Simulation-Based Medical Learning: The Future of Sri Lankan Health Care

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Abstract

Novel medical curricula stress the need for proficiency in clinical skills by medical and nursing undergraduates over the mere possession of knowledge. Simulation-based Medical Learning has gained the attention of modern clinical training by enhancing clinical performance and patient safety more than traditional clinical training at hospitals. The present modern medical context uses various types of simulators. However, Simulation-Based Medical Learning in Sri Lanka remains at a preliminary stage compared to the international context due to multiple challenges.

This paper aims to identify the challenges faced in Simulation-Based Medical Learning in Sri Lanka and recommend the mechanisms to overcome those challenges. Lack of resources and infrastructure, lack of funding, poor literacy on handling simulators, lack of trained personnel, and cultural and mindset barriers were the identified potential challenges in Sri Lanka towards Simulation-Based Medical Learning. Nevertheless, these challenges can be mediated by finding international partnerships and funding sources, establishing foreign training with new collaborations, increasing awareness through faculty development programmes, combining Simulated Patients with low-fidelity simulators, and integrating Simulation-Based Medical Learning into the medical curriculum.

Keywords: Simulation-Based Medical Learning, Sri Lanka

Simulation-Based Medical Learning

Significant medical curricular reform has taken place in the last few years after several reports raising concerns on unavailability of sufficient and suitable patients for clinical training and resulting concerns on patient safety (Al-Elq, 2010). One landmark step undertaken to resolve such concerns was the introduction of simulation based medical and health professions education.

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Simulation has safety advantages where the learner has the opportunity to practice experientially and improve clinical performance without adversely impacting patient care. A simulation is an artificially fabricated environment in which a real-world phenomenon can be studied or experienced, or it is a more general term for the representation of a real-world process that is used for educational purposes by emulating it so that students can learn by doing (Flanagan *et al.*, 2004). On the other hand, simulation-based learning (SBL) is defined as "a dynamic process involving the creation of a hypothetical opportunity that incorporates an authentic representation of reality, facilitates active student engagement, and integrates the complexities of practical and theoretical learning with opportunity for repetition, feedback, evaluation, and reflection" (Wu *et al.,* 2022). To facilitate learning via experience and introspection, simulation is more than just a technological tool.

The new curricula emphasize the value of competence in clinical skills of medical and nursing undergraduates rather than simple acquisition of knowledge. The introduction of simulation moved the attainment of clinical skills from the apprentice and opportunistic style model of 'See One, Do One, Teach One.' In to a "See One, Practice Many, Do One" model of success. Here, the learner practices the skill repetitively until mastery in a safe environment without the concerns of patient harm. The purpose of Simulation-Based Medical Learning is to equip healthcare professionals with the right mindset and skills to deal with real-life critical situations in a safe and controlled environment while preserving the ethical and legal rights of patients. One important method used during simulation is the use of clinical case- scenarios, where the learner can acquire key competencies including problem-solving, application of information to patient care especially in unexpected and stressful situations, decision-making and the capacity to prioritize tasks under stress. In addition, learners can acquire the skills of interpersonal relationships, collaboration and leadership (Al-Elq, 2010). Here the learner will learn through immersion ('immersed into the clinical scenario'), reflection, feedback, and practice without the risks inherent in a similar real-life experience (Ogden et al., 2007).

Simulation based learning can be utilized for undergraduate and post-graduate education, and for faculty development. Simulation centers are used not only for skills acquisition but also for multidisciplinary team learning and in assessment. It can also be used to enhance healthcare quality by facilitating the development and testing of novel devices, techniques, procedures, equipment and process efficiencies without negatively impacting patient care (Andreatta, 2017). Although medical simulation is relatively a new concept for Sri Lanka, it is broadly used worldwide.

Types of simulators used in medical learning

A simulator is an appliance that enables its user to replicate or simulate an event that is likely to occur during actual performance. According to their resemblance to reality and technical complexity, simulators can be categorized as low-fidelity, medium-fidelity, and high-fidelity simulators (Seropian et al., 2004). Low-fidelity simulators lack realism and situational context and are frequently inert. Typically, they are used to educate learners on the fundamentals of technical abilities such as simulated administration of injections, intubation or simple wound suturing. Low–fidelity simulators also include screen-based simulators which can be enhanced by virtual reality. Moderate fidelity simulators partially resemble reality by including functions such as heart rate, heartbeats, and respiration sounds, but lack the capacity to speak, and chest or ocular motions. Low and medium-fidelity simulations are the most cost-efficient and typically concentrate on situations and duties. They can be applied both for introducing and gaining a deeper comprehension of specific, increasingly complex skills such as Cardiopulmonary Resuscitation (CPR). High fidelity simulators employ full-body mannequins that operate like 'real' patients by speaking, breathing with measurable genuine gases, displaying peripheral pulses and blood pressure, exhibiting a cyclical blinking response, demonstrating a pupillary reaction to light, and urinating. Administered medications produce physiologically appropriate responses based on their programmed demographic data with cardiac rhythm visible on attached monitors. Creating an authentic working environment, such as a simulated intensive care unit or operating room, and documenting it with video cameras for immediate debriefing and feedback can increase the level of immersion (Datta R et al., 2012). High-fidelity simulators are necessary for clinical case-scenario that are encountered infrequently in the clinical setting or cannot be reproduced safely using real patients.

Another commonly used method is the Simulated Patients (SPs). To create a high-fidelity learning environment that effectively simulates a patient interaction, SPs play the role of a patient in a preset clinical scenario, which is largely captured by this description. SPs are given a script to follow in order to replicate an issue or set of symptoms, as well

as a set of rules for how to react in specific situations (Williams & Song, 2016). In addition, they provide the patient-centered, detailed feedback that many medical experts and students need to develop their knowledge and abilities (Cleland et al., 2009).

Overcoming Challenges to Simulation-Based Medical Learning in Sri Lanka

The benefits of healthcare simulation in resource-limited countries are expected to parallel what had been demonstrated in resource-abundant areas. However, the cost of implementing Simulation-Based Medical Learning, notably through high-fidelity simulators, is one of the major challenges in Sri Lanka. Certain methods can be used to overcome these challenges.

The purchase of the simulators should be done in a cost effective manner by a well-executed economic evaluation team which includes programme directors, regulators, and academics including curriculum designers. A comprehensive assessment should be done in determining the type of simulation modality required to accomplish the learning outcomes of the course. Further, in specific training scenarios, hybrid simulation, which combines SPs with a low or moderate-fidelity simulator in one session, maybe as successful as high-fidelity simulators while providing superior training contexts to improve patient learners' interactions with carers and involve students in the emotions of the scenario (Salman, 2021). Additionally, degree programmes like Biomedical Engineering can promote their students to develop innovative low to high-fidelity simulators at a minimum cost in the local setting and obtain a patent for it. This would encourage entrepreneurship and innovation in Sri Lanka and produce sustainable outcomes for the country. Moreover, partnerships with international institutes and collaborations with private organizations can help in finding funding sources to purchase simulators in the country.

Poor literacy in Simulation-Based Medical Learning is another major challenge identified. This is also related to the apprehension to change from the traditional teaching methods by some of the academia. The advantages of Simulation-Based Medical Learning and its potential to enhance patient outcomes should be made more widely known among medical educators. Educators who are apprehensive about using new teaching techniques should be supported through gradually exposed training which can help them overcome their apprehension. This training should not be limited to academia and should also cater to the skills of laboratory technicians who assist in simulator-based learning.

Free simulation-based training is provided by companies that market simulators in Sri Lanka. Further, some foreign trainers regularly visit Sri Lanka to share their knowledge regarding Simulation-Based Medical Learning. It is high time to establish a simulation training institute in Sri Lanka which can deliver updated knowledge island-wide. Additionally, such an institute can work with foreign institutes to offer Sri Lankan medical professionals the chance to train in simulation hospitals abroad. The organization may provide Sri Lankan medical practitioners with the most recent information and skills necessary to manage difficult healthcare situations by offering advanced medical education. This may eventually result in better patient outcomes and will produce an effective and sustainable healthcare system in Sri Lanka. Finally, working in partnership with organizations such as the World Health Organization, United States Agency for International Development and other nonprofit groups can help to support simulation-based training and professional development efforts in resource-limited regions such as Sri Lanka.

Conclusion

Delivery of medical education has completely changed thanks to technological advancements, which have made it more interactive and available. Simulation-Based Medical Learning is an ever-growing field of interest in medical education globally. Though this has been widely used in developed countries, developing countries like Sri Lanka remain at an infant stage in its utility due to numerous challenges. Therefore, the government and the policymakers of higher

education should take the necessary actions to overcome these challenges and produce sustainable outcomes in medical education.

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