



# Computer Simulation for Pain Management Education: A Pilot Study

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## ■ ABSTRACT:

Effective pain management is an elusive concept in acute care. Inadequate knowledge has been identified as a barrier to providing optimal pain management. This study aimed to determine student perceptions of an interactive computer simulation as a potential method for learning pain management, as a motivator to read and learn more about pain management, preference over traditional lecture, and its potential to change nursing practice. A post-computer simulation survey with a mixed-methods descriptive design was used in this study. A college of nursing in a large metropolitan university in the Southeast United States. A convenience sample of 30 nursing students in a Bachelor of Science nursing program. An interactive computer simulation was developed as a potential alternative method of teaching pain management to nursing students. Increases in educational gain as well as its potential to change practice were explored. Each participant was asked to complete a survey consisting of 10 standard 5-point Likert scale items and 5 open-ended questions. The survey was used to evaluate the students' perception of the simulation, specifically related to educational benefit, preference compared with traditional teaching methods, and perceived potential to change nursing practice. Data provided descriptive statistics for initial evaluation of the computer simulation. The responses on the survey suggest nursing students perceive the computer simulation to be entertaining, fun, educational, occasionally preferred over regular lecture, and with potential to change practice. Preliminary data support the use of computer simulation in educating nursing students about pain management.

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Pain management is a responsibility of all direct care nurses, regardless of the practice setting. Assessing pain accurately establishes the basis for pain treatment; however, pain assessment and reassessment are often ignored (Herr, 2011). The management of pain includes accurate assessment and the development of a treatment plan based on that assessment designed to improve or alleviate pain, as well as documentation of all actions taken and the outcomes of the treatment plan (Arnstein, 2010). Optimal management of acute pain often

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involves a multimodal treatment plan (Pasero & Poteno, 2011). This treatment plan will likely include the use of medications, either opioids or nonopioids, or possibly both (Manworren, 2015). Alternative or complementary therapies are also often considered, which might include the use of heat or cold, or distraction techniques such as watching television (Manworren, 2015). All of these aspects of pain management are typically taught in nursing school; this knowledge is expected of every new nurse and is needed to manage pain. However, several barriers to optimal pain management are identified in the literature, one of which is lack of knowledge (Fishman et al., 2013; Lin, Reid, Liu, Chused, & Evans, 2015).

## LITERATURE REVIEW

The management of pain is a key element of care for patients in the hospital and an important concern of the patients as well (Dwamena et al., 2012). Studies have found that even though information about acute pain management is widely available, pain continues to be inappropriately managed (Duncan et al., 2014) and older patients continue to suffer from pain during their hospital stay (Coker et al., 2010). Managing the pain of hospitalized patients adequately “remains a national unmet need for the United States” (McFarland, Shen, & Holcombe, 2016, p. 498).

Educating members of the health care team responsible for pain management is essential, which includes nurses. Research conducted by Latchman (2014) examined the knowledge and attitudes of 41 undergraduate nursing students related to pain management. The researcher concluded bachelor of science in nursing-prepared students at the end of their nursing curriculum had minimal knowledge of basic pain management principles. This is consistent with research reported from previous studies (Plaisance & Logan, 2006; Rushton, Eggett, & Sutherland, 2003) as well as a literature review completed by Chow and Chan (2014). Duke, Haas, Yarbrough, and Northam (2010) report senior nursing students scored below acceptable benchmarks on knowledge and attitudes toward pain management. Keyte and Richardson (2011) suggest current pain education strategies may be inadequate in preparing nurses for real clinical situations. The lack of understanding of the basic pain management principles may hinder nurses’ ability to adequately manage pain upon graduation.

Obtaining pain education information while in school using traditional teaching methods may lead to increased knowledge but may not lead to improved pain management in practice (Zhang et al., 2008). Providing education in ways different from the

traditional lecture might be one way of improving learning gains that help move toward changing practice to ensure a better pain experience for the patient. Keyte and Richardson (2011) suggest e-learning that is problem based may be able to “challenge existing beliefs, values and attitudes and to enable exploration of issues associated with the complexity of healthcare workplaces” (p. 117). Romero-Hall (2015) reports using technology and strategies that are meaningfully related to pain management education may improve pain education in nursing curricula. Further, the author states that one tool that has not been used for pain management education in the past is computer-based simulation. Simulation is engaging and provides a real-world context for information and in simulation participants are presented with a clinical situation that requires critical thinking and decision making. A computer-based simulation allows for participant interaction with the same clinical scenario, available to a large number of participants with some control, without the variables of interactor or facilitator availability or expertise.

Mandatory education programs are the primary method of communicating updated clinical practice guidelines, such as pain management techniques, to nurses and other health care professionals (American Nurses Association, 2010). The information provided in mandatory education programs is based on the most current research and evidence available and providing this education plays a significant role in health care to ensure that optimum care is provided to all hospitalized patients. In order for current information to be integrated into nursing practice, the audience must be receptive to the information provided and the teaching method being used. Based on the Diffusion of Innovations Model (Rogers, 1995), new ideas are conceptualized in the following five-step process: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. The decision process is further broken down into two pathways: adoption and rejection. When evaluating methods of teaching, the most effective methods are those that cause the audience to adopt and implement rather than reject the information that is taught.

As technology continues to advance, alternative teaching methods such as computer gaming and interactive simulation are becoming more accessible. A meta-analysis performed by Vogel, Vogel, Cannon-Bowers, Muse, and Wright (2006) compared the effectiveness of computer gaming and interactive simulation with traditional education methods. The study results yielded better attitudes toward learning and significantly higher cognitive gains when gaming and simulation methods were used instead of traditional

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