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Featured Article

Nursing Students as Epidemiologists: A Simulation Approach

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Abstract: Simulation is commonly used in nursing education to teach clinical skills. Here, we describe the development processes, implementation, and evaluation of an epidemiology simulation used in a community and public health nursing undergraduate clinical course at the University of Pennsylvania. The simulation was designed to teach students the principles and concepts of outbreak investigation and was based on the 2003 Severe Acute Respiratory Syndrome outbreak in Toronto, Canada. The simulation places students in the role of a public health nurse in the outbreak investigation team, working in groups of five to seven students to complete analyses and make recommendations under time and information constraints. Since piloting in spring 2014, we have run the simulation three times (summer and fall 2014 and summer 2015). Student evaluations show high levels of engagement and interest and substantial increase in the skills and expertise required in an outbreak investigation. We share key lessons learned, including resources required for simulation development and delivery, revisions to the simulation format and content in response to student feedback, and transferability and sustainability of the simulation. Overall, simulation was a feasible and effective modality to teach epidemiology and should be considered in community and public health nursing courses.

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Simulation of various clinical situations is one teaching strategy used in nursing curricula. Simulation provides an opportunity for students not only to become competent in

nursing-related skills required for the provision of care in acute settings (e.g., urinary catheter insertion) but also to gain additional skills from other academic disciplines and practice professions. Epidemiology is one such discipline; in this article, we present the development and implementation of a simulation to teach epidemiological concepts

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and skills to undergraduate nurses. Simulation can “replace or amplify real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner” (Gaba, 2007, p. 126). Simulations require students to actively participate, apply existing knowledge to problem-solving, and interact with peers and facilitators in high-fidelity settings. Simulation is a hallmark of the new undergraduate curriculum at the University of Pennsylvania (D’Antonio, Walsh Brennan, & Curley, 2013) and is used to some extent in every clinical course.

Key Points

- We developed an outbreak investigation simulation to teach nursing students principles of epidemiology.
- Students reported increases in skills and expertise related to outbreak investigation.
- We report lessons for future simulations including transferability, sustainability, physical settings, use of technology, expertise and resources.

Another hallmark of our new undergraduate curriculum is the emphasis on public health and community nursing, reflecting the growing importance to the nursing field of population health and care provided outside a clinical setting.

In the revised undergraduate curriculum, *Nursing in the Community* is a two course unit clinical course (i.e., twice the size of a typical semester-long course) taken at the beginning of the senior year. The goals of the revised *Nursing in the Community* course are to prepare students for public health nursing, community-based practice, and community-engaged practice. The syllabus and clinical placements for the course were informed by the core competencies established by the Quad Council, a coalition of four nursing organizations (The Public Health Foundation, 2014). Mastery of these competencies, including public health skills such as epidemiology, is critical to improve the quality and rigor of public health nursing.

As with all clinical courses in the undergraduate curriculum, *Nursing in the Community* includes a robust simulation component, comprising 36 hours across the semester. Although most of the simulation hours in the course focus on typical clinical scenarios in community or public health nursing (e.g., a home visit for a newborn and mother; a school-based clinic; a recently discharged patient with heart failure), we saw an additional opportunity to build competencies in epidemiology and public health through simulation. Notably, ten of the >30 hours of simulation in the revised *Nursing in the Community* course are focused on two *epidemiologic* (vs. clinical) scenarios in which nursing students take on the role of a nurse epidemiologist. In the first, students serve on an outbreak investigation team for a rapidly emerging infectious disease in a fictional city; in the second, they assess a national cervical cancer

screening program in a Sub-Saharan African country. In this article, we share the development, implementation, and outcomes of the outbreak investigation simulation for undergraduate nursing students in the community and public health nursing clinical course at the University of Pennsylvania School of Nursing.

Simulation Development

Resources and Roles

Development and implementation of the simulation was resource intensive (see Table 1 for personnel involved and their roles in both the course and the simulation). The effort was overseen by a course instructor (A.B.) with expertise in public health and epidemiology, who initially developed the concept of adding epidemiology simulations to the course. To support simulation development, we hired a current Master of Public Health (MPH) student (H.O.) to be the lead author and lead facilitator of the simulation. The Course Directors (L.P., C.B.) and Associate Course Director (M.H.) reviewed draft and final simulation content and assisted with facilitation during piloting and full implementation; all had participated in a simulation facilitator training course previously. Teaching assistants (T.J.S., H.T.) helped develop and validate grading rubrics and assisted with facilitation. The authors also consulted simulation specialists within and outside the nursing school, including a nationally recognized nursing simulation expert.

Development Process

In the initial planning phases in fall 2013, four epidemiologic topics relevant to community and public health nursing were identified as possible simulation scenarios: outbreak investigation, public health surveillance, screening and prevention, and population-based interventions. Of these, outbreak investigation was selected as the first epidemiology simulation to be developed given its high relevance to public health nursing and its suitability for simulation-based instruction.

Beginning in January 2014, the lead author and course instructor first developed a series of eight learning objectives for the simulation (Box 1), based on outbreak investigation content covered in popular epidemiology textbooks (Gordis, 2008; Nelson, Williams, & Graham, 2006) and the Quad Council competencies identified as important for nurses working in outbreak investigations (Sistrom & Hale, 2006). The lead author then researched several historic outbreak investigations on which to base the simulation. The 2003 outbreak of Severe Acute Respiratory Syndrome (SARS) in Toronto was chosen given available data and outbreak features conducive to meeting learning objectives (e.g., disease transmission

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