INSTRUCTIONAL DESIGN AND ASSESSMENT

An Active-Learning Assignment Using Nonprescription Medicines

Diane Nykamp, PharmD, Leisa L. Marshall, PharmD, and Laurel Ashworth, PharmD

College of Pharmacy and Health Sciences, Mercer University

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Objective. To create and implement a web-based written assignment to evaluate student's abilities to select appropriate nonprescription medications and recommend therapy.

Design. Each student developed a patient case study from an assigned condition, made treatment recommendations, and provided patient counseling information using at least 2 nonprescription medicines. The active-learning exercise required students to apply information previously presented in a large classroom setting.

Assessment. Cases most commonly submitted included therapy for burns, acne, conjunctivitis, lacerations, and poison ivy. One-hundred five students completed a 5-item questionnaire regarding the assignment. The majority of the respondents (51.9%) felt the assignment helped to reinforce course content and 58.1% felt it made them more comfortable with making product recommendations.

Conclusion. The Personal Pharmacy assignment was an effective learning activity for enhancing student's understanding and appropriate selection of nonprescription medicines.

Keywords: active learning, nonprescription medicines, self-care

INTRODUCTION

Retail sales of nonprescription medications in the United States were \$15 billion in 2005.¹ With approximately 100,000 nonprescription medications and combinations of drugs available to treat or control over 450 medical conditions, the pharmacist has opportunities to develop treatment plans and manage patients.² Pharmacists are the only health care providers that receive formal education and training in nonprescription medication therapy. Schools and colleges of pharmacy provide training in selecting appropriate nonprescription medicines as an integrated theme throughout the curriculum, in stand-alone courses, and through practice experiences.³ A greater focus on nonprescription medicines has been advocated by the North American Pharmacist Licensure Examination (NAPLEX),⁴ the Center for the Advancement of Pharmaceutical Education (CAPE) outcomes,⁵ and the Accreditation Council of Pharmaceutical Education (ACPE) accreditation guidelines, Standard 12, Professional Competencies and Outcomes Expectations.⁶

Pharmacy educators must be committed to providing training in nonprescription medicine therapy and self-care in order for pharmacy students to develop clinical judgment skills regarding appropriateness of therapy or referral to another health care professional. A structured

interviewing process known as QuEST has been developed and evaluated to improve students' counseling skills associated with nonprescription medications.^{7,8} The acronym QuEST describes guidelines used for appropriate patient counseling with nonprescription medication: Quickly and accurately assess the patient, Establish that the patient is capable of making self-care decisions, Suggest appropriate self-care strategies, and Talk with the patient. Another method of educating patients regarding proper use of nonprescription medicines describes a 4-step process in the management of nonprescription medicine therapy that can be used in didactic and experiential education to prepare students to make proper nonprescription medicine recommendations.⁹

At Mercer University College of Pharmacy and Health Sciences, nonprescription medicine therapeutics is taught primarily in the pharmacotherapy modules for second- and third-professional year students. One focus of *Integument and Special Senses* (PHA 556), a required course for third-professional year students, is teaching proper use of nonprescription medicines (Table 1). A self-care elective is also available for both second- and third-professional year students. In the *Practice of Pharmacy* courses, first- through third-professional year students are assessed on knowledge of the top 200 nonprescription medications for trade and generic name, including their components, dosage form, side effects, drug interactions, adverse reactions, indications, warnings, and patient counseling information.

Corresponding Author: Diane Nykamp, 3001 Mercer University Drive, Atlanta, Ga. 30341. Tel: 678-547-6219. Fax: 678-547-6638. E-mail: Nykamp_D@mercer.edu

Table 1. Integument and Special Senses Course Content

Ocular disorders
Glaucoma
Conjunctivitis and dry eye
Oral disorders
Canker and cold sores
Candidiasis
Integument disorders
Wound care
Dermatologic assessment
First aid and burns
Medication induced skin reactions
Psoriasis
Acne and rosacea
Keratosis pilaris
Scar therapy
Dermatitis
Skin cancer prevention
Fungal disorders
Candidiasis
Onychomycosis

This report describes the introduction of a web-based active-learning assignment, the Personal Pharmacy assignment, to the *Integument and Special Senses* course, and the impact of the assignment on student's abilities to recommend and select appropriate nonprescription medicines. Active learning refers to an instructional approach that holds students responsible for learning. An active-learning assignment should be a follow-up activity for the student to practice or utilize concepts/skills to which they have been exposed in the traditional education setting.¹⁰

Table 2. Instructions for the Personal Pharmacy Assignment

Objective: To provide the student with practice in solving self-care conditions with nonprescription medications.
(1) Each student is required to develop a case study from a topic listed below involving a pediatric patient, patient with cardiovascular disease, or patient with diabetes. Each student will be responsible for solving their case by selecting the most appropriate nonprescription medication/s.
(2) The nonprescription medication therapy should include product name and ingredient/s, dose of the agent, mechanism of action, administration instructions and patient counseling information such as adverse drug reactions, drug-drug interactions, and drug-food interactions.
(3) The assignment must be completed via PowerPoint (1 page only) and must contain images or pictures of the products selected. The PowerPoint presentation must contain both the case study and at least 2 selected products. The product selection process should encompass product cost to the patient.
(4) Three assignments must be submitted via the assignment tool on WebCT. All 3 Personal Pharmacies will be graded and together are worth 5% of the course grade.
(5) Topics for assignment #1 must include one of the following: conjunctivitis or the prevention of swimmer's ear.
(6) Topics for assignment #2 must include one of the following: first aid for sprains, first aid for lacerations, and first aid for burns, or chronic wound care.
(7) Topics for assignment #3 must include one of the following: acne, keratosis pilaris, insect bites, poison ivy, atopic dermatitis, or chicken pox.

DESIGN

The Personal Pharmacy, a web-based student assignment using nonprescription medicines to treat self-care conditions, was designed, implemented and evaluated during a pharmacotherapy module. This project was approved by the Investigational Review Board (IRB) of Mercer University.

The Personal Pharmacy assignment was designed with the objective of providing students with the opportunity to enhance their skills in recommending and selecting appropriate nonprescription medicines to treat a variety of common self-care conditions discussed in the course. The assignment was named Personal Pharmacy because students had the opportunity to make personal selections from multiple brand extensions.

After attending course lectures, the students were given instructions for completing the Personal Pharmacy assignment (Table 2). Students were instructed to choose a lecture topic, eg, poison ivy, and create their own patient scenario in which at least 2 nonprescription medications would be recommended to the patient by a pharmacist. Students were told to write the 1-page assignment in layman's terms. They were told to include product names with images, the products' ingredients, mechanisms of action, dosage, and adverse reactions, and any counseling information the patient would need to be given. Students were also advised to consider the product's price. The grading criteria for the assignment are listed in Table 3. Students were advised to use the biomedical literature, classroom notes, electronic databases, and textbooks as references to complete the assignments.

Each student was individually responsible for completing 3 assignments on topics delivered in the classroom

Table 3. Grading Criteria for Personal Pharmacy Assignment

Required Criteria	Points Awarded
Name and assignment #	1
Case study (level one = 1 pt, level two = 2pts)	1 or 2
Identifies product names (at least 2 different products)	1
Identifies product ingredients	2
Includes product images or pictures	1
Recommends appropriate medication therapy	4
Identifies dose of agent	1
Identifies mechanism of action	1
Identifies adverse drug reactions	1
Identifies retail cost	1
Identifies patient counseling information	2
Total Points	17 = 100%

Grades were assigned based on the following points earned:

17 total points = 100%
16 total points = 94%
15 total points = 88%
14 total points = 82%
13 total points = 77%
12 total points = 71%
11 total points = 65%

and for submitting each assignment via WebCT at designated dates throughout the 3-week course. Assignments were graded by 1 faculty member and returned to the student within 72 hours of receipt.

The *Integument and Special Senses* course utilized a course management program, WebCT, to post the course syllabus, course schedule, PowerPoint lecture presentations, student assignments, and grades. The final grade for the pharmacotherapy module was calculated from test grades, along with grades on the Personal Pharmacy Assignments: test 1 = 30%; test 2 = 30%; test 3 = 35%, and three 3 personal pharmacy assignments = 5%.

A questionnaire assessing the students' perceptions of the Personal Pharmacy assignment was administered to all students at the conclusion of the course.

ASSESSMENT

Of the 135 students enrolled in the *Integument and Special Senses* course in spring 2007, 130 (96%) completed all 3 personal pharmacy assignments. Cases most commonly submitted included: first aid for burns (n = 52), acne (n = 50), conjunctivitis (n = 37), first aid for lacerations (n = 25), and poison ivy (n = 19). Sample cases for first aid of burns and lacerations are presented in Appendix 1. Students who did not submit the assignments received a grade of zero. Grades ranged from zero to 100%. Mean grades for the 3 assignments were 96.5 ± 8.3 ; 97.0 ± 5.3 ; and 97.1 ± 12.8 , respectively. Students who failed to correctly identify product ingredients or provide accurate patient counseling recommendations received a deduction of 2 points (15 points out of 17) and scored 88%. Student who selected an inappropriate agent lost 4 points, which corresponded to a grade of 77%. Inappropriate recommendations consisted of selecting the wrong concentration of a product (either to low or to high), recommending a product to be used by an allergic or sensitive patient, or neglecting to include an accompanying agent for treatment, such as an oral analgesic.

A factor in the assessment of the Personal Pharmacy assignment was the cost of the products selected. Self-care is almost always the most cost-efficient method of care when used appropriately. Students quickly learned that selecting a generic equivalent or using an off-brand label provided patients with substantial additional cost savings. In some instances, students even suggested use of a household product, such as dilute acetic acid as an

Table 4. Student Questionnaire Results About the Personal Pharmacy Assignments (N = 105)

Survey Item	Responses, No. (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. The Personal Pharmacy assignment reinforced the course content.	5 (4.8)	9 (8.6)	29 (27.6)	43 (40.9)	19 (18.1)
2. The assignments increased my knowledge in the area.	6 (5.7)	10 (9.5)	28 (26.7)	40 (38.1)	21 (20.0)
3. I feel more comfortable making product recommendations now than I did prior to this course.	5 (4.8)	14 (13.3)	25 (23.8)	44 (41.9)	17 (16.2)
4. The use of WebCT to submit completed assignments was preferable to paper submission in the actual classroom.	5 (4.8)	1 (0.9)	(5.7)	36 (34.3)	57 (54.3)
5. I think the class next year should include the Personal Pharmacy assignments.	7 (6.7)	16 (15.2)	28 (26.7)	31 (29.5)	23 (21.9)

astringent agent for treating contact dermatitis or saline for cleansing a wound.

Several students selected inappropriate products when formulating their care plans. For example, in a case involving provision of first aid for sprains and strains, a student selected a capsaicin product for a child. The student should have suggested an oral or topical analgesic or a counterirritant containing menthol or camphor. Students also confused calamine with Caladryl and Solarcaine First Aid Spray with Solarcaine Burn Relief in several instances.

The questionnaire assessing student opinions about the Personal Pharmacy assignment was completed by 105 (78%) of the 135 students. Generally, students believed the assignments reinforced information presented in the classroom and provided a good working knowledge of specific products. Survey questions and responses based on a 5-point Likert scale are shown in Table 4. Open-ended questions regarding the most and least valuable aspects of the project and additional comments providing descriptive feedback are listed in Table 5.

DISCUSSION

Changes constantly occur in the nonprescription medicines marketplace as manufacturers seek to satisfy customers and increase profits. The changing nonprescription marketplace with multiple-brand extensions requires that pharmacists and pharmacy students research new and improved therapies each year.¹¹

Completion of the Personal Pharmacy assignment reinforced knowledge gained through classroom lectures and increased students' comfort level when making nonprescription medicine recommendations. Cases containing patient or disease state variables provided the framework for more complex and thought-provoking care plans. Similar findings appear in a study by Angelo¹² who reported that pharmacy students on an advanced community pharmacy practice experience found that interventions involving children less than 2 years of age and pregnant women were the most challenging. Mercer University students also reported that it was helpful in the learning process to create a case integrating patient or disease state variables. Several other students stated that creating the case was a better learning experience than having a case assigned to them. Additionally, some students reported that their detailed and "complex" cases were actually based on real-life prior encounters in which they had not known the proper product or treatment recommendations.

Several students expressed their concern regarding the due date of one of the assignments being too close to a test date. One modification that could be considered is

Table 5. Students' Descriptive Responses Regarding the Personal Pharmacy Assignment

Open-ended Questions	No. of Responses
How many hours a week did it take to complete each assignment?	
Less than 1 hour	8
1-2 hours	56
2-3 hours	24
3-4 hours	6
4-5 hours	3
8 hours	1
10 hours	3
12 hours	1
What did you like BEST about the Personal Pharmacy assignments?	
Application of course concepts to pharmacy practice	21
Reinforcement of course concepts	27
Researching product information	30
Creating a patient case	7
Creativity in slide design	6
Online assignment submission	5
Fun, easy assignment with clear expectations	7
What did you like LEAST about the Personal Pharmacy assignments?	
Difficulty in finding accurate product information	9
Time required to complete the assignment	25
Due date too close to exams	22
Space constraints of PowerPoint slides	13
Creating a patient case	7
Unclear expectations and complicated grading rubric	10
Assignment weight of final grade	3
Lack of feedback	3
Online assignment submission	1

Note: Some survey responses were included in more than one response category

giving the test on one day and requiring the assignment be turned in the following day. The limitation with this option is that the course is taught in a 3-week period. A test is administered each Monday morning, followed by presentation of new material. Another modification that will be considered is the amount of credit given for the Personal Pharmacy assignment. Currently, the 3 assignments combined are worth 5% of the total grade. Students reported that each assignment took up to 3 hours to develop. This information will assist the course coordinators in recalculating the break down of the final grade.

The use of WebCT facilitated the submission and evaluation of the student assignment, allowing more

timely feedback and easier submission of the assignment. Student assignments during the previous year were collected during class, causing classroom disruption and problems if students were absent. During the 2007 academic year, students could only submit their assignments through WebCT. WebCT offered the advantage of time and date documentation and a specific cut off time for submission. Having been previously trained on the use of WebCT, students were accustomed to using this management system and encountered minimal difficulties in submitting their assignments in a timely manner.

CONCLUSION

Given the increasing number and use of nonprescription medicines by consumers, pharmacy educators have an important role in teaching their students the importance of the pharmacist's role in self-care and nonprescription medications selection. Self-care should focus on the safe, appropriate, effective, and economical use of nonprescription medications. The use of an active-learning assignment requiring the creation of case studies, assessment of nonprescription medicine therapy, and recommendation of a care plan enhanced students' understanding of and ability to properly select nonprescription medicines.

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Appendix 1. Sample Cases for First Aid of Burns and Lacerations

Burns

The mother of a six-year-old light skinned female asks for help to treat a severe sunburn sustained by her daughter during their weekend trip to the beach. The mother explains it was cloudy part of the day and she did not expect her daughter to "get so red". The child is taking azithromycin for otitis media and is allergic to sulfamethoxazole.

Assessment:

Severe sunburn is likely due to azithromycin which is photosensitizing.

Sunscreen may not have been used since it was a cloudy day.

Treatment should not include a product containing benzocaine since the female is already allergic to a sulfa drug and has light skin.

Treatment should include an aerosol preparation of lidocaine 0.5 to 2.5%% and oral analgesic. Caution the caregiver against excessive use of lidocaine due to systemic absorption.

Example of a product containing lidocaine 2.5% is Bactine Pain Relieving Cleansing Spray®. This product also contains an antiseptic, benzalkonium chloride.

Examples of products containing lidocaine 0.5% are Solarcaine Burn Relief® or Solarcaine Aloe Extra®

Examples of oral analgesics: ibuprofen, acetaminophen.

Lacerations

The mother of 12-year-old male is asking for assistance in purchasing a product to treat a laceration on the elbow from a recent “wipe-out” on his skate board. The mother does not know if sutures are needed and is worried about an infection. The mother explains that he has been really healthy this summer except for a week with Swimmer’s Ear. He had to see a physician and she forgets the name of the drug that was prescribed, but he does remember he was allergic to the drug (he had a red streak running down the side of his face) and had to return to the physician.

Assessment:

Skin closures such as Band-Aid Butterfly®, Proxy-strips®, or Steri-strips® are appropriate wound closures. However, with a laceration on a joint such as elbow or knee and in this specific age group, sutures are most likely needed.

Immediate treatment with a topical antibiotic product is appropriate. In this case, a triple antibiotic should not be recommended because of its neomycin content. The patient has already had an allergic reaction, most likely to the neomycin content of Cortisporin Otic suspension. A product containing bacitracin and polymixin B (Polysporin®) or bacitracin (Bacitracin®) should be used to prevent infection.