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Assessment of interprofessional collaboration before and after a simulated disaster drill experience

Heiddy Digregorio*, Jennifer S. Graber, Jennifer Saylor, Michelle Ness

School of Nursing, University of Delaware, Newark, DE, USA

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ABSTRACT

Introduction: With increasing acuity, patient care requires a collaborative approach by a team of providers. Recent literature indicates healthcare professionals lack the ability to work in collaboration with other healthcare professionals resulting from communication and collaborative practice gaps.

Background/Literature: Disasters require a rich collaboration of teams in order to be effective. As a result, interprofessional collaboration is a foundational underpinning of disaster preparedness. The overall purpose of this study was to assess perceptions of interprofessional collaboration before and after participating in an interprofessional simulated disaster drill as part of a Community Health Nursing course.

Methods: This pre-test, post-test descriptive research design assessed communication, collaboration, roles/responsibilities, patient focus, team functioning and conflict management of nursing students who participated in a simulated disaster drill.

Data/Results: Participants were nursing majors and primarily Caucasian females (n = 50, 89% and n = 56, 97% respectively), representative of the school of nursing population at the University. Wilcoxon Signed-Ranks test indicated that scores for the total ICAR post-test were significantly lower than the Total ICAR pre-test ($Z = -2.006$, $p = .045$, $r = -0.19$). While each of the individual sections of the ICAR had a lower mean score on the ICAR post-test as compared to the pre-test, collaborative patient/client-family centered approach was statistically significant (p = 0,0.002).

Discussion: Following the simulated disaster drill experience, nursing students identified gaps in communication, collaboration, roles and responsibilities, collaborative patient/client-family centered approach, team functioning, conflict management/resolution.

Conclusions: The study assessed the perceptions of interprofessional collaboration among undergraduate nursing students before and after a simulated disaster drill. The assessment identified the need to integrate interprofessional competencies in disaster preparedness education.

1. Introduction/Background

With increasing patient acuity and specialization of healthcare providers, rarely do patients receive care from an individual healthcare provider. Today, patient care requires a collaborative approach by a team of providers. However, recent literature indicates healthcare professionals lack the ability to work in collaboration with healthcare professionals from other disciplines resulting from communication and collaborative practice gaps (Speakman et al., 2016). In the current landscape of healthcare, providers need to be competent in providing team-based care; however, current team-training efforts do not address needs in current professional practice. Price et al. (2014) suggested early socialization can contribute to building team-based collaborative skills. The National League of Nursing (2015) reported that recent nursing graduates were not prepared to fully provide competent team-based care and proposed a transformation to the current healthcare education system including deliberate, meaningful experiences in interprofessional collaboration and practice.

The Interprofessional Education Collaborative Expert Panel (IPEC) (2011) reported that care provided by a collaborative team results in better patient outcomes. This is consistent with the guiding principles for transforming healthcare as stated by the Institute of Medicine (IOM) (2003). IPEC (2011) stated that society functions as an interdependent system; therefore, healthcare should be provided in a similar manner supporting an interdependent system. Interprofessional collaboration is essential to build a team-based workforce with an understanding of the

* Corresponding author at: University of Delaware School of Nursing, McDowell Hall, 25 N. College Ave., Newark, DE 19716, USA.
E-mail address: heiddyd@udel.edu (H. Digregorio).

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various roles and responsibilities able to communicate in an effective manner to provide effective patient centered care.

Disaster preparedness is defined as "state of readiness to respond to a disaster, crisis or any other type of emergency situation" (Federal Emergency Management Agency [FEMA], 2018, p. 1). In nursing education, disaster preparedness refers to the ability to apply knowledge and skills to a disaster situation (Nash, 2015). FEMA (2018) states academia plays a role in the effectiveness of a disaster plan. A simulated disaster drill is an effective vehicle for disaster preparedness and response and serves to promote familiarity with roles and responsibilities to ensure safety (Demming, 2016). Simulation is an effective immersive teaching/learning strategy to promote emergency preparedness without patient risk (Kaplan et al., 2011). As a result, an immersive simulated disaster drill experience may identify gaps in emergency preparedness (Demming, 2016). Most importantly, much of the current simulated disaster drill research focuses on knowledge improvement and skills acquisition (Kaplan et al., 2011; Alim et al., 2015; Jose and Dufrene, 2014) and not interprofessional collaboration.

Despite concerted efforts to improve interprofessional collaboration and disaster preparedness through simulated experiences, rarely have the two been merged to assess participant interprofessional competencies during a simulated disaster drill experience. Disasters require a rich collaboration of teams in order to be effective in promoting health and safety for those affected (FEMA, 2018; Gamboa-Maldonado et al., 2012). As a result, interprofessional collaboration is a foundational underpinning of disaster preparedness. The overall purpose of this study was to assess perceptions of interprofessional collaboration before and after participating in an interprofessional simulated disaster drill as part of a Community Health Nursing course.

2. Methods

2.1. Research design

This pre-test post-test descriptive research design assessed communication, collaboration, roles/responsibilities, patient focus, team functioning and conflict management of nursing students who participated in a simulated disaster drill. For the nursing students, this simulation was a required part of the Community Health Nursing course.

2.2. Participants

A convenience sample of 109 nursing students participated in the simulated disaster drill. For inclusion, participants had to be over the age of 18 and a nursing student enrolled in the Community Health Nursing course. Exclusion criteria included participants under the age of 18 and any student not enrolled in the Community Health Nursing course. Students had an opportunity to discuss questions or address concerns regarding participation to ensure that they understood that the simulated disaster drill was a course requirement. Participation was voluntary and did not affect course grade.

2.3. Instruments

The Interprofessional Collaborator Assessment Rubric (ICAR) was used for all participants as the pre-test and post-test instrument. The ICAR is designed to assess competencies stated by the Interprofessional Executive Committee collaborative competencies (Curran et al., 2013). Reliability analysis of modified versions of the ICAR demonstrated a high level of internal consistency ($\alpha = 0.981$) and high levels of inter-rater percent agreement, 91.5% (CI = 90.3, 92.7) (Curran et al., 2011). Permission was granted to adapt the tool and replace "resident" with "learner" and "not observable" with "not applicable". Students were also asked to fill out a consent and demographic survey.

2.4. Study procedure

This study represented a partnership between the university school of nursing and emergency medical technicians, and nuclear medicine students from a local community college. Approximately one week prior to beginning the study, the researcher explained the study, reviewed the consent and the procedures involved in participation. Using REDCap (Research Electronic Data Capture), consented students from the Community Health Nursing course completed a demographic survey and two ICAR instruments, one before and one after the simulated disaster drill. Demographic information including age, grade point average, gender, ethnicity, and employment status, including job type, was used to describe the participants. The pre-test and post-test instruments took approximately 10 min to complete. The pre-test instrument was available via an email link for the undergraduate nursing students. The post-test instrument was available to all participants using the same mode of delivery immediately following the simulated disaster drill. The instrument remained open one week after the disaster drill and participants received one reminder three days after the simulated disaster drill.

2.5. Disaster drill protocol

Faculty facilitating the event met approximately four months prior to the simulated disaster drill to address details regarding the setting, equipment, interprofessional roles and psychomotor skills. Approximately two weeks prior to the selected date for the simulated disaster drill, students enrolled in the undergraduate Community Health Nursing course and students in the nuclear medicine course were given assigned roles and responsibilities for the simulated disaster drill. Roles and responsibilities followed the National Incident Management System guidelines. All students participating in the simulated disaster drill received didactic content in their respective courses.

On the selected day, students received a pre-briefing and viewed a short video regarding the simulated disaster. The video was created by the facilitators for the event and mirrored a news broadcast. Following the video viewing, students went to their assigned location and the drill began. The simulated disaster drill, a train derailment with chemical exposure, lasted approximately one hour with approximately 120 victims triaged and treated. All simulated disaster drill participants were allowed to collaborate naturally as the event progressed. At the conclusion of the event, a large group debrief occurred. Each participant was required to attend the debriefing; however, discussing experiences during the event was voluntary. Victims also had an opportunity to discuss their perceptions as recipients of care.

2.6. Data collection

Study data was collected and managed using REDCap electronic data capture tools hosted at the University. REDCap is a secure, web-based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources. In addition to traditional data capture functionality, REDCap's survey function is a powerful tool for building and managing online surveys (Harris et al., 2009). REDCap users can design surveys and then distribute them to potential respondents with a variety of notification methods. Real-time validation rules (with automated data type and range checks) improve accuracy of data entry and udit reports can be generated from logging records of data entry, viewing, importing and exporting (Harris et al., 2009).

2.7. Data analysis

A research team member downloaded the data from REDCap, which automatically strips identifying information from the data set when downloaded from the server. Data was encrypted, stripped of identifiers, and stored in a secure database. The de-identified data is stored in a password protected file and will remain on a password protected computer, which is stored behind a locked door. De-identified data, for which no identifying key exists, will be kept for further analysis as the database is developed.

All data were analyzed using SPSS Version 25 (IBM, 2017). A total of 93 participants completed the electronic informed consent and the pre-ICAR. The final data include the 58 participants who completed the pre- and post-ICAR. The ICAR instrument was totaled then the responses for each of the six sections (communication, collaboration, roles and responsibilities, collaborative patient/client-family centered approach, team functioning, conflict management and resolution) were totaled to examine the differences in each section. Due to non-normality of the data, the Wilcoxon Signed Ranks Test (Blair and Higgins, 1985; Rietveld and van Hout, 2017) was used to measure the changes between the perceptions of competency in interprofessional collaboration both pre- and post- simulated disaster drill training and event.

3. Results

Participants were nursing majors and primarily Caucasian females (n = 50, 89% and n = 56, 97% respectively), representative of the school of nursing population at the University. Students ranged in age from 20 to 30 years old with a mean of 21.59 (2.152). The students in this study were above average with a mean grade point average of 3.38 (0.306). Almost three-quarters (n = 41, 71%) of the participants were employed in a healthcare related field as a Certified Nursing Assistant or Emergency Medical Technician, or other medical positions (n = 41, 71%). Only 6 (10%) participants were employed in a non-medical position and 18 (31%) reported that they did not work while in school.

The Wilcoxon Signed-Ranks Test indicated that scores for the total ICAR post-test were significantly lower than the Total ICAR pre-test ($Z = -2.006$, $p = .045$, $r = -0.19$). All the sections of the ICAR had a lower mean score on the ICAR post-test compared to the pre-test (see Table 1). Only the collaborative patient/client family centered approach section on the ICAR was statistically significant ($Z = -3.153$, $p = .002$, $r = -0.30$).

4. Discussion

Our research examined nursing students' perception of interprofessional collaboration using the ICAR and found that participant's' preliminary perceptions of interprofessional collaboration for a simulated disaster drill did not reflect their perceptions following the simulated disaster drill experience. Post simulation ICAR scores were lower in all categories following the simulated disaster drill experience. These differences may have resulted from nursing students' unfamiliarity with each discipline's contribution in the simulated disaster drill and the student's perceived ability that does not reflect actual ability to utilize interprofessional competencies. This finding is consistent with the study from Michalec et al. (2017). According to Michalec et al. (2017), students may enter experiences with assumptions of roles/responsibilities of their own as well as other healthcare disciplines. Michalec et al. (2017) refer to this phenomenon as “anticipatory socialization” (p. 5). The simulated disaster drill highlighted differences in the nursing students' perceptions regarding interprofessional collaboration. A change in perception is foundational to behavior change (King et al., 2013).

Table 1
Comparison of Interprofessional Collaboration Assessment Rubric (ICAR) for sample of nursing students (n = 58).

	ICAR pre test mean ± SD	ICAR post test mean ± SD	p-value*
Total ICAR	126.45 ± 17.97	121.69 ±	0.045*
Total communication	29.86 ± 3.980	28.65 ± 5.253	0.054
Total collaboration	22.40 ± 3.076	22.19 ± 3.358	0.725
Roles and responsibilities	21.59 ± 3.911	20.49 ± 4.926	0.244
Collaborative patient/client-family centered approach	15.19 ± 2.474	13.73 ± 3.525	0.002*
Team functioning	15.07 ± 2.316	14.48 ± 2.710	0.075
Conflict management and resolution	22.83 ± 3.510	22.10 ± 3.874	0.064

* Indicates significance level < 0.05.

Simply gathering a team is not equivalent to having an effective team (Miller et al., 2008). Learners must be cognizant of how each healthcare role contributes to the overall care of the patient/victim to maximize outcomes (Speakman and Hanson-Zalot, 2017). The significance noted in the total ICAR scores may have been related to nursing students assuming they understood the roles and responsibilities of the other participating healthcare providers. Following the simulated disaster drill experience, nursing students identified gaps in communication, collaboration, roles and responsibilities, collaborative patient/client-family centered approach, team functioning, conflict management/resolution. Experiential learning facilitates the development of team concepts, shared decision-making, and other's contributions to improve patient care (Miller et al., 2008; Speakman and Hanson-Zalot, 2017). Similarly, a simulated disaster drill may also promote teamwork and uncover the necessary behaviors needed to best manage a disaster.

Additionally, the significant decrease in assessment scores in the sub-section collaborative patient/client-family centered approach highlights that patient/family needs were not addressed during the simulated disaster drill experience. The intent of IPE is centered on the patient and family's communication of their particular needs (Speakman and Hanson-Zalot, 2017). During a disaster, patient/family collaboration is essential to effectively triage victims and direct them to safety. Furthermore, during the debriefing some victims discussed that the healthcare providers were more focused on tasks rather than communication. Generally, a novice needs physical cues and experience to develop competency (Benner, 1984). Team failures can result from a lack of agreement of the plan of care (Miller et al., 2008). Disaster resilience needs a concerted effort to engage all members of the community, including residents (Gamboa-Maldonado et al., 2012). Therefore, disaster management/preparedness as a simulated disaster drill focusing on the team, including patient/family, allows a novice to uncover their learning needs in a safe environment. The experiential nature of a simulated disaster drill uncovers a learner's perception of victim engagement/cooperation and their contribution to disaster preparedness.

4.1. Limitations

This study included several limitations that warrant discussion. This study only focused on nursing students participating in a simulated disaster drill. Only 53% of the nursing participants responded to the post-ICAR assessment, which may have been due to a limited, one-week time-frame during an examination week. Furthermore, during debriefing an inexperienced debriefer focused on areas for improvement rather than learner centric self-reflection. The areas discussed were related to disaster and patient management, rather than the importance of interprofessional collaboration. Lastly, the assessment measured the immediate perception of interprofessional collaboration. While current literature mainly focuses on disaster drill knowledge, our research examined the perceptions of interprofessional collaboration. Thus, this study adds to the existing body of nursing knowledge and outweighs the limitations.

5. Conclusion

The study assessed the perceptions of interprofessional collaboration among undergraduate nursing students before and after a simulated disaster drill. The assessment identified the need to integrate interprofessional competencies in disaster preparedness education. Speakman and Hanson-Zalot (2017) indicate that intentional planning is required to provide IPE. Additionally, role identification is a significant aspect in disaster preparedness (Jose and Dufrene, 2014). As a result, the findings highlight the increased need for educational offerings intentionally focused on interprofessional team disaster preparedness training to facilitate awareness of roles and responsibilities during a disaster experience. Speakman and Hanson-Zalot (2017) assert that healthcare that does not include interprofessional collaboration leads to fragmented care and is lacking critical communication. Through changes in a student's perception, behavior change and improved interprofessional competencies may result. Further research studies are needed to assess the long-term effects of collaboration in a disaster experience and how disciplines compare to one another in the same simulated experience.

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Declaration of Competing Interest

The authors declare no conflict of interest in the manuscript, including financial, consultant, and institutional.

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