Effect of TeamSTEPPS on leadership development in interprofessional teams

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Acknowledgements

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Introduction

Background/Significance

Healthcare is a field that demands constant advancement toward better patient outcomes. Interprofessional collaboration is a powerful approach that promotes teamwork among healthcare professionals from different disciplines (IPEC, 2011). Physician assistants (PAs) play an essential role in these professional teams. Dynamic teamwork begins with providers, such as PAs, who understand the balance of leadership and cooperation when providing safe and effective patient care. In addition, more responsible treatment decisions are made when PAs start to utilize the vast knowledge held in the diverse professionals around them. In 2003, the Institute of Medicine set interprofessional collaboration in motion by drawing attention to its benefits: “When healthcare professionals understand each others’ roles and are able to communicate and work together effectively, patients are more likely to receive safe, quality care” (p. 2). The synergistic leadership found in interprofessional collaboration also has been confirmed by many other reliable studies.

The benefits of interprofessional teams have become increasingly recognized in the field of healthcare. For example, Boult et al. (2009) found patient outcomes improving and healthcare costs decreasing significantly in a study of care provided by interprofessional teams. Considering that a defining concept of the PA profession is providing proficient and efficient care, PA students and professionals need to be aware of the benefits of collaboration. It is vital to stay current with the latest advances in medicine, and new research in interprofessionalism has been shown to provide multiple benefits for the healthcare team and the patient. With economic decisions in healthcare in the current spotlight, identifying successful methods of decreasing healthcare spending while enhancing patient outcomes is crucial.
There has been a call from professional organizations for more interprofessional training and collaboration in education programs and in the healthcare workplace. The American Interprofessional Health Collaborative (AIHC, 2011) stated that students are typically educated in what can be described as disciplinary isolation (AIHC, 2011). The problem with educating students in disciplinary silos is that upon graduation they are expected to matriculate effectively as members of healthcare teams. An additional concern is that as patients become more complex, it becomes necessary for healthcare providers to work collaboratively (AIHC, 2011).

Every healthcare provider caring for complex and acute patients must be able to work resourcefully within in his or her team. This involves effectively performing teamwork skills while also providing leadership within that team. To develop these skills, a safe environment to practice is necessary. In a study conducted by Shrader, McRae, King, and Kern (2011), simulation improved clinical confidence significantly in interprofessional teams comprised of pharmacy, medical, and PA students. The benefits of simulation to promote interprofessionalism have been shown to be effective, but unfortunately, simulation is seldom found in healthcare curriculums or used by providers (Shrader et al., 2011).

The studies discussed encourage the need for interprofessional education; however, few programs provide practical applications for teaching students and practitioners how to effectively lead a healthcare team. TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety), a program developed by the Agency for Healthcare Research and Quality and the U.S. Department of Defense, developed a program to teach teamwork skills to healthcare professionals from all disciplines (TeamSTEPPS, 2006). Using an evidenced-based framework, TeamSTEPPS emphasizes the power of the team in improving performance in healthcare. This
national training program emphasizes the following four components of teamwork: leadership, communication, mutual support, and situation monitoring (TeamSTEPPS, 2006).

This leadership component, of particular interest in this study, emphasizes managing resources and planning in teams through education in the following skills: brief, huddle, and debrief. Results of this training have demonstrated a more trusting and adaptable team that can function proficiently in the healthcare setting (TeamSTEPPS, 2006). The training provided by TeamSTEPPS has the potential to develop interprofessional collaboration in the healthcare setting and in PA education, which could translate into improved outcomes for patients and their families throughout the Greater Toledo area.

**Problem Statement**

Clinicians find themselves in interprofessional teamwork situations on a daily basis, and effective leadership is required in each and every one of these interprofessional teamwork situations in order to provide the most beneficial patient care. Education to prepare clinicians is so important because leadership is an important element in every interprofessional teamwork situation. Training leaders to operate effectively in interprofessional healthcare situations is a crucial component of any collaborative educational training module. As a result, an efficient and reliable method of leadership training is needed. To resolve the current need for a better understanding of how healthcare professionals are trained to lead in interprofessional teamwork situations, AIHC (2011) has recommended a team-based approach in which providers collaborate, share expertise, and develop skills to provide efficient and effective patient care.

**Purpose**
The purpose of this study is to test the effectiveness of the leadership component of the TeamSTEPPS training program in developing leadership skills among an interprofessional healthcare team of novice clinicians.

**Research Question**

Is there a difference in simulated patient-care performance between interprofessional healthcare teams that receive TeamSTEPPS educational leadership training (huddle, brief, and debrief) and interprofessional healthcare teams that do not receive TeamSTEPPS educational leadership training?
Literature Review

Interprofessional research is on the forefront of healthcare transformation. In 2011, Johnston and Truluck provided a number of reasons why this movement toward collaboration is so innovative and important in healthcare settings. These authors found that research groups composed of diverse healthcare professionals “can lead to the creation of new ideas and fresh approaches” (p. 98). The variety of perspectives found in interprofessional research can lead to a unique creativity that cannot be found in a team comprised of practitioners from a single profession or discipline. In addition, they found that research teams commit fewer mistakes, build trust, and realize the value of others in the research team. The authors found that even disagreements build communication skills and cultivate respect within interprofessional teams (Johnston & Truluck, 2011).

The research conducted so far on interprofessional collaboration demonstrates the multiple positive results of a diverse healthcare team. Hoffman, Rosenfield, Gilbert, and Oandasan (2007) have provided an impressive list of outcome improvements that occur when healthcare professionals work in partnership. The list includes lower patient mortality, improved patient safety, superior health services, reduced hospitalization and associated costs, enhanced patient satisfaction, improved levels of innovation in patient care, increased staff motivation, increased well-being, and increased retention (Hoffman et al., 2007).

The benefits of interprofessional teams are vast; however, this study focuses on leadership, which is a critical component of teamwork. Multiple research studies have demonstrated that clear and effective leadership provides better outcomes. One such study examined the advantages of leadership training when compared to technical training. Hunziker et al. (2010) videotaped medical students in teams working on a cardiac arrest patient. Some
teams received technical training, while others received leadership and communication training before caring for this patient. They found that the leadership-trained group had more uninterrupted time performing cardiopulmonary resuscitation and a shorter amount of time before initiating rescue efforts. The researchers also found that the leadership group was still effective four months after the initial study was performed (Hunziker et al., 2010).

Additional research has demonstrated that leadership is an area where interprofessional teams can greatly improve their overall performance. In a study of team managers and researchers of multidisciplinary teams, “quality of team leadership” was one of the top indicators of improvement within teams (Deneckere et al., 2011). A study conducted by Bristowe et al. (2012) in maternity units asked frontline clinicians what elements of interprofessional teams are most important in an emergency and then had them perform a simulation. The researchers’ goal was to find the most important principles that should be emphasized in training of healthcare teams. They found that the focus groups identified experience, familiarity with the team members, and explicit identification of the leader as ways to create more effective teams. The clinicians also identified a good leader as someone who verbalizes a clear objective for the situation, delegates, and asks questions of the team to get a better handle on the situation (Bristowe et al., 2012).

Many effective qualities of leaders have been studied, but the TeamSTEPPS program aims to train interprofessional teams for higher standards of patient care with clear and specific leadership objectives (AHRQ 2006). Clapper and Kong (2012) recommend TeamSTEPPS as a way to develop team performance and increase patient safety. They found that the leadership component is the “glue” for teamwork (p. e370) and that successful leadership training allows the leader to effectively use the other TeamSTEPPS skills (Clapper & Kong 2012).
The goals that TeamSTEPPS finds most effective in successful leadership training are the brief, huddle and debrief (AHRQ, 2006). They define these as the core concepts in leadership education. The brief involves planning and formation of the team and responsibilities. The huddle is meant to create an atmosphere for team problem solving through effective and targeted communication. The debrief enhances the team’s function by giving feedback for improvements to be made in the future (AHRQ, 2006).

Further research also has identified specific aspects that are important to effective leadership within teams. A study conducted by Willems et al. (2012) with surgeons and interprofessional teams explored the non-technical skills needed in dealing with a disaster situation. The researchers found that “clear leadership” is essential to effective teamwork. Specifically, Willems et al. found that team participants felt key leadership qualities included unambiguous directions and asking for contributions from the team. The author points out that these attributes of a leader combine authoritative and participative styles of leadership (Willems et al., 2012). The qualities above are strikingly similar to the core objectives found in the leadership goals of TeamSTEPPS.

Another essential leadership skill is empowering the team, which Willems et al. (2012) have described as “transformational leadership” (p. 5). This type of leadership encourages members of the team through support. Additionally, it highlights the value of that interprofessional team, improving performance and respect in the future (Willems et al., 2012). Thylefors (2012) has agreed that active leadership in teams is more effective. In her study, the teams included a wide variety of healthcare professionals, and she found that organized and integrative leadership improved efficiency for professionals who work collaboratively in the healthcare setting (Thylefors, 2012).
Improving these leadership skills through education within interprofessional teams has long-lasting and positive effects. When Mann et al. (2009) trained clinicians in interprofessional education, the participants reported more positive interactions in their workplace even months after the training. They perceived their team in a more positive light, which increased respect. Another benefit the clinicians noticed in their practice was greater confidence in their skills and assertiveness with others in their team. An obvious but currently under-practiced advantage that participants reported was the sharing of resources between team members. The two main factors the researchers found that led to better interprofessional interactions were knowledge and confidence (Mann et al., 2009). Drummond, Abbott, Williamson, and Somji (2012) found that the most effective primary care clinics featured leaders who practiced and promoted interprofessional collaboration. They also pointed out that this leadership development in clinics can only be established if professional organizations and academia promote the change (Drummond et al., 2012).

Currently, professional medical education programs encourage autonomous practice (Whitehead, 2007). With a strong evidence base for improved patient outcomes, interprofessional education should have a place in curriculums and licensure. MacDonald et al. (2010) mentioned leadership several times in their study about promoting interprofessionalism among nursing students to improve their future in healthcare. She recommends leadership as a skill that should be taught in the preprofessional curriculum to reduce misunderstandings between professionals in the future (MacDonald et al., 2010). The American Heart Association felt that this training was so effective that they recommended leadership training for advanced cardiac life support in their guidelines (Bhanji et al., 2010).
Interprofessional teams are important in healthcare, but implementing their use within an efficient healthcare setting requires targeted and effective training, which TeamSTEPPS can deliver. Interprofessional teams with effective leaders are crucial to healthcare today, and TeamSTEPPS provides a proficient and dependable way to conduct leadership education. In order for administrators and educators to implement interprofessional leadership training, a reproducible method must be explored.
Methods

Research Design

This project involved original research that used a separate sample pre-test/post-test quasi-experimental design. This pilot study was designed by an interprofessional team of student researchers and their advisors from the University of Toledo and approved by the Institutional Review Board (IRB). Eight healthcare professionals were randomly divided into two teams of four members each. Each interprofessional team consisted of one representative from the disciplines of pharmacy, nursing, physical therapy, and respiratory therapy. Each team participated in a high-fidelity human patient simulation involving a complex patient in an acute-care setting. One team performed the simulation scenario before receiving the TeamSTEPPS educational leadership training (pre-test team), and the other team performed the simulation scenario after receiving the TeamSTEPPS educational leadership training (post-test team). Simulations were video recorded and later analyzed by the research team using a modified TeamSTEPPS Observation Tool Scoring Sheet.

Key elements of the training included informing the clinicians about the following leadership skills: brief, huddle, and debrief. The TeamSTEPPS training was delivered in one room to all participants by the trained research advisor in one PowerPoint presentation. Data were collected through videotaping equipment that previously had been installed within the simulation room. The University of Toledo Interprofessional Immersive Simulation Center (IISC) was used to conduct the simulation.

A separate sample pre-test/post-test quasi-experimental design was chosen to avoid threats to internal validity of measurement. It was determined by the researchers that administering the intervention to the same group would considerably bias the post-test results
through participant learning and adaptation. This is often encountered when conducting studies using educational interventions and a single-sample design.

**Population and Sampling Methods**

Recruitment began directly after IRB approval and ended one week before the intervention. The sample recruited included the following healthcare professionals: registered nurses, physical therapists, respiratory therapists, physician assistants, and doctors of pharmacy who were employed by ProMedica Health Systems and the University of Toledo Medical Center (UTMC). Inclusion criteria for professionals included approximately three years or less of work experience in their respective disciplines. Participants also had not received any previous training in the TeamSTEPPS program. Professionals were currently practicing in the hospital acute-care setting. Recruitment communication included offering continuing education hours in exchange for participation in the research study. Clinicians were recruited from UTMC and ProMedica by the research team through flyers and e-mails. Eight professionals responded and were randomly placed into one of two treatment groups—one pre-test control group that performed the simulation before training and one post-test experimental group that received training before performing the simulation. Each team consisted of one professional from nursing, physical therapy, respiratory therapy, and doctor of pharmacy. No physician assistant professionals responded to requests to participate.

**Procedures**

The pre-test and post-test groups performed their simulations at different times but in the same room with the same equipment available to them. The high-fidelity simulation included a moveable simulation mannequin in a hospital bed on a ventilator. Each team was provided relevant information needed to care for the simulated patient from the prior shift nurse about the
patient’s state overnight, medical history, and current medications. They were all made aware that this patient was in an ICU bed and on a ventilator. They were informed that the current orders were to get the patient out of bed and that they were to work as a team to achieve this goal. The interprofessional team was instructed to enter the room and use resources in the room, such as a gait belt, chair, and other medical equipment. They were allowed 30 minutes to care for the patient and complete the task. When the intervention and simulations were finished, the participants were surveyed about their opinions of the TeamSTEPPS training.

**Data Collection**

The simulations performed by both groups were videotaped using METIvision cameras in the IISC. The data were recorded onto videotapes, which were secured according to IRB standards.

**Data Analysis**

The interprofessional student researchers were also trained in TeamSTEPPS. Following data collection, the student researchers viewed the videotapes and, using a modified version of the TeamSTEPPS Observation Tool as a scoring sheet, gave each team a point if a brief, huddle, or debrief occurred during the simulation scenarios (see Table 1). The number of briefs, huddles and debriefs were then totaled for each team. The scoring sheets were secured according to IRB standards.
### Table 1

*Modified TeamSTEPPS Observation Tool Scoring Sheet*

<table>
<thead>
<tr>
<th>Leadership Skill</th>
<th>Number of Times Skill Observed for Pre-Test Group</th>
<th>Number of Times Skill Observed for Post-Test Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debrief</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huddle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debrief</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Limitations

This research project encountered several limitations. First, a possible threat to the validity and limitation of this study was non-blinding of the research team. They were involved in the research and watched the videos afterwards to score the total number of skills performed by the participants on the modified TeamSTEPPS Observation Tool Scoring Sheet. The research team members who watched the videos may have expected a provider to behave a certain way since they knew which providers belonged to each team. The research team used multiple scorers to watch the videos to avoid this possible bias.

Another limitation of the study was the size of the sample, which included a total of only eight clinicians sampled from only Northwest Ohio. This affected the generalizability of the study to larger populations. Additionally, small populations have a greater tendency to skew results. The smaller groups may have been due to time limits in recruitment. There was a short amount of time to solicit clinicians for the one-year grant under which the project was conducted. Another reason the sample size was small is that researchers had to limit the years of experience
and specialty of the professionals to enhance the validity of the study. More experienced clinicians may already have had training in the area of leadership or they may have held leadership positions themselves. Due to these limitations on experience for validity purposes, PAs were solicited, but none responded. This could have been due to the lack of novice PAs working in the acute-care setting. Many PAs working in this discipline have more than three years of experience. Additionally, the number of PAs at the recruitment facilities is much lower than the number of other professions solicited.
Results

The total number of each skill (brief, huddle, debrief) that occurred during the simulation scenarios was tallied for the post-test group and pre-test group (see Figure 1). The post-test group had a total of 12 in briefing while the pre-test group had a total of 8. The post-test group had a total of 11 in huddling while the pre-test group had a total of 7. The post-test group also showed higher numbers of debriefing with 8 while the pre-test group only had a total of 1.

Figure 1. Frequency of observed TeamSTEPPS leadership skills.
Participants were asked to complete an evaluation of their perceptions of the TeamSTEPPS training and the interprofessional simulation experience. These surveys were administered after all groups had completed the training and simulation. Regarding incorporation of TeamSTEPPS into their workplace, one registered nurse responded, “It has the potential to help everyone function as a team and not be so territorial.” When asked about the TeamSTEPPS training, a physical therapist responded, “I believe TeamSTEPPS can increase efficiency and safety during patient treatments.” In response to the question of how simulation can affect understanding team leadership, a physical therapist responded, “TeamSTEPPS helped me to recognize the expertise of each profession and how all disciplines shoulder work together to avoid disaster.”

Participants also noted the importance of interprofessional collaboration. A registered nurse reported, “In the acute/ICU setting, the patients are often complex, and I realize my skills and scope of practice can go so far, I need other professional healthcare workers to help.” A respiratory therapist reported, “It takes many kinds of caregivers to take care of a vented patient. Everyone needs to work together to make it work: respiratory therapists, physicians, pharmacy, physical therapy, radiology technologists, registered nurses, etc.”
Discussion

The intervention investigated in this study was the effectiveness of team leadership training, which included the key skills of brief, huddle, and debrief. Analysis of data showed that the post-test group, which received training in TeamSTEPPS before their simulation, performed the three skills (brief, huddle, and debrief) more frequently than the pre-test group. This finding demonstrates preliminary evidence of the use of TeamSTEPPS training to develop leadership skills when working within an interprofessional healthcare team. In addition, this study suggests that novice professionals who are trained in TeamSTEPPS may be more likely to use leadership skills when working in an interprofessional team. Not only are the clinicians trained in TeamSTEPPS leadership more likely to use their new skills, their positive reactions to the training in this study demonstrate that clinicians feel this is a useful tool. Their receptiveness to TeamSTEPPS education further exhibits the effectiveness of leadership skill training for pre-professional and professional training programs. When the providers respect the education they receive, the patients and teams they interact with can feel a greater impact.

This pilot study tested an interprofessional team of novice clinicians caring for a simulated patient. Further studies are needed to understand the value of TeamSTEPPS training among professionals with more experience or professionals in different specialties. The TeamSTEPPS training can be applicable to many specialties in medicine since it is designed for teams and not targeted to a specific discipline. The professions included in this study’s sample are just one example of a possible team configuration. Endless possibilities exist for interaction among different professions in the team care of any type of patient. The results of this study may be useful in designing future studies that more narrowly target specific types of teams within the healthcare setting.
Barriers to implementation include cost and time of TeamSTEPPS training. Healthcare systems should balance the benefits to their employees and patients with the possible financial costs to their facility. Additionally, busy clinicians must find time to take part in the training education. Continuing education credits were offered in this study and may be an attractive incentive for participants in future studies.
Conclusion

This pilot study demonstrated preliminary evidence for the effectiveness of TeamSTEPPS training among novice interprofessional teams in the three key skill areas. The team who received training before participating in an interprofessional simulation was more likely to use these skills. Post-simulation and training responses from clinicians showed that they found TeamSTEPPS helpful in developing interprofessional collaboration skills. This evidence of success in this type of training demonstrates that PAs should take advantage of TeamSTEPPS and use it as a valuable educational tool in their educational curriculum. PAs are required to function in teams in practice, and TeamSTEPPS may enhance the collaboration with physicians, nurses, and the numerous other team members that they encounter daily.

Educators and clinicians need to be aware of the benefits of interprofessional education in the PA curriculum and professional development. Unfortunately, it was difficult to recruit PAs, and they were not studied here. To improve PA participation in interprofessional teams, support is needed from professional organizations. The American Academy of Physician Assistants (AAPA), the Physician Assistant Education Association (PAEA), and the National Commission on Certification of Physician Assistants (NCCPA) should promote further research on TeamSTEPPS team-building training. With professional organization support, the TeamSTEPPS training may be adapted to meet the needs of a variety of teams. Many areas of healthcare can benefit from increased functionality of interprofessional teams, creating more dynamic and better-functioning healthcare teams.

Healthcare is a field that constantly demands improvement. Providers and educators must respond to the drive to improve patient outcomes and use healthcare resources efficiently. TeamSTEPPS education delivers these to clinicians by offering an opportunity to improve their
interprofessional interactions and patient care simultaneously. This pilot study created by an interprofessional team of student researchers and their advisors examined a small sample of professionals and their leadership skills, which improved through TeamSTEPPS training. The future of interprofessional leadership training is promising and this research brings to attention an immense area of research where exciting and favorable results can be experienced by patients and providers.
References


Abstract

Objective: Determine the effectiveness of the leadership component of the TeamSTEPPS training program in developing leadership skills among novice clinicians working in a simulated healthcare setting. Methods: Eight clinicians were recruited from the ProMedica Health System and the University of Toledo Medical Center. Two novice interprofessional teams, each consisting of 1 physical therapist, 1 registered nurse, 1 respiratory therapist, and 1 pharmacist were randomly assigned to a control (pre-test) or an experimental (post-test) group. A pre-test, post-test quasi experimental design was used. Videos of the patient simulation scenario for both groups were analyzed by the research team using a modified TeamSTEPPS Observation Tool for leadership skills. Results: The key elements of leadership skills: briefs, huddles, and debriefs, were more frequently observed in the experimental group. Conclusion: The results of this pilot study support the use of TeamSTEPPS leadership training module to develop essential leadership skills in a novice interprofessional team.