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Experiences in Teaching and Learning

Comparison of faculty and student self-assessment scores of aseptic technique skills and the impact of video review on self-awareness for second-year pharmacy students

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ABSTRACT

Background and purpose: Educating students about aseptic technique presents many challenges. Students at Drake University have limited exposure to this skill outside of the classroom setting, and students have previously shown a lack of awareness related to their own aseptic technique skills. One approach to developing self-awareness in this area may be the incorporation of activities involving video viewing and self-reflection.

Educational activity and setting: Second-year pharmacy students in the Intermediate Pharmacy Skills and Applications 2 course completed four total aseptic technique activities, each of which was assessed by faculty using a standardized assessment tool. Each student was video-recorded during one of these aseptic technique activities. Students were asked to self-reflect on their performance immediately after the activity and again after viewing the video recording of their performance (using the same criteria included in a standardized faculty assessment tool). Student self-reflection scores before and after video viewing were then compared to faculty scores.

Findings: One-hundred six students participated in the video recording and self-reflection activity. Compared to faculty assessment scores, there was no significant difference between the self-reflections before or after video viewing ($p = 0.571$).

Discussion: Video self-reflection had no significant impact on the ability to accurately self-assess aseptic technique skills, but this study did reveal several other opportunities for future teaching and research.

Summary: Future efforts to impact student self-awareness should include additional self-reflection instruction, repeated self-reflection activities conducted over the course of a semester, and improved video recording technology.

Background and purpose

The testing of aseptic technique and sterile compounding procedures is a critical aspect to the doctor of pharmacy curriculum. The American Society of Health-System Pharmacists was first to release a template assessment for the testing of techniques detailed in the

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United States Pharmacopeia General Chapter 797, providing recommendations for instruction and a rubric for assessing aseptic technique.¹ In 2012, the American Association of Colleges of Pharmacy released more extensive recommendations regarding the instruction of compounding, including the dedication of three faculty members to the compounding curriculum, student evaluation by direct observation of skills, and the inclusion of a quantitative analysis for assessment.² Despite literature guiding this area, educators continue to face challenges in developing effective sterile compounding curricula. A 2006 study by Brown et al.³ revealed that even with special care taken to develop a rubric for assessment of aseptic technique, pharmacy students struggled in the areas of blocking airflow and sterile manipulation of vials, ampules, and syringes. The time required to provide adequate and meaningful feedback for the resolution of these issues also presents an additional challenge.⁴

Recently, when faced with challenges such as these in the education of healthcare professionals, educators have been called to stray from traditional teaching approaches. In the book *Clinical Reasoning in the Healthcare Professions*,⁵ the authors emphasize the importance of healthcare educators going beyond the presentation of knowledge and expanding education to include the instruction of cognition (thorough evaluation of results) and metacognition (self-awareness and reflection). The active consideration of metacognitive skills, specifically, is noted to be critical in the development of clinical skills required of an independent learner and, eventually, a critically thinking healthcare professional.⁶ The expansion of metacognition research into healthcare professions to date has primarily included nursing and medical education programs, focusing on topics ranging from reflection and self-assessment to perceptions of self-efficacy. These studies cumulatively represent significant value that can be added to healthcare education with the incorporation of metacognitive activities.⁷⁻¹⁰ Two research articles published in 2014 began to explore the incorporation of metacognitive skills into pharmacy education. Both studies examined pharmacy students' self-awareness of their skill or knowledge level, both concluding that application of metacognitive skills can improve students' overall performance.^{11,12}

Activities such as self-reflection and critical self-assessment can strengthen students' metacognitive skills. The presence and cultivation of metacognitive skills such as these has been associated with high-performing students in higher education, yet the benefits can go beyond meeting cognitive objectives.^{13,14} The use of reflective practice in health professions education may increase critical thinking skills and foster a capacity for lifelong learning.¹⁵⁻¹⁸ A review article on the use of self-assessment in health professions education demonstrated that benefits included not only improved knowledge and performance, but also increased morale and motivation among learners.¹⁹ Although evidence to support the assumption is scarce, many conclude that health professions students who learn and practice these skills may ultimately provide better patient care.^{20,21}

Nevertheless, the literature has been primarily focused on cognitive-based activities, and activities related to skills and process-based learning is limited. One study in the medical education literature reported use of medical residents self-assessing a video-recorded simulated code response. While the activity was reportedly uncomfortable to complete, residents reported increased self-awareness and increased motivation for self-directed learning following the activity.²² Additionally, the use of self-assessment of video-recorded counseling simulation sessions previously revealed a significant gap between pharmacy students' self-perception and faculty scores of student communication skills.²³

At Drake University, we anecdotally observed students in our skills lab who struggled with aseptic technique and demonstrated a lack of self-awareness related to their skills. As such, this area was selected as a focus of this study. We hypothesized that viewing a video-recording of their performance may offer a solution to further bridge the gap between students' perceptions of their aseptic technique and faculty scores, thus improving their self-awareness. The objective of this study was to determine if student self-reflection following the viewing of a sterile products activity video would result in improved self-awareness of this skill as determined by comparing student self-reflection scores to faculty scores.

Educational activity and setting

Pharmacy Skills and Applications (PSA) is a skills-based, team-taught six-semester course series, that includes a 50-minute lecture and corresponding two-hour laboratory session each week. Aseptic technique and sterile compounding concepts are introduced in early PSA semesters, but these concepts are more extensively taught (through lectures) and evaluated [through multiple graded activities in the sterile intravenous (IV) compounding hood] in the fourth semester of the second professional year, which is titled Intermediate Pharmacy Skills and Applications 2 (IPSA2). Concepts demonstrated and practiced during IPSA2 include hand positioning and manipulation to avoid blocking first air to critical points, vial pressurization, prevention of vial coring, placement of products at least six inches inside a laminar airflow workbench, and appropriate arrangement of materials in the hood to avoid contamination. Faculty have observed students' lack of proficiency in compounding sterile products and have noted that students typically have minimal exposure to aseptic technique activities outside of this course series. While eight hours of sterile training is required for the introductory pharmacy practice experience completed during the second professional year of the program (comprised of shadowing and limited hands-on experience in the IV hood), less than 20% of students regularly utilize aseptic technique skills through work or internship experiences.

During the IPSA2 semester, students are evaluated on aseptic technique in the IV hood by a faculty member on four different occasions and are then tested during a high-stakes practical exam at the end of the semester. Faculty evaluate student performance using a standardized electronic assessment tool with five components worth 50 possible points: calculations, product labeling, vial reconstitution, correct/accurate product preparation, and aseptic technique. The aseptic technique portion of the assessment tool awards up to 15 points. Students begin with the maximum 15 points, and one point is deducted for each occurrence of the variances listed in Table 1. Faculty stop deducting points after a total of 15 variance occurrences, and the lowest possible score on this section is zero.

One-hundred six students were enrolled in the IPSA2 course during the spring 2016 semester, and each student completed the

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