THE ROLE OF SIMULATION-BASED LEARNING IN MEDICAL EDUCATION

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The primary goal of health professionals should be the provision of the best possible quality care to patients. Medical education provides a critical means for achieving this goal by helping practitioners develop an appropriate range of skills, knowledge, and attitudes. Medical simulation tools and techniques have much to offer in this regard, especially in the areas of error management, training for risky procedures, and assessing competences. The introduction of full-scale, high-fidelity patient simulation into medical education programs has occurred at a rapid pace. Benefits of simulation training include standardization and repetition of content, interactive learning in a clinical setting without patient risk, and the ability to design goal-oriented clinical experiences. Simulation provides a learner-focused, nonthreatening educational environment that is unencumbered by patient service commitments.

The aim of the survey was to overview the role of simulation-based learning (SBL) in medical education.

Although it has had a long history in non-medical high-risk industries such as aviation, simulation is a relatively new approach to teaching and learning that continues to grow rapidly throughout different spheres of medical education.;

Like several traditional methods of clinical medical education such as lectures, SBL has a significant purpose: improving the quality of patient safety and patient care, and now used as a pedagogical methodology that results in «demonstrable learning outcomes».

According to the dictionary, simulation is «something that is made to look, feel, or behave like something else especially so that it can be studied or used to train people.» That is, simulation can help individual learners demonstrate a situation by submerging them in an artificially created environment that «offers credible opportunities for learning» to enable them «explore behavior of the systems». In other words, it is «the technique of imitating the behavior of some situation or process…for the purpose of study or personnel training» or «the artificial replication of sufficient components of a real world situation to achieve certain goals». Within these definitions lies the importance of using simulation in education, which «emphasizes conceptual knowledge, basic skills, and an introduction to the actual work».

Medical simulation has emerged as an important tool to achieve a major driving force: patient care and safety. In addition, there are three main factors that have influenced the growth of interest in SBL in medicine: prevention of medical

errors, possibilities for instruction and assessment of knowledge and skills, and availability of new technologies.

According to the level of realism simulations come in three levels: low, medium, and high. Low-fidelity simulations use low-tech simulators such as partial manikins to «train and assess basic life support maneuvers,» that is, simple procedures such as chest compression. At this level, computer-based simulators may include the use of materials less similar to real ones. Medium-fidelity simulations, on the other hand, use materials that are somewhat similar to real ones through a computer-based simulated environment. In such an environment, the trainee will interact with the system and upon completion of the task the system will provide feedback. An example of a medium-fidelity simulator is virtual reality. Virtual reality allows for the creation of virtual environments in which objects are computer-generated. High-fidelity simulations use realistic materials, such as a full-length manikin, a computer workstation, and interface devices that actuate manikin signs and drive actual monitors.

SBL in medical education include the use three types of modalities: part-task trainers, human simulation, and computer-based simulation. First, task-trainers simulation is referred to as «interactions with a physical or virtual model requiring the use of specific psychomotor skills to complete procedures» (Piquette and LeBlanc, 2015). It is sometimes called part-task trainers—that is, simulators are used to replicate a specific body part of a real patient such as a limb Part-task trainers are used to help trainees acquire procedural or psychomotor skills These are basic skills that trainees must learn; before performing them on real patients, some trainees can try them on their own through a simulation. For instance, a trainee may learn how to do an injection by practicing on an orange. Task trainers can aid trainees not only in learning how to do a task but also in practicing communication with patients.

Second, human simulation is defined as «interactions with a simulated or standardized patient». Standardized patients are those who have received special training to portray the role of a patient or a patient's family. The standardized-patients simulation can help trainees practice their clinical and communication skills with patients and their families. Interestingly, standardized patients have been integrated into medical school curriculum and assessment. For instance, it has become a mandatory experience that medical undergraduate students must go through since it is part of the Objective Structured Clinical Examination.

Third, computer-based simulations, that is interaction with a screen-based interface have begun to proliferate in medical education since the emergence of personal computers in 1980s. In the computer-based simulations, medical

educators can upload all or part of a task/patient where trainees can see and interact in different forms (e.g. drawing or videos).

Moreover, these modalities can be combined into hybrid simulations to facilitate the simultaneous and integrative practice of complementary skills. An example of a hybrid simulation is the combination of a computer-based simulation and standardized patients; standardized patients can be put in a computer where trainees can see and interact with them. An alternative approach that is more advanced can be to set up multiple participants who would interact simultaneously with the same patient in a common «virtual world», perhaps linked through the Internet from many different sites.

Conclusion. Simulation has been used as an instructional technique in medical education. The increased interest in simulation-based medical education is a result of the reality that simulation can prevent and/or reduce medical errors. It creates a safe, risk-free environment where novice healthcare professionals can acquire knowledge, skills, and attitudes. Simulation-based learning can be used not only as an instructional method but also as an assessment tool.

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