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Featured Article

Investigating Retention of the Sepsis Care Bundle

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KEYWORDS
in situ simulation;
sepsis care bundle;
simulation knowledge retention;
simulation as teaching methodology;
self-study and simulation;
sepsis;
teaching;
high-fidelity manikin

Abstract

Objective: Compare the effectiveness of simulation to a self-study article on short- and long-term knowledge retention among critical care health care providers.

Methodology: This study used a two-group single-blinded randomized controlled design and was conducted at seven community hospitals in the Midwest United States. Participants answered a demographic questionnaire and completed a knowledge test related to sepsis care management. Participants were randomized to either the treatment intervention (simulation) or the standard intervention (self-study article). Immediately after the education intervention and again at 3 months after the education intervention, participants completed the same knowledge test.

Conclusion: Overall, there was no significant difference in knowledge test scores between groups of participants who received simulation and self-study. Knowledge scores for both groups improved after the educational intervention.

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Background

Sepsis is a serious medical condition caused by an overwhelming immune response to infection (Dellinger et al., 2013). Immune chemicals released into the blood to combat the infection trigger widespread inflammation, which leads to blood clots and leaky vessels. This results in impaired blood flow, which damages the body's organs by depriving them of nutrients and oxygen (National Institutes of Health, 2014). The Centers for Disease Control and Prevention estimated that 450,000 cases of sepsis are reported in the United States alone with >100,000 deaths (Angus et al., 2001). These numbers are far more than people who are dying from prostate cancer, breast cancer, and AIDS combined (National Institutes of Health, 2014). Severe sepsis/septic shock is a complicated costly critical illness that requires a complex and multifaceted treatment strategy. To survive this severe medical condition, sepsis has its own campaign and guidelines for better outcomes for our patients.

In 2012, a committee of 68 international experts representing 30 international organizations convened to find recommendations for treating sepsis (Dellinger et al., 2013). These recommendations are grouped into bundles as treatment management interventions. Within these bundles, there are goals and diagnostic criteria for surviving sepsis. Implementing this bundle treatment management therapy has shown to increase survival rates with the septic patient (Barochia et al., 2010). Once diagnosed, the

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treatment requires fluid resuscitation; obtaining lactate levels; locating the source of infection, blood cultures, and antibiotic therapy; and maintaining a mean arterial pressure of greater than 65 mm Hg (Dellinger et al., 2013). The use of these grouped interventions (bundles) can improve sepsis care and mortality by 14% (Martin, 2012). The cost of treatment ranges from $19,000 to $32,000, depending on the number of organ systems that go into failure (Angus et al., 2001). In order for costs to be reduced and survival rates to increase from the use of these interventions, facilities must have the knowledge of them.

Key Points
- In-situ simulation.
- Sepsis care bundle.
- Knowledge retention.

Simulation is valuable as a learning tool because it allows for repetitive training on complex issues (Orledge, Phillips, Murray, & Lerant, 2012). A previous study using pediatric mock codes using simulation revealed survival rates increased from 33% to 50% after simulation mock code education (Orledge et al., 2012). The significance with simulation is that with this type of education, is that it has the capability of promoting positive effects on patient outcomes (McGaghie, Draycott, Dunn, Lopez, & Stefandis, 2011a; McGaghie, Issenberg, Cohen, Barsuk, & Wayne, 2011b). Bundle compliance for improved sepsis survival rates has been used with multidisciplinary manikin-based simulation as a quality improvement project, but the pretest and tasks to be completed did not correlate in a knowledge relationship (Mah et al., 2009). Therefore, the question still remains, is simulation an appropriate method to use to teach sepsis education? Currently, there are no studies that make known the benefit of in situ (in the original setting) simulation education of the sepsis bundle treatment management therapy for health care workers in the critical care setting.

Purpose

The purpose of this research study was to compare clinical knowledge between critical care health care providers who received sepsis education through simulation versus critical care health care provider who received sepsis education through a self-study article (i.e., Cleveland Clinic Care Path Guide: Severe Sepsis). This study compared the two teaching methods (simulation versus self-study) on clinical knowledge before the intervention (Time 1), immediately after intervention (Time 2), and at 3 months after intervention (Time 3). The research questions that guided this study were (a) What is the difference between pre- and post-test clinical knowledge scores immediately after the educational intervention? and (b) What is the difference in pretest clinical knowledge scores and post-test clinical knowledge scores at 3 months after the educational intervention?

Methods

Sample and Recruitment

The institutional review board at the Cleveland Clinic approved this study. Participants were recruited from critical care units at seven regional hospitals associated with a large public academic medical center in the Midwest United States. To be eligible to participate in this study, individuals had to be an RN, medical doctor, Doctor of Osteopathic Medicine, resident, or fellow. A sample size of 30 individuals per group was determined to be adequate based on calculations that assumed use of two-sided tests, a significance level of .05, and power of 80%. The study aimed to enroll 69 participants to account for 10%-15% attrition during the study.

Data Collection

The authors provided sepsis education at one regional hospital weekly, during which time participants were recruited to participate in the study. Individuals who elected to participate in the study provided written informed consent and completed a demographic questionnaire and knowledge pretest (Time 1). Participants were then randomly assigned to an education intervention. One group received sepsis training via simulation, whereas the second group received sepsis training via a self-study article. Participants completed a knowledge post-test immediately after (Time 2) and at 3 months (Time 3) after the education session. Participants also completed a secondary demographic questionnaire at the 3-month time point to determine if additional education had been performed between knowledge tests.

Simulation Scenario

This provides a summary of the simulation scenario:

> "A 45-year-old male weighing 72 kg presents to the Emergency Department (ED) complaining of acute abdominal pain. Treatment in the ED includes 1-liter of intravenous fluids, blood cultures, and a broad-spectrum antibiotic. The patient is admitted to the intensive care unit where he begins to decompensate."

Participants were expected to manage the care of the "patient" (a high-fidelity simulator). If the appropriate actions were taken, the patient's status gradually improved.