

Original Publication

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Stroke Simulation Activity: A Standardized Patient Case for Interprofessional Student Learning

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Abstract

Introduction: Integration of interprofessional education (IPE) activities into health professions curricula aims to promote collaborative practice with a goal of improving patient care. **Methods:** Through intercollegiate collaborations involving four different educational organizations and an academic health center, an interprofessional stroke simulation involving standardized patients was developed and instituted for IPE-naïve student learners from medicine, nursing, physician assistant, occupational therapy, and physical therapy programs with additional involvement from pharmacy and social work learners. Herein, we describe the design of the IPE simulation and examine its impact on students' interprofessional development as assessed by students' completion of a validated IPE competency self-assessment tool and written reflective comments after the simulation. **Results:** Self-assessed interprofessional interaction and values domains were evaluated before and after the activity using the shortened 16-question Interprofessional Education Collaborative Competency Self-Assessment tool; data revealed significant changes in both the values and interaction domains of the tool from pre- to postsimulation experience ($p < .0001$). The qualitative student reflections revealed new student realizations around the concepts of collaboration, leadership, roles of different professions, and the importance of communication after participating in the simulation. **Discussion:** Quantitative data coupled with qualitative reflections from learners support the effectiveness of this activity for facilitating development of interprofessional competencies among health professions students.

Keywords

Interprofessional Education, Simulation, Stroke, Standardized Patient

Appendices

- A. Logistics.docx
- B. SP Case Development Tool .docx
- C. Case Prebrief.docx
- D. Student Instructions.docx
- E. IPE Assessment Rubric .docx
- F. SP Recruitment.docx
- G. SP Training and Instruction .docx
- H. Timekeeper Verbal Instructions.docx
- I. Facilitator IPE Debriefing Guide.docx

All appendices are peer reviewed as integral parts of the Original Publication.

Educational Objectives

By the end of this standardized patient simulation scenario, learners will be able to:

1. Demonstrate interprofessional collaboration, teamwork, and respect during interprofessional interactions as assessed by application of a rubric.
2. Identify their roles/responsibilities (nurses, occupational therapists, pharmacists, physical therapists, physician assistants, physicians, and social workers) as evidenced during the simulation and debriefing.
3. Demonstrate effective communication as a member of a health care team during the simulation and debriefing as assessed through application of a rubric.
4. Reflect upon the interactions between different health care team members to provide patient-centered quality care during the debriefing.

Introduction

Learning activities that highlight interprofessional education (IPE) in health professional disciplines are currently guided by the framework provided by the Interprofessional Education Collaborative (IPEC).¹ This framework focuses on a set of interprofessional core competencies that have been embraced by a range of health profession organizations and includes shared values and ethics, roles and responsibilities, communication, and teams and teamwork as its four main pillars. It may be ideal to expose students to

these competencies in a developmental manner as early learners by first focusing on commonalities between disciplines (e.g., shared values), followed by exposure to similarities and differences in roles and scope of practice across disciplines and subsequent experience with communication best practices (as well as strategies for managing communication difficulties). Before students transition to authentic clinical encounters, team-based simulation scenarios with standardized patients (SPs) may provide a key opportunity for learners to put the IPE competencies into practice as they use teamwork principles and effective collaboration tactics to meet patient needs. Simulation provides learners with the freedom to make mistakes and learn from them, opportunities for hands-on actions and decision making, a chance to practice effective communication, and protected time for reflection and feedback.

In our first IPE collaborative endeavor, students in their final year of experiential learning from nursing (Pennsylvania State University College of Nursing), pharmacy (clerkship students completing rotations at an academic medical center enrolled in any of seven pharmacy schools in Pennsylvania), occupational therapy (Elizabethtown College), physical therapy (Lebanon Valley College), and social work programs (Elizabethtown College) were invited to join Pennsylvania State University College of Medicine first-year physician assistant and second-year medicine students in a low-stakes, formative, interprofessional learning activity involving SPs.

Given the disciplines of student learners who were available to participate in this inaugural IPE activity, it was decided that a scenario involving a patient with a recent stroke would provide opportunities for each discipline to demonstrate collaborative teamwork and effective interprofessional communication skills; perform within their discipline-specific scope of practice; and learn with, from, and about disciplines that they had not yet encountered in their education through the simulation experience as well as the debriefing. By promoting collaboration and learning beyond the context of uniprofessional teams, this activity drew from social identity theory. In addition, theoretical frameworks relevant to experiential learning and reflective practice were also supported by learners working together and subsequently reflecting upon positive and negative aspects of the encounter, as well as upon changes they would make for future collaborative practice endeavors.

In preparation for developing this scenario, a review of the literature was conducted to identify existing IPE activities simulating team-based stroke management; we identified only a single scenario, but it pertained to an acute, emergency situation. The activity we found, by Irfan et al.,² was designed as a clinical learning and assessment tool for neurology/emergency medicine residents, nurses, medical students, and other learners who might be immediately involved in a stroke code situation. Since our intentions were to evaluate student IPE collaborative competencies while involving as many different professions as possible and incorporating educational partners from local colleges, we decided to construct our case around a post-stroke scenario in which an interprofessional team could assess a patient and make recommendations for ongoing care in a less stressful, simulated environment where rehabilitative therapy and social services would be needed.

Methods

This IPE simulation about stroke management was created by an interprofessional team of individuals representing a variety of fields across various health care specialties (medicine, physician assistant, nursing, occupational therapy, physical therapy, pharmacy, social work). Our goal in this endeavor was for health professions students to learn with, from, and about each other in order to promote interprofessional collaboration, teamwork, and discovery of roles of different health care disciplines. We created the scenario with the knowledge and skill level of IPE-naïve learners from the following programs in mind: final-year nursing, physical therapy, occupational therapy, social work, and pharmacy learners; first-year physician assistant learners; and second-year medical students. Prior to participation, prerequisite knowledge of stroke etiology and management and/or global biopsychosocial assessments (social work) was recommended.

Logistical information needed to prepare the simulation room for an inpatient encounter with an SP who recently had a stroke is described in detail in Appendix A; that document outlines the setting, props (e.g., reflex hammer, monofilaments, walker, items to assess activities of daily living, etc.), and staffing requirements for the simulation.

During each day that the IPE sessions were occurring, SPs participated in three separate encounters with student teams. SPs were expected to be in their respective roles from 3:45 p.m. to 7:20 p.m. Further details for SP development are found in Appendix B.

Briefly, each session for SPs was 50 minutes in length, comprising a 25-minute evaluation by the interprofessional student teams followed by a 25-minute faculty-led debrief; the SPs participated in the debrief only when engaged by the faculty member (e.g., “How did the team demonstrate respect for your concerns as a patient?”). Each student participated in only one encounter. Six separate simulation rooms ran simultaneously during each time slot, which required staffing by six SPs. Additional staffing needs included one timekeeper and six faculty/staff facilitators to monitor, assess, debrief, and provide feedback to each interprofessional student team per session. One to two additional staff members assisted learners through the sign-in process and navigation around the simulation center, and a simulation center technician supported audiovisual recordings of each room.

Prior to the activity, students were invited to complete an online interprofessional self-assessment questionnaire (not included; please see Lockeman et al.³ for details) and were provided with some background information to set the stage for the activity, as outlined in Appendix C. Copies of the information found in Appendix C were also posted on each SP examination room door on the day of the scenario. Students received additional instructions, as found in Appendix D. Part 1 was issued to all learners as it outlined general instructions, time limits, and expectations. Part 2 contained morning reports/sign-out notes pertinent to the SP case, with specific information disclosed to some learners (social work, nursing, pharmacy, occupational therapy, physical therapy) based upon their respective professions, as per instructions from faculty from those programs. During the activity, facilitators used a rubric (Appendix E) to evaluate interprofessional collaborative behaviors and provide individual feedback to learners. Using a rubric developed previously by Lie et al.⁴ as a guide, our IPE assessment rubric assessed individual learners, taking into account interprofessional competencies previously recognized as important for learners on our campus, and included descriptors/scoring criteria for behaviors/skills within domains relevant to communication, collaboration, roles, and patient-centered care.

SPs for this scenario were identified by staff at our accredited clinical simulation center as being exceptional actors and within an age range appropriate to this case. A total of eight SPs were trained, but only six were needed for each session. Appendix F depicts the recruitment criteria and training methodology for portrayal of a stroke patient. Briefly, during the training session, faculty from each of the disciplines answered discipline-specific questions and provided insight to the SP. The team of faculty and SPs read the case aloud to highlight specific case components and address any questions that were raised. Each of the health professionals demonstrated for the SPs the manner in which the SPs should act in response to potential student examinations or inquiries, and the SPs practiced these responses as well. Verbal feedback was provided to SPs at this time. Notably, the occupational and physical therapists were instrumental in providing demonstrations and giving feedback to the SPs regarding multiple aspects pertaining to portrayal of strength/sensory/motor assessments. Appendix G provides training material that our SPs reviewed in advance of the group training and that was also used during the training session. This is a template demonstrating how SPs should act/respond during the scenario.

During the session, a timekeeper kept the sessions running on time. A total of 65 minutes was allotted for each experience, which consisted of a 15-minute window for students to sign in and meet with team members, a 25-minute onetime encounter with the SP, and a 25-minute debrief led by a facilitator. A sample of the verbal instructions for timekeepers can be found in Appendix H. In addition, Appendix I

contains information for faculty/staff facilitators to guide the debriefing around interprofessional competencies following the simulation activity.

After the interprofessional encounter, students were invited to complete the interprofessional self-assessment questionnaire again and provide feedback about their experiences participating in the activity.

This activity was determined to be exempt from investigational review board oversight as determined by the Human Subject Protection Office at the Penn State Milton S. Hershey Medical Center.

Results

Over the first 2 academic years that this activity occurred, a total of 639 learners completed the simulation. This included five students from pharmacy, two students from social work, 71 students from physical therapy, 85 students from occupational therapy, 126 students from nursing, 61 students from physician assistant, and 289 students from medicine training programs.

Of the participants, 296 completed the interprofessional self-assessment questionnaire in a manner that allowed pre- and postactivity responses to be utilized in analyses. Some disciplines (e.g., pharmacy, social work) had too few students involved to draw meaningful conclusions. Due to data-collection difficulties encountered at the medical school during the second year the simulation was performed, data for medical students reflect only those who participated during the first year of the simulation activity. As depicted in the Table, the IPEC Competency Self-Assessment tool identified a significant change in both the values and interactions domains among the medical students ($n = 70$) and the physical therapy students ($n = 48$), as well as in the interactions domain among occupational therapy students ($n = 69$) and nursing students ($n = 80$), when responses following the IPE activity were compared to preactivity responses.

Table. IPEC Competency Self-Assessment: Simulation Years 1 and 2 Combined Data

Student Discipline	Values Domain			Interactions Domain		
	<i>M</i> Difference	95% CI	<i>p</i>	<i>M</i> Difference	95% CI	<i>p</i>
Medical	0.82	0.18-1.46	.0130 ^a	1.84	0.94-2.73	.0001 ^a
Occupational therapy	0.64	-0.23-1.50	.1450	1.79	0.76-2.80	.0008 ^a
Physical therapy	2.50	1.44-3.56	<.0001 ^a	1.42	0.07-2.76	.04 ^a
Physician assistant	0.82	-1.01-2.66	.3613	1.65	-0.22-3.52	.08
Registered nurse	0.61	-0.07-1.29	.0781	2.93	2.04-3.81	<.0001 ^a

Abbreviations: CI, confidence interval, IPEC, Interprofessional Education Collaborative.

^aSignificant at $p < .05$.

Written reflections from students were also used to gauge the quality impact of the activity. Based upon comments, the activity was a rewarding experience, with lessons learned revolving around the concepts of collaboration, leadership, discipline-specific roles, and the importance of effective communication. Representative comments from students' self-reflections are depicted under descriptions of each of these themes below.

Collaborative Teamwork

Students were surprised by the ease with which many individuals representing multiple disciplines, who had not previously worked together, were able to complement each other to work collaboratively for the sake of patient care. It also became apparent to learners that they needed to rely on each other to provide care to the patient.

- "It was interesting how each profession complements each other to provide a thorough and well-rounded patient examination."—Physical therapy student
- "I realized I need to rely on the expertise of others."—Occupational therapy student
- "Everyone was so knowledgeable. I was surprised by how well the discussion flowed even though we just met."—Medical student

Leadership

Another revelation for the students occurred with regard to leadership. While it is likely that all learners had been exposed to the concept of shared leadership in classroom settings, the simulation experience may have been the first time that many learners observed shared leadership play out in the context of patient care. Some students expected a certain discipline would take charge of the situation and were surprised when that did not happen. Some offered suggestions as to how shared leadership could have been improved in their team. Others even surprised themselves when they emerged as their team leader.

- “I was surprised that the physician students didn’t step up to take the lead. I always just assumed that they would be the primary leader on the patient’s health and care team.”—Physical therapy student
- “Me, being a nursing student, I did not expect to be considered a leader compared to med students and PAs. I felt like I developed a better relationship with the patient than the others.”—Nursing student
- “It would be easier to have one leader, preferably the physician, and then go around with the rest of the team and discuss their thoughts.”—Pharmacy student
- “Leadership is absolutely necessary and may shift depending upon the situation.”—Medical student

Roles

In some cases, students’ reflective comments alluded to a new awareness of roles that specific team members played in caring for hospitalized patients. Several realized for the first time that others might not be aware of their roles in patient care. The concept of overlapping roles among disciplines also surfaced for some students, as well as the discovery that one discipline did not need to do it all since there were many others to rely upon.

- “I was impressed with OT and Nurses’ ability to assume and act on their roles.”—Medical student
- “It surprised me that not a lot of other health professions knew what OT was.”—Occupational therapy student
- “There was a lot of overlap between the different professions.”—Physical therapy student
- “I was most surprised that the PA and med students were completely unaware that therapy personnel, particularly OT and PT were going to do a physical and neuro assessment.”—Occupational therapy student
- “When in a role as leader, I don’t have to do everything. Others can perform the history and physical while we observe and can come up with a game plan.”—Medical student
- “I was surprised by how good nurses are.”—Physician assistant student
- “I was surprised that the scenario was as realistic and how knowledgeable we each were regarding our roles and ability to mutually discuss options of care with the patient.”—Occupational therapy student
- “My responsibility as a PT, I thought, was clear but was surprised to see that the med students had no idea PTs were even in acute care. So I hope I cleared that up for them!”—Physical therapy student
- “There was some overlap between the PT and OT student and between the PA and MD students and between the nurse and all of the other 4 professions.”—Physician assistant student

Communication

Student teams that reported the best experiences in terms of collaboration and organization during the simulation attributed their productivity to communication. On the other hand, teams that had not taken time to communicate effectively prior to the simulation indicated that the biggest take-home lesson they learned was the necessity of prior discussion to clearly delineate plans. A theme related to communication that was expressed by some students pertained to the necessity of being willing to speak up.

- “It is incredibly helpful to have a brief discussion prior to meeting with the patient to formulate a game plan. I think our group did excellent with each other and fostered good teamwork and communication.”—Medical student
- “We should have come up with a plan first so communication was easier.”—Physical therapy student

- “I should increase my communication confidence and say something when I am thinking it.”—Nursing student
- “We talked before we entered the room and during the examination. We did well!”—Physical therapy student
- “. . . More planning prior to going into the room to clearly delineate roles.”—Physician assistant student
- “It’s important to decide what you’re going to do ahead of time so that you don’t go in and overwhelm the patient with your disorganization.”—Physical therapy student
- “Plan before going into the room.”—Physical therapy student
- “We held a discussion outside of the room to briefly notify each other of our own roles, expertise, and experiences. Additionally, we utilized time to communicate with team members who were not doing assessments.”—Occupational therapy student

Discussion

For learners engaged in the educational activity reported herein, this event was the first deliberate, intentional encounter that each of the participating health professional programs created for their students to interact with learners from other professions. Despite this being a onetime event, there was a perceivable shift in students’ self-assessments in the interprofessional domains assessed by the IPEC Competency Self-Assessment tool completed before and after the simulation experience. This is significant, since few educators have reported significant shifts in self-assessed constructs before and after a single IPE event.⁵ Student reflection comments also supported the positive impact of the activity as learners described new insights gained in areas related to collaboration, communication, leadership, and discipline-specific roles. Thus, the IPEC Competency Self-Assessment quantitative data coupled with qualitative student feedback provide evidence that the simulation activity was meaningful to this cohort of learners. Whether these results will be generalizable to learners who have had prior IPE experiences is currently unknown.

In putting this activity together, the faculty learned several things upon which we have been able to build. First, we learned how to work together effectively across institutions. Despite challenges of being separated by distance, we used web-based videoconference technology to hold our regular meetings, rather than meeting in person. This proved to be a valuable way to save time, and moreover, we developed our own collaborative interdisciplinary practice as a parallel process to student learning.

During the initial year that the simulation occurred, some students appeared to misinterpret the intent of the interprofessional activity, as some disciplines reported that they thought the intent was to complete as much of the patient examination as possible, rather than working collaboratively to gain a broad understanding of other health professions. At this point in their education, most students had primarily been assessed on performance of clinical skills, which may have contributed to the confusion surrounding the activity; therefore, we subsequently have reinforced and clarified the learning goals by several different mechanisms, and this has helped students be more successful in their learning.

With about five students per patient room in the simulations, we also observed during the inaugural year that the location of video cameras/one-way viewing panels often resulted in facilitators viewing the backs of students. As a result, we used new technologies (GoPro cameras mounted on the wall behind the patient’s head, connected by wifi to iPads that facilitators were given) to enable facilitators to see the same view as the patient. This modification was initiated during the second year, and positive feedback was received from facilitators.

By receiving both formal and informal feedback from students, we learned that some students had misconceptions about the roles of other disciplines. As a result, we subsequently developed other introductory interprofessional activities for new learners prior to the simulation activity—one of which focuses on getting to know the roles and responsibilities of a broad spectrum of other health care team members.

Last year, a number of students commented to faculty facilitators that they had expected something bad would happen (e.g., the SP would code) to cause chaos during the simulation. Based upon those expectations on the part of students, the next time the scenario is enacted, we will aim to increase the level of conflict and confusion by introducing an unexpected scenario around discharge planning, with the patient unwilling to accept the student teams' recommendations. We are optimistic that the clash that develops between student teams and their patient will provide students with opportunities to practice effective communication skills, particularly when conflicts arise.

Finally, some learners were hesitant to share specific information with team members when it seemed to be at odds with information the others had regarding the patient (e.g., the nursing student had information that the patient had been cleared by speech therapy to swallow despite the chart indicating that the patient should have nothing by mouth). As a result, for future enactments of the scenario, we have built in additional pieces of information that only individual disciplines receive to see if they will share them with the group. Since the initial implementation of this activity, our institutions have implemented other interprofessional activities that occur prior to this simulation; thus, increasing the complexity of this scenario to look at team dynamics (do individuals feel empowered to speak up?) may be warranted.

We are always open to modifications of the case that would include additional health professions learners. Specifically, there may be opportunities in the future to expand the case to involve speech language pathology, respiratory therapy, chaplain residents, and clinical psychology. Greater interprofessional diversity can enhance opportunities for learners to interact and to learn about communication, collaboration, leadership, and the roles of other professions.

With any interprofessional activity, challenges imposed by disparate course schedules, lack of resources, and a shortage of faculty/staff commitment can be barriers. In addition to overcoming those hurdles, we are also faced with the obstacle of different academic calendars (start, end, holidays, breaks, etc.) and the dispersed geographic locations of our various institutions. To successfully overcome these hurdles and institute an endeavor such as this necessitates alignment of values across partnering organizations and a deep-seated commitment to train learners for practice in team-based environments that will improve care delivery and patient outcomes. Importantly, we have learned that the institutional partners that have become involved with this initiative share these same ideals.

Limitations

We have overcome many limitations to bring this activity to fruition, but several remain. We do not yet know whether the results already obtained from the student perception-based questionnaires implemented before and after this activity are generalizable to learners who have had earlier IPE experiences. In addition, the assessment component of this activity and the feedback provided from faculty to learners are largely perception based rather than skill based.

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Ethical Approval

Penn State Health Milton S. Hershey Medical Center Human Subject Protection Office approved this study.

References

1. Interprofessional Education Collaborative Expert Panel. *Core Competencies for Interprofessional Collaborative Practice: Report of an Expert Panel*. Washington, DC: Interprofessional Education Collaborative; 2011.
 2. Irfan M, Tariq N, Hussein H, Fitzgerald-Swenson L, Hart D, Tiryaki E. Stroke code simulation for medical education. *MedEdPORTAL*. 2015;11:10009. https://doi.org/10.15766/mep_2374-8265.10009
 3. Lockeman KS, Dow AW, DiazGranados D, et al. Refinement of the IPEC Competency Self-Assessment survey: results from a multi-institutional study. *J Interprof Care*. 2016;30(6):726-731. <https://doi.org/10.1080/13561820.2016.1220928>
 4. Lie D, May W, Richter-Lagha R, Forest C, Banzali Y, Loheny K. Adapting the McMaster-Ottawa scale and developing behavioral anchors for assessing performance in an interprofessional Team Observed Structured Clinical Encounter. *Med Educ Online*. 2015;20(1):26691. <https://doi.org/10.3402/meo.v20.26691>
 5. Berger S, Mahler C, Krug K, Szecsenyi J, Schultz J-H. Evaluation of interprofessional education: lessons learned through the development and implementation of an interprofessional seminar on team communication for undergraduate health care students in Heidelberg—a project report. *GMS J Med Educ*. 2016;33(2):Doc22.
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