Interprofessional Education: A Survey of Students’ Collaborative Competency Outcomes

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Solving complex patient problems frequently requires the skills and knowledge of a team of health care professionals. Given the interprofessional nature of patient care and the necessity for collaboration among those who perform it, teamwork is critical to ensure patient safety (Baker, Day, & Salas, 2006). Much evidence exists that failure of health care professionals to work together and effectively communicate can have tragic consequences for patient outcomes (Barnsteiner, Disch, Hall, Mayer, & Moore, 2007; Burley, 2011; Greenwood & Heninger, 2010; Hughes, 2008; Institute of Medicine [IOM], 2001, 2003; Joint Commission on Accreditation of Healthcare Organizations, 2009; Leape & Berwick, 2005; Rabinovitch, Hamill, Zanchetta, & Bernstein, 2009; Raskin, 2010; White & Del Ray, 2009). The IOM (2003) has reported that patients receive safer, higher quality care when health care professionals work together as a team, communicate effectively, and understand each other’s roles. Because health care providers are expected to work together and share expertise in a team environment, their education and training should prepare them to be “collaborative practice-ready” (Interprofessional Education Collaborative Expert Panel, 2011a, p. 10; Romanow, 2002).

“Interprofessional education (IPE) occurs when two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes” (WHO Study Group, 2010, p. 7). The goal of these efforts is to develop knowledge, skills, and attitudes that result in effective interprofessional team behaviors and competence (Buring et al., 2009; IOM, 2003). Too often, these collaborative skills are learned on the job by trial and error. Ideally, students’ exposure and practice of effective communication skills and teamwork strategies should be woven throughout their education. The goal of IPE is for students to learn how to function as part of an interprofessional team and incorporate the knowledge, skills, and attitudes of IPE into their future practice, ultimately providing better quality and safer patient care through interprofessional collaboration (Buring et al., 2009).

A growing body of evidence links collaborative practice to fewer medical errors and improved health outcomes (Freeth, Hammick, Reeves, Koppel, & Barr, 2005; Hughes, 2008). Kinnaman and Bleich (2004) posited that collaboration is a communication process that fosters innovation and advanced problem solving among people who are of different disciplines, organizational ranks, or institutional settings. Collaborators band together for advanced problem solving and discern innovative...
solutions without regard to discipline, rank, or institutional affiliation. The process requires mutual respect, differing but complementary competencies, a distributive balance of power between the parties, and evidence of satisfying teamwork that results in change.

The available evidence suggests that training teams of health care providers constitutes a pragmatic, effective strategy for enhancing patient safety by reducing medical errors. (Baker, Gustafson, Beaubien, Salas, & Barach, 2003). However, few studies in the United States have examined the outcomes of IPE and whether the strategies and skills learned in those IPE courses are applied when the learners transition to practice. Examination of the effectiveness of IPE programs in improving the delivery of patient care is needed. This study focused on whether the students report an improvement in their collaborative competencies after completing an IPE course based on Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS®).

**Literature Review**

In the IOM’s (2003) landmark report, *Health Professions Education: A Bridge to Quality*, the need for IPE and collaborative practice was emphasized. This publication was a follow up to two earlier reports on patient safety, *To Err is Human: Building a Safer Health System* (IOM, 1999) and *Crossing the Quality Chasm: A New Health System for the 21st Century* (IOM, 2001), in which the IOM called on academic institutions to begin educating health professionals to work collaboratively. In a more recent, equally notable report, the Interprofessional Collaborative Expert Panel (2011a) identified four interprofessional competency domains for future health professionals. These included (a) asserting values and ethics of interprofessional practice, (b) leveraging the unique roles and responsibilities for collaborative practice, (c) interprofessional communication practices, and (d) performing effective interprofessional teamwork and team-based practice. Although such collaborative team-training programs have transformed the culture and outcomes of other dynamic, high-risk industries, such as aviation and nuclear power, evidence of collaborative team training effectiveness in health care is still evolving (Weaver et al., 2010).

Educational intervention evaluation is a complicated process, with any number of contextual influences and competing versions of reality to be taken into account, making it difficult to generalize findings (Reeves, 2001). Within the extensive body of descriptive evaluative literature on interprofessional undergraduate education, interprofessional learning, and interprofessional education programs, it is generally acknowledged that evaluation of outcomes are mostly limited to the level of participant satisfaction or reaction and are inconsistently measured using a range of approaches and tools (Cerra & Brandt, 2004; Davidson, Smith, Dodd, Smith, & O’Loughlan, 2008; Harris, Henry, Bland, Starnaman, & Voytek, 2003; Mitchell, 2002; Ochia et al., 2002; Rafter et al., 2006; Talie, 2003). Some quality-focused studies suggested positive outcomes associated with IPE in the workplace, with qualified practitioners being evaluated. These studies include an improvement in the culture of the emergency department and patient satisfaction (Campbell et al., 2001); management of care delivered to domestic violence victims (Thompson et al., 2000); and mental health practitioner competencies related to the delivery of patient care (Young et al., 2005).

A Cochrane review done in 2008 (Reeves et al., 2008) cited four studies with positive outcomes related to IPE, including changing learners’ attitudes toward one another’s profession (Barr, Koppel, Reeves, Hammick, & Freeth, 2005); improving knowledge of interprofessional collaboration (Cooper, Carlisle, Gibbs, & Watkins, 2001); enhancing collaborative behavior (Hammick, Freeth, Koppel, Reeves, & Barr, 2007); and making gains in the delivery of patient care (Reeves, 2001). Policy makers and other leaders will be more likely to support IPE and teamwork if they have robust evidence indicating that such practices lead to improvements in quality, safety, cost, and patient and provider satisfaction (Interprofessional Education Collaborative Expert Panel, 2011b).

The lack of strong evidence is not to suggest IPE is ineffective in changing practice or influencing patient care outcomes in the undergraduate context, but rather that such controlled intervention studies are perhaps more difficult to design and implement for prelicensed students and hence are not attempted (Nisbet, Lee, Kumar, Thistlewaite, & Dunston, 2011). The multiple metrics needed to quantify the relationship between team training and team outcomes—and the complexity of obtaining them—are sizable obstacles to attain such data (Coburn & Gage-Croll, 2011). Morison and Stewart (2005) pointed out the need to develop and use agreed-on IPE standards or learning outcomes as the basis for developing relevant assessments.

At the University of North Carolina at Chapel Hill, the schools of nursing, pharmacy, and medicine collaborate to provide an interprofessional elective using components of the TeamSTEPPS curriculum. TeamSTEPPS is an evidence-based teamwork system that aims to optimize patient outcomes by improving communication and teamwork skills among health care professionals (TeamSTEPPS, n.d.). TeamSTEPPS is the product of a research and development collaboration between the Agency for Healthcare Research and Quality (AHRQ) and the U.S. Department of Defense. It was released in November 2006 as the national standard for team training in health care. The TeamSTEPPS curriculum focuses on training health care professionals on team competencies such as leadership, situation monitoring, mutual support, and communication (Alonso et al., 2006).

Morey et al. (2002) found that the MedTeams project, an earlier version of TeamSTEPPS, reduced clinical errors and enhanced staff attitudes toward teamwork in the emergency department. Weaver et al. (2010) identified a positive relationship between TeamSTEPPS and enhanced staff perceptions of the patient safety culture, evidenced by an increase in the quantity and quality of presurgical procedure briefings and teamwork behaviors among staff.

In the operating department environment, TeamSTEPPS studies have produced similar findings. Studies have shown a reduction in the occurrence of retained foreign objects (Cima et al., 2009), an improvement in error avoidance rates, and an increase in the properly timed administration of prophylactic antibiotics (Weaver et al., 2010).
lactic measures (Awad et al., 2005). Team training has also been shown to enhance communication, increase employee satisfaction, and reduce turnover among nursing staff (Leonard, Graham, & Bonacum, 2004). TeamSTEPPS highlights the importance of having a shared mental model by using a situational briefing model known as SBAR (situation, background, assessment, recommendation). The SBAR model ensures that all health care providers are mentally on the same page regarding patient care. Clinicians at St. Joseph Medical Center in Bloomington, Illinois, used an SBAR pocket card for quick reference. Laminated SBAR summary sheets were posted to each telephone in the medical center. SBAR became the standard reporting system and improved communication handoffs among all the clinical units, which resulted in a reduction of adverse drug events and improved medication reconciliation upon both admission and discharge (Haig, Sutton, & Whittington, 2006). Similarly, Beth Israel Deaconess Medical Center in Boston, Massachusetts, practiced team training strategies specific to TeamSTEPPS (Mann, Marcus, & Sachs, 2006). Regular team briefings, situation monitoring, mutual support, and utilization of the two-challenge rules were implemented to manage conflict in their labor and delivery units. These team approaches were put into practice from 2002 to 2005, resulting in significant reductions in the occurrence and severity of adverse events (Mann et al., 2006). Another study showed that use of “a daily goals form” to facilitate staff communication and to clarify roles and responsibilities resulted in a 50% reduction in patients’ mean length of stay in the intensive care unit (Pronovost et al., 2003).

Recent data offer additional support for TeamSTEPPS implementation and its effectiveness in three separate and different health care settings. In a community hospital setting, TeamSTEPPS training was combined with simulation scenario practice, and perinatal patient outcomes improved by 37% (Riley et al., 2011). At a large academic medical center, TeamSTEPPS was implemented in the pediatric and surgical intensive care units. Team performance was observed to be significantly improved for all core areas of competency at 6 and 12 months after the training (Mayer et al., 2011). In the combat environment of Iraq, significant decreases in the rates of communication-related, medication and transfusion errors, and needle stick incidents occurred after the TeamSTEPPS training (Deering et al., 2011). These studies provide encouragement that well-designed, scientifically rooted team training interventions can positively affect clinical outcomes and patient safety (Salas, Gregory, & King, 2011).

The purpose of the current study was to examine whether nursing, medicine, and pharmacy student-practitioners report an improvement in their implementation of interprofessional collaborative competencies after completing an IPE course based on TeamSTEPPS.

Method

Using a survey design, students (n = 33) who had completed the undergraduate IPE course were e-mailed the Interprofessional Collaborative Competencies Attainment Survey (ICCAS) to determine whether a difference existed between their preclass and postclass collaborative competencies. The sample was a convenience sample. No purposive sampling was attempted. This study was reviewed by the University of North Carolina at Chapel Hill Institutional Review Board and was found to be exempt.

Sample

Participants included three cohorts of students who have participated in a 3-credit course, entitled Interprofessional Teamwork and Communication at the University of North Carolina at Chapel Hill. The students were first- and second-year nursing students, second-year medical students, and third-year pharmacy students. Of these 33 students, 17 completed the ICCAS, for a response rate of 52%.

Instrument

The ICCAS is a 20-item instrument aligned with the six interprofessional core competencies: communication, collaboration, roles and responsibilities, collaborative patient- and family-centered approach, conflict management and resolution, and team functioning (MacDonald et al., 2010). Each category of the ICCAS included two to five items, for a total of 20 interprofessional collaboration statements. The instrument used a 7-point Likert scale with 1 = strongly disagree and 7 = strongly agree.

The ICCAS was designed to document the learner’s perceptions of changes in their collaborative behaviors and competencies as a result of having participated in IPE activities. The post–post design aids in increasing the survey’s sensitivity by acknowledging that students may not be aware of what they do not know about collaboration and communication before taking the course. It is expected that they will have a better understanding of the nuances of interprofessional collaborative competencies and therefore will be better able to identify any weaknesses they may have had prior to completing IPE (MacDonald et al., 2010).

The ICCAS has undergone content validation through a Pan Canadian Delphi process. It has been validated with the reliability analysis and showed all items on the ICCAS instrument were highly correlated for internal consistency. Cronbach’s alphas for the total of all 20 items ranged from r = 0.90 to r = 0.93. (MacDonald et al., 2011). Data are currently being collected in 600 programs, including the current study, to further refine and evaluate evidence regarding the validity of the ICCAS (C.J. MacDonald, personal communication, April 12, 2012).

Procedure

Thirty-three students who had successfully completed the course were contacted via e-mail and asked to participate in an electronic survey. The ICCAS focused on students’ experience with interprofessional teamwork and communication prior to taking the IPE course, as well as currently in their present-day clinical practice. Participants received an initial prenotice letter requesting their participation in the study, followed by the actual survey e-mailed 2 days later. Follow-up strategies for nonresponders included a reminder e-mail 2 weeks and 3 weeks after receiving the initial survey. After 5 weeks of no response, a phone communication was used to solicit participation (Dillman, 1978).
Results
The sample was 33 students who completed the IPE course. Seventeen students returned the survey, for a 52% return rate, with the majority (76%) of the participants still in school (24% had already graduated). Participants per profession were 47% pharmacy, 46% nursing, and 18% medicine. Men accounted for 21% of the respondents, and women accounted for 79%.

Twenty paired-samples t tests were conducted to compare student’s collaborative competencies before and after having taken the interprofessional course. All collaborative competencies on the ICCAS were found to be significantly different (p < 0.001) between the scores before and after the IPE course was taken.

The total collaborative competency scores of both pre- and post-IPE course were found to be reliable (20 items; α = 0.90, 0.89). A significant difference was noted in the survey scores between before taking the IPE class (M = 4.0, SD = 1.17) and after having taken the IPE course (M = 6.35, SD = 0.61); t(16) = 9.7373, p < 0.001. These results suggest that taking the interprofessional teamwork and communication course had an effect on the students’ collaborative competency outcomes of improved communication, improved collaboration, improved grasp on roles and responsibilities, improved collaborative patient- and family-centered approach, improved conflict management and resolution, and improved team functioning.

Discussion
IPE is one of several relevant components to a well-rounded health care education curriculum, as it can help augment communication and teamwork among health care practitioners, optimize collaborative clinical decision making, and improve the delivery and quality of patient care. However, there are significant gaps in the IPE literature. A lack of strong evidence about IPE outcomes exists, specifically IPE outcomes in undergraduate prelicensure health care professional education. The current study provides clear evidence that medical, nursing, and pharmacy students who have participated in a well-designed, evidence-based IPE course improved their collaborative competencies in the six categories of communication, collaboration, knowledge of roles and responsibilities, patient- and family-centered care approach, conflict management, and team functioning. The hope is that collaborative practice–ready graduates will apply the valuable teamwork strategies and communication skills they learned at the point of care.

A limitation of this study includes the small sample size. In addition, self-reported data, such as the ICCAS response surveys, contain potential sources of bias. Selective memory and exaggeration are two such limitations. In addition, a peer or instructor evaluation would have strengthened this study with convergent validity measures.

If nursing students, medical students, and pharmacy students are expected to work as an effective and efficient interprofessional team upon graduation, their education should prepare them for this type of collaborative dynamic. Establishing the causal relationship between IPE and improved patient outcomes is a multistep process. The current study, as step one, shows that an IPE course based on TeamSTEPPS improves the perception of students’ collaborative competencies. Future studies will investigate whether these former students, now current practitioners, are applying these collaborative competencies at the point of care; if so, what impact has this had on their practice and, ultimately, patient safety and quality of care? Educators should consider incorporating IPE into their undergraduate curriculum to prepare a collaborative practice–ready workforce. Future studies should investigate the inclusion of schools of social work and public health in the IPE program to further simulate real-life patient- and family-centered practice.

References


