TEACHERS TOPICS

An Exercise Prescription Course to Improve Pharmacy Students' Confidence in Patient Counseling

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Objectives. To create, implement, and evaluate an elective course on the foundational aspects of exercise prescription to increase pharmacy students' knowledge about exercise and confidence in offering exercise advice in pharmacy practice.

Design. A course was designed as an elective using the American College of Sports Medicine guidelines for exercise prescription for healthy and clinical populations.

Assessment. Surveys of students who did and did not take the elective were conducted over 2 years to assess the impact of the course on students' confidence in knowledge and counseling. Students' confidence in counseling patients about exercise increased after taking the course and remained higher after 6 months.

Conclusions. This course increased pharmacy students' knowledge and confidence in incorporating exercise prescriptions in their advice to various patient populations.

Keywords: public health, exercise, nutrition, service-learning, counseling

INTRODUCTION

The first line of therapy for hypertension, hyperlipidemia, obesity, and diabetes is lifestyle modification, which includes increased physical activity.¹⁻⁴ Often patients have pharmacotherapy added to their lifestyle interventions to help manage disease. While most pharmacy students seem to be aware of the public health guidelines for physical activity (ie, 30 minutes a day, 5 days per week at a moderate intensity), they may be less informed about other guidelines regarding physical activity. These include engaging in vigorous exercise (ie, 20 minutes a day, 3 days a week) and resistance exercise (8 to 10 strength-training exercises, 8 to 12 repetitions of each exercise twice a week),⁵ or even the 10,000-steps-per-day guidance.⁶ Furthermore, students may lack the knowledge or confidence to recommend exercise programs to patients.

Because patients often need more guidance than is given in a typical recommendation to increase physical activity, exercise, like medications, should be prescribed in written form.⁷ Only individuals with specialized training, such as exercise specialists, traditionally make/give

written exercise prescriptions. Because pharmacists often are more accessible, training pharmacy students to offer more meaningful exercise counseling could improve patient outcomes. In addition, the pharmacist may serve as an accessible source for practical, evidence-based exercise advice.

Insufficient training is a barrier to physicians' providing exercise counseling, which may support the need for improved educational programs for other health care practitioners.⁸ In one study of resident physicians, 3 factors were identified as having the strongest association with the percentage of patients provided exercise counseling: the residents' confidence in exercise counseling skills, feeling successful at counseling, and perception of exercise as having high priority.⁸ While societal pressures through such programs like Healthy People 2010 can increase exercise and physical activity as a priority, pharmacy student education can help raise the confidence of these future practitioners to implement this change.

Recently, the American College of Sports Medicine, in collaboration with the United States Surgeon Generals office and various medical organizations, started the "Exercise is Medicine" initiative (www.exerciseismedicine.net) to encourage physicians to discuss exercise more frequently with their patients. The Center for the Advancement of Pharmaceutical Education (CAPE) recommends colleges and schools of pharmacy include the development of student skills in the area of overall public

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health in their educational outcomes. Healthy People 2010 identified overweight and obesity as a leading health indicator, with poor nutrition and physical inactivity being the number 2 cause of preventable death in the United States (smoking is the number 1 cause).⁹ Approximately 60% of adult Americans are overweight with a healthcare cost of approximately \$200 billion. By 2040, over 80% of adult Americans will be overweight, with a \$1 trillion health care cost.¹⁰ Because pharmacists are one of the largest, most accessible, and trusted health care professions, they have the greatest potential to play a significant role in disease prevention and health promotion by helping to facilitate and accomplish the public health goals such as those outlined by Healthy People 2010.¹¹

This paper describes the creation, evaluation, and future direction of a PharmD elective course on foundations in exercise prescription designed to address the gap between the knowledge of exercise and physical activity recommendations and students' perceived ability to prescribe exercise. The experience of conceptualizing, coordinating, and implementing an elective exercise prescription course for PharmD students and evaluating the association of participation in this course with changes in the levels of students' knowledge of exercise recommendations, benefits, and even medication management is described. The goal of this course was not for students to become exercise specialists but to introduce basic concepts and selected therapeutic applications of exercise testing and prescription. In addition, this course provides students with a foundation to build upon more complete pharmaceutical care skills by incorporating counseling regarding lifestyle changes with respect to physical activity and basic nutrition. The final goal was for students to become advocates for patients to increase physical activity and monitor eating behavior, thereby assisting in the prevention and treatment of disease.

DESIGN

In the spring of 2007, Foundations in Exercise Prescription was offered as a 3-credit hour elective course to third-year doctor of pharmacy (PharmD) students. The course was only offered to third-year students because they have completed their pharmacotherapy modules and would have the prerequisite knowledge of disease states and treatment. The course structure for the elective is presented in Table 1. Topics included exercise prescription in special populations, various disease states, and other related topics. Students were provided pedometers to assess the effort required to attain the daily recommended step counts.

During the first year the course discussion was the main instructional modality. Guest instructors used for

the course included physicians and nurses from the cardiac rehabilitation clinic; the University's sports nutritionist; and various experts on children and exercise, physical therapy in the elderly, and exercise during pregnancy.

Students worked in groups of 3 or 4 to develop patient education pamphlets that explained the benefits of exercise and some basic tips for various disease populations (ie, general benefits of physical activity, lifestyle modification program for weight loss, exercise in patients with heart disease, and nutrition and exercise for patients with diabetes). In order to receive an 'A' in the course, students had to complete 1 of the following projects in addition to their regular assignments: start, monitor, and document a 4-week walking program for an individual (eg, patient, friend, faculty member, family member); translate 1 of the groups' pamphlets into Spanish; or evaluate their own lifestyle using a physical activity questionnaire, dietary intake survey, and pedometer. The final part of their grade was a group presentation (group size 3 to 4) on various dietary supplements that were purported to increase exercise performance (eg, nitrous oxide products, creatine); supplements were chosen based on the frequently asked questions the university's sports nutritionist received from athletes. One body composition laboratory exercise was conducted the first year during which students learned how to use skin fold measurements to assess body composition and viewed a demonstration of bioelectrical impedance measurement.

The elective was modified the second year to incorporate more structured lectures in the beginning of the course. The reason for the change was that students were asked to provide service-learning in the latter part of the course and it was felt lectures would provide the basic information for these sessions in an efficient manner. The service-learning entailed students offering 30-minute informational sessions on various aspects of exercise and nutrition to faculty and staff members. There were 5 sessions during the initial year: "Recognizing signs and symptoms of heart attack and stroke," "Benefits of exercise & starting an exercise program," "Weight management," "Nutrition basics," "Dietary supplements: magic bullets?" During this year, the primary course assessment was a portfolio that included questions related to what students wanted to get out of the course, what students had learned by teaching others, review of a research article, dietary analysis, physical activity analysis from their pedometer data, general reflection on how what they learned helped in providing a comprehensive basis for the treatment of patients, and the best and worse examples of their work during the course. A second laboratory experience in resistance training was added in response to students' requests. During this laboratory session,

Table 1. Outline of Format for an Elective Course on Foundations in Exercise Prescription

Variable	2007	2008
Time	3-hour block	2-hour block + 1-hour block on separate days
Teaching method	Discussion, student presentations	Formal lectures; cases; service-learning, student presentations
Class size	14	12
Assessment	Development of pamphlets targeted at desired patient populations	Portfolio
Text	- American College of Sports Medicine (ACSM) Resource Manual and Exercise Guidelines. - Primary literature - ACSM Position Statements	Same
Other learning tools	Pedometer	Same

Topic	Approximate Course Time, hours	
Body Composition	2.0	1.0
Aerobic Training Principles	2.0	2.0
Resistance Training Principles	1.0	2.0
Risk Assessment	0.0	1.0
Cardiovascular Disease	2.0	1.0
Diabetes	1.0	2.0
Nutrition/Dietary Supplements	3.0	3.0
Cancer	0.5	0.5
Neuro/Psych (eg, depression, Alzheimer's)	0.5	0.5
Teaching Basics	0.0	1.0
Weight Control	2.0	2.0
Elderly	3.0	2.0
Children	2.0	2.0
Pregnancy	1.0	1.0
Exercise-Drug Interaction	2.0	0.0

students performed various exercises to assess maximal strength including the YMCA bench press test and using relevant tables to estimate the 1 repetition maximum from 10 repetitions (ie, have a subject perform a near maximal load that will allow him or her to complete 10 repetitions and using that weight to predict the maximal load they can lift once). Students also had group presentations around special topics including: “Performance enhancing drugs: what works?; “Resistance training and women”; “Treatment of exercise-induced muscle soreness”; “Pharmacologic treatment for obesity: what is the future?”; “Are high protein diets bad for your kidneys?”

EVALUATION AND ASSESSMENT

Course Surveys

Prior to the semester, a survey was conducted using Qualtrics Survey Software (www.qualtrics.com) assessing students' comfort level and attitudes to exercise

in various populations. A follow-up survey was conducted at the end of the semester and a final survey was conducted 6 months after the end of the semester, approximately 4 to 5 months into students' beginning their advanced pharmacy practice experiences (APPEs). The survey instrument addressed students' confidence in counseling on the benefits of exercise and ability to recommend exercise and counseling on medications for several populations covered in the course. Survey responses were based on a 5-point Likert scale with 1 being strongly agree and 5 being strongly disagree. The last survey instrument asked how often students were asked to counsel about exercise during their APPEs. Only fully completed survey instruments were analyzed using a two-way ANOVA for time (precourse, postcourse, and 6-months surveys) and student enrollment status (ie, enrolled in the elective or not enrolled). For the baseline data, a Fisher exact test was used to compare the proportion of students

responding. The data from the 2 years of collection were condensed for analysis; thus, between year comparisons were not performed. Surveys were treated as independent samples due to the low number of students that completed all 3 survey instruments. The study was approved by the University's institutional review board.

General Student Attributes

The breakdown of student characteristics for the 3 surveys is presented in Table 2. Prior to the start of the semester, students felt it was important for pharmacists to offer sound pharmacotherapy advice and less important to offer sound nutrition or exercise advice. Most students who completed the initial survey instrument said they exercised regularly, but were less likely to partake in unstructured physical activity (ie, taking the stairs more than 1 flight). Approximately half the students had taken a college level health class but less had taken a formal exercise physiology class or nutrition class.

Confidence in Counseling Ability and Knowledge Base

Changes in students counseling ability in explaining exercise benefits and recommending exercise routines are shown in Table 3 and Table 4, respectively. For students who enrolled in the elective, their confidence in counseling friends and family and patients with cardiovascular disease, diabetes, or depression, or who are obese on the benefits of exercise increased over time (Table 3). Similar results were found in students' confidence in counseling patients about designing an exercise regimen (Table 4). For students who did not enroll, there was no improvement over time in their confidence to counsel these patient groups on the benefits of exercise (Table 3), but there was

some improvement in their ability to counsel patients with depression and obese patients on designing an exercise routine (Table 4). In addition, students in the elective felt more confident in counseling patients about dietary supplements used to enhance athletic performance immediately after the semester ($p < 0.05$) and 6-months after ($p < 0.05$). Immediately after the semester, students who completed the elective had a significant increase in their confidence in designing exercise routines for patients with heart disease ($p < 0.05$, Table 4).

Understanding Barriers

At the beginning of the course, 51% of all the students strongly agreed it was important for them to understand the barriers patients may have in starting an exercise program; however, only 26% strongly agreed that they understood the barriers. There was a significant increase in understanding the barriers by the end of the semester for those who enrolled in the elective ($p < 0.05$, precourse survey = 2.2, postcourse survey = 1.3), and this was significantly better than for those who did not complete the elective ($p < 0.05$, not enrolled = 2.0, enrolled = 1.3). Prior to the semester, 85% of students strongly agreed it was important for them to understand the barriers patients may have in receiving adequate pharmacotherapy; however, only 30% strongly agreed that they understood the barriers. There was a significant increase in understanding the barriers by the end of the semester for those who enrolled in the elective ($p < 0.01$, precourse survey = 2.1, postcourse survey = 1.3) and 6 months after ($p < 0.01$, precourse survey = 2.1, 6-month survey = 1.2). There was no change in understanding the barriers among students who did not take the elective. Prior to the semester, approximately 45% of the students strongly agreed it was

Table 2. Comparison of Characteristics of Pharmacy Students Who Did and Did Not Take a Foundations in Exercise Prescription Course

Variable	Did Take Elective	Did Not Take Elective	P ^a
Completed Survey 1 (No. of observations)	14	39	
Completed Survey 2 (No. of observations)	8	44	
Completed Survey 3 (No. of observations)	10	40	
Important for pharmacists to offer sound:			
Pharmacotherapy advice, % who strongly agreed	71	98	0.014
Nutrition advice, % who strongly agreed	50	64	0.530
Exercise advice, % who strongly agreed	36	57	0.220
Exercise Regularly (> 3 times per week), %	67	57	0.750
Take the stairs more than one flight, %	11	14	1.000
Eat a balanced diet, %	22	54	0.060
Previous exercise physiology course, %	22	11	0.360
Previous nutrition course, %	22	25	1.000
Previous college level health course, %	33	57	0.220

^a Comparison of responses of students who did and did not take the elective.

Table 3. Comparisons of Pharmacy Students' Confidence in Counseling Patients About the Benefits of Exercise, Mean (SD)

Population	Enrollment Status in Foundations in Exercise Prescription	Precourse Survey^{a,d}	Postcourse Survey^{a,d}	6-months Survey^{a,d}
Cardiovascular Disease	Enrolled	2.9 (0.9) ^b	1.6 (0.5) ^c	1.5 (0.5) ^c
	Not Enrolled	2.2 (0.8)	1.7 (0.6)	1.7 (0.6)
Diabetes	Enrolled	2.4 (0.9) ^b	1.3 (0.5) ^c	1.5 (0.5) ^c
	Not Enrolled	1.8 (0.70)	1.6 (0.5)	1.5 (0.6)
Obesity	Enrolled	2.4 (0.8)	1.5 (0.6) ^c	1.4 (0.5) ^c
	Not Enrolled	1.9 (0.7)	1.8 (0.7)	1.7 (0.7)
Depression	Enrolled	2.8 (1.1)	1.9 (0.8)	1.7 (0.5) ^c
	Not Enrolled	2.3 (0.9)	2.3 (1.0)	2.2 (0.8)
Friends and Family	Enrolled	2.1 (0.7)	1.4 (0.5)	1.3 (0.5) ^c
	Not Enrolled	1.8 (0.7)	1.6 (0.6)	1.6 (0.6)

^aPrecourse survey = first week of semester; postcourse survey = last day of semester; 6-months survey = 6 months following the end of the course.

^bDifferent from students not in the elective ($p < 0.05$)

^cDifferent from precourse survey ($p < 0.05$)

^dRating scale: 1 = strongly agree; 5 = strongly disagree

important for them to understand the barriers patients face in modifying their diet. Twenty percent of the students strongly agreed that they understood those nutritional barriers. There was a significant increase in understanding the barriers at 6 months after the semester ($p < 0.05$, precourse survey = 2.1, 6-month survey = 1.4) for those students who completed the course.

Counseling Opportunities During Experiential Education

During their initial few months (4 to 6 months) of experiential education, students reported asking an average of 2.5 patients about their exercise habits and reported voluntarily offering exercise advice approximately 3 times (2.8 for non-elective, 3.8 for elective, $p = 0.23$). Approximately 2.6

Table 4. Comparisons of Pharmacy Students' Confidence in Developing Exercise Routines for Various Populations, Mean (SD)

Population	Enrollment Status in Foundations in Exercise Prescription	Precourse Survey^{a,d}	Postcourse Survey^{a,d}	6-months Survey^{a,d}
Cardiovascular Disease	Enrolled	3.5 (0.8)	1.9 (0.4) ^c	1.9 (0.7) ^c
	Not Enrolled	3.2 (1.0)	2.6 (1.1) ^{b,c}	2.7 (1.0)
Diabetes	Enrolled	3.1 (0.8)	1.5 (0.5) ^c	1.5 (0.5) ^c
	Not Enrolled	2.9 (1.0)	2.4 (1.0)	2.3 (0.8)
Obesity	Enrolled	3.4 (0.8)	1.8 (0.5) ^c	1.6 (0.7) ^c
	Not Enrolled	2.8 (1.0)	2.5 (1.0)	2.2 (0.8) ^c
Depression	Enrolled	3.5 (0.9)	2.1 (0.8) ^c	1.9 (0.9) ^c
	Not Enrolled	3.1 (1.1)	2.6 (1.0)	2.4 (0.9) ^c
Friends and Family	Enrolled	2.7 (1.0)	1.6 (0.5) ^c	1.7 (0.5) ^c
	Not Enrolled	2.7 (0.9)	2.4 (1.0)	2.3 (0.8)

^aPrecourse survey = first week of semester; postcourse survey = last day of semester; 6-months survey = 6 months following the end of the course.

^bDifferent than students not in the elective ($p < 0.05$)

^cDifferent than precourse survey ($p < 0.05$)

^dRating scale: 1 = strongly agree; 5 = strongly disagree

patients asked for nutrition advice. Students also reported they suggested lifestyle modification in addition to their pharmacotherapy advice approximately 3.4 times (3.2 for nonelective, 4.3 for elective, $p = 0.20$).

Other Findings

During the duration of the course, step counts had a positive linear trend ($r = 0.30$, $p < 0.001$), though the class average did not exceed the 10,000 step recommendation. The overall rating for the course was 4.8 on a Likert scale with 5 being the highest value.

DISCUSSION

A course on the foundations of exercise prescription was developed to help bridge the gap between pharmacy students' knowledge of exercise and physical activity and offering holistic health care. While most exercise specialist curricula typically have 2 to 3 semesters of exercise prescription, as well as other specialized courses like exercise physiology, this elective course was designed to help pharmacy students become more comfortable at recommending exercise and communicating with those individuals in allied health professions who are more specialized in exercise prescription.

Based on informal conversations and course evaluations, students enjoyed the class. The course appeared to improve student confidence in discussing the benefits of exercise and recommending exercise to patient populations. Students reported that they had relatively low exposure to counsel patients on exercise during their APPEs. This low exposure may be a function of limited experiential education in care settings where counseling about exercise would occur more frequently (eg, community or ambulatory care versus in-patient hospital) at the time of the survey (ie, students' may have had more hospital-based experiences). Another reason could be students did not take advantage of opportunities to initiate conversations about exercise with patients. There may be an increase in opportunities over time as the breadth of clinical services offered by community pharmacies increases.

While the service-learning component of this course was intended to increase and facilitate learning, there were some difficulties in the initial year due to lack of attendance by the target population (eg, staff members). Regardless of attendance by the target audience, most of the students discussed in their portfolios how difficult it was to teach others. The main reason stated was explaining concepts in a succinct nature and selecting important points. Overall, the instructor felt the students performed well in the service-learning aspect of the course. Despite initial enthusiasm among staff members about the program, advertising within the school, and keeping the time

commitment short, there was still poor attendance. The primary reason for this lack of participation is a large number of staff members joined a commercial weight loss program which met the hour before the service-learning component of the course.

The small class size was a limitation to the assessment of this course. Also, the low and inconsistent response to the surveys yielded lower power to find differences among cohorts and made statistical analysis difficult, as there was some repeated measurements combined with independent samples. Because this was an elective course, a selection bias may have occurred in that the course might have only attracted students with an interest in exercise. The possible selection bias might have resulted in an overestimation of the effectiveness of the course. Finally, course evaluations were not reported because of low samples.

Over the first 2 years of the course there have been some notable strengths and areas for improvement. The major strengths of this course are the high level of student interest, some flexibility in the course schedule to accommodate special interests of the students, and obtainment of information that benefitted them personally (eg, self-assessment of nutrition, knowledge of steps counts and physical activity, basic principles in exercise training).

The major areas for improvement of the course are to build in more activities to reinforce practical application (eg, designing exercise regimens including establishing goals, monitoring progress, and assessment) and improve the service-learning component. Based on the areas for improvement, the next iteration of the course will focus the students on developing exercise regimens for various populations and continue the use of service-learning. The designing of exercise programs will be accomplished in a workshop format. In this design, 1 hour will be dedicated to a didactic lecture on a topic and the remaining class time will be used by students to apply the information from that lecture in the development of their exercise program. For example, the first hour of class may be a lecture on goal setting with the remaining class time used by the student groups to develop goals for their assigned patient. During this time the instructor will act like a consultant and offer support and recommendations, which may facilitate further discussion on a more personal scale.

To improve the service-learning portion, one suggestion from the staff was to address issues that are aimed at those who have some exercise experience rather than those with none. In addition, students would work in groups to develop wellness programs for various disease states to help add a practical nature to the course. Students will have access to more advanced dietary analysis software as well as some body composition assessment tools (ie,

bioelectrical impedance scale, handheld device) that can be purchased in most pharmacies. The goal is to familiarize the students with equipment their patients might have or equipment they may have access to as pharmacists.

SUMMARY

Students enrolled in an exercise prescription course improved their confidence in providing exercise recommendations and felt they were able to speak more comfortably about the role of exercise in the prevention and treatment of chronic diseases. Further iterations of the class will focus more on the service-learning component to either provide more teaching or counseling opportunities.

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