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Research article

Development of a capstone course to improve student confidence and pharmacotherapy knowledge prior to advanced pharmacy practice experiences

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Abstract

Objective: To describe a capstone course designed to improve student confidence with clinical skills, improve confidence with providing medication therapy, and evaluate student knowledge.

Design: A 2-week capstone course was incorporated into the third-year pharmacotherapy course in a Doctor of Pharmacy program. Students evaluated complex patient cases and developed pharmacotherapy care plans. Pre- and post-capstone course survey results were used to assess change in student confidence using clinical skills and providing medication therapy, and quiz and exam results were used to assess student knowledge.

Results: Student confidence significantly improved from baseline for clinical skills ($p < 0.02$ across all clinical skills domains) and providing medication therapy ($p < 0.01$ across all disease states). Students reported the largest improvement in confidence for the clinical skill of creating a Subjective/Objective/Assessment/Plan (SOAP) note on a patient with multiple disease states ($p < 0.001$). Students reported the highest confidence increase for acute kidney injury ($p < 0.001$). The average written exam score was 87.2% (standard deviation ± 8.0) and the average verbal exam score was 79.1% (standard deviation ± 15.7).

Conclusion: A 2-week capstone course can be valuable to improve confidence and assess student knowledge prior to advanced pharmacy practice experiences (APPEs).

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Keywords: Capstone; Confidence; Advanced pharmacy practice experience; Pharmacy; Clinical

Introduction

The pharmacy profession has changed drastically over the past several decades with a noticeable shift to increased provision of clinical services.¹ An effective clinical pharmacist is able to improve patient outcomes by critically

evaluating, analyzing, and synthesizing patient information and succinctly communicating recommendations to providers. As such, the need to produce clinically competent pharmacy graduates is essential for sustaining the ongoing effectiveness of the pharmacy profession.²

To address this need, a capstone course was developed to better prepare students for the clinical services they will provide on advanced pharmacy practice experiences (APPEs). Capstone courses have been used in pharmacy programs to successfully integrate classroom-based curriculum, enhance critical thinking, improve student

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confidence, evaluate complex patient cases, and improve clinical documentation.^{3–6} Previous pharmacy capstone course experiences have been conducted as a semester-long course. The current investigation describes the impact of a 2-week capstone course on student confidence and knowledge. The overall capstone course objectives were to improve student confidence prior to APPEs and to evaluate students' clinical knowledge. The student-specific capstone course objectives were to: (1) prioritize patient disease states by acuity, (2) demonstrate knowledge with core disease states reviewed, (3) practice collecting and analyzing patient data for a complex patient, and (4) develop efficiency collecting and analyzing information for patients with multiple disease states. These objectives were determined based on feedback from faculty APPE preceptors as opportunities for student improvement.

In this article, we provide a detailed description of the creation, implementation, and assessment of a new 2-week capstone course in the third year of a traditional four-year Doctor of Pharmacy program. This study assessed the impact of a capstone course on students' confidence levels prior to beginning APPEs and evaluated student knowledge of core pharmacotherapy topics reviewed within the capstone course.

Methods

Faculty from Regis University School of Pharmacy (RUSOP), a traditional four-year Doctor of Pharmacy program, developed a 2-week required capstone course in the third-year curriculum. The first three years of the pharmacy curriculum are primarily campus-based, with the exception of introductory pharmacy practice experiences (IPPEs). In the fourth curricular year, students complete APPE rotations, which are typically off-campus. The 2-week capstone course was approved by the Curriculum Committee. This study received exempt status from the Institutional Review Board. As part of a greater curricular review process, several topics (a total of two weeks of content) were removed from the third-year pharmacotherapy course sequence. At the same time, the need for a capstone course was observed and subsequently implemented. The course was delivered during the final two weeks of a spring pharmacotherapy course in the third year of the pharmacy curriculum prior to students starting APPEs. The course sessions met for two hours, four times per week. The capstone course grade was 25% of the pharmacotherapy course grade. Students had to successfully complete the capstone course (total score of >70%) to progress to APPEs, in accordance with the school's academic progression policy. Faculty used a combination of case-based, active learning, and discussion-based formats that involved integrated patient cases and faculty-facilitated discussion. Four, full-time, clinical faculty developed the capstone course. All faculty were PGY2 residency trained and are Board Certified Pharmacotherapy Specialists. Each faculty member maintains a clinical practice site (three faculty in

acute care and one faculty in ambulatory care) for an average of 20 hours per week.

The instructors hypothesized that the capstone course would improve student confidence in patient-specific and disease-specific assessment skills and knowledge from baseline to the end of the course. The faculty designed the course to meet the 2013 educational outcomes established by the Center for the Advancement of Pharmacy Education (CAPE).⁷ The CAPE outcomes encourage programs to utilize teaching methods that enhance effective communication and prepare graduates for roles in patient-centered care.⁷ Although the course was developed prior to the release of the Accreditation Council for Pharmacy Education (ACPE) Standards 2016, the objectives are in alignment with Appendix A of the Standards.⁸

The capstone course structure was comprised of a 2-hour introduction with a non-graded practice case, followed by two graded patient cases. Faculty developed complex, multifaceted adult medicine patient cases to increase student exposure and competence with common disease states that mimic real clinical practice. Two graded patient cases were covered in the course. Each graded patient case was presented, facilitated, and discussed over three class days. All disease-state topics included within the cases were taught previously in the curriculum. Each patient case focused on three to four main disease states, which were common acute or chronic conditions. Each case included a minimum of one acute diagnosis and one chronic diagnosis, and each case addressed pharmacotherapy in the acute care and ambulatory care settings. Additionally, renal function calculations, venous thromboembolism prophylaxis, and stress ulcer prophylaxis were threaded throughout all cases due to the applicability of these three subject areas to all hospitalized patients.

During the introduction of the capstone course, faculty provided students with resources for working-up the patient cases. These resources included a therapeutic options outline, a Subjective/Objective/Assessment/Plan (SOAP) note matrix, an antibiogram, a formulary, and a patient work-up checklist. Students received the patient cases and resources prior to class to allow for preparation. In preparing for in-class activities, students were required to review each disease state identified within the patient case and complete a SOAP note for the case. On the first class day for each case, students completed an individual quiz to assess preparedness and knowledge of the case and disease states. The capstone course included a total of two quizzes, one for each case. Cases included the following disease states: acute kidney injury (AKI), lower respiratory tract infections (LRTIs), hypertension, atrial fibrillation, chronic obstructive pulmonary disease (COPD), heart failure, and urinary tract infections (UTIs). Faculty assigned all assessment questions to one of three levels of Bloom's Taxonomy—knowledge, application, or synthesis.⁹ The quizzes were comprised of nine knowledge level questions and one application level question (calculating creatinine clearance). After the quiz,

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