

TEACHERS' TOPICS

Integration of Pharmacy Students Within a Level II Trauma Center

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Objective. To integrate fourth-year doctor of pharmacy (PharmD) students within a level II trauma center team to improve their patient care and professional communication skills.

Design. PharmD students completed 2 consecutive 4-week internal medicine APPEs during the course of their fourth year, which included approximately 5 weeks working on an interprofessional trauma team. During patient rounds with the interprofessional trauma team, students provided patient care in a stepwise approach, drug information responses, patient counseling, and other services requested by team members.

Assessment. Ability-based outcomes (ABOs) assessment, faculty evaluations, and student self-assessment were conducted in the following areas: effective communication, drug therapy assessment and decision making, critical thinking and problem solving, and drug information retrieval. Students' mean score in these areas was 3.8 on a 5-point scale. Areas in which students needed improvement included: providing recommendations in a timely manner, self-confidence, identifying opportunity to verbally communicate with other team members, and addressing insecurities when answering drug information questions posed by the team.

Conclusion. Integrating fourth-year PharmD students within a trauma and acute surgery team and use of ABO assessment allowed for identification of areas of the curriculum in which improvements were needed, resulting in a more targeted approach earlier in the curriculum to improve students' abilities to provide appropriate and effective patient care in an interprofessional setting.

Keywords: interprofessional education, assessment, pharmacy education, trauma, advanced pharmacy practice experience

INTRODUCTION

Following completion of the classroom-based portion of the PharmD curriculum, students begin their advanced pharmacy practice experiences (APPEs). Within these APPEs, students are required to participate in interprofessional care. Barriers have been identified within the pharmacy profession, including lack of existing models from which to learn interprofessional care.¹ Opportunities for students to learn and provide pharmacy services within interprofessional settings and for preceptors to assess student performance in these settings are important aspects of most APPEs.

The Accreditation Council for Pharmacy Education (ACPE) Accreditation Standards and Guidelines² indicate that there are specific competencies that must be achieved by graduates through the PharmD curriculum that include providing patient care in cooperation with

members of an interprofessional health care team. These required competencies coincide with the Center for the Advancement of Pharmaceutical Education (CAPE) Outcomes,³ addressing the need to provide patient-centered care by means of a team approach to patient care.

Through a combination of clinical training and interprofessional care training, clinicians have demonstrated a positive change in pharmacy students' attitudes, knowledge, skills, and behaviors.⁴ Interprofessional models,⁵ in addition to successful implementation of interprofessional education, have been described.^{6,7} Interprofessional education resulting in the interdisciplinary delivery of patient-centered care have demonstrated safer, high-quality patient care.⁶

The ACPE also requires that the objectives for each APPE be defined, including the student's responsibilities, followed by documentation and assessment of the accomplished objectives.² The successful evaluation of clinical skills in pharmaceutical education, through use of ability-based outcomes, has been demonstrated.⁸

It is a fundamental component of professional development to be well versed in the area of assessment.⁹

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In addition, a key element to enhance the overall profession of pharmacy is through incorporating interprofessional learning opportunities throughout the curriculum.¹⁰ This article discusses the integration of fourth-year PharmD students within a trauma and acute care surgery team at a level II trauma center. It addresses the preliminary implementation of measuring the students' ability to participate in interprofessional patient care through assessment of ability-based outcomes.

DESIGN

As a means of meeting ACPE assessment requirements, curricular maps linking course content to ability-based outcomes have been a work-in-progress at the University of Wyoming School of Pharmacy. Pharmacy faculty members mapped ACPE Appendix B and CAPE outcomes to individual pharmacy courses. The school's 14 ability-based outcomes were subsequently linked to these maps. Internal medicine faculty members identified ACPE Appendix B items that linked to specific ability-based outcomes within the internal medicine APPE, where assessment of the APPE has been ongoing. Internal medicine faculty agreed that pharmacy students needed to achieve a score equal to or greater than 3 on a 5-point scale to demonstrate competency with regard to each ability-based outcome assessed. Three to 5 ability-based outcomes were assessed at each internal medicine site. At the level II trauma center site, specific ability-based outcomes assessed included 2 components of effective communication, drug therapy assessment and decision making, critical thinking and problem solving, and drug information. Selected ability-based outcomes and all site-specific learning objectives were listed within the course syllabus.

Table 1. Learning Objectives for an Internal Medicine Advanced Pharmacy Practice Experience at a Level II Trauma Center

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- Demonstrate the ability to provide complete medication therapy management
 - Provide appropriate drug information consultation to both health care providers and patients that include indication, dosage, mechanism of action, monitoring parameters, adverse reactions, drug-drug interactions, etc., in a timely manner
 - Effectively communicate and play a fundamental role in an interdisciplinary care setting
 - Provide appropriate therapeutic recommendations based on available laboratory data and other pertinent clinical information
 - Perform chart reviews assessing for appropriate indication, therapeutic duplication, appropriate dosing, and appropriate monitoring parameters
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Not all learning objectives for the level II trauma center site were assessed through the selected 5 ability-based outcomes (complete list in Table 1).

While attending the trauma and acute care surgery team rounds, the students participated in patient bedside rounding services with a school of pharmacy faculty preceptor, trauma attending physicians, physician assistants, trauma case managers, nurse practitioners, registered nurses, clinical dietitians, physical therapists, and staff members in charge of discharge planning. Approximately 15 health care providers participated in rounds daily.

PharmD students were scheduled for 2 consecutive 4-week APPEs over the course of their fourth year. For approximately 5 of the 8 weeks, the students attended trauma and acute care surgery team rounds, and for the remaining 3 weeks, they attended surgical and cardiac intensive care unit rounds. The students provided patient care in a stepwise approach through pharmaceutical care and clinical pharmacy services that included: direct patient management, medication therapy management, drug information consultation, patient counseling, and other services requested by the interprofessional team.

Students were required to follow and provide pharmaceutical care for 1 new patient per day while on the assigned service and continued to provide daily care for each of these patients while on the service. As listed in the course syllabus and discussed during the first day of the APPE, student responsibilities for patient care included assessment of: allergies, medications prior to admission, pertinent laboratory values, glomerular filtration rate, platelet count for heparin induced thrombocytopenia, deep vein thrombosis prophylaxis, stress ulcer prophylaxis, length of appropriate antibiotic treatment, ketorolac (not to exceed 5 days), medication monitoring parameters, medication reviews (drug-drug interactions; duplicate therapies; appropriate indications; appropriate dose; etc), and recommendations to switch from parenteral to oral dosage forms. The students evaluated each of these areas and then focused on problems for which they created informal patient-specific care plans that identified goals for improvement or alternate treatment plans. Students were expected to use the patient's record to aid in the development of patient care plans, which is an important skill.¹¹

Students were required to approach the appropriate member of the interprofessional team with any recommendation/intervention for the patients they were following. The students also conducted research using evidence-based medicine to answer drug-information questions posed by members of the interprofessional team. Students were typically given 24 hours to review the literature before presenting their response to the entire

team during rounds the following day. Students needed to demonstrate use of suitable resources, primarily focusing on clinical trials; this skill also was assessed as an ability-based outcome. This course activity fulfilled the ACPE requirement stating that pharmacy graduates must be able to “retrieve, analyze, and interpret the professional, lay, and scientific literature to provide drug information and counseling to patients, their families or care givers, and other involved health care providers.”²

The ability-based outcomes and learning objectives listed within the course syllabus were discussed with the students during the first day of the 8-week APPE. Outcomes were assessed over the course of the 8-weeks, with a final evaluation at the completion of the APPE.

Prior to trauma and acute care surgery team rounds, the pharmacy faculty preceptor met with the students to address questions and/or concerns the students had, as well as to discuss the proposed goals and treatment plans for the patients they were following. Additionally, students were asked patient-specific questions by the pharmacy faculty preceptor and other members of the team each day during bedside rounds in patient rooms. Due to the structure of the trauma and acute care surgery team rounds, while in the patient room, there was no assigned sequence in which each health care discipline provided patient care recommendations. It was left to the discretion of each member of the interprofessional team to make recommendations when necessary for each patient. During the first 2 weeks of the APPE, the pharmacy faculty preceptor provided guidance for the students on when recommendations would be received best by the team members and then advised them as needed afterward.

The University’s Institutional Review Board reviewed the research and determined the proposal was exempt from review for projects involving human subjects.

EVALUATION AND ASSESSMENT

Evaluation of student learning was assessed throughout the 8-week course using ability-based outcomes, anonymous student-composed evaluations of the faculty and the APPE site, and an online evaluation of student-perceived barriers and/or areas for improvement toward effectively participating in interprofessional care. At the level II trauma center site, 5 students were assessed over two 8-week courses.

At the conclusion of each 8-week course, the pharmacy faculty member met with students individually, discussing their strengths and areas for improvement for each ability-based outcome assessed. Only the pharmacy faculty preceptor evaluated the students’ achievement of the ability-based outcomes for the APPE. The mean ability-based outcome score was 3.8 on a 5-point scale (Table 2). Table 2 also identifies the specific ACPE Appendix B item linked to the measured ability-based outcome. Not all course objectives were measured through ability-based outcome assessment. The specific ability-based outcome that was ranked the lowest was effective professional communication (assertiveness and problem-solving techniques). Areas in which the students needed improvement included: providing recommendations in a timelier manner, improving self-confidence (including self-perceived lack of preparation, lack of suitable resources), identifying opportunities to verbally communicate with the trauma and acute care surgery team, and addressing insecurities when presenting drug information responses to the team (apprehension with speaking in front of a group and addressing impromptu questions).

A structured online APPE evaluation (site and experience) was completed by the students at the end of the course (Table 3).² Students strongly agreed (score = 5) that they were able to provide patient care as part of an

Table 2. Ability-Based Outcomes Assessment Results (N=5)

Ability-Based Outcome	ACPE Appendix B	Mean Score ^a
Effective communication	Biostatistics: understanding of statistical versus clinical significance	4
Effective communication	Professional communication: assertiveness and problem-solving techniques	3
Drug therapy assessment and decision making	Pharmacology: mechanism of action of drugs in various categories	4
Critical thinking, problem solving	Pharmacy practice and pharmacist-provided care: problem identification (e.g., duplication, dosage, drug interactions, adverse drug reactions and interactions, frequency, dosage form, indication mismatches) and resolution	4
Drug information	Pharmacotherapy: evaluation of clinical trials that validate treatment usefulness	4

^a Rating scale ranged from 1 = unacceptable to 5 = exceptional.

Table 3. Student Evaluation for Site/Experience (N=5)

Evaluation Points	Mean Score^a
Scheduled activities were designed to meet specified rotation goals and objectives	4.9
When possible, rotation activities were tailored to my interests/abilities	5.0
Rotation activities directly involved students in providing valuable patient care	5.0
Opportunities for students to identify and resolve medication related problems were available	5.0
Opportunities for students to work with physicians, nurses, and/or other health care professionals were available	5.0
I participated as a member of a patient care team/interprofessional group to provide patient care	5.0

^a Rating scale ranged from 1 = unacceptable to 5 = exceptional.

interprofessional team. In addition, they agreed the APPE activities allowed them to meet the specified objectives of the course.

As a course assignment, students were required to reflect and report on perceived barriers they encountered while participating in the trauma and acute care surgery team rounds. While 2 students reported they did not encounter any barriers, the other 3 students' comments suggested some obstacles may have been encountered. These included: feeling nervous when providing recommendations to the team, having a self-perceived lack of drug knowledge, having low confidence, experiencing difficulty in identifying when to speak during rounds, working with other health care providers who had differing preferences regarding presentation of pharmacy recommendations, adjusting to being "put on the spot" when asked specific drug information questions by members of the health care team, adjusting to crowded patient rooms that made it physically difficult to get near the attending to make a recommendation and difficult to hear all essential patient information discussed, and needing effective time management skills to successfully prepare patient care plans prior to rounds.

DISCUSSION

Pharmacy students' participation on an APPE in which they served as a health care provider on an interprofessional trauma team was valuable for both the students and the service. Both the pharmacy faculty preceptor and the students were given opportunity to evaluate and assess the students' individual performance. Providing the student an opportunity to assess their ability of participating

and providing patient care in this setting encouraged their continuing professional development and reinforced their professional dedication to interprofessional care.

Assessment of ability-based outcomes allowed pharmacy faculty members to further review the curriculum. Discussion of the ability-based outcome on which students scored the lowest, professional communication, resulted in a decision to monitor future student performance in this area and eventually determine whether students' earlier training in this area need to focus more on assertiveness and problem-solving techniques.

At 2-week intervals throughout the 8-week course, students were given a formal opportunity to provide feedback to the pharmacy faculty preceptor regarding personal insight of their performance. In addition, they were specifically asked if they had concerns or specific interests they would like to pursue while completing the course. Areas discussed during these one-on-one evaluations seemed to coincide with the feedback from the anonymous evaluations students completed throughout the course.

Completion of the assignment on student-perceived barriers and/or areas for improvement provided an opportunity for the student and pharmacy faculty preceptor to discuss a targeted approach to address these concerns and improve the student's ability to provide appropriate patient care in an interprofessional setting.

Assessment of site-specific ability-based outcomes resulted in identification of areas for improvement. Because baseline skills were not documented, assessing ability-based outcomes at the conclusion of the 8-week course limited the opportunity to document professional growth throughout the course. For the next round of assessment, 5 ability-based outcomes will be assessed at each internal medicine site. Three ability-based outcomes, selected by internal medicine faculty, will be assessed at all sites, thereby allowing site-specific assessment using the remaining 2 ability-based outcomes. Outcomes will be assessed at the completion of week 2, as a baseline measurement, and again at week 8. It would be beneficial to incorporate additional team members' assessments of the students' ability to participate in interprofessional patient care.

SUMMARY

Through APPE assessment, areas of improvement specific to each student were identified early within the course. This allowed for a more guided approach to enhancing PharmD students' abilities to provide appropriate and effective patient care in an interprofessional setting. In addition, giving PharmD students the opportunity to engage in interprofessional patient care fosters some of the essential skills important to the profession of pharmacy. Continual assessment and incorporation of interprofessional care

throughout APPEs, may increase/improve professional development, collegiality, overall professionalism, and collaboration.^{9,10} These attributes are key to the profession of pharmacy and contribute to improved patient outcomes.

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