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Answering the Call for Interprofessional Education Using a Large-Scale Simulation

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Abstract

BACKGROUND Innovative teaching strategies are needed to promote interprofessional care. An interprofessional simulation experience was developed for students to work as a team and practice TeamSTEPPS principles. TeamSTEPPS is an evidenced-based tool developed by the Department of Defense to improve teamwork and communication skills for healthcare professionals that aims to create a "culture of safety."

SAMPLE Healthcare students in Physician Assistant (PA), Social Work (SW), Occupational Therapy (OT), Nursing, Athletic Training (AT), Orthotics and Prosthetics (O&P), Clinical Lab Science (CLS), Dietetics and Health Administration (HA) participated.

METHODS A 30-item Teamwork Attitudes Questionnaire (TAQ) was given pre- and post-simulation to evaluate our goal of assessing the attitudes of students toward teamwork and communication after participating in this interprofessional simulation. Another survey was given that asked students for qualitative information regarding their experience.

RESULTS Questionnaire results from 195 students demonstrated that a significant main effect, pre- versus post-test, on each category of the TeamSTEPPS principles, i.e. team structure, leadership, situation monitoring, mutual support, and communications.

CONCLUSIONS Students in each discipline showed an improvement in attitudes toward TeamSTEPPS principles regardless of their specific discipline. All qualitative comments reported a positive, worthwhile experience. Future research would include replication of this study at multiple sites and assessing if the benefits of improved attitudes in teamwork transfer into practice and improve patient outcomes.

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Introduction

The complexity of healthcare today demands a new approach to patient care. The traditional model of professionals working independently has shifted to interprofessional teams providing care for the patient. This shift has created a need for educational institutions to teach collaboration and teamwork as part of the core curriculum (Interprofessional Education Collaborative, 2016; World Health Organization, 2010). The development of the Core Competencies for Interprofessional Practice (2016) provides a framework for this education allowing disciplines to design curricular activities aligned with interprofessional competencies. This change requires educators to go beyond conventional teaching strategies to actively engage students in learning.

This study expanded the body of knowledge on interprofessional education by creating an activity using standardized patients (SP) in a simulated experience with interprofessional teams of learners. These individuals were trained to play the role of the patient, create a more realistic experience, and further promote learner outcomes (Gerzina, 2020, Lewis et al., 2017). An institutional gap in educational experiences using standardized patients within interprofessional teams was addressed by the creation of a simulation involving nine disciplines at the college. This study also addressed a gap in the literature related to educational offerings involving these specific professions engaging in large-scale simulated experiences.

Background/Literature Review

Simulation provides a safe environment for students to learn and apply knowledge and skills while working in teams and has shown to be a useful means to foster interprofessional education (Banks et al., 2019; Bambini et al., 2016; Fewster-Thuente et al., 2016). Best practice standards have been developed to guide educators in the use of this teaching strategy (INASCL Standards Committee, 2016b). Simulation enhanced interprofessional education (SIM-IPE) draws upon pedagogies from both simulation and IPE to guide team-based learning experiences (INASCL Standards Committee, 2016b).

In a response to the call for increased team-based learning, Eastern Michigan University (EMU) College of Health and Human Services established an office for the Advancement of Interprofessional Education, Research and Practice in 2013 in an effort to create a culture of collaboration and educational opportunities for students. This initiative prompted the creation of a task force that created an interprofessional simulation involving six disciplines in the college. The pilot study started the momentum of using simulation as an educational strategy to engage students to interact with one another outside of their own discipline.

Simulation Directors from EMU sought faculty champions in other disciplines to collaborate on an interprofessional simulation experience for students in the College of Health and Human Services (CHHS). Faculty from Physician Assistant (PA), Social Work (SW), Occupational Therapy (OT), Nursing, Athletic Training (AT), Orthotics and Prosthetics (O & P), Clinical Lab Science (CLS), and Dietetics and Health Administration (HA) programs participated. All disciplines are located in the same area at the college which promoted engagement and communication. Meetings were held once a month to determine a case that would be relevant to all professions. The Simulation Directors educated the faculty on the Interprofessional Education Collaborative (IPEC) competencies as well as the TeamSTEPPS system of communication to provide a framework for the simulation. TeamSTEPPS, an evidenced-based tool used to improve communication and teamwork skills among health care professionals aims to improve patient safety by providing a training curriculum and prepared teaching resources ready for implementation to health care professionals (Agency for Healthcare Research and Quality (AHRQ, 2017). TeamSTEPPS focuses on five main principles including team structure, communication, situation monitoring, leadership and mutual support. We used specific tools related to communication and team structure that were taught to our students prior to the event in a prerecorded presentation. Case development and standardized patient training took place over an academic year in 2015-2016. The first case was piloted in 2016 with the simulation taking place over the course of 4 hours on a Saturday morning. The pilot consisted of six disciplines being represented with 14 students reporting positive results in student satisfaction and professional role identification. The simulation was modified and expanded to include more disciplines each subsequent year with the latest simulation occurring in 2018-19.

Study Aim

The purpose of this study was to build upon previous participant and faculty feedback, refine methodology, and design a new scenario to compare learner attitudes on TeamSTEPPS principles across disciplines.

Methods

Sample

The 2018-19 simulation sample consisted of students in nine disciplines at the college: PA, SW, OT, AT, O & P, CLS, Nursing, Dietetics, and Health Administration. Students were at different educational levels including graduate and undergraduate. First and Second year Graduate students included PA, SW, OT, AT, O&P & CLS. Undergraduate participants were first year Nursing students and second year Dietetic students. Only PA, O & P and Dietetics required their students to participate, tying the experience to a class they were enrolled in. The other disciplines were voluntary. Recruitment of participants was led by faculty champions in each area. Also, the PA, Nursing, and OT students were the only ones who participated in any simulation activity prior to the event. Institutional human subjects' approval (IRB #929061) was obtained, and participants were consented prior to the study using a secure online platform.

Activity Design

Case development occurred the previous year and was created with an interprofessional team of faculty. The case was developed using feedback from prior events to promote consistency across sites and engage more disciplines at the college. In this study, staff and faculty were divided more equally at both locations and facilitators were trained together using INASCL best practices. The scenarios were changed to provide more cues to engage the teams of participants. The case consisted of two scenarios with the same learning objectives. These objectives incorporated the principles of TeamSTEPPS and were the following:

- Develop an increased understanding of roles and scope of practice of other healthcare team members
- Demonstrate interprofessional communication skills during a patient encounter that involves a difficult conversation
- Establish an interprofessional plan for a patient interaction through use of the TeamSTEPPS brief, checklist, or huddle tools

In the first, the patient presented to the Emergency Department (ED) for heat exhaustion and had an unwitnessed fall resulting in a hip fracture. During surgery, the patient then had an anaphylactic reaction to a medication. In part one, the students assessed the patient in the ED, discussed fall/fall risk reduction measure, and initiated orders/pain management. In the part two, students developed an interdisciplinary plan to discuss the adverse medication reaction that occurred. They also found the patient developed foot drop in their post-Surgical assessment and needed to address this as well as concerns the patient had about discharge and returning home (see Appendix A).

The simulation occurred at two sites, EMU and St. Joseph Mercy Hospital Simulation Center. There was some variability in physical characteristics of the space, but every effort was made to ensure consistency in delivery of the experience. The date of the simulation is always scheduled the second Friday of November. Having a set date allows each program to plan accordingly for students to attend. Training based on INASCL Best Practices occurred together for facilitators, standardized patients, and staff at both locations. This included providing initial education on both TeamSTEPPS and simulation principles targeted for this activity along with review of the learning objectives for the simulations (INASCL Standards Committee, 2016a). Information was shared on a common online site for volunteers and student participants with a dry run held a week before the event. Students were given pre-learning materials prior to the event consisting of a voice over PowerPoint of TeamSTEPPS 2.0 principles. These were emphasized again in the prebrief of the simulation on the day of the event. Previous lessons learned from a pilot study guided these process improvements.

Simulation Day

Logistics in a large event are one of the most challenging aspects of the activity. Students (195 total) were placed in pre-assigned interprofessional groups of 7-8 students. Groups consisted of 6 – 7 different disciplines respectively. Each site had approximately 6 groups in a morning session and then another 4-6 student groups in an afternoon session. They were able to spend time discussing roles in their own disciplines within the

interprofessional group in an icebreaker activity. The prebrief was then conducted with simulation principles, review of the TeamSTEPPS prelearning, small group orientation to the room and explanation of the scenario and objectives. Each group of 7-8 students were split into an A and B group and would alternate observing and participating in the simulation. Three to four students actively participated in the simulation with the SP at a time. All students participated in either Part 1 or Part 2 of the scenario. Mini debriefs using scripted debriefs based on the Plus Delta Method to discuss each simulation encounter were held after each small student group participated in each scenario. A large debrief (again using scripted debriefs based on the Plus Delta Method) followed with the entire student group after all students completed Part 1 and again after Part 2. (See Appendix B for a sample schedule of the morning session).

Data Collection

Data was collected using the Teamwork Attitudes Questionnaire (T-TAQ) which was given pre- and post-simulation. A survey was also used to elicit general open-ended comments regarding the experience. The T-TAQ was chosen to evaluate our goal of assessing the attitudes of students toward teamwork and communication after participating in this interprofessional simulation. This widely used tool was developed by the Agency of Healthcare Research and Quality (AHRQ) and the Department of Defense to measure attitudes related to core components of teamwork and has proven construct and content validity. T-TAQ reliability coefficients of each construct were examined with a range in alpha values from 0.70 (team structure, mutual support) to 0.83 (situation monitoring) (Agency for Healthcare Research and Quality, 2017). These components consist of team structure, communication, leadership, situation monitoring and mutual support. The 30-item questionnaire consisted of six questions related to each of the above components. Participants were asked to rate responses on a 5-point Likert scale with responses ranging from strongly disagree to strongly agree. In addition to the questionnaire, six additional demographic questions were asked: sex, age, discipline, level in the program, healthcare and interprofessional experience. There was also one comment area at the end for participants to give open-ended feedback.

A repeated measures ANOVA was conducted to compare the effect of discipline on each TeamSTEPPS principle ('team structure', 'leadership, 'situation monitoring', 'mutual support', and 'communications') before and after the test. The ANOVA was selected because the authors wanted to determine if there was a difference in learner attitudes of TeamSTEPPS principles across programs.

Results

A total of 195 students completed both the T-TAQ pre- and post-test surveys, which consisted of a series of questions measuring 'team structure', 'leadership, 'situation monitoring', 'mutual support', and 'communications'. The sample demographics included 84% and 16% female and male participants respectively, and just over eight out of ten participants (81%) were between 20 and 29 years old. While the majority of participants (70%) were enrolled in the OT (37%), Nursing (17%), and Physician Assistant (15%) programs, an additional 11%, 9%, 7%, and 4% were majoring in O & P, Dietetics, Social Work, and Health Administration respectively. In terms of experience, 71% of the sample had 'healthcare experience,' and 54% indicated they had 'IPE experience'. With respect to level of program, nearly two-thirds were graduate students, both first and second year, followed by 28% who were juniors and seniors. The remaining 6% were second degree students.

The results revealed that there was a significant main effect, pre versus post-test, in each category, i.e. "team structure - ((F (1, 171) =23.8, p=0.000, "leadership" – ((F (1, 171) =21.2, p=0.000, situation monitoring" - ((F (1, 171) =27.6, p=0.000, "mutual support" - ((F (1, 171) =16.9, p=0.000, and "communications" - ((F (1, 171) =29.5, p=0.000. There was no significant effect found when comparing disciplines (see Appendix C).

Discussion

This study presented an interprofessional simulation aimed at increasing teamwork attitudes in healthcare students participating in the simulation. The findings added to existing research on the positive effects of SIM-IPE strategies across disciplines (Burford et al., 2020; Banks, et al., 2019; Kukko et al., 2020). Both quantitative and qualitative responses indicated that students experienced significant benefits from their participation. Students, regardless of discipline, showed an increase in individual attitudes toward team struc-

ture, leadership, mutual support, situation monitoring, and communication. Moreover, their qualitative comments were overwhelmingly positive regarding their perceived benefits. A few examples include, "I like the simulation. It gives me a sense of how it is like to work with other healthcare professional to help a patient to get better" and "This was a wonderful experience and enjoyed working with fellow students in other disciplines and collaborating together in this simulation." Students, regardless of experience or level of education, all showed increased benefit from TeamsSTEPPS training.

The feasibility and the sustainability of this type of large-scale event involved significant planning and recruitment of champions in each of the nine disciplines. These processes occurred in the months leading up to the event and included revisions, as mentioned earlier, from a previous pilot study. Limitations included disciplines without programs at our university participating, such as pharmacy or physical therapy, which would have enriched the experience. Lessons learned in the planning process included the need to increase the frequency of communication with champions, align the event with a specific course in each discipline and streamline online content for participants to increase clarity.

Conclusion

The implications of this large scale interprofessional simulation yield a model that supports TeamSTEPPS training in promoting improved attitudes toward teamwork. With limited opportunities for healthcare students to practice together in a clinical setting, large scale simulation events allow students from different disciplines to work together to care for a standardized patient presenting with complex needs. This educational strategy can be easily replicated and expanded in other institutions and settings. Future research is needed to see if the benefits of improved attitudes in teamwork transfer into practice and improve patient outcomes.

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Appendix A

Scenario 1: This is [DAY 1] of the patient's stay.

The patient has presented to the Emergency Department (ED) by EMS from their grandson's baseball game with heat exhaustion. While in the ED, the patient got up by themselves and went to the bathroom. While in the bathroom they had an unwitnessed fall. Responding staff assisted patient onto a stretcher and back to their room. The patient did not strike their head or lose consciousness during or after the fall. The patient was seen by the physician post fall and has completed x-rays of the left hip. The final radiology read is pending. The patient is back in their room and is reporting left hip pain, worse with movement. You are going in to assess your patient, perform a post fall huddle, and review and initiate orders that you will find in the patient's chart. You will use your team's TeamSTEPPS Brief Checklist and the Fall Risk Assessment/Huddle Tool.

Scenario 2: It is now [DAY 2] of the patient's stay.

The patient was seen in the Emergency Department on [DAY 1] for heat exhaustion and hypernatremia. The patient has been admitted to the Med-Surg unit s/p surgery to repair a broken femur. While in the ED, the patient got up by themselves and went to the bathroom. While in the bathroom the patient had an unwitnessed fall. The patient did not strike their head or lose consciousness during or after the fall. The patient was found to have a left proximal femoral fracture [Intertrochanteric Fracture]. The patient was admitted from the ED to the Med-Surg unit for rehydration and correction of electrolyte imbalance before surgery and then taken to the Operating Room on the morning of [DAY 2]. The patient experienced symptoms of an allergic reaction during surgery, which were recognized and treated by the CRNA and the patient's condition improved. The open reduction and fixation of the hip fracture was successfully completed. The patient was recovered post-op without any further complications. The patient is now back in their room on the Med-Surg unit. You are going in to evaluate the patient and inform them of the allergic reaction that occurred during surgery. You will use your team's plan that was developed during your planning session.

Appendix B

Table 1. *Sample schedule of the Morning Session*

	Sim 1	Debrief 1	Sim 2	Debrief 2	Sim 3	Debrief 3	Large Conference Room	Transition
8:30-8:50							**Event Orientation /Introductions** **TeamStepps Tools**	
8:50-9:10							**Read participant brief and explain role cards distributed at check in. Groups A/B planning time for Sim 1 Tools: Brief Checklist, Fall Huddle Form**	
9:10-9:25							**Orientation to simulation rooms, meet SPs**	
9:25-9:40	**A1**	**A1**	**A2**	**A2**	**A3**	**A3**	**All Group B's Conference Room** **(Extra Planning Time Sim 1)**	**Group A Sim**
9:40-9:45								**ALL GROUPS** **Group A-Large Conference Room** **Group B-Sim**
9:45-10:00	**B1**	**B1**	**B2**	**B2**	**B3**	**B3**	**All Group A's Conference Room** **(Mini-Debrief Sim 1 amongst table /Tool: TeamSTEPPS Debrief Checklist)**	
10:00-10:05								**ALL GROUPS-Large Conference Room**
10:05-10:25							**ALL GROUPS** **(Large Debrief Sim 1)** **Debrief Checklists/ SPs Feedback**	
10:25-10:35								**ALL GROUPS: Restroom Break**
10:35-10:50							**ALL GROUPS** **Sim 2 Prebrief-Participant Brief** **Planning time for Part 2/Role Cards** **Tools: Brief Checklist, Huddle Form, Error Disclosure Card**	
10:50-11:05	**B1**	**B1**	**B2**	**B2**	**B3**	**B3**	**All Group A's Conference Room** **(Extra Planning Time Sim 2)**	**Group B Sim**
11:05-11:10								**ALL GROUPS** **Group B-Large Conference Room** **Group A-Sim**
11:10-11:25	**A1**	**A1**	**A2**	**A2**	**A3**	**A3**	**All Group B's Conference Room** **(Mini Debrief Sim 2 -Tool: Debrief Checklist)**	**Group A sim**
11:25-11:35							**ALL GROUPS** **Care Conference discussion questions**	**ALL GROUPS** **Large Conference Room**
11:35-11:50							**ALL GROUPS** **(Large Debrief Sim 2)**	**ALL GROUPS** **Large Conference Room**
11:50- 12:00							**Evaluation**	**ALL GROUPS**

Appendix C

T-TAQ Category	Pre-test	Post-test
Team Structure	4.33	4.57
Leadership	4.53	4.70
Situation Monitoring	4.35	4.60
Mutual Support	3.02	3.19
Communication	3.88	4.13
N	**195**	**178**

Table 2. *Averages of Pre- and Post-test on Teamwork Attitudes Questionnaire (T-TAQ)*