SPECIAL ARTICLE

SIMULATION LAB: “A CONTEMPORARY MEDICAL ESSENTIAL”

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Introduction

Simulation-Based Medical Education (SBME) has become a standard in medical schools and residency training programs. Although it can be difficult to show direct improvements in patient outcomes from the use of SBME, many areas of medical education are improved such as medical knowledge, comfort in procedural skills, and quality education improvement in simulation performance, team communications and teamwork. SBME has gradually filtered down to the undergraduate level and is being used increasingly by nursing and allied health programs. Utilization of simulation at all levels is sometimes referred to as, “simulation-based mastery learning” (SBML). Results from the incorporation of SBML are founded upon evidenced-based medicine and are translational to educational laboratories, improved patient care practices, improved patient outcomes and positive collateral effects downstream the can be difficult to quantify. Progressive results from the use of SBML are obtained through “thematic, sustained and cumulative” use in their local programs.

Why Simulation Labs?

The primary interest of most SBME users is in determining the effectiveness of simulation in improving the clinical reasoning skills of students. Manuals containing scenarios that are either purchased from proprietary sources and/or written in-house are typically developed. Simulation lab sites can develop workshops for use by nursing and allied health students to enhance theory-based lectures and to practice/apply skill sets in the team-based patient care atmosphere. Full use of any simulation lab includes utilization by students, local medical affiliates, community groups, disaster preparedness organizations and licensed training professionals such as BLS/ACLS/PALS & NRP providers. Suggested uses for any proposed simulation lab include partnerships with the local community to improve the health and education awareness of citizens. Simulation labs also have the potential to become involved in research projects linked to their college/university, local hospitals and investigations connected to local, regional and national research studies. Depending

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on local laws, rules and requirements, simulation labs may have the potential to be financially independent, based upon how they are managed and utilized. Of course, accreditation of simulation labs is available through the Society for Simulation in Healthcare (SSH) though currently this is optional for operation.

Teaching Strategy

Use of high-fidelity simulation as a teaching strategy with medical residents, nursing students and other allied health related programs is becoming a standard. Programs that have established simulation labs and SBME must work with faculty and staff to properly train all personnel involved to integrate the high-fidelity simulation into the curriculum. In addition, simulation labs can reach out to existing healthcare professionals, allowing them the opportunity to use simulation to refresh and develop patient care and procedural skills as a means of maximizing the use of the facility.

Simulation labs are encouraged to conduct and support research into the use of high fidelity simulation as a teaching strategy to promote student success and enhanced development of critical-thinking (CT) skills. In one study, the link between CT and decision-making (DM) skills showed a positive correlation in respiratory therapists that were trained using simulation-based scenarios. In another study, the performance of respiratory therapists was evaluated using simulation-based training verses traditional methods for mini Broncho alveolar lavage (mini-BAL) and showed an enhanced outcome through the use of comprehensive simulation training. The use of high-fidelity simulation in the training of respiratory therapists caring for patients on mechanical ventilators brings together critical care technology and the simulation environment in perfect synergy.

Low-Fidelity Options

The cost of building and outfitting a full hi-fidelity simulation lab can be prohibitive for many budgets. A recommended option available to programs everywhere is the employment of low-fidelity simulation medical education. Low-fidelity simulation can range from the use of low-fidelity manikins to standardized patients who either role-play or who actually manifest the disease(s) under study. The cost of purchasing low-fidelity manikins and hosting standardized patients within regular classrooms and labs is much less than their hi-fidelity counterparts and far more likely to fall within the budgets of education programs. Low-fidelity simulators can be used by respiratory care education programs and hospitals to certify skills competencies and for updating procedural and skills renewal. An important point, regardless of the level of simulation used, is that it is based on establishing and refreshing skills and progressing to, not replacing, the live clinical experience.

Hidden Benefits

Additional hidden benefits of utilizing SBME include significant areas of consideration in the changing world of patient care and the complexity of diseases in this century and beyond. Simulation can teach cultural sensitivity in healthcare for diverse populations in a wide variety of settings. In addition to using SBME to achieve the highest standard of training, the stewardship of human and material resources can also be taught. Simulation can assist with student critiques and expedite the use of research findings application to clinical practice. Simulation, fully utilized, needs to be incorporated throughout the curriculum in order to expose students to a wide variety of disease processes, competencies, scenarios and patient acuities.

SBME, for all levels, can be used to facilitate interdisciplinary communication and collaboration that has become part of contemporary best practice. Simulation labs are typically designed as replicas of patient care areas such as the intensive care unit, emergency department, surgical suites or a standard hospital room. The labs can be arranged fully equipped with storage areas, electronic pharmacy access, telephone communication and a private debriefing room. A contemporary trend in simulation lab utilization is scenario participation by interdisciplinary team members, including physicians, nurses, respiratory therapists, pharmacists, family members and other care-givers, in addition to a hi-fidelity
simulation manikin. We strongly recommend that high-fidelity simulation labs be added to all undergraduate and graduate medical, nursing and allied healthcare training programs as a requirement for program accreditation and, additionally, that simulation be integrated into the curriculum for safe patient outcomes and best practices.

**Challenges**

Building and maintaining a simulation lab is not without unique challenges. One essential piece for the operation of a simulation lab is properly trained personnel to staff and run the scenarios, community outreach and to supervise all uses of the facility. Faculty members need to embrace the concept of simulation along with the high-fidelity technical training. Simulation labs require the support of information technology (IT) staff as technology issues are expected with normal use of these tools. The greatest hurdle facing any group planning for a simulation laboratory is finding the funding and political support to move forward with construction, purchases and training. One pillar in the camp for any such group is the body of evidenced-based literature which has expanded during the last couple of decades in the area of simulation use in medical education.

**Summary**

Simulation-based medical education (SBME) and simulation-based mastery learning (SBML) has become well-established in undergraduate and graduate medical, nursing and allied healthcare training programs. Although still in its relative infancy, the use of high-fidelity simulation to train students in a variety of health-related professions is becoming a foundational cornerstone in program curriculum in the United States and, increasingly, in the international circle. The entire investment return resulting from the inclusion of simulation training labs in healthcare programs has just begun to be realized. The future is bright for this approach to education and healthcare to become an essential tool in the resource education box for colleges, universities, hospitals and research facilities as they serve the mission of training healthcare professionals to meet the growing needs of aging populations.
References


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1. Mean of four
2. Post-tachycardia onset
3. Second twitch

**REFERENCES**

1. BRIDION® Summary of Product Characteristics (SPC).

Please see summary of product characteristics for full prescribing information.

MSD

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