

## The importance of simulation in nursing education

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### Abstract

Nursing education involves a practice-oriented curriculum in which emphasis is placed on both theoretical knowledge and psychomotor skills. In skill-based education, where learning through practice occupies a central role, it is important to ensure the integration of theoretical knowledge into practice. In this context, simulations represent an innovative teaching method that stimulates a number of senses at the same time among learners. Simulation is a method which can be designed to reflect real-life conditions. Depending on the scenario; the simulation will involve a student or a group of students performing a number of patient care activities on a manikin, player or standardized patient. The simulation method allows students to repeatedly practice their clinical skills until they develop a sense of proficiency; to learn at their own pace; and to freely make mistakes. Simulation is an educational process that can replicate clinical practices in a safe environment. Nursing students who take part in education programs involving simulations perform less medical mistakes in clinical settings, and are able to better develop their critical thinking and clinical decision-making skills. For these reasons, we commend that simulations, which represent an interactive learning method, are rendered more common in institutions providing nursing education.

Keywords: Nursing education, nursing student, simulation.

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## 1. Introduction

In the present age, rapid changes and advances are continually taking place in science and technology. In parallel to this, present-day developments in the nursing are also necessitating changes in the nursing education system. Nursing is an integrated discipline requiring knowledge and skill getting in cognitive, affective and psychomotor domains of learning (Morgan, 2006). To ensure the continuity of professions, it is especially necessary to update the education systems associated with these professions on a regular basis. For this reason, in the current information age, it is important to take into consideration the developments in the areas of education and professional education.

The first aim of nursing programs is to prepare individuals to fill a nursing role in the professional field to meet population needs and protect the public. The global standards are essential components of high quality nursing education programmes (World Health Organization, 2009). However, traditional teaching methods, in which everything is determined by the instructor, and the transfer of information occurs through a one-way communication approach, are no longer adequate for meeting the requirements of our age (Fanning & Gaba, 2007). Such education systems lead to educational practices that are not centered on the students, and, consequently, to the nurturing of students who assume passive roles. For this reason, curricula in nursing education needs to be modified in a manner that they provide an active role to the students. This requires the application of an innovative approach in education system (Dil, Uzun & Aykanat, 2012).

Over time, the fact that different individuals learn new information at different paces leads to the need to use different teaching approaches in educational environments (Ziv, Wolpe, Small, & Glick, 2003). In addition, as nursing students often experience difficulties in transferring the knowledge they acquired in laboratory environments to clinical practice, it has become somewhat obligatory for nursing schools to follow technological developments more closely and to make use of interactive educational methods (Medley & Horne, 2005).

Rapid and developing changes support the use of interactive teaching methods, including advances in technology and the promotion of learning by experience (Harder, 2009). One of the most effective teaching methods which gains cognitive, affective and psychomotor skills to nursing students are interactive methods. Interactive method contribute students to participate in learning process actively. In this context, simulation is an effective teaching method that can be used to realise the main goals of nursing education.

## 2. Simulation

Simulation is an example of an interactive teaching-learning method in nursing education. In the present-day world, simulations are used in a wide range of different areas such as construction, molecular biology, aviation, the automotive sector, the industry, and the healthcare system (Bradley, 2006; Midik & Kartal, 2010; Goris, Bilgi & Bayindir, 2014). The gold standards for professional nursing education published by the World Health and Organization also recommend the use of innovative methods such as simulations in nursing schools education programs (World Health Organization, 2009). Simulation is increasingly used as effective learning method, especially in the area of healthcare (Cant & Cooper, 2010).

One of the definitions of simulation is the imitation of certain tasks, relationships, phenomena, equipment, behaviors and cognitive activities that occur in real life (Midik & Kartal, 2010; Goris et al., 2014). Gaba (2004) defined the simulation as a technique, not a technology, to replace real experiences, often immersive in nature, that replicate substantial aspects of the real world in a fully interactive fashion. Jeffries (2005) defined this term as activities that reflect the reality of clinic environment and are designed to demonstrate procedures, appropriate organization of students in the simulation activity, decision making, and critical thinking through techniques such as role playing

and the use of devices such as low, moderate or high fidelity mannequins. Medley & Horne (2005) defined the simulation is the reproduction of the essential features of a real life situation.

In the current information age, rapid advances in science and technology have led to an increase in the prevalence of simulators in nursing education. With the developing technology in this age, the use of effective learning tools and development of them increased in nursing education (Bambini, Washburn & Perkins, 2009). The use of simulations of different formats is becoming increasingly more common in various areas, and making significant contributions to educational processes. For the purposes of the study, simulation was defined according to level of fidelity also known as realism. The level of fidelity is determined by the manikin, scenario or environment (Hayden, 2010). Fidelity into three level in simulation; low, medium/moderate and high for use in nursing education today. Low fidelity simulation application is generally static and lack of the realism such as case studies, role-playing, using partial task trainers or static mannequins. Medium/moderate simulation more realistic than low fidelity. The use of mannequins more realistic than static low fidelity ones having breath and hearth sounds or pulses but may lack chest movement or functional eyes. These types of simulation tools are useful training technique. High fidelity is the most realistic of simulation and they can provide real physical symptom. Full body patient simulators such as SimMan®, standardized patients, virtual reality trainers with high fidelity haptics provide a high level of interactivity. Simulation tools recreation of some aspect of the real clinical situation and patient care in clinical environment (Hayden, 2010; Seropian, Brown, Gavilanes, & Driggers, 2004). In simulation, scenarios or learning activities can range from simple to complex (Jeffries, 2005).

In nursing education, simulation involves the imitation of various application areas in laboratories for practicing professional skills, which the students take part before beginning in clinics (Alinier, 2007). Student nurses play an active role in different characteristics in simulation scenario and apply their roles in a real-like environment (Baillie & Curzio, 2009; Jeffries, 2005). Particularly if the students are to work in a scenario group, roles vary with the simulation case. They may play as a patient, nurse or another the observer. In this context, simulation can support to working together to solve problems and collaborative learning in the decision making process. Such activities and interactive environments encourage students to participate in the learning process actively (Jeffries, 2005).

The developments in education system have implied cooperation of cognitive, affective and psychomotor domains of learning leading to simulation practice giving an opportunity for use in nursing education (Midik & Kartal, 2010). One of the main purposes to ensure entegration of theory and practice based on nursing education system. Being able to integrate theory to practice is vital to support quality of nursing care (Morgan, 2006). Corlett, Palfreyman, Staines & Marr (2003) stated that one of the reasons of the gaps between the theory and practice is distancing of knowledge from the real-like environment. Simulation allows the students to link theory to practice and research. Simulations help to students to connect what they learn in class to what they encounter in clinical environment or in a patient care (Kaddoura, 2010). Furthermore, simulations assist the preparation of students for the nursing profession, and represent an effective learning method in many areas, including the acquisition of cognitive knowledge, critical thinking (Kaddoura; 2010; Schoening, Sittner, & Todd, 2006) self-confidence, self-sufficiency (Bambini et al., 2009; Kaddoura, 2010; Reed, Lancaster, & Musser, 2009; Schoening et al., 2006), clinical decision-making (Lasater, 2007; Reed et al., 2009), clinical skills and practices (Ballard, Piper & Stokes, 2012), leadership skills, communication skills, and team work skills (Fletcher, 1995). One of the greatest advantages of simulation is that it provides students the ability to perform applications in an interactive education environment (Nehring & Lashley, 2004; Radhakrishnan, Roche & Cunningham, 2007).

Simulation method offer a great training promise across a variety of educational domains and contexts in education. The positive contribution to the development of such skills provided by simulation, of which there are various examples in the literature. In the study by Goldenberg, Andrusyszyn & Iwasiw (2005) the self-efficacy scores of students improved following the simulation (p

= 0.001). Clark (2007) stated that simulation mirrors the real-life scenario as pulses can be sensed, chest movements can be seen and respiration sounds can be heard. In this way, the use of simulation is an effective way of providing a clinically realistic setting for nursing students. Those in the experimental group in the study by Gore, Hunt, Parker, & Raines (2011) worked preclinical simulation experience prior to human patient contact. It was reported that the anxiety scores of the experimental group was significantly lower than the control group's scores ( $p = 0.01$ ). This finding demonstrate the value of a simulation experience to reduce anxiety levels. It was reported in other experimental study by Karadag, Caliskan, Korkut, Baykara, & Ozturk (2012) that the use of simulation as a teaching-learning method should continue in nursing education. In the study by Evans et al. (2014) ratings of students demonstrate a positive impact of simulation on decision-making ( $p < 0.001$ ), communication ( $p = 0.02$ ), teamwork ( $p = 0.01$ ), confidence in management ( $p < 0.001$ ), translation to clinical experience ( $p < 0.001$ ).

Simulation is rapidly becoming an essential and effective strategy in nursing education system in a controlled and safely settings (Gore et al., 2011). The principle of "first do no harm" is very important. Although medical errors are usually considered an unavoidable of care (Ziv et al., 2003). Students are studied to implement, in clinical settings, the psychomotor skills they acquired in school; however, such settings also represent an important source of stress for them. In this context, simulators provide multiple learning objectives to be taught in a realistic clinical environment without harming patients (Wilford & Doyle, 2006). Mistakes made during simulation do not cause harm to simulators. All errors of students can be corrected immediately. In this context, students can be more easily discussed. Because in general there is no threat to patient safety (Ziv et al., 2003). From an educational perspective, students often have only one opportunity to practice a competency and feedback (Medley & Horne, 2005). In this context, simulation can also help to improve patient care when innovations are translated into clinical environments. It also allowing to students repeat their activities so that when the learners return to the workplace, they can easily apply what is learned. Allowing the students to make a mistake in simulation, giving an obbjective feedback and replaying the case with different management strategies are valuable.

Due to the lack of personnel, time, and materials in clinical settings, there is a considerable number of students who are not given the opportunity to practice or implement the necessary nursing procedures during their education (Reed et al., 2009). These nursing students may also lack the opportunity to encounter various types of clinical cases. In addition to the decreasing tolerance of patients to medical errors, nursing care provided by nursing students is also associated with a higher risk for patients, as the fact that students initially acquire many of their professional skills by practicing them on patients increases their risk of causing harm (Castanelli, 2009). However, despite all these issues, nursing students are expected to implement all of the skills they have learned in clinical settings, and to constantly reflect their knowledge onto the care of patients (Reed et al., 2009). On the other hand, the signs, symptoms and scenarios of simulations can be changed by the instructor as necessary, allowing him/her to increase the level of realism of these scenarios. Thus, simulations provide students the opportunity to practice in a safe environment where without risking harm, thereby making it easier for them to begin in clinical settings (Baillie & Curzio, 2009).

Nursing services involve fairly complex procedures that are of vital importance for people. For this reason, nursing care have not error care of patient. However, such errors that are unacceptable in clinical practice can be performed during simulation trainings to teach students on how to intervene in order to correct or prevent them (Ziv et al., 2003).

Initial clinical experiences, as well as situations where they are required to apply their skills, can cause significant anxiety and attention deficit among students (Oermann & Garvin, 2002). After encountering many new and unusual situations, students may experience high levels of stress, especially when performing invasive procedures such as their first injection, intravenous catheter implantations, sometimes even discontinuing these procedures without completing them (Sari, Turgay & Genc, 2008). On the other hand, simulation education prior to clinical practice allows students to

feel more comfortable and confident, even when working in clinics for the first time (Schoening et al., 2006).

In nursing education, it is a common approach to practice injections on oranges (Harder, 2009). However, this approach is realistic neither in terms of how it feels to administer an injection nor in terms of the patient's or object's response (Bradley, 2006; Harder, 2009). On the other hand, simulators often have features such as the ability to "speak" and "show reaction to pain," thus allowing them to recreate real-life conditions.

The literature describes that the use of simulations in nursing education contributes positively to reinforcing students' learning, to allowing students to notice and identify the areas where they need improvement, and to the students' ability to acquire professional skills and to actively implement them during their professional life (Cant & Cooper, 2010; Goris et al., 2014; Wilford & Doyle, 2006). Nursing students who use simulators during their education perform less medical errors in clinical settings, and also demonstrate better critical thinking and clinical decision-making.

For all of the reasons, simulators are considered an extremely useful educational strategy for ensuring competency during education (Radhakrishnan et al., 2007). In this context, by including innovative strategies such as the use of simulators into the curricula of nursing education programs, nurse educators can ensure that nursing students have the highest level of clinical competence by the time they first meet with real patients (Ziv et al., 2003).

### 3. Conclusion

In conclusion, nursing education is at an exciting time with rapid changes and advances. Simulation create a real like environment with respect to learning professional skills. A more realistic learning environment can be created with the use of simulation in nursing education. High levels of knowledge and skills are expected in the nursing profession. In this respect, the integration of an interactive method in a nursing programme, such as simulation, is important as it results in the development of more qualified, skilled members of the nursing profession. Cognitive, affective and psychomotor skills can be improved by using simulation technology in nursing education. Therefore, simulation is offering a safe learning environment in nursing education.

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