

INSTRUCTIONAL DESIGN AND ASSESSMENT

A Pharmaceutical Industry Elective Course on Practice Experience Selection and Fellowship Pursuit by Pharmacy Students

Rhea Hartman, PharmD, Leona Blustein, PharmD, Diane Morel, PhD, and Lisa Davis, PharmD

University of the Sciences, Philadelphia, Pennsylvania

Submitted September 17, 2013; accepted December 27, 2013; published August 15, 2014.

Objective. To design and implement 2 pharmaceutical industry elective courses and assess their impact on students' selection of advanced pharmacy practice experiences (APPEs) and pursuit of pharmaceutical industry fellowships.

Methods. Two 2-credit-hour elective courses that explored careers within the prescription and non-prescription pharmaceutical drug industries were offered for second- and third-year pharmacy students in a doctor of pharmacy (PharmD) degree program.

Results. The impact of the courses on pharmacy students' pursuit of a pharmaceutical industry fellowship was evaluated based on responses to annual graduating students' exit surveys. A greater percentage (17.9%) of students who had taken a pharmaceutical industry elective course pursued a pharmaceutical industry fellowship compared to all PharmD graduates (4.8%). Of the students who enrolled in pharmaceutical industry APPEs, 31% had taken 1 of the 2 elective courses.

Conclusion. Exposure to a pharmaceutical industry elective course within a college or school of pharmacy curriculum may increase students' interest in pursuing pharmaceutical industry fellowships and enrolling in pharmaceutical industry APPEs.

Keywords: pharmacy, student, education, pharmaceutical industry

INTRODUCTION

The career of the pharmacist has evolved greatly from the traditional dispensing role. Pharmacists can increasingly use their extensive clinical knowledge in a wide variety of roles, including traditional community pharmacy or hospital settings as well as many alternate practice settings. Additionally, changes in the field of pharmacy have occurred, such as the expanded role of pharmacy technicians, the increased use of automated dispensing systems, and increased patient use of Internet and mail-order pharmacies, necessitating that pharmacists consider alternate roles to their traditional dispensing roles.¹ Among these, the pharmaceutical industry represents a distinctive opportunity for pharmacists to use their therapeutic expertise to help patients on a global level.

Interest in the pursuit of postgraduate training specific to clinical pharmacy and the pharmaceutical industry has increased within the last 10 years. In 2012, the American Society of Health-System Pharmacists reported that of 4,200

graduating pharmacy students who pursued a residency, 1,438 of them were unable to secure a position. As interest in postgraduate training has intensified, colleges and schools of pharmacy have begun providing elective courses to prepare students for their desired career paths. At the University of Georgia College of Pharmacy, an elective course specific to postgraduate residency training is offered to prepare students for this career option.² Many other colleges and schools of pharmacy have begun to offer elective courses specific to the pharmaceutical industry to increase student exposure to postgraduate fellowships and career opportunities.

Offering elective courses within a college or school of pharmacy curriculum may promote the interest of, or further facilitate students' existing interest in, a particular pharmacy career path and the likelihood of their pursuing postgraduate training. One 2004 study found that pharmacy students' career aspirations were linked to educational experience, career commitment, and shared class attitude towards faculty members.³ However, many pharmacy students with a potential interest in pursuing postgraduate fellowships in the pharmaceutical industry do not attend a college or school of pharmacy that provides educational exposure or employs faculty members with inside knowledge of this career path.

Corresponding Author: Rhea Hartman, PharmD, University of the Sciences, 5205 Woodview Way, Malvern, PA 19355. Tel: 515-943-3670. Fax: 215-273-4049. E-mail: rheahartman@gmail.com

Further, in a 2011 survey conducted at the University of Maryland, the 3 factors that most influenced pharmacy students' decisions to pursue postgraduate training were the increased competitiveness of job acquisition, faculty advising, and pharmacy practice experiences.⁴

The American Pharmacists Association has suggested that students who may desire help in determining which postgraduate program is a good fit for them should "find a mentor, pharmacist colleague, or professor whose career path interests you. This mentor can show you what qualifications are needed for that type of position."⁵ Unfortunately, without the availability of a mentor with qualifications specific to the pharmaceutical industry, pharmacy students may not have the guidance necessary to help them build the qualifications that will make them competitive applicants for fellowship positions.

The Department of Pharmacy Practice and Administration at University of the Sciences recognized the potential impact of providing an elective course specific to the pharmaceutical industry upon students' satisfaction of elective course availability, advanced pharmacy practice experience (APPE) selection, and their decision to pursue postgraduate pharmaceutical industry fellowship training. Following the success of the initial pharmaceutical industry course, the department offered a second course in the nonprescription pharmaceutical industry. The objective of this study was to examine the design and implementation of both pharmaceutical industry elective courses within the pharmacy school curriculum and to assess the potential impact of the courses on students' future selection of APPEs and pursuit of pharmaceutical industry fellowships.

DESIGN

The Pharmacists' Introduction to the Pharmaceutical Industry course was developed to provide exposure to the prescription pharmaceutical industry. This 2-credit-hour pharmacy elective course was offered in the 2010 spring semester. A prerequisite for enrollment was successful completion of the Research Design and Drug Information course because the ability to clinically evaluate medical literature was deemed important for success within the elective course. Introduction to this course material also illustrated the practical application of medical literature.

Following the surge of interest in the prescription pharmaceutical industry elective course, the Department of Pharmacy Practice and Administration introduced a second elective course, Topics in the Nonprescription Pharmaceutical Industry, to familiarize students with the nonprescription pharmaceutical industry.

Objectives for both elective courses are listed in Table 1. Each course met weekly for 2 hours. Attendance was mandatory and class participation represented 5% of

students' grades. Participation was evaluated by incorporating TurningPoint Audience Response Systems (Turning Technologies LLC, Youngston, OH) in which students used electronic handheld response clickers to answer questions posed during class. For the prescription pharmaceutical industry course, lectures were led by an adjunct assistant professor of pharmacy practice, who also held a manager of medical information role at a local prescription pharmaceutical company. The course coordinator for the nonprescription pharmaceutical industry course was an assistant professor of clinical pharmacy who also held a manager of medical affairs role at a local nonprescription pharmaceutical company. To supplement the course material, guest lecturers were invited to speak as needed. Lecture topics and schedules can be found in Table 2.

Course content was delivered in a class period using lectures, handouts, and PowerPoint presentations. During each class period, the instructor also offered the students opportunities to apply lecture content through in-class activities and discussion. Students participated in workshops to use the electronic databases available through the USP library Web page and the Internet.

Student evaluation for this course was based on 3 core areas of assessment: written communication, verbal communication, and testing scores (Table 3). In the prescription pharmaceutical industry elective course, 40% (40 points) of the student's grade was based on written communication skills and 60% (60 points) was based on verbal communication skills. The nonprescription pharmaceutical industry elective course emphasized verbal communication skills to a greater degree; thus, 20% (20 points) of the student's grade was based on written communication skills, 70% (70 points) was based on verbal communication skills, and 10% (10 points) was based on testing scores. Class participation was included within the verbal communication skills percentage in both courses and represented 15% (15 points) of the category.

Students' verbal communication skills were evaluated in each course primarily through verbal presentations applicable to the pharmaceutical industry. Within the prescription pharmaceutical elective course, written assignments were created to evaluate students' ability to fulfill a role within the medical information department in the pharmaceutical industry. Students were required to evaluate medical literature and create advertising materials that complied with Food and Drug Administration regulations specific to the pharmaceutical industry. These assignments included the production of 1 drug product label, 1 print drug advertisement, and 1 written summary of a clinical trial involving a product used for an off-label indication. Assignments also included a verbal presentation of the written summary of a clinical trial involving

Table 1. Comparison of the Objectives of Two Pharmaceutical Elective Courses

Pharmacists Introduction to the Pharmaceutical Industry	Topics in the Nonprescription Pharmaceutical Industry
Explain the differences between providing drug information in a patient-oriented pharmacy practice setting compared to the pharmaceutical industry.	Apply medication-related primary literature in nonprescription medication decision-making.
Identify critical issues for handling drug information responses for a health care professional and the lay public.	Evaluate the role of pharmacists in nonprescription Professional Marketing as compared to marketing with prescription medications.
Describe and apply the steps for reporting an adverse event to FDA MedWatch program.	Define appropriate terminology used in the pharmaceutical industry (eg, understanding the differences concerning GxP (good manufacturing practices), GCP (good clinical practices), and GLP (good laboratory practices) as related to the pharmaceutical industry.
Explain and apply the FDA regulations established for provision of scientifically balanced medical information.	Analyze product quality complaints and categorize adverse event process.
Explain and apply the FDA regulations established for the drug approval process and promotional advertising.	Identify the role of the regulatory team within the nonprescription pharmaceutical industry.
Identify the key aspects of the structure and content of a product label.	Categorize the types of crisis/recall situations that can impact a nonprescription pharmaceutical company.
Evaluate promotional advertising for fair balance and bias, and health literacy level.	Identify outcomes from the FDA Drug Advisory Committees by interpreting purpose(s), process/procedures and outcome of the FDA Drug Advisory Committees: Nonprescription and Drug Safety and Risk Management
Evaluate biomedical literature and demonstrate decision-making based on principles of evidence-based medicine.	
Demonstrate ability to effectively use written and verbal communication skills.	

a product used for an off-label indication and a group presentation of a broadcast direct-to-consumer drug advertisement. Class participation points were awarded at the discretion of the course coordinator based on class attendance, professionalism, and contributions to class discussions.

Within the nonprescription pharmaceutical elective course, written assignments were created to correlate with a proposed nonprescription-to-prescription product switch. Students were assigned to a therapeutic area that did not offer nonprescription products. Students selected a product from within their assigned therapeutic area to

Table 2. Lecture Schedule of the Introductory Elective Courses in the Pharmaceutical and Nonprescription Pharmaceutical Industry

Pharmacists Introduction to the Pharmaceutical Industry	Topics in the Nonprescription Pharmaceutical Industry
Orientation and Introduction to Course	Orientation and Introduction to Course
Phase I to Phase II Clinical Studies	Pharmacists' Role in Innovation
The Role of the Pharmacist in Medical Information in the Pharmaceutical Industry	Nonprescription Monograph Labeling/Drug Facts Label
Formulating a Response to a Drug Information Inquiry & Internal Medical Info Databases	Prescription to Nonprescription Switch
Promotional Literature and Direct to Consumer Advertising	Claims Development
The Role of the Pharmacist in Sales & Marketing	FDA Advisory Committees & Workshop
Medical Science Liaison (MSL) Overview	Crisis Management & Recalls
FDA Regulations on the Drug Approval Process/Product Labeling	Adverse Events/Product Quality Complaints
Regulatory and Promotional Review	Franchise and Consumer Marketing
FDA Regulations on Product Labelling	Residency and Fellowship Industry Informational Day
Regulatory and Promotional Review	Healthcare Compliance
Principles Related to Adverse Drug Reactions & Post-Marketing Surveillance	Good Clinical Practice and Good Manufacturing Practice
	Managing & Reporting of Nonprescription Overdoses

Abbreviations: FDA=Food and Drug Administration.

Table 3. Final Grade Components in Two Introductory Pharmaceutical Elective Courses

Pharmacists Introduction to the Pharmaceutical Industry		Topics in the Nonprescription Pharmaceutical Industry	
Description of Assignment	Points	Description of Assignment	Points
Written communication		Written communication	
Summary of clinical trial (draft)	5	Claim development (draft)	5
Summary of clinical trial (final)	10	Claim development (final)	15
Drug advertisement	10		
Product labeling	15		
Verbal communication		Verbal communication	
Clinical study Presentation	25	Professional marketing campaign for product	25
Direct-to-consumer drug advertisement presentation	20	Nonprescription product switch proposal	30
Participation	5	Participation	15
Assessments		Assessments	
Quizzes	10	Quizzes	10
Total	100	Total	100

switch from prescription to nonprescription. Additionally, they had to create 2 advertising claims for the drug, a print drug advertisement, a broadcast drug advertisement, and a product label. Students then gave a final professional marketing campaign presentation at the end of the course. Class participation points were evaluated via audience response questions. Students who answered at least 75% of the audience response questions correctly throughout the entire semester earned all 15 possible points toward their grade, students who answered between 65% and 74% of questions correctly earned 7.5 points, and students who answered between 55% and 64% of questions correctly earned 5 points. Any students who answered less than 55% of the audience response questions correctly throughout the entire semester earned 0 points.

EVALUATION AND ASSESSMENT

To assess the impact of the 2 pharmaceutical industry elective courses on students' decisions to pursue a post-graduate pharmaceutical industry fellowship, we evaluated anonymous responses to the University of the Sciences standard annual exit survey. The exit survey was given to graduating PharmD students to evaluate their overall satisfaction with the pharmacy curriculum and their future career plans. Students were eligible to take these pharmaceutical elective courses in their second year of the pharmacy curriculum. Because the pharmaceutical industry elective courses were first offered in spring 2010, only 1 graduating class had taken the courses at the time of this study and was, therefore, included in this analysis of the courses' impact on the students' plans for postgraduate fellowship training. In addition, to evaluate the number

of students who would be eligible and choose to enroll in a pharmaceutical industry APPE, students who graduated in 2012 and students who were enrolled in APPEs for 2013 were included in our analysis.

Of 209 students in the PharmD degree program graduating class of 2012 who completed the exit survey instrument, 28 students had completed 1 of the 2 pharmaceutical industry elective courses. Of these, 13 (46.4%) chose chain retail pharmacy as their future career plans, 5 (17.9%) chose pharmaceutical industry fellowship, 4 (14.2%) chose pharmacy practice residency, 3 (10.7%) selected no career choice, 2 (7.1%) chose part-time non-specified work, and 1 (3.5%) chose hospital pharmacy (Table 4).

Similar percentages of total PharmD university graduates (48%) and pharmaceutical elective course attendees (46.4%) reported that they chose a chain retail pharmacy career on their exit survey. However, a greater percentage of students who had completed a pharmaceutical industry elective course (17.9%) pursued a pharmaceutical industry fellowship vs percentage of total PharmD university graduates (4.8%) (Table 4). As a baseline measure of interest prior to offering the pharmaceutical industry elective courses, only 7 (3%) of the 228 graduates from the PharmD program in 2010 had indicated they would pursue a pharmaceutical industry fellowship.

The impact of the pharmaceutical industry elective courses on APPE selection was also evaluated to assess students' interest level in the pharmaceutical industry prior to graduation. Forty-three (31%) of 138 students who enrolled in an APPE in the pharmaceutical industry in 2012 or 2013 had taken one of the pharmaceutical industry elective courses.

Table 4. Exit Survey Results of the 2012 Doctor of Pharmacy Degree Program Graduates From the University of the Sciences

Comparisons	Students Responding to 2012 Survey, No.	Intended Area of Practice, Career Choice					
		Chain Retail Pharmacy, No. (%)	Pharmacy Practice Resident, No. (%)	Industry Fellowship, No. (%)	Hospital Pharmacy, No. (%)	Part-Time Nonspecified, No. (%)	None, No. (%)
By class semester							
Spring 2010 (N=11)	0						
Fall 2010 (N=29)	15	6 (40)	3 (20)	3 (20)	0	1 (6.7)	2 (13.3)
Spring 2011 (N=27)	12	6 (50)	1 (8.3)	2 (16.7)	1 (8.3)	1 (8.3)	1 (8.3)
Fall 2011 (N=12)	1	1 (100)					
Spring 2012 (N=13)	0						
By student group							
Students in pharmaceutical elective courses	28	13 (46.4)	4 (14.2)	5 (17.8)	1 (3.6)	2 (7.1)	3 (10.7)
All graduating PharmD students class of 2012	209	102 (48.8)	51 (24.4)	10 (4.8)	32 (15.3)	2 (0.9)	12 (5.7)

DISCUSSION

The primary goal of each of the pharmaceutical industry elective courses was to expose pharmacy students to the role of pharmacists within the pharmaceutical industry. This experience could be invaluable to pharmacy students by sparking their interest in pursuing a career or fellowship in the pharmaceutical industry or, conversely, providing them with confirmation of their interest in an alternate career setting. Academically speaking, students were able to strengthen skills that they could integrate into their future careers, regardless of setting. Successful completion of each elective course required the students to refine their verbal and written communication skills. Students were also expected to critically evaluate medical literature to successfully complete each of their assignments.

In the 2012 exit survey, a greater proportion of students who took 1 of the pharmaceutical industry elective courses responded that they pursued a fellowship within the pharmaceutical industry than those students who had not elected to take either course. This potential impact on students' choice to pursue a pharmaceutical industry fellowship could be based on their exposure to the pharmaceutical industry within 1 of these elective courses. Alternatively, a student with known interest in the pharmaceutical industry would also be more likely to enroll in 1 of the 2 elective courses.

Limitations to this method of course assessment included that only 1 graduating class of students had the opportunity to take 1 of the pharmaceutical industry elective courses at the time of the study. In addition, graduating students from the PharmD program were encouraged but not required to complete the annual exit survey, limiting the number of responses that could be evaluated. Further

analysis over subsequent years of graduating students is warranted.

As the role of pharmacists expands to fulfill functions in a variety of practice settings, pharmacy students are interested in gaining exposure to the responsibilities of pharmacists within these positions. While student awareness of postgraduate training is increasing, their awareness of fellowship training and graduate education opportunities is far less than student awareness of residency training programs.⁶ Unfortunately, without proper exposure, many students may graduate from colleges or schools of pharmacy without an understanding of the many opportunities available to them and without the interest necessary to apply to a fellowship or residency. This has the potential to negatively impact their future career satisfaction; 45% of pharmacists with postgraduate training indicate a high level of satisfaction with their employment compared with 32.7% of pharmacists without postgraduate training.⁷

SUMMARY

Offering pharmaceutical industry elective courses within pharmacy curricula may represent an opportunity to increase student interest in the pursuit of postgraduate fellowships and enrollment in APPEs within the pharmaceutical industry, thereby providing student exposure to one of many alternate career opportunities for pharmacists. A greater percentage of pharmacy students who completed a 2-credit pharmaceutical industry elective course later reported pursuing postgraduate fellowship training or enrolling in APPEs in the pharmaceutical industry following graduation than pharmacy students who had not elected to complete those courses.

ACKNOWLEDGEMENTS

This manuscript was part of a fellowship program completed by the corresponding author, Rhea Hartman, PharmD, at University of the Sciences. The author expresses deep appreciation to Sarah Spinler, PharmD; Hiren Patel, PharmD; Stacey Ross, RPh; Ed Kuffner, MD; Kathleen Boyle, PhD; Kathleen Franklin, RN; and to all reviewers.

REFERENCES

1. Dipiro JT. Preparing our students for the many opportunities in pharmacy. *Am J Pharm Educ.* 2011;75(9):Article 170.
2. Bryles BP, Bourg CA, Guffey WJ, Phillips BG. An elective course on postgraduate residency training. *Am J Pharm Educ.* 2012;76(9): Article 174.
3. Siracuse MV, Schondelmeyer SW, Hadsall RS, Schommer JC. Assessing career aspirations of pharmacy students. *Am J Pharm Educ.* 2004;68(3):Article 75.
4. American Pharmacists Association. Postgraduate education frequently asked questions: residencies and research fellowships. <http://www.pharmacist.com/sites/default/files/files/10-417postgraduate.pdf>. Accessed January 20, 2013.
5. Tai BW, Beardsley RS, Lebovitz LP. Significant factors that influence pharmacy students' decisions to pursue residencies. *Am J Pharm Educ.* 2011;75(10):Article 212.
6. Hagemeier NE, Murawski MM. Junior pharmacy faculty members' perceptions of their exposure to postgraduate training and academic careers during pharmacy school. *Am J Pharm Educ.* 2012;76(3):Article 39.
7. Padiyara RS, Komperda KE. Effect of postgraduate training on job and career satisfaction among health-system pharmacists. *Am J Health-Syst Pharm.* 2010;67(13):1093-100.