



Role of Simulation System in Medical Education in Indian Scenario: Are We Future Ready?

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ABSTRACT

Indian medical system dates back to the era of Charaka and Sushruta who were considered as the masters of indigenous medicine. Medical education has evolved quite considerably since then, and with this transition phase, it is necessary to update the existing method of knowledge acquisition. The ongoing COVID-19 pandemic has put forth a key educational dilemma further threatening the whole education system. The medical/dental schools have suspended all the clinical postings and theoretical didactic classroom teaching with the fear of mitigating viral transmission. The barring of live patient contact during a pandemic has proven to be potentially disruptive to medical education. This pandemic would lead to a substantial loss of learning time and a probable depreciation in the confidence and clinical skills of students. Novel education strategies need to be planned to optimize educational endeavours. Technological advances have the potential to substitute in-person lecture and clinic based teaching during this pandemic. So it is peremptory to update methods to disseminate knowledge among medical school trainees.

Keywords: Knowledge acquisition, Didactic classroom, Mitigating viral transmission

INTRODUCTION

The virtual education environment is the need time to tackling this insidious possibility of the declined rate of learning [1]. A much needed shift from the wonted lecture based learning to experiential learning *i.e.* Web based learning, video vignettes, simulation, real world situation based learning is needed to minimize the disruption of medical education [2,3]. Student patient engagement during patient contact in the clinical environment for medical school students is a must for learning and building a diagnostic clinical thought process. 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 [4,5].

This transformation of stressing the importance of proficient clinical skills rather than theoretical knowledge will affect the skills of the upcoming medical generation. It has been well documented that the use of simulation based technology during undergraduate medical training program contributes to improved competencies; overall higher quality of learning and patient care. Such novel approaches may not only be effective during the time of pandemic but could also lay the foundation to deal with future pandemics. The current paper aims to present in detail the Indian perspective of medical education during the changing times, to discuss the current scenario of simulation labs in India, how these simulation labs work for health institute and who all are the world wide simulation providers and the impact of simulation based learning during the times of COVID-19 for medical trainees. The purpose is to know

how well our medical profession and teaching is prepared to face such pandemics and keep the learning going for our doctors.

LITERATURE REVIEW

Historical perspective of medical education in India: Formal education in medical sciences was started during British rule in India and was still in infancy during the period of independence. In the 1970's the need for medical education was prioritized by the Shrivastava committee [6]. This very committee tailored the medical education according to national needs. To meet the growing demand for medical professionals, colleges were established across the country. Medical colleges of Bombay and Calcutta were among the first few to be established. Further, the establishment of MCI as a statutory body ensured the maintenance of uniform standard for medical education. The majority of medical colleges in India follow the traditional curricula in teaching *i.e.* disciplined based, teacher centered and examination oriented. Such modules have faced quite a lot of criticism for placing too much emphasis on memorization of facts and figures and for overloading the students with excessive details. As a result, students are unable to correlate with the basis of clinical cases and thus often face problems with the diagnosis and treatment of a patient [7]. Tremendous responsibility is vested upon the institutions providing medical education to bring about required innovations in the existing system. Significant changes in the instructional methods have resulted in innovative medical curricula. Teachers should assume a new role of facilitating the process of active learning rather than overloading students with excessive details through a series of elaborate lecture and voluminous books. Thus, integration between preclinical and clinical subjects plays a crucial role not only in the learning experience but also for better problem-solving in clinical practice [8]. Integrated Teaching (IT) aims to cater to the students' needs and helps in bridging connections between academic knowledge and practical's.

What is simulation?: Simulation has been defined as a situation in which a particular set of conditions is created artificially to study or experience something 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 [9]. Experiential learning, which is a part of the simulation, is an active process during which the learner constructs knowledge by linking new information and new experience with previous knowledge and understanding. Experiential learning or learning from experience during simulation-based training sometimes involves the use of clinical scenarios as the basis of learning [10]. Simulation tools serve as an alternative to the real patient. High fidelity and virtual reality simulations can bridge the gap between theory and practice by immersing the learner in a more realistic, dynamic, complex setting [8].

Role of simulation during pandemics: During a pandemic, the risk for health care professional increases by many folds. Training in the clinical environment is risky because of the obvious danger of contamination [11]. But a lack of student patient engagement could adversely affect the clinical skills. Simulation is the answer to these questions as it can be used to resemble the existing curricular material. They are realistic enough to engage trainees physically and emotionally as well as provide a unique learning experience through high fidelity simulator patients where they can talk, breath, move, blink.

Simulation has a huge potential to help to manage the pandemics like COVID-19 and can help in making our medical profession future ready to face grim situations.

Simulation can rapidly facilitate hospital preparation and education of large numbers of healthcare professionals and students of various backgrounds and has [12] clinical skills competencies including communication skills, history taking, professional attitudes, awareness of ethical basis of healthcare, physical examination, procedural skills, clinical laboratory skills, diagnostic skills, therapeutic skills, resuscitation skills, critical thinking, clinical reasoning, problem solving, teamwork, organization skills, management skills and information technology skills should all be a part of the core undergraduate curriculum [13]. Additional benefits include a scaled-up workforce capacity, improved quality of patient care and safety and change in health care systems. Trainees can make mistakes and learn from them without the fear of distressing the patient [14]. 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.

RESULTS

Current scenario of simulation labs in India: India currently lags far behind in the utilization of human patient simulation in medical education. As the curricula in India are still based on trials on real patients, this concept of simulation based learning is still in its formative years. In developed countries, doctors and nurses are not allowed to touch real patient before they completed their stipulated time in simulation training. The introduction of virtual learning centers in the Indian health care system has added a new facet to quality patient care [3-7]. With Bihar being the first state in India to start with skill laboratories for capacity building and skill enhancement many other states look forward to achieving the same within the prospective years (Figure 1 and Table 1).

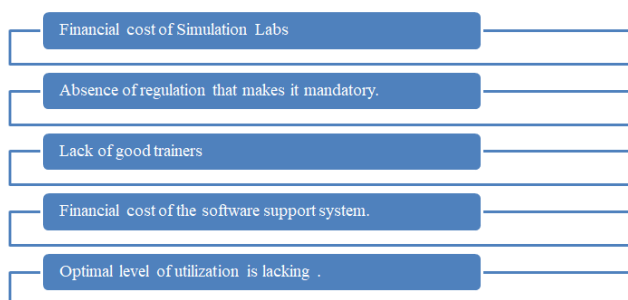


Figure 1 Possible limitation in INDIA.

Table 1 Simulation facilities currently available in India.

S. No	List of medical colleges having simulation center	Name of the simulation center	Location
1	University college of medical sciences		New Delhi, India
2	All india institute of medical sciences, New Delhi		New Delhi, India
3	Amrita institute of medical science	Amrita Clinical Skills Simulation Center	Kochi, kerala
4	Armed forces medical college	Department of Anaesthesiology and Critical Care	Pune, Maharashtra, India
5	Bharati Vidyapeeth's medical college	Simulation Lab	Pune, Maharashtra, India
6	BMCRI-Bangalore Medical College and Research Institute		Bangalore, Karnataka, India
7	Christian Medical College	Anaesthesia Skills Lab	Vellore, India
8	DY Patil University	D Y Patil University Medical Simulation Laboratory	Navi Mumbai, India
9	Dayanand Sagar University	Ge Advanced Healthcare Simulation Lab	Bangalore, Karnataka, India
10	Deenanath Mangeshkar Hospital and Research Centre	Dr. Indumati Amodkar Simulation Centre	Pune, India
11	Father Muller Medical College	Father Muller Simulation and Skill Centre	Mangalore, India

12	GCS Medical College, Hospital and Research Centre	Simulation based learning	Ahemdabad, India
13	Geetanjali University	Central clinical lab	Udaipur, Rajasthan, India
14	Govt. Medical College	Simulation based learning	Kozhikode, Kerala, India
15	GSL Medical College	GSL Smart Lab	Rajahmundry, Andhra Pradesh, India
16	Institute for Medical Sciences and Research Centre		Jaipur, India
17	Jamia Hamdard		
18	Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER)	Anesthesia Simulation Center	Pondicherry, India
19	Jawaharlal Nehru Medical College, AMU	Cadaveric Skill Lab	Aligarh, Uttar Pradesh, India
20	JSS Medical College	Establishes Skill and Simulation Centre	Mysore, Karnataka, India
21	KS Hegde Medical Academy, Nitte University	Nu Medsim	Mangalore, India
22	Kasturba Medical College	Simulation Lab	Manipal, India
23	Kerala Institute of Medical Sciences-KIMS	Kims Clinical Skills and Simulation Center	Kerala, India
24	Madras Medical College		
25	Mahatma Gandhi Medical College and Research Institute, Sri Balaji Vidyapeeth	Medical Simulation Centre	Pondicherry, India
26	MAHE-Manipal Academy of Higher Education	Medical Simulation Centre	Mangalore, Karnataka, India
27	Maulana Azad Medical College	Clinical Skill Center	Delhi, India
28	Max Institute of Health Education and Research	Max Institute of Simulation Training and Research Innovations (MISTRI)	Greater Noida (NCR), India
29	Meenakshi Medical Colleges and Research Institute		Kanchipuram, Tamilnadu.
30	Navodaya Medical College	Dr. N. K. Bhat Centre for Simulation and Research	Karnataka, India
31	PSG Institute of Medical Sciences and Research	Centre for Clinical Simulation and Research	

32	PSG Institute of Medical Sciences and Research Institute	Center for Clinical Simulation and Research's	Coimbatore
33	Punjab Institute Of Medical Sciences [PIMS]		Punjab, India
34	Rajiv Gandhi University of Health Sciences	Skill lab for simulated learning	Bangalore, Karnataka
35	S. Ramiah Medical College	Ramaiah Advanced Learning Center	Bangalore, Karnataka, India
36	Saveetha Medical College		Tamil Nadu, India
37	Shri Guru Goving Singh Tricentenary University	National Simulation Reference Centre	Gurgaon, Haryana, India
38	Skill Lab-Era's Lucknow Medical College and Hospital	Skill lab	Etawah, Uttar Pradesh India
39	Sri Ramachandra Institute of Higher Education and Research		Tamil Nadu, India
40	Sri Venkateswara Institute of Medical Science	Svims Simulation System	Tirupathi, Andhra Pradesh, India
41	SRM Medical College Hospital and Research Centre	SRM/STRATUS Centre for Medical Simulation	Tami Nadu, India
42	St. John's Medical College	Advanced Simulation Training Critical Care	Bangalore, Karnataka, India
43	Stanly Medical College		Chennai, India
44	Symbiosis Institute of Health Sciences	Symbiosis Centre for Health Skills	Pune, Maharashtra, India
45	Symbiosis International University	symbiosis centre for health skills	PUNE, India
46	Yenepoya University	Advanced Comprehensive Clinical Training and Simulation Centre (ACTS-YEN)	Mangalore, India

DISCUSSION

The future of simulation in medical education is very optimistic, however, there will be rise in the cost and value of medical education. High fidelity simulation will be the future of healthcare over next two decades. Earlier simulation was used by tertiary care specialists but in future it will more be used in primary care and severe disease management. Simulation based research or teaching has wider scope for all the stakeholders in terms of developing their clinical skills and practice. New benchmarks using simulation for competency based performance assessment will be set in future. The current generation of healthcare specialist will be the true leader to take simulation in medical education to the next level and will decide how future of simulation will actually take. Above all, the occurrence of pandemics since two years is a great reflection that simulation based medical teaching holds a promising future worldwide.

CONCLUSION

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