

Healthcare Students' Perceptions, Attitudes, and Beliefs on Professional Identity and Interprofessional Socialization After a Single Event Co-treatment Simulation

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Abstract

INTRODUCTION Readyng healthcare students for interprofessional care is an essential responsibility of higher education institutions that can be accomplished using simulation. The purpose of this study was to investigate the changes of student values, beliefs, and attitudes related to their professional identity and interprofessional socialization in entry-level occupational and physical therapy students.

METHODS Forty-one healthcare professional students, 23 physical therapy and 18 occupational therapy, mean age 24.73 (\pm 2.07), participated in a simulation-enhanced interprofessional co-treatment experience using a pre-post study design. Surveys were completed before and after the simulation.

RESULTS Paired t-tests revealed statistically significant differences between the pre- and post-test scores of the Interprofessional Socialization and Values Scale ($p \leq 0.001$) and the Professional Identity Values Scale- Professional Development (≤ 0.001). Between group comparisons by program revealed no statistically significant difference at baseline or at post-testing for the Interprofessional Socialization and Values Scale ($p = 0.145$).

DISCUSSION The results suggest participation in a simulation-enhanced interprofessional co-treatment experience promoted positive changes in perceptions of professional identity measured by the Professional Identity Values Scale- Professional Development and interprofessional socialization measured by the Interprofessional Socialization and Values Scale. These measures may be useful for obtaining quantifiable data to track learning outcomes in entry-level physical and occupational therapy students.

CONCLUSION Entry-level healthcare student impressions regarding professional identity and interprofessional collaboration are essential for successful clinical internship experiences and safe patient care. To quantify long-term learning outcomes, further research is needed related to carryover after interprofessional simulation experiences within a variety of entry-level healthcare professions.

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Implications for Interprofessional Practice

- Occupational therapy and physical therapy students experienced a significant improvement in interprofessional socialization and professional identity after a single-event interprofessional simulation. Educators may want to consider the value and feasibility of a one-time simulation when designing future interprofessional opportunities.
- All students, regardless of gender, profession, or previous interprofessional simulation experience benefitted from the interprofessional simulation as evidenced by improvements in perceptions, attitudes, and beliefs regarding professional identity and interprofessional collaboration.
- Results from this study support current evidence to incorporate interprofessional education using simulation into entry-level healthcare education to prepare students for collaboration among healthcare teams.

Introduction

Ensuring that healthcare students are ready for collaborative practice upon entering the workforce is a global priority to strengthen health systems, manage complex health situations, and improve patient outcomes (World Health Organization, 2010). Higher education institutions with a focus on healthcare professions play an essential role in readying students to work within a healthcare team to provide quality patient care. Some accrediting bodies, including those for physical and occupational therapy programs, have set a precedent by incorporating interprofessional education (IPE) requirements into their educational standards. Agencies such as the Interprofessional Education Collaborative (IPEC) support universities in preparing students for interprofessional care by providing core competencies which can guide the planning of interprofessional learning activities for students (IPEC, 2016).

Literature supports the use of various IPE learning activities, including experiential learning, simulation, online courses, service learning, and case-based scenarios to promote the development of IPE competencies and enhance the perception of collaborative practice in healthcare (Brzuz & Gustafson, 2019; Kim, Radloff, Stokes, & Lysaght, 2019; Rhodes et al., 2019; Seif et al., 2014; Sheldon et al., 2012; Yang et al., 2017). Assessment of IPE experiences is critical to ensure achievement of educational outcomes outlined by the mission and goals of the institution, program, and course curriculum (Kahaleh, Danielson, Franson,

Nuffer, & Umland, 2015). Sound psychometric assessments exist across a wide range of competencies, including interpersonal relationships, knowledge of professional roles, perceptions, attitudes, and beliefs related to teamwork and leadership (Kahaleh et al., 2015). While recent literature has focused on the importance of values, beliefs, attitudes, and behaviors surrounding the collaborative practice of interprofessional work, there is a paucity of evidence pertaining to the development and adoption of interprofessional identities and collaboration among entry-level occupational and physical therapy students.

Literature Review

Simulation as a Teaching Method

The use of simulation as a teaching and learning method has become increasingly popular in allied healthcare education (Owen, 2016). Simulation experiences afford opportunities for hands-on experiential learning, role exploration, and communication skills for learners without posing risk to a real client (Kolb, 2001; West & Parchoma, 2016). Literature supports the use of simulation as a method for delivery of IPE, as learners can practice teamwork and clinical decision making within the context of interprofessional healthcare-related scenarios (Karnish, Shustack, Brogan, Capitano, & Cunfer, 2019; Lee, Pais, Kelling, & Anderson, 2018; Sergakis et al., 2016).

Specifically, simulation is a plausible option to enhance professional identity and socialization (Karnish et al., 2019; Sergakis et al., 2016). According to Sergakis et

al. (2016), students included in the study demonstrated increased positive attitudes toward interprofessional learning after participating in an interprofessional simulated scenario involving eight different professions. Quantitative data revealed significant differences in all subscales of The Readiness for Interprofessional Learning Scale instrument, except for roles and responsibilities (Sergakis et al., 2016). Qualitative themes extracted from focus group data included improved professional identity and role recognition, teamwork and collaboration, cross-discipline communication, and improved confidence and skills (Sergakis et al., 2016). The resultant themes of a qualitative study by Layne, Perry, Andrea, and Collins (2019) expanded beyond role identity, with students reporting concepts including development of affective skills, emotional reactions to simulation, appreciation of realism, and interest in increased IPE. Karnish et al. (2019), reported a significant improvement in student attitudes toward interprofessional collaboration after a singular simulation involving nursing, physical therapy, and medical imaging students in the acute care setting.

Professional Identity and Socialization in Healthcare Education

Professional identity is the culmination of an individual's perceptions, knowledge, beliefs, attitudes, and experiences which define themselves in a professional capacity, and is developed through cognitive and social means (Monrouxe, 2010; Schein, 1978). A strong sense of professional identity is critical to develop confident, committed, and team-oriented healthcare professionals (Liddell, Wilson, Pasquesi, Hirschy, & Boyle, 2014; Monrouxe, 2010). Professional education programs hold a significant role in shaping professional identity (Hayward & Li, 2015; Monrouxe, 2010). The development of professional identity in healthcare students is context-dependent and cultivated within a community of practice in the classroom or clinic with the help of instructors, mentors, and peers (Hayward & Li, 2015; Liddell et al., 2014). Professional identity is constructed when students connect theory and practice, and can be achieved through educational activities such as simulation, peer learning activities, interprofessional experiences, experiential learning, and reflective learning (Binyamin, 2018; Caza & Creary, 2016; Ikiugu & Rosso, 2003; Liddell et al., 2014; Sergakis et al., 2016). A student's profes-

sional identity is further solidified during interactions with other healthcare professionals and patients in the clinical setting (Wilson, Cowin, Johnson, & Young, 2013).

Successful clinical practice within a healthcare team requires individuals to advance their professional identity into an interprofessional identity through a course of socialization (King, Shaw, Orchard, & Miller, 2010). The process of interprofessional socialization occurs when members of different professions work together to learn with and about each other, and ultimately transition from security within their professional individuality to comfort within the interprofessional team (Khalili, Orchard, Laschinger, & Farah, 2013; King et al., 2010). Factors which influence the socialization process are an individual's beliefs, attitudes, and behaviors (King et al., 2010). Khalili et al. (2013), provides a framework for interprofessional socialization which includes three stages. In stage one, learners break down barriers resultant of a singular professional viewpoint and preconceived notions of disciplines other than their own (Khalili et al., 2013). Stage two encompasses interprofessional role education through interprofessional collaboration and requires student engagement in exploratory learning activities and discussions about how to cooperate with various professions (Khalili et al., 2013). In stage three, students form a dual identity in which their professional individuality fits within an interprofessional identity (Khalili et al., 2013). Research supports the use of IPE experiences, including simulation, in healthcare programs to improve interprofessional socialization (August, Gortney, & Mendez, 2020; Karnish et al., 2019). Educational institutions can provide opportunities for interprofessional socialization to develop team-oriented clinicians ready for collaborative practice.

Occupational and Physical Therapy Interprofessional Collaboration

Occupational therapists (OT) and physical therapists (PT) rarely work independently of one another in healthcare; however, there is a lack of literature that investigates role identity and interprofessional collaboration between the two specific disciplines (Lee et al., 2018). Previous studies investigating interprofessional collaboration and role identity have combined various healthcare professions in simulated experi-

ences, but delivery of the scenario has been variable or unreported (Karnish et al., 2019; Sergakis et al., 2016). The intent of this simulation experience was to deliver a realistic scenario of interprofessional care by allowing occupational and physical therapy students the opportunity to collaborate prior to performing a co-treatment with the patient. The purpose of this study was to investigate the changes of student values, beliefs, and attitudes related to their role identity and interprofessional collaboration in entry-level occupational and physical therapy students.

The following were the guiding research questions for the study:

- What is the effect of an IPE experience on student values, beliefs, and attitudes related to their professional identity and interprofessional socialization among entry-level occupational therapy and physical therapy students?
- Is there a significant difference between occupational therapy and physical therapy students in values, beliefs, and attitudes related to role identity and interprofessional collaboration?

Methods

Participants and Setting

A pre- and post-test study design was used to assess the changes in attitudes, beliefs, and behaviors toward collaborative practices within and between occupational and physical therapy students after a single simulation-enhanced interprofessional education (Sim-IPE) co-treatment experience. The investigators received institutional review board (IRB #UR-0618-293) approval prior to participant consent. Participants were enrolled in a private, for-profit graduate health sciences university in the southeast region of the United States. All students were in the fourth term of the Doctor of Physical Therapy program or the Masters/Doctor of Occupational Therapy program and were expected to participate in the IPE activity as a requirement of coursework. Participation in the Sim-IPE co-treatment experience was required, though student's participation in the study was voluntary and did not affect academic standing.

Eighty-eight total students were notified of the study in a regularly scheduled class, and paper informed consent forms were distributed to and signed by those who wished to participate.

Measures

Interprofessional Socialization and Values Scale. The Interprofessional Socialization and Valuing Scale (ISVS) is a self-report tool that measures interprofessional attitudes, beliefs, and behaviors within health-care students and professionals as influenced by collaborative care practices (King et al., 2010). The ISVS consists of 24 items which the responder rates using a 7-point Likert scale (1 = not at all; 7 = to a very great extent). "Not applicable" is also included as a response choice. The measure is scored out of a total of 168 points with higher scores indicating greater presence of collaborative care characteristics. The ISVS can be used to assess changes in interprofessional socialization after the implementation of a workplace or educational intervention (King et al., 2010). The ISVS includes three subscales: self-perceived ability to work with others (beliefs), value in working with others (attitudes), and comfort in working with others (behaviors) (King et al., 2010). The subscales have excellent reliability (Cronbach's alpha ranging 0.79-0.89) and the coefficient alpha for the entire scale is 0.90 (King et al., 2010). A study conducted by De Vries, Woods, Fulton and Jewell (2016) later validated the 24-item ISVS with practicing health-care professionals and discovered two new factors: self-perception of team responsibility and valuing of patient-centered care. Due to poor factor loading they revised the scale eliminating item 24, "I believe that interprofessional practice is difficult to implement." For these reasons, the current study used a revised 23-item modified version of the ISVS from the De Vries et al. study (2016), as seen in Table 1.

Professional Identity and Values Scale- Professional Development Subscale. The Professional Identity and Values Scale (PIVS) is an instrument that assesses practices, attitudes, and beliefs regarding professional identity within the counseling profession and has since been validated with the athletic training population (Eason, Mazerolle, Denegar, Burton, & McGarry, 2018). Originally developed by Healy (2009),

the PIVS is comprised of 32 items that measure professional identity and consists of two subscales: Professional Orientation (18 items) and Professional Development (14 items). The Professional Development subscale of the PIVS analyzes the progression of one's training and education through three stages: imitation and internalization of expert beliefs, acceptance of one's inner voice as expert and role exploration, and individualization of professional beliefs (Eason et al., 2018). To ensure a focused approach to

measuring professional identity, this study only utilized the Professional Development (PD) subscale as seen in Table 2. Participants were asked to rate each item using a 6-point Likert scale (1 = strong disagreement to 6 = strong agreement) for a maximum score of 84 (Woo & Henfield, 2015). Higher scores indicate greater presence of role identity (Woo & Henfield, 2015). According to Healy and Hays (2012), Cronbach alpha levels (0.80) indicate moderate to strong face and content validity for the total subscale scores.

| Subscale | Item |
|--|---|
| Comfort in Working with Others | I feel comfortable initiating discussions about sharing responsibility for client care. |
| | I feel comfortable debating issues in a team. |
| | I am comfortable being the leader in a team situation. |
| | I feel confident in taking on different roles in a team. |
| | I am able to share and exchange ideas in a team discussion. |
| | I feel comfortable speaking out within the team where others are not keeping the best interest of the client in mind. |
| Value in Working with Others | I see myself as preferring to work on an interprofessional team. |
| | I have gained an appreciation for the benefits in interprofessional teamwork. |
| | I have gained greater appreciation of the importance of a team approach. |
| | I believe that interprofessional practice will give me the desire to remain in my profession. |
| Self-Perceived Ability to Work with Others | I believe that interprofessional practice is not a waste of time. |
| | I have gained a better understanding of my own approach to care within an interprofessional team. |
| | I am able to listen to other members of the team. |
| | I feel comfortable clarifying misconceptions with other members of the team about the role of someone in my profession. |
| | I more highly value open and honest communication with team members. |
| | I have gained more realistic expectations of other professionals on a team. |
| Self-Perception of Team Responsibility | I have gained an enhanced awareness of the roles of other professionals on a team. |
| | I feel comfortable in accepting responsibility delegated to me within a team. |
| | I feel able to act as a fully collaborative member of the team. |
| Valuing of Patient-Centered Care | I feel comfortable in being accountable for responsibilities I have taken on. |
| | I am comfortable engaging in shared decision making with clients. |
| | I have gained a better understanding of the client's involvement in decision making around their care. |
| | I have gained an appreciation for the importance of having the client and family as members of a team. |

Table 1. *Interprofessional Socialization and Valuing Scale*

Overall, I do not feel confident in my roles as an occupational/physical therapist (R)

My approach to my work in physical/occupational therapy is largely modeled after those I perceive to be experts.

Feedback from my supervisors and experts serve as the primary means by which I gauge my professional competence.

I am unsure about who I am as an occupational/physical therapist. (R)

I understand theoretical concepts, but am unsure how to apply them. (R)

I am still in the process of determining my professional approach. (R)

I always gauge my professional competence base on both internal criteria and external evaluation.

In making professional decisions, I balance my internal professional values and the expectations of others.

Based on my level of experience within the occupational/physical therapy profession, I have begun developing specialization within the field.

I have developed personal indicators for gauging my own professional success.

I feel confident in my role as an occupational/physical therapist.

I feel comfortable with my level of professional experience.

At this stage in my career, I have developed a professional approach that is congruent with my personal way of being.

I have developed a clear role for myself with the occupational/physical therapy profession that I think is congruent with my individuality.

Table 2. *Professional Identity and Values Scale – Professional Development Subscale Items*

Procedure

Simulation-enhanced Interprofessional Education Co-treatment Experience. The Sim-IPE co-treatment experience was designed by the investigators in accordance with criteria as presented by the International Nursing Association for Clinical Simulation and Learning (INACSL) (INACSL Standards Committee, 2016a; INACSL Standards Committee, 2016b). The simulation was created and driven by carefully assessed educational needs and objectives for student learning. Preparatory videos were provided, and a pilot test of the Sim-IPE co-treatment experience was completed the prior term to ensure uniform execution. The novel Sim-IPE co-treatment experience required an OT and PT student to provide a cohesive collaborative intervention for an elderly patient presenting with an acute cerebral vascular accident. The Sim-IPE co-treatment experience took place in a simulated sub-acute rehabilitation setting in the university's simulation center. To preserve fidelity of the experience, a standardized patient and family member were used for the scenario. The standardized patient and family member were given a 1-hour training about the scenario and acting roles. Additionally, a patient video was provided as an example of func-

tional deficits common for a patient with a cerebral vascular accident. Due to large class size, all students were randomly divided among three groups to participate in the simulation. The simulated actors remained consistent for each of the three simulation experiences. Each experience took approximately 50 minutes. Instructors provided a verbal pre-brief and gave the PT and OT students five minutes to examine a paper chart with case information. The selected students collaborated in a private area and the interaction was streamed into the room for observers to view live. The simulated scenario took 20 minutes and was followed by a 25-minute debriefing. Instructors used a combination of three-phase debriefing and Plus-Delta debriefing techniques to elicit students' reactions, analysis of behaviors, and how the learned information would be used in future clinical care (Abulebda, Auerbach, & Limaiem, 2020). Instructors were trained via in-person simulation and debriefing seminar and the same instructors debriefed all groups for consistency.

Prior to the simulation, one PT and one OT student were randomly selected to participate in the simulation scenario. The students collaborated prior to entering the patient's room to mimic a realistic interaction between co-treating therapists. Once in

the treatment room, the students interacted with two actors; the patient and the patient's son. The remaining students actively observed via two-way glass and video. Upon completion of the simulation, a faculty member from the occupational therapy program and the physical therapy program facilitated a debrief session for student reflection and discussion.

Data collection. Student preparation and data collection occurred over the course of three weeks. Two weeks prior to the simulation, students in each class were informed of the Sim-IPE co-treatment experience by the study investigators. Investigators were blinded to those participating in the study. One week prior to the simulation experience, the pre-survey was sent via a web-based survey tool, Google Forms, to all students with the instructions that only study participants who signed the informed consent should complete the form. The survey included basic demographic information about the students, the ISVS, and the PIVS-PD. Estimated time to complete the survey was 15-20 minutes. Once the simulation experience was completed, the students had one week to complete the post-test survey, which consisted of the ISVS and the PIVS-PD. All data were deidentified.

Data analysis. An a priori G-power analysis was used assuming a two-tailed, paired t-test analysis, resulting in the need of 34 total students to achieve 80% power with an alpha of 0.05 and medium effect size of 0.5. Data were downloaded from Google Forms to Excel and then uploaded to Statistical Package for the Social Sciences (SPSS) v 25 for final analysis. Reverse coding was completed for negatively keyed items within SPSS. Baseline characteristics of the sample ($n = 41$) were analyzed. Descriptive statistics were performed between groups at pre- and post-tests for the following groups: entire sample, program enrollment, gender, prior interprofessional (IP) work experience, and prior IP simulation experience. Assumptions for normality were analyzed and met. The primary research question was tested using two-tailed paired t-tests to measure the change between pre- and post-test results of each scale, ISVS and PIVS-PD within the total sample. Data were further analyzed to assess between group differences according to demographic groups and between groups for each scale using independent samples t-tests. Point biserial correlations were calculated to assess the strength of the

relationship between the two measures. All data were analyzed using alpha level of 0.05. Cohen's d effect sizes were calculated and interpreted as small ($d = 0.2$), medium ($d = 0.5$), and large ($d = 0.8$) (Cohen, 1988).

Results

Fifty out of 88 total occupational therapy and physical therapy students participated in the study, yielding a response rate of 56.8%. Nine students were removed due to incomplete data. Demographic characteristics of the study sample ($n = 41$) can be seen in Table 3. Most students were female (75.6%), and more than half of the sample were enrolled in the Doctor of Physical Therapy program (56%) as compared to the Masters/Doctor of Occupational Therapy programs combined (44%). Only 19.5% of the sample experienced prior IP simulation.

Differences within Groups

Two-tailed, paired samples t-tests were used to compare pre-test and post-test mean scores of student attitudes, values, and beliefs about interprofessional collaboration and perceptions of role identity (Table 4). Analysis revealed statistically significant differences between the pre-test and post-test scores of both the ISVS ($p \leq 0.001$, $d = 0.63$) and the PIVS-PD ($p \leq 0.001$, $d = 0.39$). In addition, differences from pre- to post-test within various demographic groupings revealed statistical significance for within group comparisons for program, female gender, prior IP work experience, and prior IP simulation for the PIVS-PD scale. Paired samples t-tests revealed within-group differences measured on the ISVS scale did not have a significant change in those with prior IP simulation experience ($p = 0.297$). Individuals with and without prior IP work experience demonstrated statistically significant differences in the PIVS-PD scores at post-testing, however, the effect size was larger within the group without prior IP work experience ($d = 0.46$), compared to within the group with prior IP work experience ($d = 0.34$). Male gender, when analyzed for within group changes, despite resulting in higher post-test scores, were not statistically significant for either the PIVS-PD ($p = 0.342$, $d = 0.41$) or ISVS ($p = 0.118$, $d = 0.47$).

| | <u>Total</u> | <u>DPT</u> | <u>MOT</u> | <u>OTD</u> |
|------------------|--------------|------------|------------|------------|
| n | 41 | 23 | 10 | 8 |
| Gender | | | | |
| Male | 31 | 8 | 2 | 0 |
| Female | 10 | 15 | 8 | 8 |
| Age in years | | | | |
| Mean | 24.73 | 25.04 | 24.6 | 24 |
| SD | 2.07 | 2.33 | 1.71 | 1.69 |
| Range | 22-34 | 23-34 | 22-28 | 23-28 |
| Previous IP Work | | | | |
| Yes | 22 | 14 | 5 | 3 |
| No | 19 | 9 | 5 | 4 |
| Mean in years | 1.07 | 1.2 | 0.95 | 0.81 |
| SD | 1.49 | 0.32 | 1.2 | 1.73 |
| Range | 0-6.5 | 0-6.5 | 0-3 | 0-5 |
| Prior IP SIM | | | | |
| 0 experiences | 33 | 18 | 8 | 7 |
| 1-5 experiences | 8 | 5 | 2 | 1 |

Table 3. *Demographics of the interprofessional simulation participants*

Note. DPT = Doctor of Physical Therapy. MOT = Master of Occupational Therapy. OTD = Doctor of Occupational Therapy. SIM = simulation. SD = Standard deviation. IP = Interprofessional

| | <u>Mean Difference</u> | <u>t-statistic</u> | <u>p-value</u> | <u>Cohen's d</u> |
|----------------|------------------------|--------------------|----------------|------------------|
| PIVS-PD | | | | |
| Whole group | -3.29 | -3.84 | ≤ 0.001* | 0.39 |
| Program | | | | |
| OT | -3.94 | -3.01 | 0.008* | 0.48 |
| PT | -2.78 | -2.42 | 0.024* | 0.35 |
| Gender | | | | |
| Male | -3.30 | -1.45 | 0.181 | 0.41 |
| Female | -3.29 | -3.68 | 0.001* | 0.40 |
| Prior IP Work | | | | |
| Yes | -2.91 | -2.98 | 0.007* | 0.34 |
| No | -3.74 | -2.51 | 0.022* | 0.46 |
| Prior IP SIM | | | | |
| Yes | -3.00 | -3.46 | 0.010* | 1.00 |
| No | -3.36 | -3.20 | 0.003* | 0.43 |
| ISVS | | | | |
| Whole group | -12.46 | -3.99 | ≤ 0.001* | 0.63 |
| Program | | | | |
| OT | -9.00 | -2.13 | 0.048* | 0.43 |
| PT | -15.17 | -3.38 | 0.003* | 0.81 |
| Gender | | | | |
| Male | -9.50 | -1.00 | 0.342 | 0.47 |
| Female | -13.42 | -4.61 | ≤ 0.001* | 0.68 |
| Prior IP Work | | | | |
| Yes | -8.82 | -2.12 | 0.046* | 0.42 |
| No | -16.68 | -3.58 | 0.002* | 0.91 |
| Prior IP SIM | | | | |
| Yes | -9.38 | -1.13 | 0.297 | 0.55 |
| No | -13.21 | -3.91 | ≤ 0.001* | 0.66 |

Table 4. Paired samples *t*-test for Profession Identity and Values Scale (PIVS-PD) and Interprofessional Socialization and Values Scale (ISVS)

*Statistically significant

Note. OT = Occupational therapy. PT = Physical therapy. SIM = simulation. IP = Interprofessional

Differences between Groups

Secondary analysis investigated between-group differences of each scale for the following demographics: program (PT vs OT), gender, prior IP work experience, and prior IP simulation experience. Baseline characteristics of all groups were not significantly different for the ISVS indicating a homogeneous population. Results of independent t-tests for each between group comparison for the ISVS revealed no statistically significant changes from pre-test to post-test (Table 5).

Descriptive analysis of the PIVS-PD revealed significant differences between groups at baseline between program ($p = 0.026$) and prior IP simulation experience ($p = 0.001$) (Table 6). Further analysis revealed statistically significant differences for the PIVS-PD post-survey when comparing students with and without prior IP simulation experience ($p = 0.007$, $d = 0.96$). No statistically significant difference and small effect size were found from pre- to post- scores of the PIVS-PD between participants with and without prior IP work experience ($p = 0.560$, $d = 0.18$) (Table 6).

| Category (n, n) | Pre | | | Post | | | Cohen's d |
|--------------------------------------|-------------|---------|------------------|-------------|---------|------------------|-----------|
| | t statistic | p-value | Mean Differences | t statistic | p-value | Mean differences | |
| OT, PT (8, 23) | -0.40 | 0.690 | -2.69 | -1.50 | 0.145 | -8.86 | 0.49 |
| Male, Female (10, 31) | 0.69 | 0.502 | 6.02 | 0.36 | 0.727 | 2.10 | 0.12 |
| Prior IP Work no, yes (19, 22) | -0.61 | 0.545 | -4.13 | -0.67 | 0.510 | 3.74 | 0.21 |
| Prior IP SIM no, yes (33, 8) | -1.94 | 0.075 | -14.04 | -1.53 | 0.152 | -10.20 | 0.59 |

Table 5. Independent t-tests of the Interprofessional Socialization and Values Scale (ISVS)

Note. OT = Occupational therapy. PT = Physical therapy. SIM = simulation. IP = Interprofessional

| Category (n, n) | Pre | | | Post | | | Cohen's d |
|--------------------------------------|-------------|---------|------------------|-------------|---------|------------------|-----------|
| | t statistic | p-value | Mean Differences | t statistic | p-value | Mean differences | |
| OT, PT (8, 23) | -2.31 | 0.026* | -5.82 | -1.83 | 0.076 | -4.66 | 0.58 |
| Male, Female (10, 31) | 1.32 | 0.208 | 4.10 | 1.48 | 0.156 | 4.11 | 0.52 |
| Prior IP Work no, yes (19, 22) | -0.88 | 0.384 | -2.34 | -0.59 | 0.560 | -1.51 | 0.18 |
| Prior IP SIM no, yes (33, 8) | -3.74 | 0.001* | -6.40 | -2.94 | 0.007* | -6.04 | 0.96 |

Table 6. Independent t-test of the Professional Identity and Values Scale – Professional Development subscale (PIVS-PD)

*Statistically Significant

Note. OT = Occupational therapy. PT = Physical therapy. SIM = simulation. IP = Interprofessional

Relationship between Measures of Interprofessional Socialization and Professional Identity

Point biserial correlations analyzed the relationship between the ISVS and PIVS-PD scores (Table 7). The scales were significantly correlated (≤ 0.001) with 58% of the variance being shared between the two measures at baseline. Post-test results were also significantly correlated with slightly less variance being shared (41%) between the scales.

| Correlations | Pearson r_{pb} | p-value | R ² |
|----------------------------------|------------------|----------------|----------------|
| Pre-SIM PIVS-PD – Pre-SIM ISVS | 0.759 | $\leq 0.001^*$ | 0.58 |
| Post-SIM PIVS-PD – Post-SIM ISVS | 0.637 | $\leq 0.001^*$ | 0.41 |

Table 7. Point biserial correlations of the Interprofessional Socialization and Values Scale (ISVS) and the Professional Identity and Values Scale – Professional Development subscale (PIVS-PD)

*Statistically Significant

Note. SIM = simulation.

ber must understand their personal and professional role (King et al., 2010). Additionally, interprofessional socialization involves the development of an individual's professional and interprofessional identity, also known as a dual identity (King et al., 2010).

Two separate tools were used to capture change in attitudes, beliefs, and values of the variables interprofessional socialization and professional identity. As the ISVS does not specifically assess the domain of professional identity, the PIVS-PD was also included. Findings from this study identified a significant correlation between the ISVS and PIVS-PD, supporting their use congruently to investigate the primary research question. The findings from this study indicate that a single, hour-long Sim-IPE co-treatment experience significantly improved the overall outcome of both the ISVS and PIVS-PD scores within the total sample of both PT and OT students compared to baseline. While it is important to recognize the value of statistical significance, effect size can provide meaning to the change by giving reference to how well the experience worked (Coe, 2002). In this study, the effect sizes ranged from medium to large for the changes on the ISVS, and small to medium for the changes on the PIVS-PD, thus align-

Discussion

The primary purpose of this study was to investigate change in attitudes, beliefs, and values related to interprofessional socialization and professional identity after a single exposure to a Sim-IPE co-treatment experience between an entry-level occupational therapy and a physical therapy student. Role identity and responsibility is an IPEC competency critical for successful interprofessional collaboration (IPEC, 2016). To deliver effective patient care within a team setting, each mem-

ing with previous literature reporting the effectiveness of IPE experiences on healthcare education outcomes (Connaughton et al., 2019; Hood et al., 2014; Lapkin, Levett-Jones, Gilligan, 2013). A study by Karnish et al. (2019) examined a similar question among medical students, physical therapists, and medical imaging students using an acute care simulation experience. The interprofessional simulation positively affected the students' ratings of the ISVS-21 post-simulation (Karnish et al., 2019). However, no additional tool was used to assess professional identity among these groups (Karnish et al., 2019). The results from this study are in accordance with prior literature as it relates to improved interprofessional socialization, while also seeking to investigate the changes in professional identity of healthcare students. The Sim-IPE co-treatment experience in this study was designed to challenge the student's ability to represent their profession independently and inter-dependently with another healthcare provider role. Therefore, the emphasis of co-treatment between two disciplines may have contributed to positive changes in the attitudes, values, and beliefs about professional identity, as there were statistically significant improvements with small to medium effect size for both the PT and OT students.

In addition to the primary research question, this study investigated secondary factors, such as prior IP work experience, prior IP simulation experience, and gender that revealed differences in attitudes, values, and beliefs of interprofessional socialization and professional identity within and between groups. Prior IP work experience was defined as having worked in an interprofessional healthcare team before matriculation into the current program of study. Prior IP simulation experience was defined as having a simulation experience that included two or more disciplines working together within the current program. Literature suggests that prior interprofessional experiences in general may contribute to improved or more effective interprofessional collaboration (Kahlili, Orchard, & Laschinger, 2013). However, it is not clear if the type of prior interprofessional experience matters. According to the results of this study, no differences existed in the ISVS post-score between groups with or without prior IP work or prior IP simulation experiences.

Individuals with prior IP simulation experience reported higher scores at baseline on the PIVS-PD compared to those without. Hood et al. (2014), discovered that students with prior interprofessional learning experiences had more positive attitudes related to professional identity, which could help explain the reason for the difference at baseline in the current study. In the current study, participants with prior IP simulation experience demonstrated significantly improved scores with a large effect size ($p = 0.010$, $d = 1.00$). Based on these results, it is possible that prior IP simulation experience reinforced professional identity and allowed for further improvement after an additional IP simulation experience. The participants with prior IP work experience also demonstrated significant change on the PIVS-PD, however, with a corresponding small effect size ($d = 0.34$). After the Sim-IPE co-treatment experience, all students, regardless of whether they had prior IP simulation experience, demonstrated statistically significant improvement of professional identity on the PIVS-PD as evidenced by the paired t-test.

The topic of gender differences has been studied among various healthcare professionals as it relates to collaborative interprofessional training and professional identity. Prior research conducted by Falk, Hammar, & Nystrom (2015) reported that female healthcare professionals within occupational therapy, physical therapy, and nursing reported more positive impact of an inter-

professional training experience on professional identity as compared to males. Males tended to report less positive impact of the experience on their professional identity and development (Falk et al., 2015). The current study revealed males scored themselves higher on the pre-survey PIVS-PD and ISVS as compared to females, although not significantly. Additionally, males did not have a statistically significant change for either the ISVS or PIVS-PD as compared to the female sample after the Sim-IPE co-treatment experience. Although results from this study were not statistically significant for the within- or between- comparisons based on gender, the female sample (combined physical and occupational therapy) revealed statistically significant positive changes in both professional identity and interprofessional socialization attitudes, beliefs, and values after this Sim-IPE co-treatment experience. Further research is needed to investigate gender differences among perceptions of interprofessional experiences.

Limitations

Although the results of this study provide evidence for improved attitudes, beliefs, and values for interprofessional socialization and professional identity, limitations should be noted. Use of self-reported measures can result in undesirable response-bias due to potential misunderstanding of the measurement tool, social-desirability bias, recall bias, sampling approach, and selective recall (Althubati, 2016; Rosenman et al., 2014). This study may have been at risk of social-desirability bias in the context that the sample was comprised of students, and the co-investigators who facilitated the class also conducted the research for the study. However, the investigators were blinded to student participation to help mitigate the threat to internal validity. Recall bias, also referred to as recall error, is often present with self-reported questionnaires. Recall bias may occur when the participant experiences an increased length of time between exposure to the intervention or variable and the time in which they provide their self-report (Althubati, 2016). Therefore, timing of the post-survey administration could be a limitation of this study. The design of this study investigated short term, immediate changes of the perceptions, attitudes, and beliefs about interprofessional socialization and professional identity after a single Sim-IPE co-treatment experience. The time frame of one week before and one week after completion of the simulation experi-

ence may have introduced recall bias. Had the surveys been provided within 24 hours of the experience, recall bias may have been reduced. The risk of students not meeting a shortened timeline was the factor in deciding to provide an extended window.

The students were recruited using a convenience sample from a single for-profit university and were targeted at a particular timepoint in their curriculum. This study assessed PT and OT students; therefore, the sample may not be representative of students within other healthcare education disciplines. Cultural beliefs could impact a student's attitude, values, or belief as it relates to interprofessional socialization and professional identity, yet this information was not collected in the demographic portion of the survey. Readers are cautioned when applying the results of this study due to limitations of generalizability.

The PIVS-PD scale has been validated with both licensed counselors and athletic trainers (Woo & Henfield, 2015; Eason et al., 2018). Given the similar constructs of counselors, athletic trainers, and the professions of OT and PT, the PIVS-PD was used for this study. However, limitations exist in the interpretation and generalization of results as the PIVS-PD has not been validated in OT and PT student populations.

Upon reviewing the results specific to those with and without prior IP simulation and IP work experience, it is unclear of the influence the prior experiences had on the outcome of this study. The results indicate the need for more research investigating the influence of prior IP experiences among entry level healthcare students when measuring aspects of IP collaboration and professional identity. Moreover, there exists a demand to increase exposure to interprofessional experiences earlier within healthcare education to meet accreditation standards. Therefore, it may become more challenging to assess the effectiveness of a single exposure interprofessional simulation experience. Future research may need to focus on measuring advances in the areas of professional identity and interprofessional socialization over the course of an entry-level healthcare education program.

Conclusion

The results of our study add a unique element to the growing IPE literature as it specifically investigated professional identity using the PIVS-PD in addition to

the commonly researched topic of interprofessional socialization for OT and PT students. Despite its limitations, this study revealed positive changes of attitudes, values, and beliefs of professional identity and interprofessional socialization in both PT and OT students after experiencing a single Sim-IPE co-treatment experience. Most importantly, this study targeted specific interprofessional competencies critical to entry level healthcare student's growth and success within patient care settings. Often, these competencies are linked to institutional and program learning outcomes related to interprofessional collaboration in promoting the preparation of healthcare professionals to engage in the domain of interprofessional collaborative practice (ACOTE, 2018; CAPTE, 2017; IPEC, 2016). Quantifying and tracking learning outcomes related to IPE competencies may be feasible with the use of valid and reliable measures such as the ISVS and PIVS-PD. However, there continues to be a paucity of research that investigates long-term carry over effects of attitudes, beliefs, and values of interprofessional collaboration upon transition from student to preceptor within clinical internship experiences, and then in to becoming a licensed clinician. Therefore, future research is needed to measure the long-term impact of interprofessional simulation on entry-level healthcare students as they enter their clinical internship experiences and beyond into licensed patient care.

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