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Featured Article

Using Visualization in Simulation for Infection Control

Stuart Pope, DNP, RN^{a,*}, Samantha Baggett, BSN, RN^b,
Eva Jean Dubois, EdD, FNP-BC, RN^c, Chris Martin, BSN, RN^b,
Teresa Gore, DNP, FNP-BC, NP-C, CHSE-A^d

^aAssociate Clinical Professor, School of Nursing, Auburn University, Auburn, AL 36849, USA

^bGraduate Student, School of Nursing, Auburn University, Auburn, AL 36849, USA

^cAssociate Clinical Professor, School of Nursing, Auburn University, Auburn, AL 36849, USA

^dAssociate Professor, School of Nursing, Auburn University, Auburn, AL 36849, USA

KEYWORDS

simulation;
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Abstract: Infection control, isolation, and hand hygiene continue to have a major impact on preventable medical deaths and the increase in health care costs. To control these factors, it is important for content taught in the classroom to translate to clinical practice. Simulation has proven to be an effective educational method to increase the competence of health care providers. This article gives a brief review of current evidence-based literature on infection control and simulation and provides details about the development, implementation, and evaluation of a simulation that integrates visualization as a learning strategy to help students apply knowledge to the clinical setting. Scenario development focuses on patient safety. Attention to detail during implementation creates a realistic scenario, and using feedback from students and faculty during the evaluation process allows continuous improvement of the simulation exercise. The article describes a simulation learning experience. The simulation provides a powerful impression that encourages the students to recognize and appreciate the significance of isolation precautions and hand hygiene in controlling hospital-acquired infections.

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Problem Identification

The reports of hospital-acquired infections (HAI) are alarming. HAI are increasing mortality risks, substantial

costs, and are ultimately the responsibility of the health care providers. Nance & Bartholomew (2012) suggests that the “United States is killing 30 people an hour on average due to preventable medical errors and infections.” (pg. iii). Preventable deaths and billions of health care dollars could be saved if health care providers would consistently incorporate proper hand hygiene into practice settings (Fitzpatrick, Everett-Thomas, Nevo, Shekher, Rosen &

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* Corresponding author: wsp0002@auburn.edu (S. Pope).

Scheinman, 2011). A major cause of illness and death worldwide is contributed to HAI (Pittet et al., 2008; WHO, 2011). The World Health Organization (WHO) (2011) began an annual global “clean hands campaign” along with guidelines that provide infection control rec-

Key Points

- Infection control, isolation, and hand hygiene impact death and healthcare cost.
- Simulation takes didactic content and translates it to clinical practice.
- How to create a simulation that integrates visualization as a learning strategy.

ommendations for health care delivery systems and providers around the world. Health care members must comply with these recommendations, evidence-based practice related to HAI, and intentionally work at reducing infection rates. Proper hand hygiene is emphasized as the single most effective way to reduce HAI (Gould, 2014; Gould, Chudleigh, Moralejo, & Drey, 2009; Pittet, 2001). However, to

prevent the nosocomial spread of antibiotic-resistant pathogens, such as methicillin-resistant *Staphylococcus aureus*, additional interventions, which include patient isolation, must be integrated into practice (Farr & Bellingan, 2004; Gould, 2014; Karkada, Adamic, Kahn, & Iwashyna, 2011).

Patient safety and quality of health care is directly linked to the competence of nurses and other health care providers. All health care providers must be knowledgeable of the different modes in which infectious organisms are transmitted from a carrier to a susceptible host and the importance of complying with standard and transmission-based precautions to reduce HAI. Environmental contaminants play an important role in the transmission of infections in the hospital setting (Gould & Drey, 2013b; Weber, Rutala, Miller, Huslage, & Sickbert-Bennett, 2010). In the current environment of professional accountability, new graduate nurses must enter the clinical arena prepared to exhibit practices that maintain patient safety, which includes appropriate and consistent infection control practices. Application of appropriate infection control practices by graduate nurses can be accomplished using a variety of educational strategies. The National Council of State Boards of Nursing supports the use of simulation as one teaching strategy that is effective in increasing nursing skill compliance with good hand hygiene practices or more globally infection control precautions. (Roche, Schoen, & Kruzal, 2012).

Infection control principles taught in the classroom unfortunately are not consistently carried over into practice, hence the increasing rate of HAI and length of hospital stays (Fitzpatrick, et al., 2011). Educators must identify which simulation teaching strategies are more effective in helping students recognize the critical importance of using

consistent infection control precautions as a means to decrease HAI.

A baccalaureate nursing student (BSN) typically receives infectious disease content regarding modes of transmission, portals of entry, characteristics of a susceptible host, and the importance of infection control precautions in a didactic nursing course (Fitzpatrick, et al., 2011). Simulation experiences help reinforce this content through interactive learning, deliberate practice, and visual cueing (Secomb, McKenna, & Smith, 2012). Infection control education must be included early in a preclinical experience to protect patients, their families, and the health care team.

The purpose of this article was to discuss how one institution developed a simulation scenario to address the issue of isolation precautions and proper hand hygiene. The main emphasis for developing this simulation scenario was to take an abstract concept (infection control) and provide a concrete experiential learning opportunity (visualizing the infection). As a new simulation scenario, anecdotal faculty feedback was obtained in postsimulation implementation debriefing and student feedback from reflective journaling. Quantitative data were not collected.

Review of Literature

Infection Control

Infection control in health care is a critical quality safety indicator measured to improve patient outcomes and reduce the incidence of patient infections in both inpatient and outpatient settings. The spread of infection in health care settings has been studied, and a vast amount of literature written about infection control. Current infection control guidelines are based on evidence and continually being updated as research continues. Multiple infection prevention control techniques are required to reduce the rates of nosocomial infections (Backman, Taylor, Sales, & Marck, 2011). Precautions that help prevent the spread of infection are universal precautions, respiratory isolation, contact isolation, droplet isolation, and/or a combination of these precautions. Isolation precautions can become resource intensive but are necessary and remain central components of national guidelines (Department of Health, 2006; Karkada et al., 2011; Nicolle, 2000; Saint, Higgins, Nallamothu, & Chenoweth, 2003). The World Health Organization (2012) recommended the use of Standard and Contact Precautions for multidrug-resistant organisms (MDRO) (Karkada et al., 2011; Siegel, Rhinehart, Jackson, & Chiarello, 2007; WHO, 2012). Use of contact isolation in patients known to be colonized or infected with these MDRO is recommended and widely used in health care institutions. The use of gloves, gown, and surgical mask reduce the likelihood of contamination with microorganisms from a patient or an

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