

Special Contribution

Simulation Training in Disaster Response for Healthcare Students

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Disasters, man-made as well as natural environmental events, pose a local and global public health challenge. To address the impact of all forms of disaster and mass casualty events, disaster training must be incorporated into the curricula of healthcare programs. This article describes how one university integrated disaster training through use of a spiral curriculum approach and simulation methodology.

Key words: simulation, disaster training, spiral curriculum

1. Introduction

Disasters, whether they are man-made such as acts of war and terrorism or natural environmental events, pose a local and global public health challenge. Natural disasters result in approximately 90,000 deaths and impact nearly 160 million people annually¹. To address the impact of all forms of disaster and mass casualty events, disaster training must be incorporated into the curricula of healthcare programs. The American Association of Colleges of Nursing (AACN), the national organization which sets the standards for nursing education, published the “Essentials of Baccalaureate Education for Professional Nursing Practice” in 2008². These standards guide nursing curriculum to ensure that nurses are trained to meet the challenges of the 21st century (AACN, 2008). AACN Essential criteria VII, mandates that curriculum include content on mass casualty events, disasters and emergency situations. This article describes how one university integrated disaster training into their

curriculum through use of a spiral curriculum approach and simulation methodology.

2. A Spiral Curriculum approach to disaster training in a university nursing program

Historically the university’s nursing programs relied on didactic lectures and reading assignments to teach disaster preparedness, response and recovery. Every three years, students participated in a community wide disaster drill developed by the local government to train first responders. The healthcare students participated as victims and did not have the opportunity to practice the roles expected of a health professional in disaster situations. Though this large scale community simulation was engaging, students were not able to transfer their newly acquired disaster response knowledge to a simulated situation. Therefore, a team of nursing faculty collaborated with local disaster experts to create a new disaster training program for healthcare students.

The revised disaster program was designed utilizing a constructivist spiral curricular approach to education described by Jerome Bruner in 1960. A spiral curriculum intentionally revisits topics throughout the course

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Table 1. Tips on how to enhance a basic table-top scenario to apply to new situations

Key tips	Examples of how to spiral disaster content with increased complexity – radiation exposure.
Objectives should be designed for the specific type of disaster <ul style="list-style-type: none"> • Consider the learner's level of expertise. • Focus on crisis team interactions and communication skills. 	Develop objectives that reflect application of the core disaster content to the expected consequences of radiation exposure. Suggestions would be to include objectives for triage of victims of radiation exposure, personal protective gear, management of victim's injuries, decontamination, delayed health effects, and psychological effects.
Preparation for simulation: <ul style="list-style-type: none"> • Ensure that learners are aware of the objectives for the simulation and have reviewed reading assignments and received core disaster training content. 	Specific content on management of radiation disaster response should be assigned as preparation work prior to students attending this simulation session.
Keep the exemplar simple with realistic information <ul style="list-style-type: none"> • Present the table top scenario in discrete segments. Part one can reflect the immediate response to the event • Part 2 will unfold to reflect the impact of the disaster on community that occurs over one to two weeks post disaster event. 	Part 1: Initial response to radiation exposure is the focus of this session. Students will triage and manage the event, victim cards must reflect appropriate radiation exposure symptoms. For example if the disaster is a result of a dirty bomb, include: <ul style="list-style-type: none"> • victim cards that reflect blast injuries and symptoms of radiation exposure. • equipment cards can be created that allow students to select personal protective gear and methods for decontamination. • Maps should be developed that show the site of the radiation release and immediate surroundings. Learners can then select their control lines and location of command center should be provided. (Upwind vs downwind of contaminated site).
Enhance fidelity with the inclusion of video clips and sound effects.	Part 2: Continued follow up of the victims and observation for the delayed health effects of radiation exposure and the psychological effects.
Evaluation and after action reporting	Images or video clips of a radiologic event (dirty bomb)

and with each revisit, content increases in complexity. The increased complexity may be in terms of new knowledge, skills or advanced applications of the content. The learner gains mastery of the topic by comparing and contrasting the previously learned content to the increasingly complex new information³. In addition, use of simulation teaching methodologies were utilized to engage the learner and provide opportunities to practice the full scope of nursing roles during a disaster. Simulation is a teaching methodology described as an educational technique designed to provide the learner with guided experiences that closely replicate real healthcare situations⁴. Design of the simulation activities followed the International Nursing Association for clinical Simulation and Learning (INACSL) Standards of best practice⁵. Lastly, teamwork and interprofessional education and collaboration are important concepts that are threaded throughout the curriculum of all healthcare schools. Therefore, simulation sessions were designed to guide interprofessional teams through learning exercises and promote application of teamwork and collaboration skills.

The spiral approach to presenting the disaster content included an assigned series of core content modules. Each module built on the previous module content.

The following subject areas were included: 1) disaster classification, 2) emergency preparedness, 3) roles of healthcare providers and Disaster Medical Assistance Teams during the response phase (disaster response roles, incident command, triage, and first aide), 4) recovery phase (disease surveillance, vector control, epidemiology, food and water safety and counseling). Short application exercises were integral components of each module and consisted of mini case studies focused on practice of select skills such as triage and epidemiology tracking.

3. Table-top Simulation development

Two simulation exercises were developed to integrate and apply knowledge and skills gained from the modules. Faculty determined that a table-top simulation was the most time efficient and manageable method for large groups of students. Table-top simulation is an education tool that has been successfully used in public health to train students, practicing professionals and community agencies involved in disaster response. A table-top exercise is held in a classroom setting and the goal is to promote discussion and clinical decisions that occur in a disaster situation⁶. The faculty determined that the university's location in the Pacific Ocean made the

selection of a tsunami wave as the exemplar for the table-top simulation activity, realistic and applicable to our island setting. The exercise was designed as a 6 hour training and was divided into two parts. Part one occurred immediately after the tsunami wave hits the island and part two unfolds events that occur during the two weeks after the disaster strikes.

The simulation participants were composed of undergraduate as well as graduate students with no practical experience with this content. Therefore, objectives for part one of the simulation were focused on application of the roles of first responders during the initial response phase. Students applied their core disaster skills to assess the scene, triage victim cards, allocate resources, transport survivors and apply first aid. Immediately after part one, expert facilitators debriefed the simulation, encouraging students to reflect on their response decisions, communication and situation awareness. Personal safety issues were discussed and finally students were asked to reflect on how they could encourage the community to prepare for such an event in the future.

Part two of the scenario unfolded to focus on the issues faced by the survivors in the ensuing days after the disaster, before external help was able to arrive. Common issues that occur in shelters were simulated as well as an outbreak of an infectious disease due to poor food and water handling and sanitation. The goal of this portion of the simulation was to encourage collaboration and discussion within groups of students.

The tsunami disaster was a striped down- simplified version of a community wide disaster simulation. Facilitator guided discussions allowed for students to reflect on the application of their core knowledge during each phase of the disaster. Having the simulation focused on the foundation core disaster concepts, allowed

the faculty to repurpose the basic scenario to address alternate forms of mass casualty or disaster events. Table one describes how the basic scenario can be adapted to address a radiation disaster response.

4. Conclusion

In conclusion, the spiral approach to disaster response curriculum and the guided simulation experiences provide a straight forward, constructivist method for training core disaster concepts.

Conflict of Interest Disclosure

The author declares no conflicts of interest associated with this manuscript.

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