

Can a simulated hospital interprofessional experience between allied health and nursing students change self-efficacy beliefs?

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Abstract: The purpose of this study was to determine if participation in a hospital simulation experience could change the students' self-efficacy to engage in interprofessional behaviors. This single-group pre-test and post-test design study utilized students from: Occupational Therapy, Physical Therapy, and Nursing programs. The student assumed their roles as health-care practitioners collaboratively in a simulated hospital IPE session (SHIPES) while they managed patients admitted to the hospital played by live actors. The student participants completed the Self-Efficacy for Interprofessional Experiential Learning (SEIEL) questionnaire that consists of a total score and two subscales scores (Interprofessional interaction and Interprofessional team evaluation and feedback) before and after the SHIPES. Results: significant ($p < 0.001$) increase in the total and two subscales scores indicating an increased student self-efficacy to engage in interprofessional learning after participation in the SHIPES. Increased self-efficacy is a positive indicator of future behavior and could facilitate more interprofessional collaboration in clinical settings.

Keywords: interprofessional education; hospital simulation; self-efficacy; allied health; nursing

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Introduction

Interprofessional education and healthcare simulation have been utilized in the training of healthcare professionals for nearly 50 years internationally (Palaganas, J. C., 2014). In the United States of America (USA) simulated patient-care activities have been used in educational and actual acute care settings to practice and refine healthcare provider-patient care interactions during normal situational, emergency, and routine events. Simulated patient-care activities provide the healthcare student or practitioner an opportunity to receive feedback, guidance, and practice skills necessary to implement safe patient-care procedures without the consequence of adverse outcomes to an actual patient (Rider & Schertzer, 2023). Studies have shown that simulated patient-care activities foster a reduction in medical errors, refinement of patient care processes and procedures, and enhance collaboration among members of the healthcare team as the roles of each team member are better understood (Goolsarran et al., 2018; Higham & Baxendale, 2017; Wang et al., 2022).

Interprofessional collaboration and education are viewed as the best path forward to meet the complex needs of patients while adhering to third-party payer requirements in the United States of America (USA) (Moyers & Metzler, 2014). The World Health Organization (WHO) defined interprofessional collaboration as 'when multiple health workers from different professional backgrounds work together with patients, families, caregivers, and communities to deliver the highest quality of care (WHO, 2010).

Interprofessional education (IPE) is a requirement in academic programs in the USA to satisfy entry-level healthcare accreditation organizations. These rigorous academic requirements pose challenges in the current curricula of healthcare programs often limiting collaborative practice opportunities until clinical rotations are started (Wong et al., 2016). Ineffective communication and inadequate teamwork are primary sources of medical errors and poor patient outcomes (Eddy et al., 2016). The goals of IPE experiences are to expose students to other healthcare disciplines, educate them on the roles of other healthcare professionals, and foster interprofessional communication (Cunningham et al., 2018; Wong et al., 2016; Wynarczuk et al., 2019). The literature supports that IPE promotes teamwork, leadership, problem-solving, critical thinking, and communication which can lead to decreased errors and improved patient quality of care (Cunningham et al., 2018; Labrague et al., 2022; Wallace et al., 2016).

The literature continues to support the need to reduce medical errors using IPE and simulation patient education activities (Baker et al., 2008; Goolsarran et al., 2018; Wang et al., 2022). In the USA, organizations charged with the task of accrediting healthcare institutions require a continuum of care that includes several patient safety goals to assist institutions and healthcare practitioners in creating safer practice environments. One area of practice stated as a standard of focus includes communication (Rodziewicz et al., 2023). Part of the solution to improving patient safety outcomes among interprofessional teams involves fostering earlier educational activities that expose students to other healthcare disciplines. This increased opportunity for exposure promotes collaboration and communication among them. One type of educational activity used to meet this objective is the use of simulated healthcare scenarios.

In 2013, The WHO included simulation as a recommendation for curriculum development stating, 'Health professionals' education and training institutions should use simulation methods (high fidelity methods in settings with appropriate resources and lower fidelity methods in resource-limited settings) of contextually appropriate fidelity levels in the education of health professionals.' (WHO, 2013) The published 2013 guidelines were to promote transformational changes in all communities and countries to enhance quantity, quality, and relevance across all country health systems.

Participation in simulated hospital settings can provide a realistic experience for nursing students by facilitating critical analysis and decision-making (Ayers et al., 2014). A study in 2008 (Baker et al.) concluded that IPE which utilized simulation-based activities offered a positive approach to preparing students as future healthcare professionals. The current review of the literature indicates that implementing a simulation-enhanced IPE curriculum contributes to elevated levels of teamwork and potentially improves patient safety outcomes (Wong et al., 2016).

Self-efficacy is a construct of the Social Cognitive Theory developed by Bandura (Bandura, 1977). Self-efficacy is based on the notion that individuals have varied levels of perceptions to be successful in a task. Enhanced self-efficacy confers a sense of confidence that a successful outcome can be achieved if individuals are provided opportunities to achieve mastery of a given task (Gallagher, 2012). The ability to become and maintain persistence to achieve mastery is based on the level of self-efficacy possessed by individuals (Gallagher, 2012). For this study, improvement in self-efficacy to engage in interprofessional activities to foster teamwork

and collaboration is necessary to master these skills. Based on this theory, if students can improve their self-efficacy to learn how to collaborate in an interprofessional setting, they may be more likely to demonstrate these behaviors as they matriculate to actual clinical practice.

This type of preparation not only fosters interprofessional teamwork to enhance self-efficacy in fieldwork situations, but it also is a model currently being used in today's continuum of care (Eddy et al., 2016; Goolsarran et al., 2018; Wong et al., 2016). Once students graduate and become entry-level practitioners, training continues at the professional level in the form of drills and mock exercises to discover deficiencies, gaps, and improvements needed.

Both IPE and simulated educational activities have strong support in the literature (Cunningham et al., 2018; Labrague et al., 2022; Moyers & Metzler, 2014; Nichols et al., 2019; Vari et al., 2013); however, there is little research that examines the effectiveness of IPE in a simulated clinical setting. The purpose of this study was to determine if student participation in an interprofessional hospital simulation session could change the perception of self-efficacy after engaging in an interprofessional, experiential learning activity designed to foster teamwork, communication, and collaboration.

Method

This is a single group, pre-test-post-test design conducted during the Spring of 2020 on the campus of Texas Woman's University (TWU) located in Houston, Texas, USA. This study was approved by the Institutional Review Board of Texas Woman's University. A convenience sample of entry-level nursing, occupational therapy (OT), and physical therapy (PT) students were recruited to participate in this study. The simulated hospital IPE session (SHIPES) was a planned educational activity for all three programs. Before the commencement of this learning activity, informed consent was obtained from these students to use their questionnaire as data for this study. Students were instructed verbally and written within the informed consent that the use of their data for this study is optional and that regardless of their participation, there would be no adverse or favorable influence on their grading outcome. This was not a graded assignment and was completely voluntary. The PT students and OT students were in the didactic, coursework phase of their academic programs. The nursing

students were nearing completion of their entry-level degree to practice and had several clinical experiences in various hospital settings before the SHIPES. The heterogeneity in clinical education experience among the OT, PT, and nursing students was intentionally designed, as the nurses needed to have prior experience with routine patient care at the bedside for the SHIPES to operate similarly to an actual hospital. The students of these three disciplines did not have any formal clinical experience which previously required them to interact with each other.

Measures

Previous interprofessional healthcare experiences were collected at baseline from the participants via a questionnaire. This questionnaire contained items that queried the settings and hours of previous clinical experiences; if their previous clinical experiences were paid or unpaid; if they witnessed any professional collaborative efforts within a healthcare setting; if participants have family members who practice in a healthcare setting; and if participants have a family with physical, cognitive, mental, or chronic health conditions.

The participants' self-efficacy was measured using the Self-Efficacy for Interprofessional Experiential Learning (SEIEL) questionnaire (Mann et al., 2012). This instrument was developed to specifically assess the levels of self-efficacy of health professional students as they engage in interprofessional experiential learning activities.

The scale has 16 items that are measured using a 1-10 Likert scale with 1 being 'Low confidence' and 10 being 'High confidence'. Mann et al. (2012) identified two factors: interprofessional interaction, and interprofessional team evaluation and feedback. The interprofessional interaction subscale measures 'interacting with students from other health professions to learn, plan, and resolve issues in patient care'. The interprofessional team evaluation and feedback subscale measures 'the capabilities involved in providing feedback on and evaluating the team's function.' The SEIEL total score has a Cronbach's alpha of 0.96. The interprofessional interaction subcomponent has a Cronbach's alpha of 0.94 and a Cronbach's alpha of 0.93 for the Interprofessional team evaluation. The scale has also been shown to have high content validity among individuals who are experts in the field of IPE (Mann, et al., 2012).

Intervention

This intervention was conducted via a simulated hospital IPE session on the Texas Woman's University Houston campus. Complex patient case scenarios were developed with patient diagnoses of total knee replacement, total hip replacement, dehydration in an elderly woman, and a wheelchair-bound woman with a urinary tract infection. Senior student nurses provided total patient care for the patient (patient actors were student nurses). The live actors utilized written scripts with specific information to facilitate their acting in the patient role. These scripts generated patient-practitioner scenarios which fostered realistic clinical depictions and encouraged interactions among the three disciplines charged with the care of the patient. The scripts included admission diagnosis, physician/provider orders, and activity limitations which each discipline incorporated in their evaluation of the simulated patient. The scripts included directives to the patient-actor on how to answer specific questions from the PT, OT, and nursing students charged with the care of the patient-actor. The scripts also included acting tips for more accurate simulation of the patient admitted to an acute care setting. The nursing students who provided total nursing care for the patient actor knew that either a PT or OT evaluation would occur at some point during their 'shift' but they did not have a specified time. This varied schedule mimicked actual acute care hospital interactions in the USA among disciplines. It is usual practice that interprofessional team members require spontaneous interaction to address any concerns before the patient interaction. Following the PT or OT evaluation, a short verbal report was provided to the nurse to communicate the patient's functional capacity and tolerance to activity.

The face and content validity of these scripted scenarios developed by the nursing faculty occurred over ten semesters. The additional interactions with the nursing, PT, and OT students were added to these existing scripts by PT and OT faculty while being refined over two semesters of trial simulation sessions to improve authenticity.

The simulated experience took place over six continuous hours for the nursing students who provided the patient care to the live patient actors, as this was a required part of their clinical experience during their final nursing semester. PT and OT students participated in pairs for one hour each throughout the day. During the hour, PT and OT students provided appropriate bedside assessments, interventions, and communication with the patient and nursing students. All student participants were encouraged to participate in interprofessional communication, critical thinking, and

clinical reasoning with minimal to no input from preceptors and faculty during the experience. Each discipline completed a post-experience debrief with their respective faculty through open discussion.

Data analysis

All statistical analyses done were completed in SPSS version 25 (BM SPSS Statistics for Windows, Version 25.0. Armonk, NY). Paired t-tests were used to compare the total scores of the SEIEL and the scores from the interprofessional interaction and interprofessional team evaluation subscales scores. Demographic information and previous interprofessional interactions before and during the student participants' academic training are summarized using descriptive statistics.

Results

A total of ninety-three healthcare professional students participated: 38 OT students, 37 PT students, and 18 Nursing students. Demographic data for student nursing participants is incomplete.

Overall, the participants' ages ranged from 21-42 years. Of the total participants, 89.3% identified as female, and 10.7% identified as male. The majority of participants (61.3%) were Non-Hispanic White. Many (39.8%) of the participants had 200 or more hours of clinical experience outside of their school experiences. Ninety-one percent of participants reported observing an interprofessional collaboration during their clinical experiences. See Table 1 for complete demographic and background information of participants.

Table 2 shows the results of the overall change in the SEIEL as well as the change in each subcomponent. A significant mean difference of 13.87 between the pre-and post-intervention total SEIEL score was found [$t(92) = 6.87, p < 0.001$]. A significant mean difference of 7.45 ($t(92) = 7.58, p < 0.001$) was found for the interprofessional interaction subscale score. The mean difference in the interprofessional team evaluation subscale scores was statistically significant at 7.46 ($t(92) = 7.61, p < 0.001$). These results indicate an improvement in self-efficacy attributed to participation in the simulated hospital IPE session.

	Occupational Therapy N (%)	Physical Therapy N (%)	Nursing N (%)	Total Participants N (%)
Gender:				
Male	3 (7%)	5 (13.5%)	1 (5.6%)	8 (10.7%)
Female	35 (92%)	32 (86.5%)	17 (94.4%)	67 (89.3%)
Age	Unavailable	24.5 (2.02)	Unavailable	
Race/ethnicity:				
Non-hispanic white	26 (68.4%)	20 (54.1%)	Unavailable	46 (61.3%)
Black	5 (13.2%)	2 (5.4%)		7 (9.3%)
Hispanic	5 (13.2%)	6 (15.2%)		11 (14.7%)
Asian	0 (0%)	8 (21.6%)		8 (10.7%)
Other/multiethnic	2 (5.2%)	1 (2.7%)		3 (4.0%)
Clinical experience outside school	38 (100%)	37 (100%)	9 (50%)	85 (91.4%)
Hours of clinical experience outside school:			Unavailable	
0-20	2 (5.3%)	0		2 (2.2%)
20-80	9 (24.7%)	0		9 (9.7%)
80-200	12 (31.6%)	15 (40.5%)		27 (29%)
200-500	8 (21%)	12 (31.6%)		20 (21.5%)
500-2,000	4 (10.5%)	4 (10.5%)		8 (8.6%)
>2,000	3 (7.9%)	6 (15.8%)		9 (9.7%)
Paid prior clinical experience:			Unavailable	
Yes	1 (2.6%)	2 (5.4%)		3 (3.2%)
No	28 (73.7%)	21 (56.8%)		49 (52.7%)
Mix of both	10 (26.3%)	13 (35.1%)		23 (24.7%)
Observed IP* collaboration during their clinical experience	33 (86.8%)	35 (94.6%)	17 (94.4%)	85 (91.4%)
Observed IP* collaboration during a personal experience	18 (47.3%)	17 (45.9%)	14 (77.8%)	49 (52.7%)
Has family in healthcare	20 (52.6%)	17 (45.9%)	10 (55.6%)	47 (50.5)
Has family with chronic health condition	22 (57.9%)	8 (21.6%)	7 (38.9%)	37 (39.8)

Table 2. Before-after comparison of self-efficacy for interprofessional experiential learning scores*				
	Mean	SD	95% CI*	p
Total score	13.87	19.46	9.86, 17.88	<0.001
Interprofessional interaction	7.46	9.49	5.51, 9.42	<0.001
Interprofessional team evaluation	7.38	9.35	5.45, 9.30	<0.001

Discussion

Despite having significant observation of interprofessional collaboration before the simulated hospital experience, the data showed a statistically significant difference in the participants' pre-post test scores on the SEIEL suggesting there were improvements in the students' self-efficacy to interact with students from other healthcare professions (Interprofessional Interaction subscale) and in working to improve teamwork (Interprofessional Team evaluation subscale). Similar findings were reported by Bethea et al. (2019) who found significant improvements in occupational and physical therapy students' readiness and attitudes toward engaging in interprofessional learning after a series of multimodal IPE sessions. The series of multimodal IPE sessions used individual paper- and video-based standardized patient scenarios, an interprofessional meeting, and a live patient evaluation.

The persistent improvements in self-efficacy were found in other IPE activities that use different combinations of disciplines to promote teamwork and communication. Pilot work done by Stehlik et al. (2018) with nursing and pharmacy students that used a clinical laboratory to simulate two scenarios, one with a patient admission and stay at a hospital and the second that involved a discharge from the hospital showed significant improvements in pre-post attitudes towards interprofessional collaboration. Nichols (Nichols et al., 2019) reported a greater understanding of the various roles and responsibilities for collaborative practice with the need for holistic, patient-centered care after students from six different health science disciplines all participated together in two interdisciplinary

simulation activities.

The SHIPES experience was a revelation for some of the student participants. During the debriefing sessions, some of the occupational therapy students expressed that their self-efficacy was higher before the simulated hospital lab experience but realized they were not as prepared for the SHIPES as they assumed. These sentiments were reflected in the lower scores on the SEIEL after the simulation experience. Based on these sentiments, assumptions can be made that some students may have preconceived beliefs about the intricacies of learning to collaborate as an interprofessional team until they are actually in a clinical environment that fosters these efforts.

The literature states that both poor communication and poor teamwork are primary sources of medical errors leading to lower patient outcomes (Sirota R. L. (2000); Topcu et al., 2017). Improving student participants' self-efficacy in communication and teamwork increases the chances that they will be effective interprofessional healthcare providers and provide quality healthcare to future patients (Thomas et al., 2017). This study adds to the literature on IPE-simulated healthcare experiences. A limitation of this study was the lack of randomization of students into intervention and control groups. Randomization may have enhanced the understanding of the effects of the simulated hospital IPE experience and minimized the possibility of improved self-efficacy for interprofessional learning which may have occurred naturally through usual didactic coursework activity.

Another limitation was the relatively small number of nursing students participating compared to the PT and OT students in this study. The small number of nursing students may limit the generalizability of this study's results for nursing. The nursing students' prior clinical experience and paid clinical experience were not recorded which is another limitation of this study. The possibility for heterogeneity of experiences of the nurses as a baseline could have produced floor or ceiling effects of the intervention. More precise collection of this data for the nursing students would improve the ability to detect the effect of this intervention for the collective student group. Lastly, this study did not examine the long-term effects of the intervention on self-efficacy over time, however previous literature supports a positive association between higher levels of self-efficacy and the increased likelihood to display professional behaviors such as interprofessional collaboration (Thomas et al., 2017).

Implications for practice

Accreditation requirements in the USA have mandated the inclusion of interprofessional activities in entry-level educational programs for healthcare professionals. Faculty members of these programs must elevate the expectations for engaging with members of varied health professional backgrounds by providing meaningful and realistic opportunities for students to communicate and collaborate as an interprofessional team. Challenges were encountered in providing this experience. Coordinating the class schedules of three different healthcare programs was difficult and the simulated hospital experience was resource-intensive to plan and implement.

However, the results of this research were worth the effort to improve the educational experience and increase the potential self-efficacy of future practitioners. Educational activities designed to enhance students' self-efficacy to communicate and collaborate in an interprofessional environment may have the potential to cultivate students' interests to seek structured and unstructured opportunities to learn from students of other healthcare disciplines during the didactic phase of their training. These behaviors may initiate the formation of interprofessional learners and teams that ideally will persist as they become healthcare professionals.

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