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Featured Article

A Peer-Led Interprofessional Simulation Experience Improves Perceptions of Teamwork

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KEYWORDS
Peer-led;
interprofessional;
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Abstract

Background: Simulation-based interprofessional education (IPE) improves teamwork, self-efficacy, and clinical preparedness among health profession students.

Methods: A mixed-method design assessed differences in perceptions, knowledge, and skills related to a peer-led, acute care—focused IPE experience for 319 nursing, physical therapy, and occupational therapy students.

Results: All students demonstrated an improvement in positive perceptions of teamwork and collaborative practice. Qualitative themes derived included the importance of teamwork, communication, and valuing other professions, increased understanding of the roles of other professions, and improved leadership skills.

Conclusions: Peer-led simulation-based IPE effectively improved student attitudes, values, and beliefs regarding interprofessional collaboration and increased student understanding of professional roles in an acute-care environment.

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Background

The development of teamwork and communication skills through interprofessional education (IPE) is increasingly becoming a priority during health care professional education. (Greer, Clay, Blue, Evans, & Garr, 2014; IPEC, 2016; Josiah Macy Jr. Foundation, 2012; Reeves, Tassone, Parker, Wagner, & Simmons, 2012; Zorek & Raehl, 2013). Consensus exists that simulation should be used with IPE. Simulation-based IPE has been shown to be an effective strategy for improving teamwork, communication, and collaboration among health profession students; and it can increase student self-efficacy and preparedness for clinical situations (Bandali, Craig, & Ziv, 2012; Decker et al., 2015; Lee, Pais, Kelling, & Anderson, 2018; Poore, 2014; Scherer, Myers, O'Connor, & Haskins, 2013; Watters et al., 2015; Wilhaus et al., 2013). In fact, the International Nursing Association for Clinical Simulation and Learning (INACSL) Standards of Best Practice—Simulation SM—includes a standard solely dedicated to simulation-enhanced IPE (Decker et al., 2015). As simulation-based IPE is considered best practice, it provides an environment for active learning and meets new accreditation standards; faculty at our institution sought opportunities to establish collaborative IPE simulation experiences, emphasizing an acute-care clinical setting while aligning profession-specific course objectives.

Key Points

- IPE simulation positively influenced students' opinions of collaborative practice.
- IPE simulation improved the understanding of acute-care professional roles.
- Peer lead IPE is an effective method for improving student leadership skills.

Students from the professions of occupational therapy (OT) and physical therapy (PT) were simultaneously enrolled in different courses with similar patient-care objectives related to the acute-care environment. Nursing students were not synchronously enrolled in a course that aligned with patient care objectives related to the acute-care environment. However, the multidisciplinary OT, PT, and nursing faculty believed nursing student participation was a crucial component for an interprofessional acute-care simulation experience. Previous studies have shown the benefits of PT and nursing (Bartlett & Dimitroff, 2018; Wellmon, Lefebvre, & Ferry, 2017) or PT and OT IPE simulation activities (Thomas, Rybski, Apke, Kegelmeyer, & Kloos, 2017). Hence, the faculty created a novel IPE simulation approach and included nursing students, who were enrolled in a leadership and management course, in the role of peer teacher. Peer teaching is a technique used to develop leadership skills (Bennett, 2017; Ravanipour & Bahreini, 2015; Stigmar, 2016). In addition, interprofessional peer teaching can be an effective tool for improving communication and developing increased understanding of other professions' roles (Dunleavy & Sposetti, 2017; Dunleavy, Sujay, Reid, Kristina & Dhar, 2017; Sadowski, Li, Pasay, & Jones, 2015; van Schaik, Regehr, Eva, Irby, & O'Sullivan, 2016).

The purpose of this study was to investigate the effects of combining peer teaching and an IPE simulation experience on health care profession students' attitudes, values, and beliefs regarding interprofessional collaboration. We hypothesized that students involved in the IPE simulation would increase their understanding of the need for communication and collaborative care in the acute-care environment. In addition, we hypothesized that the peer teaching role would increase the leadership skills of the nursing students.

Theoretical Framework

The social constructivist theory of learning served as the framework for our hypotheses (Ballard, 2016). The social constructivist perspective suggests the social environment mediates learning and knowledge acquisition, and learning is a process that occurs through both social and environmental interactions (Davis, Maher, & Noddings, 1990; Graham et al., 2006; McWilliam, Kothari, Ward-Griffin, Forbes, & Leipert, 2009; Thomas, Menon, Boruff, Rodriguez, & Ahmed, 2014; Thomas, Saroyan, & Dauphinee, 2011). This IPE simulation experience promoted learning through a social context by having students from different health professions learn about, with, and from each other while providing collaborative patient care in a simulated acute-care setting. The simulation cases were designed to reflect the students' current levels of knowledge and skill, which minimized barriers to shared problem solving (Hean, Craddock, & O'Halloran, 2009; Lee et al., 2018). The simulation cases were also designed to require communication, teamwork, and shared responsibility for optimal care of the patient to be provided. In addition, we provided the environment and social context for nursing students, who served as peer teachers, to develop leadership skills.

Material and Methods

Study Design

A novel IPE simulation experience was used in the fall semesters of 2016 and 2017. Using a mixed-methods design, this study assessed change in student perceptions over time (pretest/posttest) and differences between professions using the Student Perceptions of Interprofessional Clinical Education - Revised (SPICE-R) (Dominguez, Fike, MacLaughlin, & Zorek, 2015; Zorek et al., 2016). Qualitative analyses were performed using grounded theory

methods to identify primary themes based on the open response question "What is the most important learning experience you took away from the interprofessional training." The grounded theory method was chosen for qualitative analysis to allow the data to speak for themselves (Creswell, 2012).

Instrumentation

The SPICE-R was developed for and validated with a general population of health profession students, and it has satisfactory goodness of fit, construct validity, and reliability. The 10-question 5-point Likert scale has response options ranging from 5 (strongly agree) to 1 (strongly disagree). The tool was designed to assess teamwork and team-based practice (6 questions), roles and responsibilities (2 questions), and patient outcomes from collaborative practice (2 questions) (Dominguez et al., 2015; Zorek et al., 2016). The instrument was used with permission from the authors.

Participants

Nursing students (2016, n = 51; 2017, n = 68) developed, implemented, and participated in a four-station simulation experience designed to replicate an acute-care setting. During the simulation experience, PT (2016 n = 53, 2017 n = 52) and OT (2016 n = 48, 2017 n = 47) students worked together to cotreat the simulated patients while consulting with nursing students acting as the staff nurse.

All students were in their last year of their professional curriculum; however, the groups of students had different educational experiences throughout their programs of study. Nursing students were enrolled in the last academic year of the Bachelor of science in nursing program having completed two full academic years of undergraduate nursing education in the classroom and a variety of acute-care settings. The OT and PT programs, by contrast, are graduate professional programs at the masters and doctoral level, respectively. At the time of the simulation experience, OT students did not have any experience in the acute-care setting and a small percentage of PT students had experience in an acute-care setting. Given the diversity of educational and practical experience, the content of the simulation focused on building teamwork based on the similarities and strengths of each group of students in a collegial environment. To facilitate the simulation, nursing students were given information about the scopes of practice for OT and PT developed by faculty from those programs.

Simulation Experience Objectives

Two levels of objectives, broad and profession-specific, guided the IPE simulation experience. Broad objectives related to communication and teamwork applied to all students participating in the experience. Specific objectives were used to guide the learning of students in each professional program. These objectives were directly related to each profession's course and clinical objectives. Nursing students participated in the experience during the Nursing Leadership and Management course; therefore, the objectives were directed toward role modeling, facilitation of learning, and organization of the operations of the simulation experience. OT students participated during their Holistic Interventions: Adult to End of Life Coursework, and PT students participated during their Complex Patient Management Coursework. Therefore, the objectives for the OT and PT students were directed toward patient safety in the acute-care setting and developing and implementing plans of care for the acutely ill patient.

All students were provided with both the broad and specific objectives before the simulation experience. Nursing students used the specific objectives for PT and OT students to guide scenario development, cues and prompts, and debriefing questions for the experience. Lead faculty from each program worked together to develop the essential elements of the scenarios. Nursing students were provided with an outline of the essential elements and parameters for the scenarios. Nursing faculty provided guidance for the nursing students to develop patient stories and scenario details. Faculty members from each professional program were available throughout the peer teaching and simulation experiences to facilitate learning and assess performance for all students.

Peer Teaching Experience

Nursing students were assigned 15 clinical hours over a period of 5 weeks to prepare for the simulation experience as part of their leadership and management course. During the preparation phase, nursing students were assigned to groups by station. Each group composed the patient's story, wrote a script, planned the scenario activities, and gathered equipment. Nursing students also learned the foundational principles of simulation, such as facilitation and debriefing (INACSL Standards of Best Practice: Simulation ^{SM}) to prepare for the role of peer teacher (Sittner et al., 2015). During the simulation experiences, nursing students were responsible for equipment management, prebriefing, running the simulation scenarios, and debriefing, all with guidance from an interprofessional faculty team. By working alongside faculty to prepare the simulation experience for the PT and OT students and serving in the roles of facilitator, actor, or equipment manager, nursing students were able to meet leadership and management course and clinical objectives, learn foundational principles of simulation, and work as a part of an interprofessional team.

Format of the Simulation Experience

Before participating in the interprofessional simulation experience, PT and OT students were separately provided objectives and expectations for the experience. The experience included four stations with scenarios of varying complexity. Each session began with an introduction and prebrief facilitated by a lead faculty member and nursing students assigned to the station. The prebrief established psychological safety and expectations for the experience by review of simulation objectives, review of students and faculty roles, establishment of ground rules, and establishing a fiction contract (INACSL Standards of Best Practice: Simulation ^{SM} Standard 1). All OT and PT students attended station one simultaneously and then formed into preassigned groups to rotate through stations 2, 3, and 4. In stations two to four, PT and OT students were assigned to dyads to assess and treat the patient in each scenario. Nursing students acted in the roles of facilitator, equipment manager (i.e., operation of the manikin), staff nurse, family member, or patient (i.e., station two only). Each station included approximately 15 minutes of activity and 15 to 20 minutes of debriefing. After completion of all the stations, all students and faculty members participated in a group debriefing session led by the lead faculty member. An online debriefing activity was also included for students to allow for individual reflection.

Clinical Scenarios and Fidelity

Station one was a hands-on learning station that included examples of equipment used in acute-care settings. Each piece of equipment was labeled with the name and intended use. During this station, nursing students facilitated identification and manipulation of the equipment and described the purpose and proper use of the equipment. Objectives for the OT and PT students consisted of identifying, manipulating, and describing the purpose of each piece of equipment and discussed ways to maximize patient safety during care.

Station two consisted of a scenario in which the OT and PT students assisted a patient with a stroke and left-sided weakness to safely transfer to a chair, dress, ambulate a short distance to a sink, and perform grooming activities. Nursing students acted in the role of the patient for station 2. The patient had a simulated indwelling urinary catheter and continuous IV infusion. When asked to help, nursing students acting in the staff nurse role assisted with the mobility activities and maintaining patient safety and equipment integrity.

Station three consisted of a scenario in which the OT and PT students provided a rehabilitation session for a patient with a traumatic brain injury and functioning at level III on the Rancho Los Amigos Level of Cognitive Functioning Scale. The patient simulator used was a Gaumard Scientific HAL® with articulated hips and knees so the manikin could be moved into a sitting position and transferred. The patient was hemodynamically stable and breathed independently but was receiving supplemental oxygen, continuous enteral feedings, and continuous IV fluids. The patient also had an indwelling urinary catheter and drainage tubes. The goals for the OT and PT students were to have the patient safely sit on the side of the bed, transfer to a chair, and perform activities of daily living (e.g., washing face, brushing hair, applying lotion to hands, and so forth). A nursing student acting in the role of staff nurse assisted with patient mobilization and maintenance of patient safety and equipment integrity.

Station four included a scenario in which the OT and PT students provided a rehabilitation session for a semiconscious, critically ill patient with acute respiratory failure. The patient simulator used was a Laerdal Nursing Anne® midfidelity manikin. For the scenario, the patient was hemodynamically stable but was receiving mechanical ventilation, intermittent gastric suctioning, arterial pressure monitoring, and continuous IV fluids via a central venous line. The patient also had an indwelling urinary catheter, a chest tube, and wound dressings. The goals for the OT and PT students were to perform appropriate mobility exercises, range of motion, sensory stimulation, and address prevention of secondary complications (e.g., positioning, splinting to prevent foot drop, skin integrity, and so forth). A nursing student acting in the role of staff nurse assisted with patient mobilization and maintenance of patient safety and equipment integrity.

Debriefing after Clinical Scenarios

The nursing student in the role of facilitator led the debriefing sessions after stations 2 to 4. All students and the faculty member assigned to the station participated in debriefing based on Dreifuerst's (2010) Debriefing for Meaningful Learning method. Before beginning the formal debriefing session, the faculty member assigned to the station asked students to spend a few moments discussing general reactions to the simulation activity. Debriefing questions (Figure 1) were developed using the Interprofessional Education Collaborative: Core Competencies for Interprofessional Collaborative Practice including (1) values/ethics for interprofessional practice, (2) roles/responsibilities, (3) interprofessional communication, and (4) teams and teamwork (IPEC, 2016).

Quantitative Data Analysis

Students completed the SPICE-R assessment within a 7-day timeframe both before and after the simulation experience (response rates of 75% and 77% for consecutive years). The sums of scores for all questions on the SPICE-R instrument were analyzed using a mixed-model ANOVA. In addition, the three subscales on the SPICE-R instrument were analyzed separately using mixed-model ANOVAs. A p value $\leq .05$ was considered significant.

Debriefing Questions

1. What did you do well in this scenario?
2. What were the roles and responsibilities of each team member
3. Were you able to communicate with patients, family members, and other healthcare providers to address the health care needs of the patient?
    a. Why? Why not?
4. Were you able to work effectively as a team?
    a. Why? Why not?
5. Were you able to maintain an environment of mutual respect and shared values?
    a. Why? Why not?
6. What would you do differently next time?
7. How might you communicate your plan of care for the patient with other professionals?
8. Are there any specific questions or observations to discuss?

Figure 1 Debriefing questions developed using the Interprofessional Education Collaborative: Core Competencies for Interprofessional Collaborative Practice.

Qualitative Data Analysis

The open response item was examined through a grounded theory open coding process to allow for codes and themes to emerge (Corbin & Strauss, 2008). Such an approach also allows for the data's own voice to emerge rather than the researcher's voice (Lincoln & Guba, 1985). The open response item was phrased as follows "what is the most important learning experience you took away from the interprofessional training?" We were able to obtain n = 231 open-ended responses. Responses to the item were first coded by one of the authors and a student worker. To foster intercoder reliability, and to ensure credibility, the author and the student worker coded the responses independently and then discussed each code to establish agreement on the codes (Creswell, 2012). Next, once the codes were established, a third author reviewed the codes to ensure agreement between the two sets of coded responses. Finally, the two authors and one student worker collapsed the codes into themes after discussing the interpretations of each code (Creswell, 2012).

Results

Quantitative Results

All student groups, regardless of profession, demonstrated a significant increase in post-test scores compared with pretest scores on the SPICE-R ($p = .001$, partial eta squared = 0.088) as reported in Table 1. No significant differences between the professions ($p = .843$; partial eta squared = 0.001) or interaction effect between time and profession ($p = .496$, partial eta squared = 0.006) were observed.

When further assessing responses on the SPICE-R, students most frequently choose agree (4 on the Likert-type scale), followed by choosing strongly agree (5 on the Likert-type scale) during pretesting. At post-testing, there was a shift toward students most frequently choosing strongly agree (5 on the Likert-type scale) followed by choosing agree (4 on the Likert-type scale). The shift of the mode toward strongly agreeing is demonstrated in the pretest and post-test histograms in Figure 2.

Table 1 Student Perceptions of Interprofessional Clinical Education—Revised Overall Pretest and Post-test Results

Profession	N	Pretest Mean (SD)	Post-Test Mean (SD)
Nursing	103	43.4 (4.9)	45.2 (6.2)
Occupational therapy	43	42.5 (4.3)	44.0 (5.6)
Physical therapy	91	43.1 (5.4)	44.5 (5.9)

All student groups demonstrated a statistically significant increase ($p \leq .039$) in scores in every subscale area on the SPICE-R when comparing post-test scores to pretest scores (Table 2). In addition, there was no significant difference between professions in the subscale content areas of (1) interprofessional teamwork and team-based practice and (2) patient outcomes from collaborative practice. However, in the roles/responsibilities for collaborative practice subscale, nursing students scored significantly higher ($p = .001$) than OT students at both pretesting and post-testing. There was no statistically significant difference between OT and PT students nor PT and nursing students.

Qualitative Results

We aimed to assess the postassessment free response question ("What is the most important learning experience you took away …") to better understand student outcomes. Overall, five themes emerged from the data: (1) The need for teamwork and collaboration for effective patient care, (2) the importance of communication to develop a plan of care, (3) increased understanding of the roles of other professions, (4) the importance of valuing other professions and having respect and trust in interprofessional teams, and (5) increased confidence in leadership skills. Each theme is presented in Table 3 along with supporting quotes. The quotes presented are representative of the 231 responses as data saturation was achieved (Creswell, 2012; Lincoln & Guba, 1985).

Discussion

Previous studies have demonstrated interprofessional simulation experiences can increase understanding of other professions roles, influence student perception of the need for teamwork in health care, and increase student understanding of the need for communication for optimal collaborative care (Bandali et al., 2012; Bartlett & Dimitroff, 2018; Decker et al., 2015; Lee et al., 2018; Poore, 2014; Scherer et al., 2013; Thomas et al., 2017;

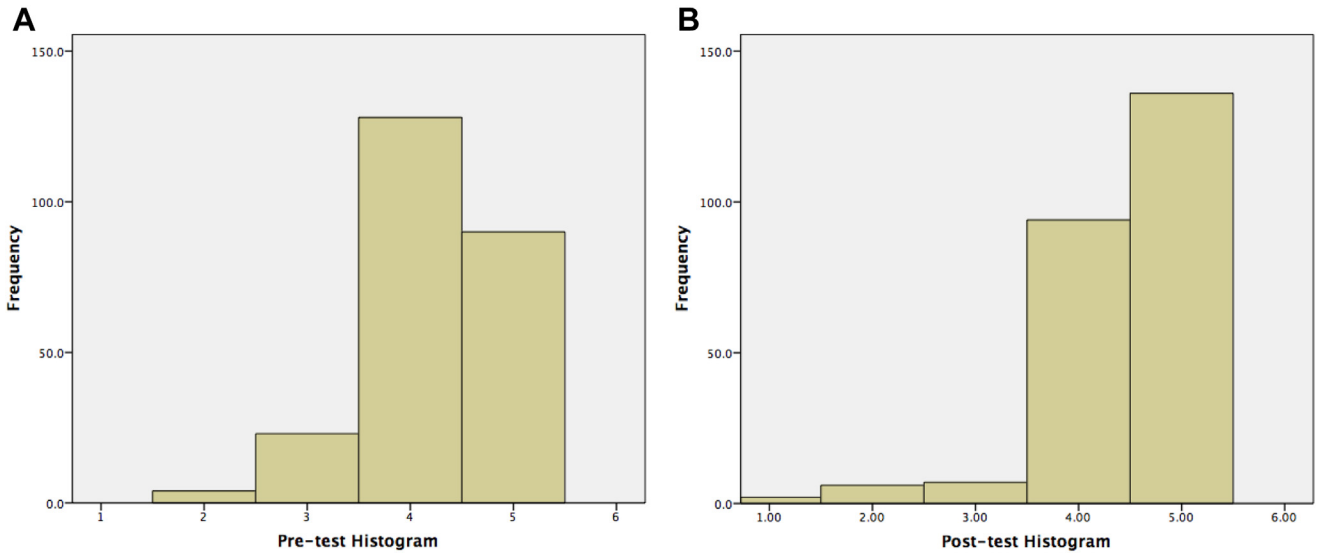

Figure 2 Example histograms at pretesting (A) and post-testing (B) for the question: Working with students from another health profession enhances my education.

Watters et al., 2015; Wellmon et al., 2017; Wilhaus et al., 2013). However, the present study is unique because nursing students were in a peer-teaching role as they participated in the interprofessional simulation experience. This allowed nursing students to meet objectives for their course related to leadership and management while still participating in the interprofessional simulation experience. We found combining peer teaching with an IPE simulation experience positively influenced students' attitudes, values, and beliefs regarding interprofessional collaboration. Study findings indicate that while students entered the peer-led IPE simulation with favorable opinions of working interprofessionally, the activity positively influenced students' opinions of teamwork, collaborative practice, and further increase understanding of other professions' roles and responsibilities.

Qualitative results indicated an enhanced learning experience among the students across each of the five themes presented earlier. Students were able to take away an increased understanding of the importance that teamwork, communication, and knowing how the roles of various professions can merge to enhance patient care. In addition, as the quotes presented earlier have demonstrated, students elicited greater respect toward their peers from other professions while also recognizing their own growth in leadership.

Limitations

This study did not have a comparison group, and student perceptions were only assessed before and shortly after participation in the IPE simulation activity. Future

Table 2 Student Perceptions of Interprofessional Clinical Education—Revised Descriptive and Inferential Statistics for Each Subscale

Descriptive Statistics			Inferential Statistics			
Profession	Pre-Test Mean (SD)	Post-Test Mean (SD)	Statistical Comparisons	*p* Value	Partial eta Squared	Power
Interprofessional teamwork and team-based practice						
Nursing	26.1 (3.4)	27.1 (3.9)	Interaction	.697	0.003	0.108
OT	26.0 (2.8)	26.8 (3.5)	Pre-post	≤.001*	0.061	0.973
PT	26.2 (3.5)	26.8 (3.7)	Between Prof.	.945	0.000	0.059
Roles/responsibilities for collaborative practice						
Nursing	8.3 (1.1)	8.9 (1.3)	Interaction	.871	0.001	0.071
OT	7.6 (1.1)	8.2 (1.4)	Pre-post	≤.001*	0.139	1.00
PT	8.0 (1.3)	8.5 (1.4)	Between Prof.	.001*	0.056	0.928
Patient outcomes from collaborative practice						
Nursing	9.0 (1.1)	9.2 (1.3)	Interaction	.958	0.000	0.056
OT	8.9 (1.0)	9.0 (1.2)	Pre-post	≤.039*	0.192	0.543
PT	8.9 (1.3)	9.1 (1.2)	Between Prof.	.660	0.003	0.117

Note. OT = occupational therapy; PT = physical therapy.
* Indicates a statistically significant difference.

Table 3 Qualitative Results

Theme	Supporting Quotes
Need for teamwork and collaboration for patient care.	"I learned problem solving in an interprofessional team." "The planning, collaboration, and execution was so much smoother in the last groups compared to the first groups."
Importance of communication to develop a plan of care.	"Communication is key to working in (an) interprofessional team." "Ask the nurses for help!" "How to communicate more effectively with other health care members."
Increased understanding of the roles of other professions.	"Learning the roles and expertise of other professions…" "I learned a lot more about OT and PT which was cool…" "Roles align in places and differ in other places, and that is a good thing for patient care."
Importance of valuing other professions with respect and trust.	"It is important to collaborate with other disciplines to enhance safety and effectiveness." "It takes all professions to improve patient outcomes." "Practice and making errors in a safe space."
Increased confidence in leadership skills.	"How to lead without being bossy." "There is a time to lead and a time to follow." "…taking on leadership/followership roles in certain situations."

studies should compare peer led IPE simulation activities to other instructional techniques to assess effectiveness. Longitudinal testing should occur to examine if the change in students' perceptions are maintained over time. Behavior change should also be assessed in future studies.

Conclusions

Combining interprofessional simulation and peer teaching was an effective way to improve student attitudes, values, and beliefs regarding interprofessional collaboration and increase understanding of professional roles in an acute-care environment. The experience had similar effects on students' perceptions of IPE regardless of whether they participated in the peer-teaching role and/or the simulation participant role.

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