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Experiences in Teaching and Learning

Student pharmacists' preparedness to evaluate primary literature pre- and post-Advanced Pharmacy Practice Experiences

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ABSTRACT

Background and purpose: The primary objective of this study was to assess the effect of formal primary literature evaluation (PLE) during advanced pharmacy practice experiences (APPEs) on student pharmacists' preparedness and knowledge related to literature evaluation.

Educational activity and setting: A perception of preparedness survey and knowledge assessment was given to student pharmacists pre- and post-APPEs. Student pharmacists were also asked to characterize their opportunities for formal PLE during APPEs. Literature evaluation experiences, knowledge base and preparedness data were compared between student pharmacists who completed two or more PLE on APPE and those who did not.

Findings: A total of 211 student pharmacists completed 529 formal PLE during their APPE experiences. Quiz grades and average perception of preparedness increased significantly from pre- to post-APPE regardless of whether student pharmacists had the opportunity for formal PLE on APPE. Student pharmacists who completed two or more PLE on APPE stated they felt more confident in evaluating primary literature after APPE, had greater post-APPE preparedness scores and a trend towards higher post-APPE quiz scores.

Discussion and conclusion: APPEs provide an important opportunity for student pharmacists to improve their PLE knowledge.

Background and purpose

Provision of drug information is one of the most fundamental responsibilities of a pharmacist, as highlighted by the Pharmacists' Patient Care Process published in 2014 by the Joint Commission of Pharmacy Practitioners.¹ Advances in evidence-based medicine require pharmacists to be able to proficiently evaluate primary literature, regardless of practice setting. In the latest published survey of U.S. colleges of pharmacy, 89% required the completion of at least one didactic drug information course and 36% required two drug information courses.² Only 20% of U.S. colleges of pharmacy required a drug information advanced pharmacy practice experience (APPE); however, 70% offered it as an elective APPE. The authors concluded that the high percentage of programs requiring one didactic course and offering a drug information APPE support the concept of drug information skills as an integral part of pharmacy education.²

Pharmacy programs strive to provide a solid foundation in drug information practices as these skills allow pharmacists to positively impact patient care and promote lifelong learning. Biostatistics and literature design courses provide a valuable foundation to help students evaluate primary literature. However, these courses often occur early in the curriculum and are designed to support

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understanding of basic statistics and research design such that primary literature may be objectively evaluated. Student pharmacists in their first professional year have very little exposure to therapeutics topics and are limited in their ability to apply literature evaluation skills. Thus, many pharmacy curricula thread concepts of literature evaluation throughout program. Despite these experiences, we have found anecdotally that student pharmacists rarely feel confident in their literature evaluation skills prior to their fourth year APPEs. Thus, it is important that APPEs provide student pharmacists with the opportunity to build upon their literature evaluation skills through journal clubs and other formal primary literature evaluation (PLE) opportunities.

The utility of “journal club” experiences and formal PLE opportunities to support literature evaluation skills in the didactic setting have been well characterized in health related disciplines.^{3–8} However, significantly less is known about the role of formal PLE opportunities in learning for student pharmacists, especially outside of didactic teaching.^{9–13} One study demonstrated that three required journal clubs on two required APPEs (one journal club on the drug information APPE and two on the internal medicine APPE) were valuable for student pharmacists.¹⁰ In addition, little is known regarding preceptor provided feedback for formal PLE on APPE and whether this improves student performance or confidence. Given the importance of literature evaluation skills in pharmacy practice, this study hopes to aid in the understanding of what formal PLE opportunities are provided during APPE and the effect of literature evaluation opportunities on student pharmacists' knowledge and confidence.

The primary objective of this study was to assess the effect of formal PLE during APPE on student pharmacists' preparedness and knowledge related to literature evaluation. The secondary objectives were to describe student pharmacists' PLE opportunities during APPE and determine if preceptor feedback affected student pharmacist preparedness and knowledge related to literature evaluation.

Educational activity and setting

A perception of preparedness survey was distributed to student pharmacists during the fall semester of the third professional year at Mercer University College of Pharmacy. This survey was developed by the authors and did not undergo external validation prior to use. At this time, student pharmacists also completed a quiz assessing knowledge related to literature evaluation and statistics. Immediately prior to graduation, student pharmacists completed the same preparedness survey, quiz, and a survey regarding APPE PLE opportunities. PLE opportunities assessed in this study included journal clubs with the preceptor or other healthcare providers in oral or written format. The Mercer University Institutional Review Board approved this study and student pharmacists provided written informed consent prior to participation in both voluntary surveys.

The instruments used were a quiz and one-page survey consisting of questions related to knowledge and application of critical literature evaluation. Student pharmacists were asked to rate the adequacy of their preparedness on a four-point Likert scale with 1= extremely unprepared, 2= unprepared, 3= prepared, and 4= extremely prepared. The instructions for the perception of preparedness survey were for each student pharmacist to self-assess his or her own ability to perform the stated task. Topics assessed in the perception of preparedness survey are shown in [Table 1](#). An additional “yes” or “no” question on the survey prior to graduation asked whether or not student pharmacists felt they were more prepared to evaluate primary literature after completing APPEs.

During the survey prior to graduation, student pharmacists also described their formal PLE experiences during their APPEs. Student pharmacists provided the name of the APPE, the number of PLE completed on that APPE, and the type of feedback provided by the preceptor.

Only student pharmacists providing written informed consent and completing both surveys and quizzes (pre- and post-APPE) were included in this study. An average score was calculated for each quiz (pre- and post-APPE). In addition, responses to each question in the perceptions of preparedness surveys were averaged to create a composite score. For the purposes of this study, APPE were classified based on the required APPE structure at Mercer University where student pharmacists must complete an advanced community, advanced institutional, two acute care, and one ambulatory care APPE. The remaining APPE were considered electives.

Literature evaluation experiences, knowledge base, and preparedness data were compared between student pharmacists who completed two or more PLE on APPE and those who did not. In addition, data were compared between those who received feedback (verbal, written, or verbal and written) regarding PLE of any kind from at least two different preceptors during APPE and those who did not. The threshold of two PLE opportunities for this study was chosen based on preliminary data from a small cohort of students suggesting a mean of two PLE opportunities occurred on APPE. Data were described using descriptive statistics. Comparisons between groups were done utilizing chi-square or Fisher's exact tests for dichotomous data and Wilcoxon Signed Rank or Mann-

Table 1

Description of topics included in the perception of preparedness survey.

Define different types of data (nominal, ordinal, continuous)
Identify the correct statistical test for a given set of data
Calculate the number needed-to-treat
Interpret odds ratios
Interpret relative risk, relative risk reduction, absolute risk reduction
Determine decision errors in hypothesis testing (type 1 vs. type 2 error)
Interpret the results of a study based on confidence intervals
Interpret the results of a study based on p-values
Differentiate between clinical significance and statistical significance
Define the components of a primary literature article
Define different types of study design

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