TEACHERS' TOPICS

An Elective Course on Pharmacy-Based Health Screenings

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Objective. To provide an elective course for pharmacy students focused on the knowledge and skills necessary to implement health screenings in a pharmacy environment.

Design. Course lectures focused on expert recommendations for health screenings as well as regulatory requirements and procedures integral to the implementation of screening services. Workshops provided hands-on experience with blood glucose, body composition, bone density, and cholesterol testing devices.

Assessment. Attainment of knowledge and skills was assessed by patient case assignments, screening device demonstrations, group projects, and a final quiz. Annual course evaluations revealed consistently favorable student feedback regarding the course design and content. Students reported a high level of preparedness and interest in participating in health screening services in future practice.

Conclusion. An elective course focused on the delivery of health screenings in pharmacy settings was well received by student participants and exposed students to a unique opportunity in patient care.

Keywords: elective course, health screening, point-of-care testing

INTRODUCTION

Pharmacist involvement in health promotion and disease prevention is a core component of patient care and is a supported focus of curricular outcomes for US colleges and schools of pharmacy. The American Association of Colleges of Pharmacy Center for the Advancement of Pharmaceutical Education 2004 Educational Outcomes document specifically addresses public health: "promote health improvement, wellness, and disease prevention in cooperation with patients, communities, at-risk populations, and other members of an interprofessional team of health care providers."¹ This was also adopted as a professional competency and outcome expectation in the accreditation standards and guidelines of the Accreditation Council for Pharmacy Education.²

Health screenings allow for early identification of disease. Recommendations for their routine incorporation into patient care are published by many expert groups, including the US Preventive Services Task Force (USPSTF).³ Multiple publications facilitate pharmacist involvement in health screenings by describing implementation steps and instruction in the use of point-of-care testing.^{4,5} Outcomes of various health screenings performed by pharmacists are well documented in the literature, including those

reporting high levels of patient satisfaction with the services.⁶⁻¹¹ In a doctor of pharmacy (PharmD) curriculum, instructional content relevant to health screenings may be incorporated across multiple core courses, such as public health, therapeutics, skills laboratories, law, and management. An elective course allows for a concentrated focus on all elements to provide a stepwise approach to the development and implementation of health screening services as a practice opportunity.

The Midwestern University College of Pharmacy-Glendale began offering the Pharmacy-Based Health Screenings elective course in 2003 in the second year of a 3-year PharmD program. Use of the course design described in this paper began in 2010. The elective was designed to complement core curricular content in the area of health promotion and disease prevention. An additional motivator was to provide a mechanism to train students for extracurricular community health screening activities. The objective of this manuscript is to describe the implementation and evaluation of an elective course focused on health screenings in a pharmacy environment.

DESIGN

The primary goal of the elective course was to provide students with the knowledge and skills to develop and implement pharmacy-based health screening services. Students were expected to meet the following objectives upon completion of the course: (1) describe the development of policies and procedures regarding screening

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programs, including Occupational Safety and Health Administration (OSHA) and Clinical Laboratory Improvement Amendments (CLIA) regulations; (2) list risk factors and screening parameters for cancer, cardiovascular disease, osteoporosis, and diabetes; and (3) demonstrate correct use of screening equipment for diabetes, hypercholesterolemia, osteoporosis, and body composition. The college offered the 1.5-credit-hour course through a combination of 1.5-hour lecture and 4-hour workshop blocks over a 10-week quarter. The course capacity was 100 students with 73 students enrolled in the fall quarter of 2010 and 91 students in the fall quarter of 2011.

The course schedule (Table 1) began with an introductory discussion of the steps required to implement health screenings in a pharmacy, including CLIA and OSHA regulations. A background lecture was then provided on general recommendations for health screenings as defined by the USPSTF. A take-home assignment required the students to use the associated online resources. Subsequent lectures targeted osteoporosis, body composition, cancer, and cardiometabolic screenings. Each lecture was designed to complement the core pathophysiology and therapeutics lectures and was limited to the discussion of risk factors for the disease, available screening techniques, interpretation of results, limitations of testing, and recommendations for followup and risk reduction.

Workshop blocks were used for hands-on training with 4 health screening devices: body composition analyzer, blood glucose meter, bone sonometer, and a point-of-care

cholesterol testing device. The devices and supplies were either provided by the college or generously loaned by local pharmacies that offered health screening services. Each student attended 2 workshop sessions in the course; one addressed the body composition and bone sonometer tests and the other addressed the blood glucose and cholesterol testing. The 2 workshops were each divided into 4 sessions to allow for manageable group sizes for device training and evaluation. During each workshop session, the group as a whole observed a device demonstration and then students worked in small groups to perform the procedure on each other. Course faculty members and senior pharmacy students completing their advanced pharmacy practice experiences oversaw the sessions. Faculty members used predefined checklists to evaluate individual students' device technique. Students were asked to repeat device evaluation until they achieved 100% competence on the checklist. Students also completed an in-class assignment during each of the workshop sessions. The assignments consisted of a patient case scenario with questions related to the identification of the patient's risk factors, interpretation of the screening results, and counseling on risk reduction techniques (Appendix 1). Further examples of assignments and other course materials are available by request from the author.

Two group projects were assigned during each course offering. Students worked in self-selected groups of 5 to complete the projects. The first project was to explore pharmacists' opinions about health screenings through an interview with a practicing pharmacist. The

Table 1. Schedule of Topics for Pharmacy-Based Health Screenings Elective Course

Week	Lecture/ Discussion Topic	Assignments/ Workshops
1	Course introduction Stepwise approach to implementation of health screenings Regulatory issues	Assignment of group projects
2	General health screening recommendations	Take-home assignment
3	Osteoporosis screening Lifestyle modification/ body composition screening	Bone density and body composition device workshop Osteoporosis casework (1/2 class)
4	Cancer screenings	Bone density and body composition device workshop Osteoporosis casework (1/2 class)
5	Group project preparation	
6	Cardiometabolic screenings (cholesterol, diabetes, blood pressure)	Blood glucose and cholesterol testing device workshop Diabetes/ Hyperlipidemia casework (1/2 class)
7	Cardiometabolic screenings (cholesterol, diabetes, blood pressure)	Blood glucose and cholesterol testing device workshop Diabetes/ Hyperlipidemia casework (1/2 class)
8	Group project preparation	
9	Group project #1 discussion: community pharmacy analysis	
10	Group project #2 discussion: health screenings	Final quiz

second project was for the group to complete a “strengths, opportunities, weaknesses, and threats” analysis for an existing community pharmacy to determine the factors associated with the provision of health screenings in that environment. Each group prepared a written summary report for each project and discussed the report with the class as a whole. During the presentation component, students discussed possible solutions to the obstacles and weaknesses identified in the analyses.

The second project was designed to explore commonly available health screening tests not otherwise discussed in the course: thyroid function, abdominal aortic aneurysm, peripheral arterial disease, carotid artery stenosis, and chronic obstructive pulmonary disease. The students were asked to research USPSTF recommendations regarding one of the screenings and prepare a written document describing the available testing methods, its limitations, and the group members’ opinions regarding the appropriateness of the screening in a pharmacy setting. The papers were presented and discussed with the class in the final lecture period of the course.

ASSESSMENT AND EVALUATION

Assessment of students’ performance in the course was based upon 4 device evaluations (10 points each), 1 take-home assignment (10 points), 2 in-class case assignments (10 points each), 2 group projects (25 points each), and a final quiz (50 points). The comprehensive final quiz included 3 patient case scenarios with 19 open-response questions targeted at the application of USPSTF screening recommendations; interpretation of blood glucose, cholesterol, body composition, and bone density test results; and patient-specific recommendations for risk-factor reduction.

Students performed well on all assignments for the course in 2010 and 2011. The average scores on the final

quiz were 98.0% and 97.2%, respectively. Student evaluations of the course occurred at the end of each course offering (Table 2). Open-response comments regarding the course revealed appreciation for the “real world” practical experience using the screening devices, and the discussions of the opportunities and challenges associated with offering screenings in a pharmacy setting.

At the end of the course in 2011, students were asked to participate in a voluntary survey to assess their attitudes about their readiness to offer health screenings as well as plans to incorporate screenings into their clinical practice upon graduation. The Institutional Review Board at Midwestern University approved the survey instrument. Eighty-one of the 91 students (89%) enrolled in the course provided at least 1 response to the survey items (Table 3). Most students strongly agreed or agreed that they felt comfortable setting up a health screening service in a pharmacy, planned to implement screenings in their future pharmacy practice, and considered the ability to perform health screenings a factor when choosing an employer. When asked to list all types of screenings they would be interested in implementing in the future, students showed the greatest interest for blood glucose, lipids, and blood pressure (Table 4). When asked to rank 5 obstacles to performing health screenings in a pharmacy setting from most important to least important, 46 (61%) of 75 respondents ranked time constraints as most important followed by lack of support from management (17.3%), difficulty obtaining reimbursement (12%), lack of pharmacist knowledge (6.7%), and space constraints (2.7%).

DISCUSSION

The structure of this elective course allowed for a comprehensive presentation of topics relevant to the development and implementation of a health screening service in a pharmacy setting. From the review of regulations

Table 2. Final Evaluations for a Pharmacy-Based Health Screenings Elective Course

Survey Item ^a	Year ^{b,c}	Strongly Disagree, No. (%)	Disagree, No. (%)	Neutral, No. (%)	Agree, No. (%)	Strongly Agree, No. (%)
The course objectives were clear.	2010, n=59	1 (1.7)	0	1 (1.7)	8 (13.6)	49 (83.1)
	2011, n=77	3 (3.9)	0	0	8 (10.4)	66 (85.7)
The course content was well organized.	2010, n=60	0	0	0	10 (16.7)	50 (83.3)
	2011, n=75	2 (2.7)	0	0	6 (8.0)	67 (89.3)
The evaluation methods adequately sampled the information I was expected to learn.	2010, n=61	0	0	0	11 (18.0)	50 (82.0)
	2011, n=71	1 (1.4)	0	1 (1.4)	6 (8.5)	63 (88.7)
Overall, I rate this course highly.	2010, n=60	0	0	0	13 (21.7)	47 (78.3)
	2011, n=78	2 (2.6)	0	1 (1.3)	5 (6.4)	70 (89.7)

^a Responses based on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

^b 73 students enrolled in 2010; 91 students enrolled in 2011.

^c Median response for all survey items = 5.

Table 3. Student Opinions Regarding Knowledge and Skills for Pharmacy-Based Health Screenings Implementation (N = 81) ^{a,b}

Survey Item	Strongly Disagree, No. (%)	Disagree, No. (%)	Neutral, No. (%)	Agree, No. (%)	Strongly Agree, No. (%)
I feel prepared to set up a health screening service in a pharmacy.	0	4 (4.9)	18 (22.2)	51 (63.0)	8 (9.9)
I plan to implement health screenings in my future pharmacy practice	1 (1.2)	2 (2.5)	22 (27.2)	35 (43.2)	21 (25.9)
I will consider the ability to perform health screenings as a factor when choosing an employer upon graduation.	3 (3.7)	4 (4.9)	33 (40.7)	32 (39.5)	9 (11.1)

^a Responses based on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

^b Median response for all survey items = 4.

and the development of policies and procedures to the hands-on use of health screenings devices, the students were exposed to the complexities of offering a health screening service that broadened their skill set beyond the foundational material taught in the core curriculum.

Students performed well in the course and provided positive feedback regarding their experiences. Based upon the survey of the 2011 course offering, most students expressed that they felt prepared and motivated to participate in health screenings in their future practice settings, and the types of screenings they expressed interest in reflected topics covered in the elective course. Fewer students wished to make the ability to provide health screenings a point of contingency when selecting their future employer, although their perceived obstacles to implementing screenings, which were lack of time and support by management, would be heavily influenced by this decision.

The use of group projects and a take-home assignment extended learning opportunities beyond the lecture and workshop periods. The use of the USPSTF online assessment tool familiarized students with a key resource for remaining updated on this topic in the future. Critical evaluation of additional health screenings in the first group project allowed the students to weigh advantages and disadvantages, form an opinion about the appropriateness of the screening, and present their summary verbally to their peers. These steps represented the same process a pharmacist must use in the initial development stages of a new screening service in a pharmacy. The second group project provided real-world application of the health screenings course content as the students interviewed a pharmacist and evaluated a pharmacy site for health screenings. The class discussion of their interviews revealed examples of pharmacists who had overcome obstacles to this service as well as some who had not, and served as a platform for brainstorming possible approaches.

Several limitations were identified through course implementation. The hands-on application required access to health screenings equipment and supplies, as well

as the time to critically evaluate individual students' techniques. Using existing equipment owned by the college for community outreach activities and borrowing equipment from local pharmacies kept the costs to a minimum. Supply costs were the primary expense and were further reduced by using donated expired test cartridges for the cholesterol testing. Some students expressed disappointment with the inability to accurately assess their cholesterol levels while practicing the device technique. An additional course fee for each student would allow for supply purchases if this was determined to be a priority for future course offerings. In terms of time allotment, the course was designed with a single demonstration and evaluation opportunity for each student on each device. Although the students repeated their demonstration until they achieved 100% competency on the evaluation checklist, there were no further opportunities to assess progress. A smaller class size or increased access to equipment and supplies would allow for multiple assessment opportunities. The use of a final practical examination requiring the demonstration of a randomly selected health screening would also provide for subsequent measurement of skills.

Although the development of health screenings skills was taught primarily within the context of future career development, a secondary and more immediate benefit of the elective course was the cohort of trained students who

Table 4. Types of Health Screening Services Pharmacy Students Planned to Implement in the Future

Type of Screening	Responses, No. (%) ^a
Blood glucose	47 (88.7)
Lipid	40 (75.5)
Blood pressure	33 (62.3)
Osteoporosis	7 (13.2)
Body composition	6 (11.3)
Asthma	2 (3.8)
Cancer	1 (1.9)

^a 53 total respondents, multiple responses allowed.

could participate in extracurricular community health screening events. The training records were retained at the college for this purpose. Because the foundational instruction was already completed, subsequent “refresher” training sessions reduced the time required to prepare for outreach events. Some students requested the incorporation of a community screening event as a required part of the elective to provide immediate opportunities to use their skills. This remains a consideration for future course offerings.

SUMMARY

Students participating in an elective course focused on pharmacy-based health screenings responded positively to a stepwise learning approach to designing and implementing these services. The application of lecture content to hands-on workshops, patient case examples, use of electronic resources, and evaluation of existing pharmacy sites provided a multi-faceted introduction to an innovative practice opportunity. This course structure could also be used to develop electives focused on the design of other novel pharmacy-based services.

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Appendix 1. Example of an In-class Case Assignment for the Blood Glucose and Cholesterol Testing Workshop

A 38 year old Native American male (member of the Pima Indian tribe) presents to a health screening event. He has a history of hypertension for which he takes atenolol 25 mg once daily (started 1 year ago). He has smoked 1/2 pack of cigarettes per day for the past 20 years and does not drink alcohol. He walks 1 hour 5 days a week for exercise and has been trying to follow healthy dietary habits for the past 6 months, including no fast food and lots of fruits and vegetables. He is a high school gym teacher. His father (age 69) has diabetes and suffered an acute myocardial infarction at age 50. His mother died at age 62 of lung cancer. His brother (age 44) and 2 sons (ages 10 and 13) are healthy, with no chronic medical conditions. His physical examination reveals the following: weight 190 pounds, height 69 inches, blood pressure 158/96 mm Hg, pulse 72 beats per minute. He completes his health screening consisting of a fasting blood glucose and lipid panel with the following results: total cholesterol 270 mg/dL, triglycerides 240 mg/dL, LDL 180 mg/dL, HDL 42 mg/dL, blood glucose 116 mg/dL.

Please answer the following questions:

1. List all risk factors for diabetes exhibited by this patient.
2. Does his blood glucose meet criteria for referral? Why or why not?
3. What major cardiac risk factors does this patient have?
4. What is his LDL goal?
5. What is his blood pressure goal?
6. List two questions you would ask this patient to help you evaluate his blood pressure result from today.