



Opinion

An elective course in evidence-based health care using team-based learning

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Abstract

The objective of this article is to describe the implementation of an elective course in evidence-based health care (EBHC) using team-based learning (TBL) for pharmacy students. In 2012 and 2013, an elective course in EBHC with 15 contact hours was offered to third-year pharmacy students using TBL methods. Course readings involved recently published studies in common disease states and assessments involved literature evaluation concepts and pharmacotherapy principles. Attainment of knowledge was assessed by individual readiness assessment tests, team readiness assessment tests, and team application activities. Annual course evaluations revealed consistently favorable student feedback regarding the design and content of the elective. Students also responded positively to TBL as a method for learning the material. It was concluded that an elective course in EBHC was well received by pharmacy students.

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Introduction

Evidence-based health care (EBHC) involves the conscientious use of up-to-date information from relevant and valid research in making patient care decisions.¹ Therefore, the practice of EBHC requires that practitioners understand and critically evaluate the primary literature. Pharmacists, as important members of the health care team and usually the best resource for drug information, must likewise possess literature evaluation skills. In fact, the 2011 Accreditation Council for Pharmacy Education (ACPE) Accreditation Standards and the Center for the Advancement of Pharmaceutical Education outcomes state that pharmacy graduates should be able to provide patient care that is based on sound therapeutic principles and evidence-based data and that graduates should be able to retrieve, analyze, and interpret

the professional, lay, and scientific literature to make informed, rational, and evidence-based decisions.^{2,3}

The ACPE Accreditation Standards also state that active learning strategies should be incorporated throughout the curriculum to aid in the development of critical thinking and problem-solving skills.² Team-based learning (TBL) is an active learning pedagogy in which student teams use the majority of class time to practice critical thinking skills to solve problems that they are likely to face as practicing professionals, while having faculty present to support and guide them.⁴ Hence, the use of TBL is valuable for any subject or class in which students analyze and apply knowledge.

TBL has been used within both required and elective courses, as well as the pedagogy for the entire curricula in United States colleges and schools of pharmacy.⁵ A review of TBL in pharmacy education describes its use in endocrine, cardiovascular, and pharmacotherapeutics modules; a pathophysiology and therapeutics course sequence; ambulatory care elective courses; and a pharmacokinetics course.⁶ Although active learning techniques are used within drug information and literature evaluation courses, specific descriptions of TBL within these courses are sparse.⁷ Two

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studies describe the implementation of cooperative learning and TBL within required courses to assist students in gaining knowledge of tertiary drug information resources.^{8,9} Another study describes the use of active learning techniques, but not specifically TBL, in an evidence-based medicine elective course in pharmacy.¹⁰ No published literature was identified on the use of TBL as the pedagogy for an elective course on primary literature evaluation in pharmacy education.

A recent survey of pharmacy schools in the United States indicated that literature evaluation is taught as a stand-alone course (33%); in combination with drug information (8%), biostatistics (13%), and both drug information and biostatistics (31%); or intertwined within pharmaceutical care courses (15%).⁷ Overall, 73% of the survey respondents also specified that the area in which students struggle the most is critical evaluation of medical literature. In addition, an earlier survey of drug information in Doctor of Pharmacy programs in the United States indicated that only 23% of programs required an advanced pharmacy practice experience (APPE) in drug information, 62% offered an elective APPE in drug information, and 15% did not offer an APPE in drug information.¹¹ As a result, the authors felt that pharmacy graduates may not have adequate drug information skills for practice.

In accordance with the ACPE standards and within the context of EBHC, TBL gives students the opportunity to analyze and interpret scientific literature in order to make evidence-based decisions in the care of patients. This is more important now than ever before since the role of the pharmacist has expanded beyond that of just dispensing and is evolving into active participation in chronic disease management as a member of the health care team.¹² Due to the importance of the ability to evaluate primary literature and function well as a team in practice, an elective course in EBHC using TBL as the method of delivery was developed for pharmacy students. The objective of this article is to describe the implementation and evaluation of the course at Midwestern University College of Pharmacy–Glendale (MWU CPG).

Design

A new elective titled “Trials and Tribulations: Evaluation and Application of Clinical Literature” was developed and offered to third professional year student pharmacists in the last didactic quarter of the three-year curriculum using a TBL format. At the time, no required courses, but one elective on nutrition and lifestyle modification, were offered at MWU CPG using TBL as the primary learning method.¹³ The goal of the course was to improve students’ abilities to evaluate and apply concepts from recently published literature to clinical practice. Upon completion of the course, students were expected to meet the following objectives: (1) list recent developments in health care, (2) evaluate clinical studies accurately, and (3) apply clinical

literature in making patient care decisions. It was coordinated and taught entirely by two faculty members. In the required prerequisite course in EBHC, offered two quarters earlier, students received instruction on how to evaluate various types of clinical studies. Though a TBL format was not used, students were required to read seven studies in that course; for four of the studies, students took a quiz at the beginning of the class at which it was discussed, and for the other three studies, students completed an assignment during class in pairs.

The elective in EBHC was developed for 25 students (five teams of five students) and offered in 2012 and again in 2013, with slight modifications based on experiences in the first year. Electives at MWU CPG are typically designed to meet for 1.5 hours over ten weeks, for a total of 15 contact hours. In 2012, the elective was structured in this manner, with an introductory session on the first week, eight weeks of TBL sessions, and a wrap-up session on the last week. During the first year, longer TBL sessions were noted to be needed. Thus, in 2013, the introductory session was one hour, the TBL sessions were extended to two hours and decreased to six weeks, and the wrap-up session was two hours. Although the class met for only eight weeks, the course objectives and contact hours remained the same.

At the introductory session, the principles of TBL were explained, since no required courses at MWU CPG were offered using that instructional method. Additionally, the grading system was reviewed. In both the years, teams were randomly formed by having each student draw a number, and teams remained the same throughout the course. For each TBL session, students were assigned one recently published study to read and evaluate prior to class. Different study designs, disease states, and activities were chosen in order to reinforce previously learned material and provide a well-rounded experience. During TBL sessions, students took individual readiness assessment tests (iRATs), followed by team readiness assessment tests (tRATs), and then completed team application activities. On the last day of the course, peer evaluations were conducted, and journal club presentations were given by students with excused absences from application activities. Journal club presentations were chosen because an example was given in the prerequisite course. The presentations were worth the same number of points as the application activity. For students with excused absences from readiness assessment tests, iRATs were taken, and the score received was recorded as the iRAT and the tRAT scores for that week. Students were not allowed to make-up missed readiness assessment tests or application activities for unexcused absences. No examinations were given in the course. A summary of the activities is provided in [Table 1](#).

TBL sessions started with iRATs that consisted of ten multiple choice questions to assess the students’ knowledge and comprehension of the assigned studies. To ensure testing was consistent with the current literature on TBL, questions were based on the low level of Bloom’s taxonomy.^{4,14} Students were not allowed to refer to the studies

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