Students Experience Mass Casualty Nursing From the Patient Perspective in a Simulated Mass Casualty Exercise

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Abstract

Life-saving response to mass casualty incidents (MCIs) requires education and training. Participation in an MCI full-scale exercise provided nursing students with a rare opportunity to experience a simulated disaster from the patient perspective to better understand the unique issues involved in mass casualty response. This innovative teaching approach enabled students to undergo triage and decontamination as victims of a chemical MCI and participate in a research study. We describe student feedback on this learning experience and the implications of incorporating a full-scale MCI for providing a patient perspective into nursing curricula.

Keywords

Mass Casualty Incidents; Emergency Preparedness; Simulation; Nursing Students

Mass casualty incidents (MCIs) present unique challenges for health care personnel. A sudden surge of patients may overwhelm medical resources, resulting in patients receiving inadequate treatment and/or poor outcomes. Emergency response competencies for graduates of nursing programs are considered essential by the National League for Nursing and American Association of Colleges of Nursing and are included on the NCLEX-RN examination. This article describes impressions of students who participated in a mass casualty full-scale exercise (FE) to gain experience in research, decontamination (DECON), and MCI triage.

BACKGROUND

In 2005, a deadly train derailment occurred in Graniteville, South Carolina, releasing chlorine fumes throughout the town. Hundreds of victims descended on the local emergency department (ED), which was ill equipped to deal with a chemical MCI (Culley et al. 2017). In response to this incident and the need for better tools to process patients during chemical MCIs, Culley and colleagues developed the Emergency Department Informatics Computational Tool (EDICT). A FE was planned to test EDICT using students as simulated patients. Since there is scant literature validating the effectiveness of DECON procedures, DECON was also tested.

The FE is part of a research study to develop and test EDICT's validity to triage victims of chemical incidents. It was incorporated into nursing courses and students received credit for participation; junior and senior nursing students were required to participate. The three aims of the FE included exposing students to research, chemical MCI triage, and DECON procedures.

METHOD

The FE was conducted in 2017 in the university's football stadium. The university institutional review board reviewed and approved the study as exempt from protection of human subjects regulations. Deidentified patient data from the Graniteville disaster were used for reenactment of victims. Students consented for photo releases and DECON unless they signed an opt-out form; they could opt out of the DECON component at any point during the exercise with no penalty toward their academic grade. The local fire department hazmat team conducted the DECON and monitored all safety procedures.

The Incident Command System (ICS), a standardized approach to the command, control, and coordination of emergency response (Corporation for National and Community Service, n.d.), served as the framework for the FE. Two standardized DECON procedures were employed to test their effectiveness; research protocols specified in the grant provided the framework for the testing of EDICT. Prior to the exercise, students completed two online emergency preparedness training modules (North Carolina Institute for Public Health Training, https://nciph.sph.unc.edu/tws/index.php): Responder Health and Safety: Basics of Public Health Preparedness, Module 5 and Mental Health Interventions in Disasters: Mental Health Interventions in Disasters, NC DRN, Module 4. They then took a quiz to demonstrate comprehension of their role as simulated ED or DECON participants and were randomly assigned to one of two groups: ED patients (to test EDICT) or DECON participants (to test DECON effectiveness).

ED and DECON Procedures

Participants were given information packets with a schedule, Job Action Sheet outlining responsibilities, and a paper response survey. The student coordinator provided just-in-time training on how to simulate patient roles, and the safety officer provided a safety briefing. More than 30 nurse faculty engaged students in clinical groups to discuss the exercise,

answer questions, and help students complete journals for course credit; 294 students acted out the role of patients from the 2005 Graniteville chlorine spill.

Participants received a card detailing patient demographics, symptoms, and vital signs and passed through a three-stage triage system in the simulated ED. First, they were assessed for life-threatening conditions. Second, the remaining patients entered patient card data at kiosk stations on tablet computers equipped with the EDICT mobile app; tablet cameras were used to scan the barcode from patient cards. Third, patients reported to a triage nurse who accessed the information they entered, questioned them further, took their respirations, and recorded a triage determination.

The 67 DECON participants were sprayed with an ultra-violet (UV) fluorescent powder (glo-germ) used as a surrogate for chlorine exposure. Wearing standard blue t-shirts over bathing suits, slippers, safety goggles, and surgical masks, participants were photographed in a darkened room under UV light, which illuminated the powder, to establish a baseline. They were then decontaminated by one of two methods: a) gross DECON (just removing shirts) or b) technical DECON (proceeding through a tent where they removed their shirts, were sprayed with water, and were given towels to dry off). Participants were photographed again to determine contaminant removal; students who were decontaminated in tents changed into dry clothes immediately after being photographed.

Survey Evaluation and Analysis

After DECON and triage procedures were concluded, participants returned to the waiting area to complete journals and surveys and participate in a debriefing and discussion of the research process, chemical MCI triage, and DECON procedures. Paper surveys included Likert questions and a few open-ended questions to identify issues encountered, best/worst experiences, and if they would volunteer again. (See supplemental content for Appendix A.)

Students also submitted journals that included mass casualty questions specific to their courses. For example, students enrolled in the Obstetrics Course were asked, "You are triaging a patient in her 20s who is able to walk; however, she is pale in color and complains of severe abdominal pain. As a nurse, how would you triage this victim? Explain what nursing interventions you would take and why." Faculty in each course used the same grading rubric to determine activity grades.

Agree-disagree questions included a five-response Likert scale (5 = strongly agree, 1 = strongly disagree). Data were entered into an Excel spreadsheet; descriptive and inferential statistical analyses were performed using SAS/STAT® version 9.4. Combined ED and DECON results were averaged and a t-test and chi square test were used to determine statistically significant differences. Responses to the open-ended questions were summarized.

RESULTS

Of the 363 participants, 361 submitted surveys (response rate 99 percent). Most (89 percent) were ages 18 to 24; 93 percent were female, and 89 percent were Caucasian.

Participants were presented with a list of potential problems based on their role. The most frequent issues in the ED were "getting started" and "scanning the barcode" (20.4 percent and 10.2 percent). Only 2.4 percent reported issues with summoning help when needed. Among the DECON group, the most frequent complaints were "adequacy of slippers," "getting started," and "being photographed" (37.3 percent, 19.4 percent, and 13.4 percent, respectively). Asked if they would volunteer for another mass casualty exercise, 84 percent of DECON participates and 61 percent of ED participants marked "yes." Chi-square test showed a significant association between "being volunteer" and group (Chi square = 13.08, $p = 0.0003$).

In response to "experience was valuable" and "piqued an interest in emergency response," both groups gave positive average answers: DECON, 4.2 ($SD = 0.73$) and 4.0 ($SD = 0.85$), respectively; ED, 3.9 ($SD = 1.0$) and 3.8 ($SD = 1.1$), respectively. The ED group showed a lower response compared to the DECON group in both areas, $t(132) = 2.84$, $p = 0.0023$; $p = 0.040$.

Open-ended responses for both groups included: working with fellow students, faculty, and staff (7.1 percent and 14.9 percent); and learning about triage and DECON procedures (11.2 percent and 20.9 percent). The ED group commented on good or speedy execution (7.8 percent) and enjoyed the environment of the football stadium (7.5 percent); the DECON group enjoyed the DECON procedure (35.8 percent). Journal responses were specific to each course (leadership, obstetrics, pediatrics, mental health, med/surg). For example, student enrolled in the pediatric course explained nursing interventions they would use in a situation involving an unconscious infant brought to the ED whose mother was triaged as deceased.

DISCUSSION AND IMPLICATIONS

Creation of a Mass Casualty Exercise site in the course management system facilitated communication between the research team, faculty, and students. The site included specific learning activities with linked resources, training modules, and a discussion board for asking questions. A quiz prior to the exercise ensured students understood their roles, responsibilities, and opt-out decision for the DECON experience. Completion of a posttest verified competency in the material.

The favorite activity for ED participants was acting out the symptoms of their assigned patients. DECON participants enjoyed participating (36 percent) and learning about DECON (21 percent). The worst experience for participants was waiting (68 percent), for registration, triage or DECON, food, and the end of the exercise; waiting was inevitable because of the large-scale nature of the exercise. For DECON participants, 45 percent said the worst experience involved being cold and wet after being hosed down. Students saw the FE as a "valuable learning experience" that "will help … in the hospital if something like this ever happened." Review of journals entries indicated that after acting out the patient role, students were able to identify nurses' actions in mass casualty scenarios.

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Education and training in mass casualty response is critical in our uncertain world. MCI exercises present opportunities for students to experience the patient perspective and more fully appreciate and understand research and its application in real-life situations. The importance of DECON is rarely discussed in nursing curricula. Journaling for course credit provided a means for students to apply what they learned to situations specific to each course. Limitations included the use of nursing students as simulated patients; students may differ from typical MCI patients, and the survey tool was not designed to capture comments regarding the victim experience. Although it did not fully address issues that occur in an MCI, the FE provided stress testing of an informatics approach to increase triage efficiency.

CONCLUSION

Overall, participants found the experience valuable. DECON participants reported significantly higher responses than ED participants to "the experience was valuable," and "would you volunteer for another mass casualty exercise." It is hypothesized that the lower waiting times and more physical activities for the DECON group resulted in higher satisfaction and interest; however, these are both realistic parts of a mass casualty scenario.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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