BRIEF

Assessing Self-Perceived Interprofessional Collaborative Competency on Advanced Pharmacy Practice Experiences Through Interprofessional Simulations

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Objective. To implement and assess the impact of Doctor of Pharmacy (PharmD) students participating in a required interprofessional (IP) simulation during an advanced pharmacy practice experience (APPE).

Methods. Fourth-year PharmD students completing APPEs were required to participate in one of three IP simulations during the 2016-2017 academic year to improve their interprofessional teamwork and collaboration skills. Pharmacy student self-perception of IP competence was measured by the Interprofessional Collaborative Competency Attainment Survey (ICCAS), administered in a retrospective pre-/post-test design. Responses were analyzed using descriptive statistics to obtain an overview of the data. Paired *t* tests were used to compare the pre- and post-test results.

Results. During the 2016-2017 academic year, 157 PharmD students were assigned to complete an IP simulation. Student scores on the six subscales of the ICCAS (communication, collaboration, roles and responsibility, collaborative patient-centered approach, conflict management, and team functioning) were compared. Scores in all categories significantly increased after completion of the simulation.

Conclusion. Following participation in an IP simulation, PharmD students felt competent to engage in IP collaboration, and this, along with their performance on APPEs, determined their practice-readiness for IP teamwork upon graduation.

Keywords: interprofessional, simulation, Interprofessional Collaborative Competency Attainment Survey (ICCAS), Advanced Pharmacy Practice Experiences (APPE)

INTRODUCTION

Interprofessional education (IPE) is when two or more students from different health professions learn about, from, and with each other to support collaboration and improve patient health outcomes. Interprofessional collaborative practice (IPCP) in healthcare occurs when multiple health professionals from different backgrounds provide comprehensive services by working with patients, their families, caregivers, and communities to deliver the highest quality of care.¹ The importance of IPE, IPCP, and teamwork as it relates to improved patient care and safety has been recognized since 1972 by the Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine.¹ However, there is a gap in the literature demonstrating the effect IPE has on patient and health-system outcomes. One way to address

this gap is to ensure that students are developing into competent healthcare professionals who can collaborate effectively as a team.

Based on this call to action, the Center for the Advancement of Pharmacy Education (CAPE) Educational Outcomes and the Accreditation Council for Pharmacy Education (ACPE) standards now include IPE and IPCP in their guiding documents.^{2,3} The CAPE outcomes require that curricula prepare all Doctor of Pharmacy (PharmD) students to provide entry-level, patient-centered care in a variety of practice settings as a contributing member of an interprofessional (IP) team.² Furthermore, ACPE standards require assessment of students' practice-readiness to collaborate in an interprofessional (IP) team upon graduation.³

Initial assessment data from our institution indicated that students' direct interaction with the IP team varied significantly, with some advanced pharmacy practice experiences (APPEs) providing ample opportunities for collaboration and others providing only minimal

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opportunities. Furthermore, our preliminary internal surveys conducted to evaluate IPCP at APPE sites demonstrated that even when there was a high level of IP teamwork at a site, the team often engaged directly with the pharmacy preceptor who did most of the IP communication and collaboration. This left the student to simply observe rather than actively contribute to the team. Therefore, we hypothesized that incorporating IP simulations into the experiential curriculum might provide pharmacy students with a standardized and authentic opportunity to work with students in other healthcare professions as a team.

Studies have demonstrated increased confidence in students' perceived IP competence after completing a team-based simulation.⁴⁻⁶ Kostoff and colleagues reported an increase in pharmacy student's self-perceived competence and attitude towards interprofessional collaboration after completing a simulation with nursing students.⁴ Similarly, Gellis and colleagues demonstrated that students had a more positive attitude toward working in healthcare teams and greater self-efficacy and IP competency after completing a simulation.⁵ Romito and colleagues developed a learning activity where interprofessional, non-pharmacy students participated in a simulated IP patient case to allow the teams to further practice their IP communication and teamwork skills. Their perceived competency was measured post-simulation using the Interprofessional Collaborative Competency Attainment Survey (ICCAS), which yielded significant positive changes on all subscales.^{6,7} However, evaluation of standardized simulations to engage in IPCP and assessment of perceived collaborative competency during APPEs is lacking in the literature.

The University of Kansas offers a four-year Doctor of Pharmacy (PharmD) degree to approximately 140-160 students per class. The students are divided between two campuses, with the majority (120-140) located on the main campus in Lawrence and the remaining students (20) on the Wichita campus. Both campuses have access to collaborate with students from multiple healthcare professions (both prescribers and non-prescribers) and opportunities to complete APPEs in a variety of pharmacy practice settings across the state. Additionally, as part of the IP curriculum, all students participate in TeamSTEPPS program Level 1 and Level 2 during their first and second year of pharmacy school as early IP experiences.⁸

The final year of the PharmD program is spent learning through APPEs. These APPEs consist of nine one-month blocks of 160 contact hours each in various health care settings. Such practice settings may include acute care, ambulatory care, community pharmacy, institutional pharmacy, managed care, specialty pharmacy,

academia, and pharmaceutical industry. Each APPE provides an academically structured environment that enables the student to gain practical experience under the guidance of a practicing pharmacist or designated healthcare professional preceptor. During these APPEs, students were required to meet and document a variety of requirements, one of which is being an active IP team member. According to internal survey data, this requirement varied widely for each student and there was not a consistent approach to how much exposure and interaction students were getting during their APPEs. To address this concern, we incorporated a standardized IP simulation into the APPE curriculum to ensure all students had an opportunity for exposure to IP.

The purpose of this study was to create and implement an IP simulation to serve as a standardized IP experience for all PharmD students. We measured students' readiness to collaborate as an interprofessional team member upon graduation utilizing the ICCAS.

METHODS

Faculty members from several health professions schools met together to develop three interprofessional patient case scenarios. The development of each case scenario varied based on the needs of the schools involved in the simulation. Summaries of the IP patient case scenarios are described further in Table 1. The three simulations included standardized patient actors who were trained prior to participating in the simulation.

Three simulations were included to ease scheduling and other logistical factors encountered when collaborating with other health professions schools. For example, in the nursing school, an annual offering of a primary care simulation was needed but could not accommodate all of the pharmacy students due to the mismatch in number of students. Therefore, offering all three simulations longitudinally throughout the year provided the correct number of simulations for the pharmacy students to participate in one simulation and allowed our collaborators to meet their specific needs as well. All three simulations provided an opportunity for every pharmacy student to collaborate with at least one student prescriber (either from the school of medicine or the physician assistant studies program), along with a nursing, dental hygiene, and/or physical therapy student, depending on their availability.

Each of the simulations included about 20-30 minutes of preparation work before the simulation to review expectations, key clinical concepts, and set student expectations that the simulation was focused on their teamwork and collaboration skills. For two of the simulations, students were required to complete the preparation work independently via a podcast prior to the

Table 1. Simulation Case Description

<u>Emergency Department Case</u>
<p>Case Scenario: An 80-year-old patient presents to the emergency department with her grandchild who is not her usual caregiver. The grandchild reports a two-day history of increased confusion and agitation. The patient has a medical history including dementia, depression, and constipation.</p> <p>Professions Involved: Medical, nursing, and pharmacy students.</p> <p>Time: 2 hours, 45 minutes, which included two cycles of the case with two different standardized patients and team members. The cycle included a 15-minute team huddle, 30-minute simulation, and 30-minute team debrief.</p> <p>Debriefers: One interprofessional faculty member from either medicine, nursing, or pharmacy observed the team's simulation and facilitated the debrief.</p>
<u>Primary Care Case</u>
<p>Case Scenario: A 55-year-old patient presents to establish care after recently moving and obtaining a job where health insurance is provided. The patient reports non-adherence to his prescribed diabetes regimen due to adverse reactions, poor understanding of the disease, lack of awareness of self-management, and cost and insurance concerns.</p> <p>Professions Involved: Medicine, nursing, and pharmacy students.</p> <p>Time: 1.5 hours, which included a 10-minute introduction, 20-minute pre-visit huddle, 20-minute patient encounter, 30-minute debrief, 10-minute wrap-up.</p> <p>Debriefers: One interprofessional faculty member from either medicine, nursing, or pharmacy observed the team's simulation and facilitated the debrief.</p>
<u>Primary Care- Transitions of Care Case</u>
<p>Case Scenario: A 52-year-old patient who is a homeless veteran presents to establish care by his nephew. The patient also suffers from alcohol use disorder and has not been seen by a medical provider for at least 10 years. The patient's main concern is hip and knee pain.</p> <p>Professions Involved: medicine, nursing, pharmacy, dental hygiene, physical therapy, and physician assistant students</p> <p>Time: 3 hours, which included 30-minute pre-work-up, followed by three different 20-minute case-scenarios involving the same patient, with three 15-minute debriefs between each scenario, and ending with a 30-minute overall debrief.</p> <p>Debriefers: One to four interprofessional faculty members from medicine, nursing, dental hygiene, or pharmacy observed the team's simulation and facilitated the debrief.</p>

simulation. For the third simulation, students received this information during an interprofessional discussion conducted prior to starting the simulation. After each simulation, students participated in a faculty-led debrief focused on teamwork and collaboration.

During the 2016-2017 academic year, fourth-year pharmacy students were required to participate in one of three IP simulations while completing their APPEs. Following the IP simulation, the pharmacy students' self-perception of interprofessional competence was measured by the psychometrically validated ICCAS, which is administered in a retrospective pre-/post-simulation test design. The ICCAS validation study included over 15 different institutions that used the survey in a variety of IPE experiences and included both trainees and healthcare professionals, making it widely applicable to a variety of professions and experiences. The ICCAS contains 20 items rated on a seven-point Likert scale ranging from strongly disagree to strongly agree.⁷ The ICASS has six subscales that reflect the widely accepted interprofessional education collaborative core competencies for practice.⁹ The six subscales

included in the ICCAS are: communication, collaboration, roles and responsibility, collaborative patient-centered approach, conflict management, and team functioning. The ICCAS requires that learners reflect and self-assess their level of competency prior to and following completion of an IP simulation using the ICCAS survey. The ICCAS is emerging as a preferred IPE survey instrument as evidenced by the National Center for Interprofessional Practice and Education recommending it as one of 50 best practice recommendations.¹⁰ Immediately after the simulation, students were provided a link to complete the survey electronically using REDcap (Research Electronic Data Capture) 8.1.20 (<https://projectredcap.org/resources/citations/>) electronic data capture tools hosted at the University of Kansas.¹¹ The survey was identified and students were required to complete it in order to receive credit.

The quantitative survey was analyzed using descriptive statistics to obtain an overview of the data using Excel. Paired *t* tests were then used to compare the pre- and post-intervention test results using IBM SPSS Statistics for Windows, Version 22 (IBM Corp. Released

2013; Armonk, NY). This study was approved by the University of Kansas institutional review board.

RESULTS

During the 2016-2017 academic year, 157 APPE pharmacy students were assigned to complete an IP simulation. One hundred fifty of the students (95.5% response rate) completed the ICCAS. Six subscale means were compared from baseline to completion of the simulation. The breakdown of each subscale and their scores are provided in Table 2.

All subscales achieved statistical differences and improved from baseline to completion of simulation ($p < .001$). All individual measures within each subscale also achieved significance (Table 2). The greatest change was observed in the “address” measure of the subscale on

collaboration, with pre-simulation scores increasing from a mean of 5.7 to a mean post-simulation score of 6.5. The address measure assessed student’s perceived competency in seeking out IP team members to address issues. There was a similar improvement in the plan measure of the team functioning subscale, with a pre to post score of 5.8 to 6.6 respectively. The plan measure assessed student’s perceived competency in developing an effective patient care plan with IP team members. The feedback and responsibility measures had the lowest pre-simulation scores at 5.5 and 5.6 respectively.

DISCUSSION

In an effort to meet accreditation standards and ultimately provide safe and effective patient care, all students must be prepared to provide entry-level, patient-centered

Table 2. Doctor of Pharmacy Students’ Self-Perceived Interprofessional Collaborative Competency Before and After Participating in an Interprofessional Simulation^a

ICCAS Subscales	Individual Measures	Pre Score ^b	Post Score ^c
Communication	Mean Score	5.9	6.5
	Communicate	5.9	6.5
	Listen	6.4	6.7
	Judge	6.0	6.5
	Feedback	5.5	6.4
	Express	5.7	6.4
Collaboration	Mean Score	5.9	6.6
	Address	5.7	6.5
	Enhance	6.0	6.6
	Learn	6.1	6.6
Roles and Responsibilities	Mean Score	5.9	6.5
	Identify	5.8	6.5
	Account	6.0	6.5
	Understand	5.9	6.6
	Recognize	5.9	6.6
Collaborative Patient-Centered Approach	Mean Score	5.8	6.5
	Assess	5.9	6.5
	Provide	5.8	6.6
	Include	5.8	6.5
Conflict Management	Mean Score	6.1	6.6
	Respect	5.9	6.5
	Perspective	6.2	6.6
	Ideas	6.1	6.7
Team Functioning	Mean Score	5.7	6.5
	Plan	5.8	6.6
	Responsibility	5.6	6.5

Abbreviation: ICCAS= Interprofessional Collaborative Competency Attainment Survey

^a A paired *t* test was used to determine significance, defined as $< .05$, between students’ pre-simulation score and post-simulation score. All comparisons were significant at $p < .001$

^b Pre score=mean pre-simulation score of 155 students who completed the ICCAS

^c Post score=mean post-simulation score of 155 students who completed the ICCAS. Pre- and post-intervention scores were measured on a 1 to 7 scale where 1 was strongly disagree and 7 was strongly agree

care in a variety of practice settings as a competent member of an IP team.³ Our study showed similar results to Romito's and Kostoff's work, further demonstrating a positive impact on students self-perceived competency in all domains of the ICCAS after participating in an IP simulation.^{4,6} However, these studies had a low response rate and minimal pharmacy student participation.⁴⁻⁶ Despite previous literature focused on interventions that demonstrate student-perceived IP growth, a study that specifically assessed pharmacy students IP competency during APPEs is missing in the literature. We designed this study using the ICCAS to determine the impact of IP simulations during APPEs (as a means for standardized exposure to IP collaboration) on pharmacy students' self-perception of their IP competence.

Our study contributes to the literature in several ways. Interprofessional simulations provided standardized and guaranteed opportunities for pharmacy students to participate as part of an IP patient care team. This can enhance pharmacy students' confidence in IP competency across the IP skill areas during APPEs prior to graduation. The simulations also included various healthcare professionals within a patient care team to provide a broad understanding of the skillset of different health care professionals, and in turn prepared them for their practical IP experiences upon graduation. A high response rate (95.5%) provided an accurate depiction of the results and prevented any significant nonresponse bias. Although participation in the IP simulation and completion of the ICCAS were required to receive credit, because this was the first year in which the process was implemented, the seven students who did not complete the ICCAS did not incur any repercussions. We plan to be stricter with these requirements in the future.

A major limitation of the study was the varying level of IP clinical experiences that students had been exposed to during their APPEs prior to participating in the IP simulation. Students participated in their assigned simulation in cohorts throughout their final year of pharmacy school, which led to students having varying levels of experiences prior to completing the simulation, dependent on whether they completed the simulation earlier versus later in the academic APPE year. Another limitation is that ICCAS is a self-rated scale which could result in over- or underestimation of the student's self-perceived attainment of IP collaborative competencies. However, as mentioned earlier, the ICCAS is validated and a widely accepted assessment tool for IPE.¹⁰ Despite ICCAS not being used with pharmacy students during their APPEs prior to this study, it has been validated with other healthcare trainees and established healthcare professionals in a

variety of IPE experiences, making it applicable to this study.⁷ Additionally, ICCAS is now being used to assess competence after being immersed in inter-professional practice-based settings as well.¹² The retrospective pre-post design can present with bias associated with social desirability, effort justification, and cognitive dissonance, which may have impacted the results. Moreover, the varying levels of education of students from the other professional schools could have also influenced the accuracy of the results. Finally, there were no internal comparisons of the three simulations to determine whether differences existed between them.

We faced challenges with coordinating each of these simulations, as multiple health professionals were included, all of which had varying schedules and were needed at different timepoints in the curriculum. Advanced planning with representatives from each of the professions involved helped to overcome these challenges. Because of some of these limitations, especially having students miss clinical time during their APPEs to complete the simulation, changes were made. The largest change was to move the IP simulations to the third professional year, as they are easier to schedule during the didactic curriculum. In addition, feedback indicated that students desired to participate in these simulations prior to starting their APPEs. While conducting the simulations during APPEs did ensure that students had consistent IP exposure, we found alternative ways to improve this during practice-based APPEs. The two most impactful methods to enhance exposure to IP collaboration include completing their acute care experience only on hospital services that have IP rounds and providing preceptor development regarding intentional IP collaboration. The IP simulations now serve as a measure of students' competence for pre-APPE team readiness. Future areas of research include determining whether there are differences in ICCAS scores depending on which simulation a student completed and using the ICCAS instrument to determine the impact of enhancing practice-based experiences to ensure more intentional IP exposure. A final area for future research includes identifying and/or creating additional opportunities to address the ICCAS domains with the lowest scores, which included feedback and responsibility.

CONCLUSION

After participating in an IP simulation during the APPE curriculum, students demonstrated a significant improvement in their self-reported attainment of IP competencies. Doctor of pharmacy programs should

consider adding an IP simulation during, or directly prior to APPEs, to ensure all students are sufficiently exposed to intentional IP collaboration prior to graduation.

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