

INSTRUCTIONAL DESIGN AND ASSESSMENT

An Elective Course on Lifestyle Modifications in Pharmacotherapy

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Objectives. Develop and implement a pharmacy course explaining basic lifestyle modification components and assess changes in student knowledge, skills, beliefs, and confidence after completing the course.

Design. A 2-credit hour elective course was offered to pharmacy students in which basic lifestyle modification components were applied to case-based patients with hypertension, dyslipidemia, diabetes mellitus, obesity, and metabolic syndrome in the pharmacy practice setting through comprehensive wellness programs. Knowledge, skills, beliefs, and confidence assessments were embedded into the course.

Assessment. There were significant improvements in students' skills and confidence, and in most knowledge areas, but not in their beliefs regarding health behaviors.

Conclusion. Implementing an elective course on lifestyle modifications is an effective means of teaching students about wellness and disease prevention.

Keywords: lifestyle, wellness, prevention, ability-based outcomes, pharmacotherapy

INTRODUCTION

Preventing and treating chronic diseases through lifestyle modifications has become a focal point in caring for patients. Educating and training healthcare practitioners with the proper skills needed to care for patients through the use of lifestyle modifications in now becoming an important issue in health professions education. The 2003 Institute of Medicine (IOM) report outlining health professions education describes the need for all programs that educate healthcare professionals to integrate 5 core competencies.¹ One of the 5 core competencies includes delivering patient-centered care. Within the description is the statement that patient-centered care must "...continuously advocate disease prevention, wellness, and promotion of healthy lifestyles, including a focus on population health."¹

In 2004, the American Association of Colleges of Pharmacy's (AACCP) Center for the Advancement of Pharmaceutical Education (CAPE) released an updated version of its educational outcomes² intended to provide a broad framework for pharmacy schools to revise and develop their own curriculum. The major headings of the 2004 Educational Outcomes include pharmaceutical care, systems management, and public health.² The public

health component is intended to promote health improvement, wellness, and disease prevention.² Additionally, in 2004 the National Association of Boards of Pharmacy (NABP) released new blueprint standards for the North American Pharmacist Licensure Examination (NAPLEX).³ Competency 3.2.2 states to "Provide health care information regarding nutrition, lifestyle, and other non-drug measures that are effective in promoting health or preventing or minimizing the progression of a disease or medical condition."³

Other organizations have also stressed the importance of lifestyle modifications for improving overall health. Sponsored by the US Department of Health and Human Services, Healthy People 2010 is a set of health objectives for the United States to achieve over the first decade of the new century.⁴ Twenty-eight focus areas were developed by leading federal agencies with the most relevant scientific expertise. Healthy People 2010 has identified 10 leading health indicators (LHIs) that reflect the major health concerns in the United States at the beginning of the 21st Century.⁴ The top 3 LHIs include: lack of physical activity; overweight and obesity; and tobacco use, all of which are lifestyle behaviors. Additionally, a study published in the *Journal of the American Medical Association (JAMA)* in 2004 showed that the leading cause of death in 2000 was heart disease, but the top 3 actual causes of death in 2000 were tobacco, poor diet and physical inactivity, and alcohol consumption.^{5,6} Therefore, even though most Americans die from diseases related to the

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heart, the actual reason for most deaths in America are related to lifestyle behaviors.

In 2002, the Healthy People Curriculum Task Force was established by the Association of Prevention Teaching and Research (APTR) and the Association for Academic Health Centers (AHC) as a multidisciplinary group of 7 health professions disciplines including pharmacy.⁷ Its mission was to fulfill the Healthy People 2010 Objective 1.7 which states, "Increase the proportion of schools of medicine, schools of nursing and health professional training schools whose basic curriculum for health care providers includes the core competencies in health promotion and disease prevention."⁷ The curricular framework outlined by the Task Force includes the areas of evidence-based practice, clinical preventive services/health promotion, health systems and health policy, and community aspects of practice. Each health profession (ie, pharmacy) is to adapt the curricular framework to meet the needs of their discipline.⁷

Much evidence exists to support the justification for greater emphasis on addressing lifestyle modifications with patients. One of the shortcomings in pharmacy education, however, is that few pharmacy schools currently offer courses on disease prevention, particularly as it relates to lifestyle modifications. In fact, a recent study showed that only 8% of US pharmacy schools offer a required course devoted to the topics of nutrition, exercise, weight loss, smoking cessation, or alcohol use.⁸ Additionally, only 2% of pharmacy schools offer a required course that incorporates more than one lifestyle modification topic into the same course.⁸

The purpose of this current project was to (1) develop a pharmacy course that discusses the basic lifestyle components of nutrition, physical activity, weight control, tobacco cessation, and health behavior change; (2) explain how lifestyle modification components can be effectively delivered and applied in a pharmacy course; and (3) assess student knowledge, skills, beliefs, and confidence as part of the learning environment and grading structure of the course.

DESIGN

In the fall semester of 2006 a new elective course was offered to pharmacy students at Creighton University entitled *Lifestyle Modifications in Pharmacotherapy*. Basic health promotion and lifestyle modification strategies such as nutrition, physical activity, weight control, tobacco cessation, and health behavior change were discussed in the course. These lifestyle modification strategies were applied in case-based format to sample healthy individuals and patients with chronic diseases in a pharmacy practice setting with the purpose of preventing dis-

ease and/or the progression of disease. The course was designed to be lecture, discussion, and application based so that students would have ample practice implementing these strategies. The 3 overall objectives of the course included:

- Explain the basic components of nutrition, physical activity, weight control, tobacco cessation, and health behavior change strategies.
- Apply the basic concepts of nutrition, physical activity, weight control, tobacco cessation, and health behavior change strategies to sample case patients.
- Construct a comprehensive wellness plan for a sample patient with hypertension, dyslipidemia, diabetes mellitus, obesity and metabolic syndrome.

The course met 1 day each week for 2 hours. The concepts of nutrition, physical activity, weight control, tobacco cessation, and health behavior change were introduced during the first half of the semester. Each of these topics was allotted either 2 or 4 hours of semester contact time. Fifty percent of class time was spent introducing new material in lecture/discussion format, and 50% was spent reinforcing and demonstrating proficiency. The second half of the semester was designed to apply the material learned in previous class sessions to the disease states of hypertension, dyslipidemia, diabetes mellitus, obesity, and metabolic syndrome. Similar to the previous topics, 50% of class time was spent introducing the concepts in lecture/discussion format, and 50% of class time was spent reinforcing and demonstrating proficiency of the material. Table 1 provides a course outline of topics and contact hours.

Table 1. Outline for Elective Pharmacotherapy Course in Patient Lifestyle Modifications

Topic	Contact Hours
Introduction to Disease Prevention in Pharmacy Practice/Baseline Assessments	2
Nutrition	4
Physical Activity	4
Weight Control	4
Tobacco Cessation	2
Health Behavior Change	2
Hypertension	2
Dyslipidemia	2
Diabetes Mellitus	2
Obesity	2
Metabolic Syndrome	2
Reimbursement for Preventive Services/Baseline Assessments	2

Content reinforcement and demonstration was accomplished via several active-learning strategies. For example, during the nutrition section, students were required to keep a personal food intake diary for a 4-day time period. Students then analyzed their nutritional intake via an online computer database and presented their results to the class. Students were also required to write a reflection paper about their experience and asked to compare their results to published nutritional guidelines. In addition, 1 hour of class time was devoted to analyzing food labels. Students were required to bring a minimum of 5 food labels to class and present their analysis of the nutritional content. The instructor also brought an additional 25 items for analysis.

Content reinforcement and demonstration of the physical activity material also incorporated several active-learning strategies. Students were asked to wear a pedometer and to keep a physical activity diary for 7 days. Similar to the nutrition section, the students were required to write a reflection paper about their experience and were asked to compare their results to published nutritional guidelines. Additionally, the students were taught how to estimate their daily caloric requirements and expenditures in order to calculate their personal daily caloric balance. These activities helped the students gain personal insights into their own lifestyle habits which they could later use to assist their patients in modifying their health behavior habits. Similar activities were conducted for the topics of weight control, smoking cessation, and health behavior change.

As stated above, the second half of the semester was devoted to applying the basic lifestyle modification strategies to case patients with disease in a pharmacy practice setting. Content reinforcement and demonstration during this portion of the course was accomplished through the creation of comprehensive wellness programs. Students were given case-based scenarios of patients with hypertension, dyslipidemia, diabetes mellitus, obesity, and metabolic syndrome. The complexity of each case increased as the semester progressed. Initially students worked on the cases in groups, but were later required to work independently. The students were required to submit 5 completed cases (1 for each topic) and were required to present 3 of the 5 cases to the class. Each student presentation was followed by class discussion about the appropriateness of the wellness plan.

In addition to the course content, a portion of the first and last class days of the semester were spent discussing how the skills learned in this course could best be applied in various pharmacy practice settings, reimbursement for these types of activities, and continuing education of the topics. Also, within each lecture topic a discussion was

included about how pharmacy professionals could apply the information at the individual patient level and at the population health level.

The Creighton Pharmacy Program has recently approved a revised set of ability-based outcomes (ABO) for the curriculum. One of the 9 ABOs is Public Health, of which lifestyle modification, wellness, and disease prevention are components. An important aspect of the curricular ABOs is the implementation of the assessments embedded within each course in the program. A key component of the *Lifestyle Modifications in Pharmacotherapy* course was the embedded assessment of the students' knowledge, skills, beliefs, and confidence.

During the first day of the semester, student beliefs and confidence were assessed via 12 Likert-scale questions. Beliefs regarding how well the course information related to pharmacy practice were assessed according to the students' level of agreement with 4 statements. Confidence regarding their ability to implement the course information in a pharmacy practice setting was assessed based on the students' level of agreement with 8 statements. Identical belief and confidence questions were again collected from students during the last day of the semester.

Knowledge was also assessed during the first day of the semester via 12 multiple choice and short answer questions. The knowledge questions covered various aspects of nutrition, physical activity, and weight control and were based on national guideline recommendations for nutrition, physical activity, and weight loss. Identical knowledge assessment questions were again collected from students during the last class period of the semester. It should be noted that a single instructor graded all students for both the pre and post assessments.

The students' skills were assessed on the first day of the semester by presenting them with a complex case-based scenario of a patient with metabolic syndrome followed by 3 questions. In the first question, students were asked to complete a SOAP (subjective, objective, assessment, plan) note of the case-based scenario. The second question asked students to identify the patient's cardiovascular risk factors. The third question asked students to design a comprehensive wellness program that included individualized nutrition, physical activity, weight loss, and tobacco cessation programs for the sample patient. The first and second questions counted as 18% and 10%, respectively, of their skills assessment grade, while the third question counted as 72%.

A similar case was then used as both the postcourse assessment and final examination for the course. The final examination questions were the same in that students were asked to write a SOAP note, identify the sample patient's

cardiovascular risk factors, and design a comprehensive wellness program as stated above. Students practiced writing individual patient specific wellness programs throughout the semester a minimum of 5 times before they were formally assessed on this skill for the final examination. A single instructor graded all students for both precourse assessment and postcourse assessment skills.

A midterm formative assessment of the course was conducted to gauge any immediate changes that may have been needed. An end of course formative assessment was conducted to provide feedback for the next time the course was offered. In addition, a summative course evaluation at the end of the semester was conducted to provide objective feedback of the course and the instructor in relation to how this course fits into the overall curriculum and compares with other courses that the students take.

Non-parametric statistics were used to evaluate the precourse and postcourse assessments. The Wilcoxon signed ranks test was used to analyze the skills assessments while Chi square was used to analyze the belief and confidence assessments. Chi square and Fisher's exact tests were used to analyze the knowledge-based assessments. All statistical analyses were performed using SPSS, v. 14.0 (SPSS, Inc. Chicago, Ill) statistical software.

ASSESSMENT

Thirteen pharmacy students participated in the course during the fall semester of 2006, of which 62% were female and 85% were in their third-professional year. After the semester was completed, comparisons were made of the knowledge, skills, beliefs, and confidence of the students during the first day versus the last day of the semester. The analysis showed a significant difference in students' assessment of confidence but no significant difference in their assessments regarding beliefs about health behaviors.

Table 2 provides the students' response to the beliefs and confidence assessment questions. The students showed significant improvements in mean scores in each of the skills assessments in the precourse vs. postcourse tests. Students significantly improved their ability to write SOAP notes (8.9/12 vs. 10.8/12, $p < 0.001$), identify cardiovascular risk factors (3.2/7 vs. 6.2/7, $p < 0.001$), design a patient specific nutrition program (1.23/12 vs. 10.88/12, $p = 0.001$), design a patient specific physical activity program (1.1/12 vs. 11.2/12, $p = 0.001$), design a patient specific weight loss program (0.2/12 vs. 11.3/12, $p = 0.01$), and design a patient specific smoking cessation program (0.6/12 vs. 10.3/12, $p = 0.003$).

The results varied in the knowledge portion of the assessments. On average, students significantly improved

their knowledge of specific nutritional recommendations ($p < 0.01$), essential components of an exercise prescription ($p = 0.05$), and obesity-related interventions ($p = 0.05$). Non-significant changes in knowledge were revealed in the areas of physical activity recommendations, defining obesity, and in recommendations for weight loss. Most students scored high in these areas on the precourse assessment and therefore had little room for improvement on the postcourse assessment.

Overall, the students strongly agreed that the course met the stated objectives and that it was useful in their preparations for becoming a pharmacist. Specific comments included, "Loved the class. Should be a required course!" and "I really enjoyed taking this class. I'm glad I had the opportunity to take it since the material is only covered briefly in *Therapeutics*. I feel I have a better understanding of how important it is for people to make lifestyle changes to prevent disease."

DISCUSSION

Increasing the amount of material/information on lifestyle modification, wellness, and disease prevention formally included in the curriculum has become a priority for many health care professions. The Institute of Medicine (IOM) and the American Association of Colleges of Pharmacy (AACP) both advocate that this information be included in the formal education of all health professions, including pharmacists.^{1,2} There are indications, however, that US pharmacy schools may not be offering their students enough education in this area.⁸ This may warrant more formal courses on lifestyle modification, wellness, and disease prevention for student pharmacists.

The application of these topics in the pharmacy setting is already taking place in some areas of the country. The American Pharmacists Association (APhA) Foundation has sponsored several projects with regard to lifestyle modification and disease prevention. The most notable of these projects are the Project ImPACT trials on hyperlipidemia and osteoporosis and the Asheville Project on diabetes mellitus and asthma.⁹⁻¹⁵ Results from the APhA Foundation studies demonstrate that lifestyle modification, wellness, and disease prevention activities can logistically be incorporated into a pharmacy practice setting, are reimbursable, produce better patient outcomes, and save insurers money.¹⁰⁻¹⁵

Lifestyle Modifications in Pharmacotherapy is a 2-credit hour elective course offered to pharmacy students at Creighton University in an effort to address the lack of wellness and disease prevention topics that were formerly offered to students. The primary focus of this course is on learning the components of nutrition, physical activity, weight control, tobacco cessation, and health

Table 2. Pharmacy Students' Beliefs and Confidence Levels Regarding Patient Lifestyle Modifications Before and After Completing an Elective Pharmacotherapy Course (N = 13)

Statements*	Average Preassessment Value [†]	Average Postassessment Value [‡]	P
Belief Assessment			
I believe that patients with certain chronic disease(s) (ex. hypertension, dyslipidemia, coronary heart disease) should engage in lifestyle modification activities such as proper nutrition and physical activity to effectively manage their disease(s) along with taking appropriate medication.	5.00	5.00	[§] NA
I believe that pharmacists should counsel selected patients to engage in disease prevention activities that specifically involve lifestyle modification strategies (i.e. nutrition, physical activity, weight loss, tobacco cessation)	4.62	4.85	0.37
I believe that pharmacists can effectively implement disease prevention strategies such as proper nutrition, physical activity, weight loss, and tobacco cessation with their patients who need such interventions.	4.31	4.62	0.39
I believe that pharmacist should work with other healthcare professionals to collaboratively implement disease prevention strategies in patients who need such interventions.	4.77	4.85	0.51
Confidence Assessment			
I am confident that I can accurately analyze the daily nutritional intake for an individual without disease.	2.69	4.38	<0.001
I am confident that I can accurately analyze the daily nutritional intake for an individual with one or more specific chronic disease(s) (ex. hypertension, dyslipidemia, coronary heart disease).	2.00	4.31	<0.001
I am confident that I can accurately recommend appropriate physical activity for an individual without disease.	2.92	4.77	<0.001
I am confident that I can accurately recommend appropriate physical activity for an individual with one or more specific chronic disease(s) (ex. hypertension, dyslipidemia, coronary heart disease).	2.46	4.38	<0.001
I am confident in my ability to design and implement a weight loss program for an individual who is obese.	2.54	4.62	<0.001
I am confident in my ability to design and implement a tobacco cessation program for an individual who smokes tobacco.	1.85	3.85	<0.001
I am confident in my ability to design and implement behavior change strategies to improve an individual's adherence to lifestyle modification activities.	2.38	4.31	<0.001
I am confident in my ability to accurately and effectively talk with other healthcare professionals about lifestyle modification disease prevention strategies for specific patients.	2.85	4.46	<0.001

*Likert scale agreement: 1 = strongly disagree; 2 = disagree; 3 = undecided; 4 = agree; 5 = strongly agree

[†]Preassessment = Assessment on the first day of class

[‡]Postassessment = Assessment on the last day of class

[§]Analysis cannot be performed due to the pre and post values being the same

behavior change as they apply to individual patients with and without disease. Students are taught how to supplement the treatment of a patient with a chronic disease (eg, hypertension) using lifestyle modification strategies. This type of care can directly help individual patients. Additionally, the information learned in this course can also be applied at the population health level.

The topics of lifestyle modification, wellness, and disease prevention fall under the broader general topic of public health. Many public health recommendations made by organizations such as the IOM and AACP stress the importance of the concept of population health. Population health generally refers to disease prevention practices for groups of individuals rather than to individual patient care. The information covered in *Lifestyle Modifications in Pharmacotherapy* could be applied in this manner. In fact, a great deal of time in this course is spent discussing population health. Examples of applying this information to population health in a pharmacy setting are: (1) creating monthly pharmacy newsletters that are sent to individual households; (2) lifestyle modification classes (eg, smoking cessation, weight loss, etc) offered and taught at the pharmacy; or (3) a series of informational pamphlets on various lifestyle modification topics that are on display in the pharmacy and free to the public. At a broader population health level, pharmacists' can take the information learned in this course to participate on state and local policymaking boards or become involved in advocacy groups and health coalitions.

Course Changes

As stated above, embedded assessments of the students' performance were an integral part of this course. As a result of the precourse and postcourse assessments collected on the students knowledge, skills, beliefs, and confidence, as well as the formative and summative student feedback assessments, several changes to the course will take place prior to the next course offering in fall 2007. These changes include: (1) the addition of practice worksheets covering lecture material to increase student knowledge; (2) the addition of weekly quizzes over lecture material to increase student knowledge; (3) more case-based scenarios to enhance wellness prescription writing skills; (4) greater emphasis on applying health behavior change strategies to the case-based scenarios; and (5) more practice in applying tobacco cessation strategies to the case-based scenarios.

In addition, several activities worked well and will be maintained for the next course offering. These include: (1) maintaining the overall number of disease states covered; (2) continuing to have students design comprehensive wellness prescriptions; (3) continuing to have

students keep personal nutrition intake and physical activity diaries to experience what patients experience with this task; and (4) maintain the concept of progressing from easy to more complex patient case scenarios.

Although the assessment process of the students' abilities was helpful in providing course and individual student feedback, some limitations did exist. The fact that this course is an elective offering means that students who enrolled were most likely more interested in and motivated to learn the material compared to students who would have only taken the course if it had been a requirement. Additionally, the students may have received lifestyle modification information from other sources and therefore their improvements may not have been due solely to this course. Also, the significant increases in knowledge and skill may have been the result of this course being most students' first exposure to content on the disease states. The same knowledge questions were used in the precourse and postcourse tests and some students may have remembered the questions and answers when taking the postcourse test. Lastly, the relative low number of students included in this analysis makes it difficult to generalize the results.

CONCLUSIONS

Lifestyle modifications have been proven to be an important component to the prevention and treatment of many diseases. Educating future healthcare practitioners on this topic has been advocated by many organizations, including the IOM and AACP. *Lifestyle Modifications in Pharmacotherapy* was a course designed to provide students with basic information on lifestyle modification and wellness topics and to apply the course content to patient case scenarios. Embedded assessments of students' knowledge, skills, beliefs, and confidence about lifestyle modification topics showed that students who took the course demonstrated significant improvements in these areas throughout the semester. This project showed that an elective course on lifestyle modification topics can be successfully implemented into the pharmacy curriculum to teach students about wellness and disease prevention topics.

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