INSTRUCTIONAL DESIGN AND ASSESSMENT

An Introductory Pharmacy Practice Experience Based on a Medication Therapy Management Service Model

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Submitted October 15, 2010; accepted March 7, 2011; published May 10, 2011.

Objective. To implement and evaluate an introductory pharmacy practice experience (IPPE) based on the medication therapy management (MTM) service model.

Design. Patient Care 2 is an IPPE that introduces third-year pharmacy students to the MTM service model. Students interacted with older adults to identify medication-related problems and develop recommendations using core MTM elements. Course outcome evaluations were based on number of documented medication-related problems, recommendations, and student reviews.

Assessment. Fifty-seven older adults participated in the course. Students identified 52 medication-related problems and 66 medical problems, and documented 233 recommendations relating to health maintenance and wellness, pharmacotherapy, referrals, and education. Students reported having adequate experience performing core MTM elements.

Conclusion. Patient Care 2 may serve as an experiential learning model for pharmacy schools to teach the core elements of MTM and provide patient care services to the community.

Keywords: medication therapy management, introductory pharmacy practice experience, patient care service learning

INTRODUCTION

In 2003, the Medicare Part D prescription drug benefit was approved as a part of the Medicare Drug Improvement and Modernization Act.¹ The Act mandated that plan providers offer medication therapy management (MTM) services to high-risk beneficiaries with multiple comorbidities.¹⁻³ However, the legislation did not provide clear guidelines for how MTM services should be defined, implemented or reimbursed.⁴ In 2004, 11 pharmacy organizations developed a profession-wide consensus statement defining the vision and core elements for MTM services.³

In response to the Medicare Modernization Act of 2003 and other trends in healthcare, the Accreditation Council for Pharmacy Education (ACPE) updated curricular standards to recommend professional competency in MTM and patient-centered care for students upon graduation.⁵ In a 2008 national survey of experiential learning programs, 12 of the 46 respondents reported incorporating some type of MTM activities into their introductory pharmacy practice experiences (IPPEs).⁶ Although this survey is not representative of all colleges and schools of pharmacy, it does suggest that some institutions have begun to respond to the new ACPE standards. Similarly, the Uni-

versity of Maryland School of Pharmacy's Experiential Learning Program identified opportunities to meet the new standards in its curriculum. The objective of this report is to describe an IPPE that was redesigned to incorporate the 5 core elements of the MTM service model into student-driven patient-care activities and to assess the program's capability of achieving course outcomes using an adaptation of Kirkpatrick's 4 levels of evaluation.⁷

DESIGN

Course History

Prior to 2006, the school's experiential learning program offered Longitudinal Care 1 and 2, a 4-semester longitudinal IPPE sequence in the second and third year of the curriculum. The overall outcomes of the Longitudinal Care courses included developing direct patient-care skills required in caring for older adults, such as history taking, physical assessment, and interpersonal communication. Longitudinal Care 2 was selected as the ideal course in which to introduce the MTM practice model because it is offered during the third year along with the therapeutics sequence. Content knowledge related to medication and disease-state management provided in the therapeutics course provides a basis for recommendations made in the experiential learning course.

The analysis, design, development, implementation, and evaluation (ADDIE) instructional design model was

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used as a framework for redesigning the IPPE sequence. This model uses a systematic approach to instructional design and has been used successfully in a variety of health disciplines, such as training programs for pharmacists and physical therapists.^{8,9} Based on the ADDIE model, course managers conducted a task analysis to identify curriculum gaps related to the knowledge and skills required to perform the core MTM elements. Subsequently, new course outcomes were developed to reflect the MTM process of providing direct care to older adults in the community. The course was renamed Patient Care 2 and course assignments were restructured to model the 5 core elements of an MTM service.

Course outcomes for Patient Care 2 included:

- (1) Perform the core elements of a MTM service as it pertains to assessing and managing drug therapy and chronic disease states;
- (2) Exhibit effective provider-patient communication skills to develop a trusting relationship with the patient, elicit candid health information, and provide education appropriate to the patient's level of health literacy;
- (3) Develop effective presentation and communication skills for appropriate interactions with other healthcare providers; and
- (4) Demonstrate acceptable qualities and characteristics of professional behavior for patient and provider communications, appearance and attire, timeliness and commitment, and initiative.

The 2 faculty members who served as course managers for Patient Care 2 developed all course-related activities, evaluation tools, and course-related communication via Blackboard. A pharmacist was hired as a dedicated part-time coordinator to manage participant recruitment and serve as a liaison between students, participants, and their healthcare team. The coordinator also evaluated student

progress on most written course assignments. Additional faculty time was allocated to facilitate small group workshops and observe initial patient visits.

Educational Methodology

The Patient Care 2 course was implemented in the 2008 fall semester. Four core assignments were developed to model the core elements of the MTM process. Figure 1 illustrates the Patient Care 2 MTM practice model and sequence of assignments.² The task analysis identified SOAP (subjective, objective, assessment, plan) note writing, billing, and patient education in the form of written action plans as curricular gaps. During the semester, small-group workshops were developed and implemented to address these 3 content areas in preparation for completing the course assignments. As additional assistance, selected readings and tutorials pertaining to the MTM process were available on the course blackboard site. At the conclusion of the course, students completed a reflective writing assignment. The intent of the self-reflection assignment was for students to assess their ability to perform the core elements of MTM and their attitudes toward the practice model.

Participant Recruitment

Program participants were recruited primarily from 2 retirement communities in Baltimore County, Maryland, and the medical directors, providers, and care managers at each site were educated about the program by course faculty members. A site agreement was developed for the 2 communities. Patient Care 2 was promoted to residents enrolled in a Medicare Advantage Prescription Drug Program (MAPDP) as the Patient Care Program, an MTM service provided by UMSOP. Eligibility criteria for the program required that participants have at least 1 medical condition, currently be taking 2 or more prescription or nonprescription medications, have a working telephone,

Figure 1. Patient Care 2 Medication Therapy Management Model and Assignment Sequencing. Abbreviations: SOAP= subjective, objective, assessment, plan.

and be willing to work with pharmacy students over the course of 4 months. A 2- to 3-member student team was assigned to work with each participant and visits were conducted at the participant's home. Students worked in teams for their safety and to minimize the burden of recruiting more participants.

Course Assignments

In order to adequately reflect an MTM process, the course methodology was a combination of written assignments and face-to-face encounters. For each written assignment, a skills-based scoring rubric was used to assess student performance based on several domains within the assignment. For each domain, students received a rating of outstanding, acceptable, or not acceptable, and a corresponding number of points was assigned. Each assignment was worth between 16 and 20 points and the maximum score for all course assignments was 100. Student teams were given an average of 14 days to complete each written take-home assignment. Student teams were required to conduct 3 in-person visits with their assigned patient and to make at least 1 follow-up telephone call during the year. Although visits did not have a point value that contributed to the final course grade, student teams were required to maintain a complete patient encounter log to satisfactorily complete the course.

Assignment 1: Initial Visit. Assignments began with an initial visit, the purpose of which was to meet the patient, collect information for a patient database, and conduct a medication therapy review. A faculty preceptor was assigned to observe the initial visit and evaluate the team's ability to conduct an efficient interview and each student's skills in doing so. Following the initial visit, the preceptor provided immediate feedback using a 5-item global impression scale, which was used to establish a grade for the first assignment.¹⁰ During the interview, the faculty preceptor simultaneously collected any information that would help students identify suitable problems to work-up and or would be needed to notify the coordinator of any patient issues that needed to be addressed immediately.

Assignment 2: MTR Database. Based on information collected during the initial visit and the faculty preceptor's feedback, the student team developed a written medication therapy review database. This database is a standardized collection form used throughout the curriculum to document patient information, the domains of which included demographic data, chief complaint, history of present illness, past medical history, medication history, review of systems, physical examination, laboratory data (if available), and family and social history. Students developed a problem list based on the information in the database.

Assignment 3: Patient and Provider Recommendations. Student teams developed patient and provider recommendations for 2 problems identified in the medication therapy review database using clinical practice guidelines or other evidence-based resources. At least 1 of the problems addressed in the SOAP note and action plan had to be documented using the Hepler and Strand classification of medication-related problems.¹¹ Student teams used standardized templates to create 3 documents for this assignment: cover letter and SOAP note, patient action plan, and personal medication record. After the assignment was graded and recommendations approved, the student teams conducted 2 follow-up visits. At the first follow-up, students reviewed written action plan and personal medication record and provided a copy to the patient. A copy of the cover letter and SOAP note recommendations were sent to the patient's healthcare provider via fax or mail. If there were changes in health status or medications, the medication therapy review database was updated at this visit. The purpose of the second visit was to follow up on recommendations made during the first.

Assignment 4: Follow-up Note. After the final visit, student teams wrote a SOAP note documenting the patient's level of adherence to the action plan. Because this visit marked the end of the student-participant interaction, participants were asked to complete a 10-question survey instrument about their experience in Patient Care 2.

Workshops

Objectives for 2 small group workshops were developed to review specific skills needed to complete the course assignments. The workshops focused on documentation of medication-related problems and developing individualized patient action plans.^{2,11} Other workshop objectives addressed appropriate documentation and billing for cognitive services. This included an assignment in which student teams used a mock Centers for Medicare & Medicaid Services 1500 billing form and MTM-specific service codes to document the patient encounters. The design of the workshops followed Gagne's 9 Events of Instruction and included opportunities for students to use the skills discussed in a role-playing exercise and receive feedback from either peers or facilitators.⁸ Table 1 lists Gagne's 9 events and how each was implemented in the workshop activities.

The class was divided into groups of 24 students per session with 1 faculty facilitator. Google Docs was used as an online tool to promote active learning and facilitate peer-to-peer collaboration during the workshop and other team-related written activities for the course. For example, a pre-workshop assignment for the documentation workshop required student pairs to use Google Docs to create

Table 1. Application of Gagne's 9 Events of Instruction in Patient Care 2 Course

Events of Instruction	Workshop Activity
Gain Attention	Describe a personal experience with MTM
Direction	State learning objectives of the workshop
Recall Content	Review core elements of MTM "Documentation and Billing" powerpoint presentation
Guided Learning	Large group activity guiding students through a sample SOAP note and documentation of MTM activity on CMS-1500 form
Eliciting Performance Feedback	Think-Pair-Share activity; Student teams work together to complete an example case and CMS-1500 billing form
Evaluation	Submit CMS-1500 form to facilitator for grading
Retention and Transfer	Workshop activities prepare students to complete Assignment #3. Students develop a SOAP note and complete a CMS-1500 form based on the encounter with their assigned patient

Abbreviations: MTM = medication therapy management ; SOAP = subjective, objective, assessment, plan; CMS = Centers for Medicare & Medicaid Services

a patient action plan and problem list for a mock patient. As collaborators on the document, each student could edit the document simultaneously and Google Docs would save the edits in different versions. By comparing the different versions, the workshop facilitator could determine how much each student contributed to the assignment and monitor the collaborative learning process.

EVALUATION AND ASSESSMENT

Course Implementation

For the 2008-2009 academic year, 53 older, community-dwelling adults completed the program. Two participants dropped out of the program prior to the final follow-up visit for personal health reasons. The average age of participants was 80.5 years and 72% were female. Participants reported an average of 5.5 disease states and the use of 6.5 prescription and 3.9 nonprescription medications. Student teams made approximately 171 visits and conducted over 400 hours of face-to-face patient encounters. On average, each student team spent 2.5 to 3.5 hours with each participant over the course of 12 to 16 weeks.

Managing and implementing this 1-credit course required a collective minimum of 0.7 FTE shared among the course managers and the pharmacist coordinator. An additional 60 to 70 hours of faculty support was provided by the practice department to facilitate small group workshops and conduct student observations for assignment 1. Ideally this course would be easier to facilitate at an MTM site already staffed by a permanent pharmacist; however, given the lack of suitable MTM practice sites to accommodate a large class, course managers planned to continue working with retirement communities to provide this IPPE experience.

Evaluating Course Outcomes

Course outcomes were assessed using an adaptation of Kirkpatrick's 4 levels of evaluation that has been used by institutions of higher education to evaluate programs.^{12,13} Originally developed to assess training programs, Kirkpatrick's framework is a systematic approach to evaluation involving examination of a course on multiple levels using different data sources. The current study did not include a level 4 evaluation, which focuses on the impact of student behavioral changes to their future place of employment.^{7,12,14} The authors chose Kirkpatrick's framework in favor of other available evaluation approaches because they were most familiar with it.¹⁴

Course Evaluations

Kirkpatrick's first level of evaluation has been used to determine participant satisfaction with the training activity.^{7,8} In the current study, course evaluations and patient satisfaction surveys were administered at the end of the course to determine how satisfied participants were with this training activity. Standard Experiential Learning Program course evaluations were used to assess the relevance of course content and program satisfaction for students taking Patient Care 2. The survey response rate was 99%. The evaluation consisted of 19 questions with 5 possible responses ranging from strongly disagree to strongly agree or unable to comment. Several questions from the evaluation representing student feedback about the course are summarized in Figure 2.

Most respondents (74% to 83%) reported feeling prepared to complete course requirements and capable of managing the required work. Respondents also agreed that the course managers were effective teachers, created meaningful learning activities, and communicated lecture material in an organized and logical manner. Two areas of course management received a high rate of disagreement: uniform implementation of course policies as stated in the syllabus and management of class-wide issues. The barriers cited included delayed patient recruitment and difficulty scheduling initial visits.

Figure 2. Summary of student course evaluations for Patient Care 1 (2008-2009 academic year).

One of the challenges of this program was recruiting a sufficient number of participants. Retired older adults were recruited for the program based on eligibility for MTM services and schedule flexibility. However, students found it difficult to find acceptable visit dates and times because of participants' conflicting medical appointments, unexpected illness, or family obligations. Because off-campus visits were conducted outside scheduled class time without designated time slots, students also perceived this course requirement as extra work.

In order to address both perceived and actual logistical barriers, course managers worked with the Dean's office to prospectively identify specific times in the academic calendar for students to use for conducting visits and or completing assignments. The second workshop was also restructured to give students time to begin working on assignment 3, which is usually the most time consuming in the course. The course faculty members also decided to begin recruitment process earlier and continue the process throughout the year to in order to enroll enough participants to prevent assignment delays.

Participant Survey

At the conclusion of the student-patient interaction portion of the course, patients were asked to complete and return survey instruments about the Patient Care Program

to the school's experiential learning office. There was only a 50% return rate for the survey instruments, making it difficult to generalize the responses to all participants. However, based on survey responses received, most participants gave the highest ratings for their teams' knowledge about medications, interpersonal skills, and professionalism as well as their overall personal experience with the course. Many patients also expressed interest in participating in the program when it was available again. In a note sent directly to the course managers, one patient reported understanding more about their medications and medical conditions after completing the program.

Assessment of Student Learning

Kirkpatrick's second level of evaluation addresses students learning as measured by change in the students' knowledge, skills, and/or abilities. Student performance on assignment 3 was used to assess learning. As previously described, teams collaborated on assignment 3 to develop 1 SOAP note with recommendations, a patient action plan, and a personal medication record. The rubric consisted of 5 domains, including the 4 main components of the SOAP note, the patient action plan, and peer collaboration.

A summary of class results for the SOAP note domains of the assignment are presented in Table 2. SOAP note results showed that at least 90% of the class achieved

Table 2. Student Performance on Assignment 3 SOAP Note^a (N=100)

SOAP Note Element	No. of Students Who Achieved This OAN Rating		
	Outstanding	Acceptable	Not Acceptable
Subjective & Objective	69	25	6
Assessment	52	21	27
Recommendations	65	27	8

Abbreviations: SOAP= subjective, objective, assessment, plan; OAN= outstanding, acceptable, not acceptable

^a Some assignments were not included in this analysis as some evaluations were missing at the time of data collection.

ratings of either outstanding or acceptable for the subjective/objective and plan domains. For the assessment domain, 27% of the class missed one or more items listed under acceptable criteria, resulting in ratings of not acceptable. Figure 3 illustrates the assessment domain for assignment 3. Items 3 and 5 were the most commonly missed or incompletely documented because the assessment did not clearly state the problem's suspected etiology and patient risk factors or provide sufficient data to support the problems assessment. To address the lower performance on the assessment domain of assignment 3, a SOAP note-writing activity focusing on problem assessment was included as part of the workshop for the following year. Course managers also developed a SOAP note tutorial and example as part of the course resources.

Table 3 provides a summary of the 52 medication-related problems that student teams identified and docu-

mented. Nonadherence was the most commonly identified medication-related problem. The most common nonadherence-related issues included failure to receive a drug because the patient could not afford the medication, no refills, or inappropriate medication administration (eg, improper inhaler technique). Student teams documented 66 medical problems that fit into 4 broad categories, including chronic disease states (45%), geriatric syndromes (25%), health promotion (3%), and other problems, such as back pain (25%).

Student teams made a total of 233 recommendations primarily focused on health maintenance and wellness (n = 72), pharmacotherapy (n = 95), referrals (n = 12), and patient education (n = 54). The most frequent health and wellness recommendations included lifestyle habits to improve control of chronic disease states (eg, increasing level of daily exercise), while pharmacotherapy recommendations were weighted toward improving medication adherence (eg, appropriate administration or use of adherence aids). Although the types of patient education varied, they typically addressed medication adherence, compliance with health screenings, and appropriate vaccinations based on age and comorbid conditions.

Self-Reflection Assignment

Kirkpatrick's third level of evaluation addresses change in student behaviors and their ability to apply what they had learned to the practice site. Students completed a self-assessment survey at the end of the course reflecting on their ability to perform MTM activities. Figure 4 summarizes student responses. Students reported adequate or plenty of experience carrying out the core elements of MTM related to patient communication and professionalism, but

SOAP Note: Assessment Domain		
Performance Level	Performance Criteria	Comments
Outstanding	As in Acceptable AND does all of the following: (1) accurately describes (in sufficient detail) information that allows the reader to understand the basis for the plan; (2) discuss impact or potential impact of medication-related problem AND (3) provides accurate information regarding the control and/or stability of the problem consistent with national treatment guidelines if available.	
Acceptable	Assessment includes all of the following: (1) lists the current therapy being used by the patient for the specific medical or medication-related problem being worked up (including a negative statement if the patient is not using drug therapy for the problem); (2) accurately states whether or not therapeutic objectives have been reached; (3) is based on data presented in the subjective and objective sections; (4) is consistent with or makes reasonable patient-specific judgments in consideration of national treatment guidelines; (5) identifies the etiology of the problem or the patient's risk factors for the problem; AND (6) describes whether toxicity has been experienced or is imminent.	
Not Acceptable	Does not contain all criteria for Acceptable	

Figure 3. Excerpt of assignment 3 scoring rubric.

Table 3. Student-Identified Medication-Related Problems

Medication-Related Problem	Identified by Students, No.
Nonadherence	14
Untreated indication	7
Subtherapeutic dose/ineffective treatment regimen	9
Adverse drug reaction	7
Improper drug selection	5
Overdose	3
Drug use without indication	4
Drug Interaction	3
Total	52

they reported less confidence about and minimal experience in communicating with healthcare professionals. Students also reported having less confidence in their ability to develop SOAP notes and action plans and in completing billing forms for service.

DISCUSSION

Patient Care 2 is the first course in the curriculum designed to use the MTM practice model to identify assess and develop recommendations for medication-related

problems. Based on the number and types of recommendations made by student teams, the Patient Care 2 MTM model was most effective at promoting health and wellness, medication adherence, and educating older adults eligible for MTM services. A similarly structured student-driven pharmaceutical care clinic at the University of Minnesota has shown positive results in working with the community.¹⁵ On average, students made approximately 4 recommendations per patient, which is consistent with findings from the Iowa Pharmaceutical Case Management Program (3.8 recommendations per patient).¹⁶ Based on survey feedback to the course managers, participants perceived the student interventions to be beneficial for learning about their health and medications. These survey results are consistent with participant feedback in past years with the Longitudinal Care courses.

Third-year students taking this course were confident in their ability to perform the core elements of MTM. Similar results were found in a 2008 survey of all students at the school regarding students' perceptions and abilities related to MTM.¹⁷ Third-year students, who represented the largest portion of respondents, perceived MTM is an important advancement in pharmacy practice but were not confident in their ability to provide these services and be compensated for them in the future. This perception suggests that

Figure 4. Summary of student self-evaluations for Patient Care 2 (2008-2009 academic year).

this course is an important first step in teaching the skills needed to provide MTM services but that additional practice opportunities with other MTM models are needed to improve student confidence in their ability to provide and be compensated for MTM services as future pharmacists.

SUMMARY

Patient Care 2 is a unique IPPE that provides students with real-life experience practicing the core elements of MTM. The Patient Care 2 student-centered MTM model may serve as a model for introducing MTM principles into the experiential learning component of a PharmD curriculum. This introductory practice experience provided students with fundamental principles of writing SOAP notes and action plans that may be useful during fourth-year advanced practice experiences. The course also promotes the value of pharmacy services to the community and to PharmD candidates about to enter the workforce. It also may have potential in decreasing medication-related problems and improving the health of community-dwelling older adults. Tracking the value of the program over time may be instrumental in evaluating the impact of student-driven MTM services on participants health as well as student involvement in providing MTM services following graduation.

ACKNOWLEDGEMENTS

The authors thank the Department of Pharmacy Practice and Science and the Experiential Learning Office for their support of this course over the years, with special appreciation to Dr. Latasha Weeks for being an outstanding coordinator. We also acknowledge all previous course managers, faculty members and preceptors who have served in various capacities for Longitudinal Care and Patient Care. We are grateful to the following communities for their ongoing support of the school's doctor of pharmacy program: the Charlestown and Oakcrest Retirement Communities, Stadium Place, Gallagher Mansion and the Oblate Sisters of Providence Convent. To the seniors all throughout Baltimore County and Maryland who have helped to educate our students, thank you for your time and dedication.

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