## *EDITORIAL*

# Simulation Based Learning in Medical Education

Simulation-Based Learning is considered as the best alternative teaching and assessment tool that able to make the change in education, training, improving the quality and assessing the performance of the medical students. It helps students for acquiring many skills such as professionalism, communication, self-evaluation, time management, and teamwork.

Simulation has been defined as a situation in which a particular set of conditions is created artificially in order to study or experience something that is possible in real life; or a generic term that refers to the artificial representation of a real world process to achieve educational goals via experimental learning.[1]

Aviation and aerospace industries have been using simulation as a teaching tool for many years. Simulators are now widely used in education and training in a variety of high risk professions and disciplines, including the military, commercial airlines, nuclear power plants, business and medicine.[2]

There are many types and classifications of simulation; it may be classified into human simulation such as role-play and standardized patient or non-human simulation such as manikin and the based computer simulation.[3] According to the type, it is classified into compiler-driven and event-driven.[4] Simulators can be classified according to their resemblance to reality into low-fidelity, medium- fidelity and high-fidelity simulators.[5] Low-fidelity simulators are often static and lack the realism or situational context. They are usually used to teach novices the basics of technical skills. Example of a low-fidelity simulator is the intravenous insertion arm and Resusci-Anne. Moderate fidelity simulators give more resemblance of reality with such features as pulse, heart sounds, and breathing sounds but without the ability to talk and they lack chest or eye movement. They can be used for both the introduction and deeper understanding of specific, increasingly complex competencies. An example of a moderate fidelity simulator is the "Harvey" cardiology simulator. High fidelity simulators combine part or whole body manikins to carry the intervention with computers that drive the manikins to produce physical signs and feed physiological signs to monitors. They are usually designed to resemble the reality. They can talk, breathe, blink, and respond either automatically or manually to physical and pharmacological interventions. Good examples of high-fidelity simulator is the METI Human Patient Simulator (HPS) which is model driven and the "Noelle" obstetric simulator which is instructor driven. In general, the higher the fidelity, the more expensive it is. Simulation types should be assessed depending on their design and the expectations for its ability to achieve because there is not any type of simulation that can do all tasks effectively.

It is universally accepted that clinical skills constitute an essential learning outcome. The acquisition of appropriate clinical skills is key to health education; however, students sometimes complete their educational programs armed with theoretical knowledge but lack many of the clinical skills vital for their work. A major challenge for medical undergraduates is the application of theoretical knowledge to the management of patients.

Traditionally, the acquisition and ongoing improvement of high level psychomotor skills required by future physician take place in an apprentice-style model of 'See One, Do One, Teach One.' This apprentice-style of learning is no longer considered acceptable because of the increasing concern for the quality of patient care and safety and change in health care systems. The pressure of managed care has shaped the forms and frequency of hospitalization and led to a higher percentage of acutely ill patients and shorter inpatient stays. This has resulted in fewer opportunities for the medical learner to access a wide variety of diseases and physical findings. Relying on exposure to real hospital patients during training years may result in an ad-hoc method of learning clinical skills, as this depends on the availability of cases, and consequently to less than optimal development and performance of clinical skills. There are many reports that indicate concerns for the level of skills medical graduates even in western countries possess.[6, 7]

Effective learning requires repetitive practice and feedback during the learning experience. To err is human. But one err in high risk clinical management may takes live. Concerns about patient safety and fewer available patients for learning, and many other factors have led to the introduction of simulation and the development of

simulation centers and clinical skills laboratories in medical education.[8, 9] The practice of a scenario can be videotaped for immediate feedback to participants during the debriefing sessions. Employing medical simulation techniques can help move medical training from the old "See One, Do One, Teach One" method into a "See One, Practice Many, Do One" model of success.[10]

However, training through simulation should be viewed as an adjuvant and not a replacement for learning with real patients. Simulation is not intended to replace the need for learning in the clinical environment, so it is important to integrate simulation training with the clinical practice during curriculum development. Simulation laboratories are quite costly. The ability to practise without risk must be weighed against the cost of this new technology.

The major challenge to medical simulation is the fact that evidence to date is weak in methodology. Most of the published work is descriptive and limited in generalisability. The assumption that such learning is directly transferable to the clinical context is often untested.[11] Only a few studies have shown a direct positive impact in the clinical outcome from the use of simulation for medical training.[12]

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