

Perception of faculty towards simulation-based teaching in Otorhinolaryngology

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ABSTRACT

Introduction: Changing curriculum has led to transforming the role of teachers to that of facilitators. Simulation-based teaching is a practical method of teaching both essential and emergency procedures. The study aims to assess the challenges in simulation-based teaching

Methodology: This cross-sectional study was conducted from March to August 2024 across 50% of the medical colleges in Karnataka. Of the 67 medical colleges in the state, nine that had been established within the last two years were excluded. The study population comprised 33 faculty members from the Department of Otorhinolaryngology (ENT), of various medical colleges across Karnataka. The results were expressed in percentages and proportions.

Results 14 (42.4%) faculty members had received Simulation-based training, and 26 (78.8%) colleges had a functional simulation lab. More than 50% of the faculty members said that they had sufficient mannequins for foreign bodies and tracheostomy. The faculty members perceived that major challenges for simulation-based teaching were - students not getting sufficient hands-on practice, and lesser number of mannequins

Conclusion The majority of the study participants believed that simulation-based teaching improved the knowledge and clinical skills of the students. Infrastructural, faculty deficiency, and the training of faculty are the significant challenges.

KEYWORDS: Challenges, ENT, Simulation

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1. INTRODUCTION

Globally, the medical education system has undergone a paradigm shift to Competency-Based Medical Education.(1). The

CBME curriculum was introduced in India with the 2019-2020 MBBS batch. In the new curriculum, knowledge-based medical training has shifted to CBME training. CBME co-opts the national goals of “Health for All” by capacity-building of Indian Medical graduates to provide holistic care, contributing to research, and acting as professionals (2). Changing the curriculum has also led to transforming the role of teachers to that of facilitators, motivating the undergraduates to be competent clinicians who can perform essential and emergency procedures during internships and rural services.

Despite their knowledge, interns may not be confident in managing emergencies in Otorhinolaryngology (ENT).(3), thereby raising patient safety issues. Adequate knowledge, confidence, and skilled management are required to manage emergencies and reduce morbidity and mortality. Learning skills on patients may be challenging and risky, especially in emergencies. (4). Simulation-based medical education is a practical method of teaching both essential and emergency procedures and systematic care. (5).

Simulation-based medical education requires a dedicated team of trained faculty members and a simulation lab with well-maintained high and low-fidelity mannequins. Capacity building in simulation and standardising the simulation-based teaching in ENT is essential. With many colleges yet to fully develop and use simulation labs efficiently for teaching and training undergraduates, the study aimed to assess the challenges in simulation-based teaching in otorhinolaryngology.

2. AIMS AND OBJECTIVES

To find out the perception, knowledge, experiences, and challenges of faculty members in implementing Simulation-based teaching and learning

3. MATERIALS AND METHODS

This cross-sectional study was conducted between March 2024 and August 2024 across medical colleges in Karnataka. At the time of study conception, there were 67 medical colleges in the state, of which approximately nine had been established within the preceding two years. These recently established colleges were excluded, and the study was carried out in 50% of the remaining institutions. The study population comprised faculty members from the Department of Otorhinolaryngology (ENT) with at least five years of post-MS teaching experience. From each medical college, one eligible faculty member was invited to participate, yielding a target sample of 29 faculty members. In total, 40 faculty were approached, and responses were obtained from 33 participants. Data were collected using a structured Google Form, which included questions on demographic characteristics, teaching experience, perceptions, experiences, and challenges related to the implementation of simulation-based teaching and learning. The results were summarized using percentages and proportions, and data analysis was performed with SPSS version 29.2.

Evaluation matrix (Kirkpatrick Model)

Evaluation	Evaluation question	Indicators	Data source	Data collection method
Level I (reaction)	1. Is the understanding of students about ENT emergencies better after skill-based teaching? 2. What is the perception of students regarding skill-based learning?	1. Percentage of students showing improvement in clinics 2. Percentage of students giving positive feedback	Teacher Teacher	Feedback using Questionnaire Feedback using Questionnaire
Level II (learning)	What is the perception of Teachers and students regarding simulation-based teaching	Percentage of Teachers and students in favour of simulation-based teaching	Teachers	Feedback using Questionnaire
Level III (Impact/ Behaviour)	Does this enable students to apply the knowledge and skills learnt in the skill lab to the local community for the betterment of health?	Percentage of Students and Teachers who think that this enables them to apply knowledge and skills learned in the skill lab in the local community for the betterment of health	Teacher	Feedback using Questionnaire
Level 4 (Results)	Will this enable medical graduates to apply knowledge and skills learnt in Skill lab in	Morbidity and mortality of ENT emergencies reduced.	Teacher	Feedback using Questionnaire

	local community for betterment of health?			
	Is there any positive impact on community health?			

4. RESULTS:

Socio Demographic Profile

A total of 33 faculty members from various medical colleges in Karnataka participated in the study. Among them, 21 (63.6%) were male. The mean age of the participants was 45.24 ± 7.83 years. Most of the respondents held the designation of Associate Professor or higher. (Table 1)

Table 1: Socio-demographic Profile of Study Participants N=33		
Sex	Male	21 (63.6%)
	Female	12 (36.4%)
Designation	Professor & HOD	9 (27.3%)
	Professor	9 (27.3%)
	Associate Professor	9 (27.3%)
	Assistant Professor	6 (18.2%)

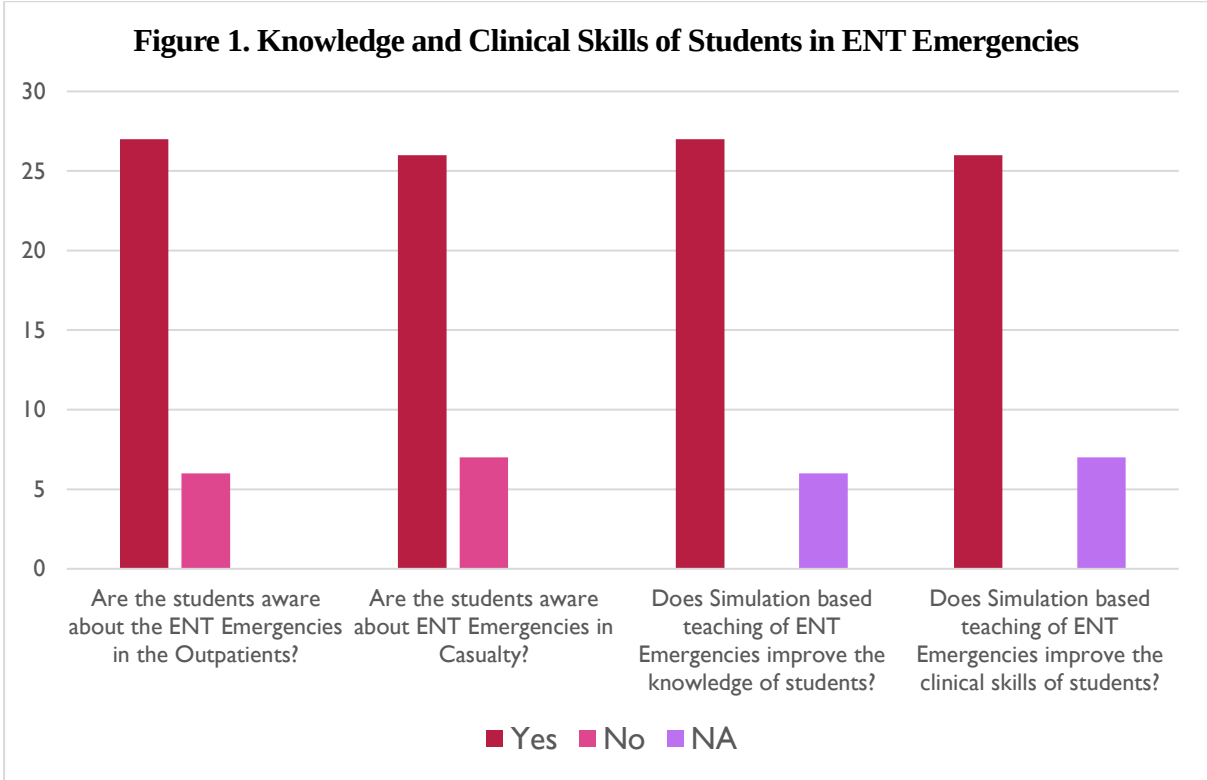
Simulation Lab Facilities and Infrastructural Challenges

Only 14 (42.4%) participants had received training through a simulation-based instructor course. (Table 2, Figure 2). In contrast, 26 (78.8%) reported that their institution had a functional simulation laboratory. Fewer than half of the institutions possessed task trainers for foreign body removal, while approximately 60% had mannequins available for practicing tracheostomy or cricothyroidotomy. The majority of participants noted that students rarely obtain hands-on experience in the simulation laboratory. (Table 2)

Table 2: Simulation Lab Facilities and Infrastructural Challenges	Response	N=33
Have you undergone any simulation-based instructor course	Yes	14 (42.4%)
	No	19 (57.6%)
Do you have a functional simulation lab at your institution?	Yes	26 (78.8%)
	No	7 (21.2%)
Do you have task trainers for Foreign Body removal from the airway	Yes	16 (48.5%)
	No	12 (36.4%)
	NA	5 (15.2%)
Do you have mannequins for practicing Tracheostomy or Cricothyroidotomy	Yes	20 (60.6%)
	No	9 (27.3%)
	NA	4 (12.1%)
Do all the students in a batch Attending the Simulation Lab provides hands-on experience	Yes	15 (45.5%)
	No	10 (30.3%)
	NA	8 (24.2%)

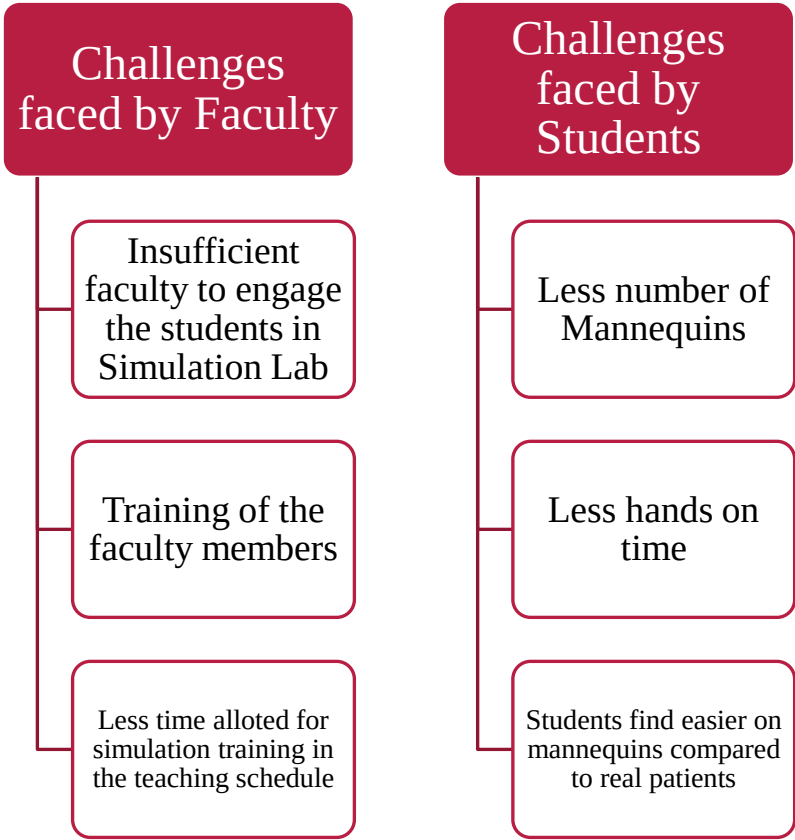
Knowledge and Skills of Students in ENT Emergencies

Most study participants reported that students possess adequate theoretical knowledge of ENT emergencies encountered in the Outpatient Department and the Casualty/Emergency Department. They further emphasized that simulation-based teaching enhanced students' knowledge and clinical skills in managing such emergencies. In addition, most faculty members highlighted that students perceived simulation training as an effective and engaging method for teaching and learning ENT emergencies, as it provided a safe, structured, and practice-oriented environment for skill acquisition and clinical decision-making. (Figure 1)



Challenges in Simulation-Based Teaching

Figure 2. Challenges in teaching and Learning of ENT Emergencies



5. DISCUSSION

The present study highlights the perceptions, experiences, and challenges faced by faculty members in implementing simulation-based teaching in Otorhinolaryngology (ENT) across medical colleges in Karnataka. Simulation-based education is increasingly recognized as an effective teaching methodology, especially in developing the competency and confidence required for managing emergencies in clinical practice. However, significant barriers to its implementation remain.

The findings of this study are consistent with earlier research on simulation-based teaching. A study by Smith et al. (2015) emphasized the importance of simulation in ENT emergencies and concluded that it improves trainees' knowledge and technical skills (3). Similarly, our study observed that the majority of the faculty members believed that simulation-based teaching significantly enhances students' knowledge and skills in managing ENT emergencies. However, key challenges identified were the lack of adequate infrastructure, trained faculty, and access to functional simulation labs.

Faculty Perception and Training Needs

Only 42.4% of faculty members in our study had undergone simulation-based instructor training. This aligns with the broader challenges of capacity building in simulation-based medical education. In line with findings by the National Medical Commission (NMC) on Competency-Based Medical Education (CBME) (1), the need for adequately trained facilitators is critical to the success of simulation-based teaching. Without proper training, faculty members may face difficulties in effectively conducting simulation sessions, further limiting the scope of experiential learning for students.

Infrastructural Limitations

The study highlighted infrastructural gaps, with only 48.5% of institutions having task trainers for foreign body removal and 60.6% having mannequins for tracheostomy or cricothyroidotomy. These findings are similar to observations in surgical training programs, where limited access to high-fidelity mannequins and task trainers has been a recurring issue (4). Effective simulation-based education requires sufficient infrastructure, regular maintenance and upgrades to ensure usability.

Student Challenges

The faculty's perception that students do not receive sufficient hands-on experience in the simulation lab resonates with existing literature on medical simulation. A study by Dimitriadis et al. (2015) noted that limited access to simulation labs and mannequins reduces the effectiveness of simulation training (5). Furthermore, the lack of hands-on practice can hinder students' ability to translate theoretical knowledge into practical skills, as observed in this study.

Implications for CBME

The introduction of the CBME curriculum in India has increased the focus on skill-based learning, requiring students to demonstrate competency in managing clinical emergencies (2). Simulation-based teaching aligns well with CBME principles, allowing students to practice in a safe, controlled environment without compromising patient safety. However, the success of this approach depends on addressing key challenges, such as allocating dedicated time for simulation training in the teaching schedule and ensuring equitable access to resources.

Future Directions

The study findings emphasize the need for further qualitative research to explore faculty and student perspectives on simulation-based teaching. Understanding these perspectives can inform policy-level decisions and guide resource allocation for simulation labs. Additionally, incorporating virtual reality (VR) and augmented reality (AR) into simulation-based teaching, as suggested by previous studies (4), could be explored to overcome infrastructural limitations.

Limitations

The study was limited to faculty members from medical colleges in Karnataka, and the results may not be generalizable to other regions. Furthermore, using self-reported data may introduce bias in assessing faculty perceptions and challenges. Nevertheless, the study provides valuable insights into the current state of simulation-based teaching in ENT and highlights actionable areas for improvement.

6. CONCLUSION

Simulation-based teaching is perceived as a valuable tool for improving knowledge and clinical skills in ENT emergencies. However, challenges such as insufficient infrastructure, faculty training, and limited hands-on experience for students need to be addressed to optimize its implementation. Aligning simulation-based teaching with CBME goals requires concerted efforts in resource development, capacity building, and policy support.

Further, Qualitative research is needed to explore the challenges in Simulation-based teaching of ENT Emergencies from the faculty and student perspectives.

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