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Research Paper

Pharmacy resident teaching and learning curriculum program outcomes: Student performance and quality assessment

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ABSTRACT

Introduction: The purpose of this study was to assess: (1) student performance on topics taught by first and second year postgraduate pharmacy residents and (2) the quality of learning objectives and multiple choice questions prepared by pharmacy residents.

Methods: Using a retrospective cohort design, residents and students who taught or were enrolled, respectively, in the Medication Therapy Management course in years 2010 to 2012 were participants in this study. Student performance was assessed using scores earned on the individual readiness assurance tests (iRATs), team readiness assurance tests (tRATs), and course examinations. To assess the quality of the learning objectives and multiple choice questions written by pharmacy residents, criteria were established by the authors. Each learning objective and multiple choice question was then evaluated independently by two authors to determine if these criteria were met.

Results: Statistical differences were observed in student performance across all content areas among the three years for iRAT, tRAT, and course examination scores, with the exception of the heart failure course examination ($p = 0.05$; all other p-values < 0.05). A total of 20 (42%) learning objectives met all quality review criteria, while 73 (79%) of the multiple-choice questions met all quality review criteria.

Discussion and conclusions: Student performance varied significantly depending on the content, but the overall impact of resident instructors on student course performance was not educationally significant. Teaching and learning curriculum programs should focus on teaching residents to create quality learning objectives that help students focus on learning the most important course content.

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Introduction

In 2006, the American College of Clinical Pharmacy (ACCP) published a position statement regarding the completion of postgraduate residency training for pharmacists who intended to enter direct patient care practice.[1] The position statement recommended resident instruction in teaching methods as an essential component of postgraduate training.[1] The first report regarding the incorporation of a formal teaching and learning curriculum program into pharmacist residency training was published in 2001.[2] Since that time, many institutions have implemented teaching and learning curriculum programs for pharmacy residents in postgraduate years one and two. In 2013, the ACCP published a white paper and provided guidelines for resident teaching experiences.[3] This white paper specified recommendations to include content related to basic teaching experiences such as writing learning objectives and evaluating student performance. Identifying learning objectives prior to teaching has distinct advantages for both instructors and students. They provide a clear picture of the intended outcome as a result of teaching-learning interactions. Learning objectives communicate the target behavior that the instructor wants students to show as a measure of successful attainment of behavioral change, hence acquisition of new knowledge, skill attainment, values orientation, or professional attributes. Similarly, learning objectives help focus student attention on what they need to study and master promoting their concentration on what is essential. When measured along a continuum, learning objectives indicate the degree of success students have attained and additional behavioral changes, new learning, skill attainment, or attitude formation still needed. When used wisely, learning objectives can be used to develop corresponding measures of assessment to test the sustainability of behavioral changes, skill development, or performance actions over time. Learning objectives provide a means for faculty to communicate with one another across courses, programs, or institutions. In addition, they give purpose and focus to teaching in ways that can ensure alignment between the selection and organization of content, learning activities, assessments, and outcomes. Determining learning objectives prior to instruction can assist instructors with selecting the material that is likely to be of greatest value to students.[4]

In 2014, the American Association of Colleges of Pharmacy (AACP), Pharmacy Practice Section's Task Force on Student Engagement and Involvement collaborated with the American Society of Health-System Pharmacy (ASHP) to establish a framework for teaching and learning curriculum programs.[5]

After their review of published teaching and learning curriculum programs for pharmacy educators, Strang et al[6] recommended further study of program quality outcomes related to teaching behaviors and faculty development. The review identified 20 papers on residency training teaching and learning curriculum programs. They discovered that the outcomes of these programs relied heavily on the use of participant surveys and changes in self-efficacy following program completion. In addition, the framework created by Wright et al.[5] recommended a process for programmatic assessment. However, this framework focuses heavily on participant surveys and self-efficacy of the participants and does not recommend routine assessment of the quality of instructional materials created by residents in the program. To date, there has been one published report of a program that assessed the impact of resident instruction in an elective course on student performance.[7] However, the quality of the instructional materials prepared by residents has not yet been evaluated. The purpose of this study was to assess: (1) student performance on topics taught by first and second year postgraduate pharmacy residents in a required course and (2) the quality of learning objectives and multiple choice questions prepared by pharmacy residents.

Methods

This proposal was reviewed and deemed exempt by the University of Tennessee Graduate School of Medicine and University of Florida Institutional Review Boards. In 2009, faculty at the University of Tennessee Health Science Center College of Pharmacy implemented a teaching and learning curriculum program for pharmacy residents in programs throughout the state. First and second postgraduate year pharmacy residents at the University of Tennessee Medical Center participated in this program. The program components met the criteria for a resident teaching certificate program described by the ACCP white paper on resident teaching experiences.[3] These components included: (1) developing a teaching philosophy, (2) receiving guidance from a mentor, (3) attending a seminar and workshop series focused on educational pedagogy, and (4) acquiring experiences in delivering didactic lectures, facilitating small-group active learning, and precepting students on advanced pharmacy practice experiences (APPEs). The program elements are summarized in Table 1. Of note, the teaching and learning curriculum program provided instruction on writing learning objectives, multiple choice questions, and active learning strategies including team-based learning (TBL). Residents who participated in the program were also instructors in a required Medication Therapy Management (MTM) course that was offered in the spring semester of the second professional year in the doctor of pharmacy degree program. As the instructors, residents created materials for one topic that was delivered as a one-hour didactic lecture and a two-hour TBL session. The residents wrote multiple choice questions for the readiness assurance tests (RATs) for the TBL sessions and course examinations. Each resident was paired with a faculty mentor who provided guidance in developing course materials. After mentor approval, the course director reviewed the materials. Residents teaching in this course also received additional training in creating TBL modules and specific classroom procedures used in the course.

Using a retrospective cohort design, residents and students who taught or were enrolled, respectively, in the MTM course in 2010 (year 1), 2011 (year 2), and 2012 (year 3) were participants in this study. The analysis included course topics that residents taught across all three years of the study period, including hypertension, heart failure, dyslipidemia, and gastroesophageal reflux disease (GERD). Prior to enrollment in the MTM course, all students completed a therapeutics course that first introduced pathophysiology and management of these disease states. The disease content was taught by a different instructor in the therapeutics course series. For the MTM course, each year a different resident taught each topic with the exception of the heart failure content, which was taught by