

SIMULATION TRAINING IN MEDICINE

Salimova N.D., Salaeva M.S., Mirakhmedova Sh.T., Boltaboev H.K.

ANNOTATION

One of the most important steps in curriculum development is the introduction of simulation- based medical teaching and learning. Simulation is a generic term that refers to an artificial representation of a real world process to achieve educational goals through experiential learning. Simulation based medical education is defined as any educational activity that utilizes simulation aides to replicate clinical scenarios. Although medical simulation is relatively new, simulation has been used for a long time in other high risk professions such as aviation. Medical simulation allows the acquisition of clinical skills through deliberate practice rather than an apprentice style of learning. Simulation tools serve as an alternative to real patients. A trainee can make mistakes and learn from them without the fear of harming the patient. There are different types and classification of simulators and their cost vary according to the degree of their resemblance to the reality, or 'fidelity'. Simulation- based learning is expensive. However, it is cost-effective if utilized properly. Medical simulation has been found to enhance clinical competence at the undergraduate and postgraduate levels. It has also been found to have many advantages that can improve patient safety and reduce health care costs through the improvement of the medical provider's competencies. The objective of this narrative review article is to highlight the importance of simulation as a new teaching method in undergraduate and postgraduate education.

Medical training must at some point use live patients to hone the skills of health professionals. At the same time, there is an obligation to provide optimal treatment and to insure patients' safety and well-being. These conflicting needs create a fundamental ethical tension in medical education, one that is widely recognized although little discussed. Recent articles in the bioethical literature have condemned the unreflective use of patients especially sedated or dying patients as training tools for clinicians.

Simulation-based medical education (SBME) can be a valuable tool in mitigating these ethical tensions and practical dilemmas. Recent discussions of medical error and risk reduction strategies have highlighted simulation as an important tool in improving the safe delivery of medical care. Nevertheless, medicine has lagged behind other high-technology, high-risk professions in the use of simulation, such as aviation, in which sophisticated technical and behavioral skills are necessary.^{9–11} The reasons include financial outlays in an era of increasing cost containment, limits to accurately modeling complex human pathophysiology, demands for rigorous scientific evidence of effectiveness, and resistance to change from a strong professional culture. However, a more receptive atmosphere for expanding the use of simulators in medical training may now exist. An international patient safety movement based on epidemiological studies delineating the numbers and costs of preventable patient injuries due to medical management has reinvigorated the principle of “first do no harm” in policy debates.

Simulation has been used unsystematically since the early days of medicine. In the 16th century, mannequins (referred to as “phantoms”) were developed to teach obstetrical skills and reduce high maternal and infant mortality rates.

Today, it is common for students to do their first injections on an orange, practice suturing on pieces of cloth, rehearse medical interviews while role playing, or practice physical examination on simulated (standardized) patient-actors.

Application of modern medical technologies requires complex team interactions that mandate improved training techniques. Advanced SBME can provide realistic representations of complex clinical environments and allow educators to alter patient reactions and responses in ways unattainable with actual patients. The recent Institute of Medicine report on medical errors recommends such an interactive use of simulation. Recent studies have supported the efficacy of screen-based and realistic simulators in enhancing technical, behavioral, and social skills in medicine. Modern medical simulation falls into 5 main categories.

Further research is needed to establish the effectiveness of each of these categories of SBME, as well as their limitations. Equally important is an examination of the ethical features of SBME and its potential contributions and challenges to medical pedagogy.

Patients have the right to receive the best care that can be reasonably provided. It is understood that physicians-in-training will treat patients. However, from an ethical perspective, harm to patients as a byproduct of training or lack of experience is justified only after maximizing approaches that do not put patients at risk.

The clinical encounter in a teaching environment may focus too much on training, at times to the detriment of the patient. Although instructors monitor trainees and patients during procedural and cognitive tasks, strategies to place patient well-being foremost occasionally fail. Novices experience significant performance anxiety, generally cannot focus on multiple tasks, and follow simple rules inflexibly. SBME allows trainees to more often have their first encounters with real patients when they are at higher levels of technical and clinical proficiency. Practitioners can use SBME to improve proficiency when learning new procedures or when honing existing skills. The use of simulation wherever feasible also can convey a critical educational and ethical message to all stakeholders in health care: patients are to be protected whenever possible and they are not commodities to be used as conveniences of training.

The responsibility of educators, decision makers, and society to provide clinicians with the best training and most constructive learning experience can also be viewed as a moral commitment to trainees. Yet, increasing fragmentation, production pressure, and cost cutting have placed unprecedented constraints on training, making systematic training in real settings unattainable. SBME may allow consistent trainee exposure to a variety of clinical presentations and procedural contexts, including atypical patterns, rare diseases, critical incidents, near misses, and crises. The process and structure of medical education then becomes a series of

progressive choices by educators rather than a response to ad hoc clinical availabilities.

SBME can be complex and subtle, enabling training for encounters such as unanticipated patient demise. Curricula have been developed and tested in which medical students and residents engage “speaking” computerized mannequins who unexpectedly die, or in which simulated operating room resuscitation fails. The “deaths” of such simulated patients can evoke close-to-real feelings of loss and responsibility. The SBME protocols may even involve actors posing as the “families” of the simulated patient. Clinician trainees can be trained and evaluated on their approach to informing families of adverse events or the death of a loved one.

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