

Perceptions, Benefits, and Challenges of Simulation-Based Education Among Medical Faculty in Pakistan: A Qualitative Study

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ABSTRACT

Background: Simulation-based education is increasingly used in medical training, yet faculty perceptions in Pakistan remain underexplored. Understanding their experiences is essential for improving teaching quality and curriculum design.

Objectives: This study aimed to explore the perceived benefits, uses, and challenges of simulation-based education (SBE) among medical faculty in Pakistan. Understanding faculty perspectives is critical for optimizing the integration of SBE into medical curricula.

Methodology: The design of the qualitative case study was conducted in three medical colleges of the Dow University of Health Sciences, Karachi during the period from March to August 2024. Convenience sampling was used to select a total of 11 faculty members who were interviewed using the semi-structured interview technique. The interview guide was informed by the CFIR. Virtual and face-to-face interviews were conducted and an informed consent was given to the participants. The software and thematic analysis assists in coding data with the assistance of Otter.ai.

Results: The thematic analysis reveals that six key themes exist (1) Advantages of SBE, which are enhanced skill acquisition, realistic practice, and flexible learning; (2) Challenges in implementation, such as resource constraints, faculty training, and schedule clashes; (3) Institutional factors, such as accreditation influence and limited policy support; (4) Personal motivation, such as faculty initiative; (5) Instructional approach, such as structured, student-centered strategies; and (6) Reflective practice and continuous improvement, such as iterative feedback and debriefing.

Conclusion: Faculty are extremely appreciative of SBE as a means of skill enhancement and safe learning environment but resource constraints, lack of adequate training and institutional support prevent the efficient application of the strategy. These barriers need to be overcome in order to optimize the educational potential of SBE.

Keywords: Simulation-Based Education, Medical Faculty, Qualitative Study, Implementation Challenges, Skill Acquisition

INTRODUCTION

SBE has become an integral part of contemporary medical education, providing an interactive learning platform that provides a bridge between theory and practice¹⁻⁴. The high-stakes environments presented through traditional medical training, which places a lot of emphasis on lectures and encounters with real patients, tend to expose learners to high-stakes settings where mistakes can be costly. SBE will address these risks by creating a safe and regulated environment where students can learn clinical skills, practice decision-making, and perfect procedural skills prior to their exposure to patients⁵⁻⁶.

Globally, the integration of SBE into medical curricula has been associated with improved student confidence, enhanced technical skills, and better patient safety outcomes⁷⁻⁸. SBE pedagogical underpinnings lie in experiential theory of learning, and active learning, planned practice, and reflective feedback as essential elements of retaining knowledge and mastering the skills⁹⁻¹⁰. Manipulations of simulation, such as low-fidelity mannequins at one end to high-fidelity virtual simulation at the other, allow learners to experience rare or difficult clinical situations uncommon in daily clinical rotations¹¹.

Although SBE is described as successful in practice, several obstacles have been identified in implementing the approach in the low- and middle-income countries (LMICs), which comprise financial constraints, lack of proper faculty training, and suboptimal institutional infrastructure¹²⁻¹³. Pakistan Medical education is experiencing paradigm shift as competency based curricula and student-centered learning methods are gaining prominence. Nevertheless, there is limited evidence on the implementation, perceived advantages, and obstacles of SBE in the local scene. The faculty views are of special importance, and

instructors are the ones who design, facilitate, and maintain simulation programs¹⁴. The effect of faculty involvement, motivation and pedagogical competence has a direct impact on the effectiveness of SBE and integration into the curriculum¹⁵⁻¹⁶. The Consolidated Framework for Implementation Research (CFIR) is a systematic method of assessing the multi-level determinants of the implementation and sustainability of the educational innovations, including SBE¹⁷. CFIR allows a deeper insight into both facilitators and impediments of successful implementation by considering the factors of institutional support, individual motivation, instructional strategies and resource availability. These understandings will be necessary to make SBE initiatives relevant to the educational and cultural specifics of Pakistani medical colleges¹⁸.

Additionally, an effective SBE program also includes reflective practice and structured debriefing, as they allow learners to generalize knowledge, find areas for improvement, and improve clinical decision-making¹⁹. Such procedures not only improve individual competencies, but also cultivate a culture of continuous improvement, critical thinking, and sensitivity of medical trainees to patient safety.

Given the fact that the notion of SBE has become a high-profile part of the modern academic community as a possible tool of pedagogy, it is important to see how medical professors perceive the benefits, constraints, and means of introducing it. The proposed study will likely fill in the existing gap in the literature by carrying out a study on three medical colleges in Pakistan on the experiences of faculty with SBE, identifying the primary enablers and constraints, and suggesting the most effective way to implement it in the context of medical education. Information about these perceptions will inform the institutional policy, faculty development initiatives, and resource distribution and eventually improve the outcome of medical training and patient care.

METHODOLOGY

The aim of this qualitative case study was to explore the perceptions, advantages, and experiences of simulation-based education (SBE) in the medical faculty in Pakistan. The researchers carried out the research in three medical colleges of

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the Dow University of Health Sciences, Karachi, for the duration from March to August 2024, after obtaining approval from the Ethical Review Board of the university. Semi-structured interviews with 11 faculty members were used to collect the data based on the convenience sampling to ensure the accessibility and willingness to participate. The Consolidated Framework for Implementation Research (CFIR) informed the use of the interview guide to investigate factors related to implementation in a systematic way. The interviews were done through physical interviews and online platforms depending on the choice of the participant and all participants had informed consent. The analysis of the data was carried out through manual coding and software-assisted thematic analysis with the use of Otter.ai which made it possible to identify recurrent patterns and themes in the perceptions of faculty members of SBE.

RESULTS

Thematic analysis of the interviews with 11 medical faculty members indicated that there are six major themes in relation to simulation-based education (SBE) in medical education: Interpretive interview analysis of medical faculty members (n=11) data revealed 6 significant themes about simulation-based education (SBE) in medical education. First, faculty reported the advantages of SBE by saying that it enhanced the learning of skills significantly, provided a safe means of experiencing, and provided firm and pliable student-focused education. They also emphasized the significance of real clinical scenarios in the theory-practice gap. Second, there were also widespread documents of implementation challenges through limits of resources in the form of inadequate simulation devices, lack of training, and time constraints hindering a successful implementation of SBE. The situation was also affected by institutional forces, in which accreditation requirements provided some degree of incentive, but policies and funding of SBE was perceived in general as insufficient. Another dominant theme was personal motivation and interest in new teaching methods at the faculty level was viewed as some significant contributing factors to successful implementation. Concerning the teaching method, the participants underlined that teaching plans, teaching approaches based on students and the planning of the scenario based on the curriculum were crucial to the process of learning. Finally, the significance of reflective practice and the concept of continuous improvement was also valued, as the faculty realized that the aspect of the debriefing sessions, feedback, and reflective procedures were not only essential to the enhancement of the learning outcomes but that they were also leading to the ongoing maturation of the skill.

Table 1: Participant Demographics

Participant	Age (years)	Gender	Department	Experience (years)
P1	42	Male	Medicine	12
P2	38	Female	Surgery	10
P3	45	Male	Pediatrics	15
P4	41	Female	Obstetrics & Gyn	11
P5	37	Male	Emergency Medicine	9
P6	44	Female	Internal Medicine	14
P7	39	Male	Surgery	11
P8	40	Female	Pediatrics	12
P9	36	Male	Obstetrics & Gyn	8
P10	43	Female	Emergency Medicine	13
P11	38	Male	Internal Medicine	10

Figure 1

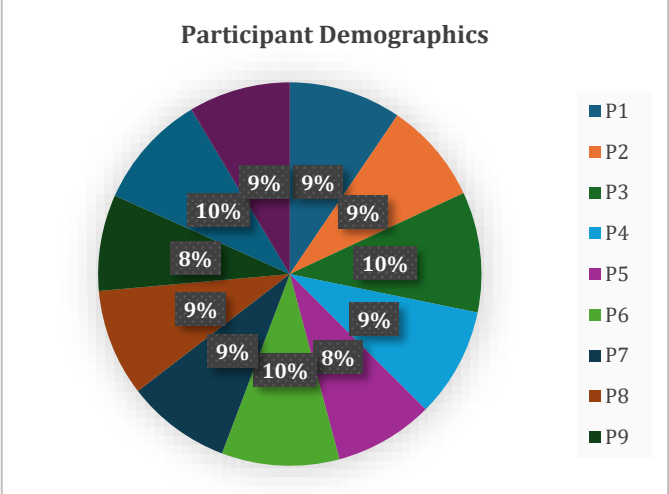


Table 2: Summary of Key Themes from Thematic Analysis

Theme	Description	Representative Quote
Advantages of SBE	Improved skill acquisition, realistic practice, flexible learning	"Students gain hands-on experience safely."
Challenges in Implementation	Resource limitations, lack of trained faculty, scheduling issues	"We need more equipment and proper training."
Institutional Factors	Influence of accreditation, limited policy and funding support	"Policies exist, but financial support is lacking."
Personal Motivation	Faculty initiative drives adoption of SBE	"I try to integrate simulation whenever possible."
Instructional Approach	Structured, student-centered learning strategies	"Scenarios must be planned and aligned with curriculum."
Reflective Practice & Continuous Improvement	Iterative feedback, debriefing enhances learning outcomes	"Debriefing sessions are critical for learning."

The results show that faculty members are conscious of the pedagogical advantages of SBE, but its application is limited by both feasibility and support institutional considerations. These challenges can be addressed by faculty motivation and long term instructional plans.

DISCUSSION

The paper has explored the perception, benefits and challenges of simulation based education (SBE) in Pakistani medical faculties and provided an outcome that has aligned to the global trends in medical education. These findings indicate that SBE is highly valued regarding its potential to enhance the formation of skills, realistic clinical scenarios, provide learners with the chance of working in a secure environment where patients did not face danger. The results are consistent with the existing literature that simulation encourages the experiential learning and clinical competence.²² Faculty emphasized the flexibility and student-centered nature of SBE, supporting literature that suggests simulation can accommodate diverse learning styles and promote active engagement.²³ Despite these benefits being observed to have, the study revealed the existence of high implementation obstacles like absence of institutional resources, inadequate faculty training, and time constraint. Similar problems have been reported by other low- and middle-income nations, and the pedagogical innovations are often supported by infrastructure and policy.²² Personal initiative and faculty motivation were also discovered to be necessary facilitators of SBE adoption and, again, the role of individual commitment and innovation in the systemic barriers process becomes important. This aligns with Consolidated

Framework of Implementation Research (CFIR) that emphasizes that personal and organizational factors interact in an effective implementation.

SBE integration was subject to institutional forces such as the accreditation requirements and a lack of policy support. Although motivated by accreditation standards, the use of innovative teaching methods cannot be sustained due to financial and administration problems. This highlights the fact that there is a need to establish institutional investment, institutionalized faculty developmental programs, and well-organized policy frameworks that will enhance the effectiveness and scalability of simulation-based learning. In addition, it was observed that reflective practice and feedback during the process is also of critical importance to facilitate the best possible learning outcomes, which is supported by the fact that structured debriefing is highly valued in terms of knowledge retention and the ability to make clinical decisions.

CONCLUSION

The learning potential of simulation education is tremendous because it enhances clinical competence, experiential learning, and a safe learning environment to medical students. The faculty perceptions reveal that SBE is highly valued particularly in terms of its interwoven approach to theory and practice and facilitation of student centered learning. Nevertheless, resource constraints,

ineffective faculty development and institutional support are challenges to effective implementation. Personal motivation and guided teaching approaches were defined as the major facilitating factors to adoption, whereas reflective practice and debriefing improve the learning outcomes. To achieve the full potential of SBE in Pakistan, it is critical to invest in faculty development programs, infrastructural development, and have enabling policies that promote integration into the curriculum. Such practices will not only enhance the quality of medical education but also help in improving patient care outcomes.

Authors' Contribution

KM: Concept & study design, data collection and drafting of the manuscript.

AT: Data entry, statistical analysis, interpretation of the results.

SM: Manuscript editing and critical revision of the manuscript.

All authors approved the final version of the manuscript to be published.

Conflict of Interest

The authors declared no conflict of interest.

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Data Availability

Data is available with authors and can be provided on request.

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