), and the *Physicians' Desk Reference* (Medical Economics, Montvale, NJ) were the most frequently used references to answer drug information questions.³ A survey of 259 hospital and community pharmacists in southeast Michigan indicated that community pharmacists were more likely to use *Drug Facts and Comparisons*, *Drug Topics Red Book* (Medical Economics, Montvale, NJ), *American Druggist Blue Book* (American Druggist Blue Book Data Center, San Bruno, Calif), and the *Physicians' Desk Reference*.⁶ The rates of use for *Drug Facts and Comparisons* and the

Physicians' Desk Reference (package inserts) were similar to those found in our study despite the differences in methodology used, ie, direct documentation vs pharmacist-recall. This result would be expected as these references are still readily available in contemporary community pharmacy settings. The use of *Micromedex*, not available when previous studies were conducted, reflects the availability of that resource to students and their familiarity with it. The high frequency of *Micromedex* use in the present study raises a concern as students could be developing their drug information skills using a resource that may not be available in their practice setting upon graduation.

Although one publication suggests the resources frequently cited by pharmacists must be valuable to the community pharmacist, none of the studies directly assessed the usefulness of the available references.³ A high frequency of use may not indicate a drug reference is useful, rather, it may simply be accessible. Although our results indicate that students frequently attempted to use *Drug Facts and Comparisons* yet most of them rated it "not useful," the results are limited by the subjectivity of the usefulness rating and the low number of inquiries available for assessment. In addition, perhaps a lack of familiarity with the format of some of the resources, or failure to choose the correct drug reference for the inquiry, led to low usefulness ratings, rather than an actual deficiency in the reference itself. This study did not seek to evaluate the adequacy of the student's research process and whether the most appropriate drug reference was used. An assessment of the quality of the student responses was left to the preceptor. A review of the inquiries during data entry by the authors revealed that some inquiries could have been completed more thoroughly. This prompted the CPAPE Coordinator to modify the drug information section of the preceptor training program to incorporate more examples of adequate and inadequate responses and require preceptors to document questions received in their practice setting for review by the Coordinator as a development exercise. The database of questions is currently being used by faculty members to develop standardized drug information assignments for the didactic curriculum in order to enhance student development of this CAPE outcome. During on-site visits to CPAPE rotations, the Coordinator is currently more critically evaluating the submissions completed by students to enhance both student and preceptor skills in this area. A formal assessment tool for evaluating the adequacy of drug information inquiries is lacking, but could provide faculty members further guidance when training students and preceptors in these skills.

CONCLUSIONS

This project identified the types of questions received in the community pharmacy setting, enabling faculty members to ensure students have the skills necessary to answer these inquiries. Several of the most useful references identified by the students may not be readily available at all pharmacy sites. Our College provides online access to drug information resources for our adjunct faculty preceptors and provides sites with vouchers to be used for continuing education or towards the purchase of drug information resources for their site. More schools and colleges of pharmacy should work with community pharmacy sites to ensure adequate resources are available to answer these inquiries and assist preceptors in the evaluation of these inquiries. The results of this project not only provided insight into the questions received in this practice setting, but also revealed that we may not be adequately preparing our students, preceptors, or preceptor sites to respond to these important inquiries using the resources readily available in this practice setting. These results could prove useful to other faculty members when developing didactic and experiential curriculum, in addition to preceptor development programs.

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