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Original Article

PERCEPTION OF SIMULATION-BASED LEARNING AMONG HEALTHCARE PROFESSIONALS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Airway and breathing management are essential components of emergency care, requiring adequate knowledge and practical skills among healthcare professionals. This study assessed the knowledge and practice of airway and breathing management among healthcare professionals.

Methods: A descriptive cross-sectional study was conducted among 519 healthcare professionals using a structured, self-administered questionnaire. Data were analyzed using descriptive statistics and the Chi-square test to determine the association between demographic variables and knowledge and practice levels, with statistical significance set at $p < 0.05$.

Results: Overall, 59.2% of participants had poor knowledge, whereas 57.0% demonstrated good practice regarding airway and breathing management. Knowledge was significantly associated with department, familiarity with airway management, curriculum exposure, and source of knowledge ($p < 0.05$). Practice showed significant associations with gender, year of study, familiarity, curriculum exposure, BLS/ACLS training, and source of knowledge ($p < 0.05$).

Conclusion: Although participants demonstrated satisfactory practical skills, inadequate theoretical knowledge highlights the need for structured curriculum integration, simulation-based training, and regular competency assessments to improve airway and breathing management and enhance patient safety in emergency care.

Keywords: Airway, Breathing Management, Health care professionals.

Introduction:

Healthcare education has undergone remarkable transformation over the past two decades as institutions increasingly adopt competency-based educational models that emphasize practical skills, clinical reasoning, communication, professionalism, and patient safety in addition to theoretical knowledge. Modern healthcare systems require graduates who are capable of delivering safe, evidence-based, and patient-centred care immediately upon entering professional practice. Consequently, educational institutions are continuously adopting innovative educational strategies that bridge the gap between theoretical knowledge and clinical practice [1].

Simulation-based learning (SBL) is one of the most important innovations in healthcare education and has become an integral component of competency-based curricula worldwide [2]. SBL is an educational approach that allows learners to acquire clinical knowledge, psychomotor skills, communication abilities, teamwork competencies, and decision-making skills using simulated clinical scenarios that closely resemble real-life healthcare situations without placing actual patients at risk [3]. Simulation environments may include standardized patients, task trainers, virtual reality platforms, computer-assisted simulations, and high-fidelity patient simulators capable of reproducing realistic physiological responses [4].

Traditional bedside teaching has long been considered the cornerstone of healthcare education. However, increasing student enrolment, reduced hospital stay, concerns regarding patient safety, ethical limitations, variability in clinical exposure, and limited opportunities for repeated procedural practice have significantly challenged conventional clinical training methods [5,6]. These limitations have encouraged educators to incorporate simulation into undergraduate curricula as an adjunct rather than a replacement for clinical education [7]. Simulation-based learning is founded on Kolb's experiential learning theory, where students actively participate in simulated clinical experiences followed by structured reflection and debriefing to consolidate knowledge and improve future performance [8]. Unlike traditional teaching approaches, simulation provides a psychologically safe learning environment where mistakes become opportunities for learning instead of causing harm to patients. Immediate faculty feedback during debriefing further enhances critical thinking, self-reflection, and clinical competence [9].

Numerous systematic reviews have demonstrated that simulation-based education significantly improves procedural skills, communication, leadership, teamwork, clinical judgement, and patient safety outcomes among healthcare professionals [10,11]. High-fidelity simulation has been shown to improve learner confidence, reduce procedural anxiety, increase knowledge retention, and facilitate long-term acquisition of clinical competencies compared with conventional lecture-based teaching [12].

Simulation also provides a unique opportunity for repetitive deliberate practice. Students can repeatedly perform complex procedures such as airway management, cardiopulmonary resuscitation, medication administration, trauma management, and emergency response until competency is achieved without exposing patients to unnecessary risks [13]. Such repetitive practice has been associated with improved technical proficiency, faster decision-making, and enhanced patient outcomes following graduation [14]. Beyond technical competence, SBL contributes substantially to the development of non-technical skills including communication, leadership, teamwork, professionalism, ethical decision-making, and crisis resource management [15]. Interprofessional simulation exercises involving nursing, medical, physiotherapy, and allied health students improve collaborative practice by enhancing understanding of professional roles and promoting effective communication within multidisciplinary healthcare teams [16].

Recent technological advances have further expanded simulation-based education through integration of artificial intelligence (AI), virtual reality (VR), augmented reality (AR), mixed reality, and computer-generated virtual patients [17]. These technologies provide immersive educational experiences that allow students to encounter rare clinical conditions, complex emergencies, and multidisciplinary scenarios that may not be available during routine clinical rotations [18]. Students' perceptions play a critical role in determining the effectiveness of educational innovations. Positive learner perception has been associated with increased engagement, improved motivation, higher confidence levels, better knowledge retention, and greater acceptance of competency-based teaching methods [19]. Previous studies have consistently reported favourable perceptions toward simulation-based education among undergraduate healthcare students, with learners acknowledging its contribution to clinical competence, patient safety, communication skills, and confidence development [20,21].

Although simulation laboratories have become increasingly common across healthcare institutions in India, published evidence evaluating students' perceptions across multiple healthcare disciplines remains limited. Most available studies have focused exclusively on medical or nursing students, while relatively few have simultaneously evaluated Allied Health Sciences, Physiotherapy, and Nursing students within a single institutional setting [22]. Understanding learners' perceptions is essential for effective curriculum planning, resource allocation, faculty development, and successful integration of simulation-based educational strategies into healthcare programmes [23]. Therefore, the present study was undertaken to assess the perception of simulation-based learning among healthcare professional students enrolled in Allied Health Sciences, Nursing, and Physiotherapy programmes at ACS Medical College and Hospital, Chennai. Furthermore, the study aimed to examine the association between selected sociodemographic variables and students' perceptions toward simulation-based learning.

MATERIALS AND METHODS

Study Design: A questionnaire-based cross-sectional study was conducted to assess the perception of simulation-based learning (SBL) among undergraduate healthcare professional students. The study adopted a quantitative research design to evaluate students' attitudes and perceptions regarding the effectiveness of simulation-based education in enhancing clinical learning and professional competence. The cross-sectional design was considered appropriate as it enabled the assessment of perceptions at a single point in time across different healthcare disciplines.

Study Setting: The study was carried out at ACS Medical College and Hospital, Chennai, Tamil Nadu, India, between November 2025 and April 2026. The institution is a multidisciplinary healthcare education centre offering undergraduate programmes in Allied Health Sciences, Nursing, Physiotherapy, and Medicine, with well-established clinical skill laboratories equipped for simulation-based training. During the study period, students regularly participated in skill laboratory sessions as part of their academic curriculum.

Ethical Considerations: Prior to commencement of the study, ethical approval was obtained from the Institutional Ethics Committee of ACS Medical College and Hospital (Approval No. 343/2025/IEC/ACSMCH). The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Participation was entirely voluntary, and electronic informed consent was obtained from each participant before completion of the questionnaire. Participants were assured that their responses would remain anonymous and confidential, and no personally identifiable information was collected.

Study Population: The study population comprised undergraduate students enrolled in the Allied Health Sciences, Nursing, and Physiotherapy programmes. Students who had attended simulation-based skill laboratory sessions and were familiar with simulation-based learning formed the target population. A total of 850 students participated in the study.

Inclusion and Exclusion Criteria: Students who were actively attending simulation-based skill laboratory sessions, were aware of simulation-based learning, and were willing to participate in the study were included. Students who declined participation, postgraduate students, individuals unfamiliar with simulation-based learning, and those who submitted incomplete questionnaires were excluded from the study.

Sampling Technique and Sample Size: A random sampling technique was employed to recruit eligible participants from the selected healthcare programmes. A total of 850 undergraduate healthcare professional students were included in the final analysis. The study population consisted of students from Allied Health Sciences, Nursing, and Physiotherapy, representing different years of undergraduate education. The large sample size enabled comprehensive assessment of students' perceptions across multiple healthcare disciplines and improved the generalizability of the study findings within the institution.

Study Instrument: Data were collected using a structured, self-administered questionnaire developed through Google Forms. The questionnaire consisted of two sections. The first section collected sociodemographic information including age, gender, department, year of study, and previous exposure to simulation-based learning.

The second section assessed students' perceptions towards simulation-based learning using twenty statements adapted from the validated questionnaire developed by Joseph et al. Each statement was evaluated using a five-point Likert scale ranging from Strongly Agree (5 points), Agree (4 points), Neutral (3 points), Disagree (2 points), to Strongly Disagree (1 point). Higher scores indicated a more favourable perception of simulation-based learning.

Data Collection Procedure: The questionnaire was distributed electronically through institutional email groups and official WhatsApp groups to eligible undergraduate students. Before accessing the questionnaire, participants were provided with detailed information regarding the purpose of the study and were required to provide informed consent electronically. To maintain data integrity, the Google Form was configured to accept only one response from each participant. Completed responses were automatically recorded in a secure Google Sheets database, thereby minimizing manual data entry errors and ensuring completeness of the collected data.

Outcome Measures: The primary outcome of the study was students' overall perception towards simulation-based learning. Secondary outcomes included the association between perception scores and selected sociodemographic variables such as age, gender, department, year of study, and previous exposure to simulation-based learning. Individual questionnaire responses were also analysed to identify students' perceptions regarding the educational benefits, clinical usefulness, communication skills, patient safety, confidence, curriculum integration, and perceived limitations of simulation-based learning.

Statistical Analysis: The collected data were exported from Google Sheets into the Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corp., Armonk, NY, USA) for statistical analysis. Descriptive statistics including frequencies, percentages, means, and standard deviations were used to summarize participants' demographic characteristics and perception scores. Associations between sociodemographic variables and perception towards simulation-based learning were analysed using the Chi-square test. Statistical significance was established at a p-value of less than 0.05. The study findings were presented using appropriate tables and graphical representations to facilitate interpretation of the results.

RESULTS

Demographic Characteristics

A total of 850 undergraduate healthcare professional students participated in the study. The study population included students from the Allied Health Sciences, Nursing, and Physiotherapy programmes. The majority of participants belonged to the 18–20 years age group (646 students), followed by those aged 21–23 years (188 students) and 24 years and above (13 students). Female participants constituted the larger proportion of the study population (547; 64.4%), while male students accounted for 302 (35.6%). Department-wise distribution showed that Allied Health Sciences contributed the highest number of participants (512; 60.2%), followed by Nursing (175; 20.6%) and Physiotherapy (163; 19.2%). Most respondents were studying in the third year (491; 57.8%), whereas 290 (34.1%) were second-year students and 69 (8.1%) were interns. Furthermore, more than half of the participants (460; 54.1%) had previous exposure to simulation-based learning, while 390 (45.9%) had no prior simulation experience.

Association Between Sociodemographic Variables and Perception Towards Simulation-Based Learning:

The association between selected sociodemographic variables and students' perception towards simulation-based learning is presented in Table 1. Analysis according to age demonstrated a gradual increase in perception scores with advancing age. Students aged 24 years and above exhibited the highest proportion of good perception (69.2%) with a mean perception score of 98.15, followed by students aged 21–23 years (60.6%; mean score 95.29). In contrast, students aged 18–20 years demonstrated comparatively lower perception scores, with approximately half (49.7%) showing a favourable perception. Gender-wise analysis revealed that female students demonstrated a marginally better perception towards simulation-based learning than male students. Among female participants, 54.3% exhibited good perception compared with 49.0% among male participants. Similarly, the mean perception score was slightly higher among females (93.39) than males (91.99).

Departmental comparison demonstrated noticeable variation in perception scores. Nursing students reported the highest mean perception score (97.56), with 68.6% demonstrating good perception towards simulation-based learning. Physiotherapy students also exhibited favourable attitudes, with 61.3% reporting good perception and a mean score of 95.22. In comparison, students from Allied Health Sciences showed relatively lower perception scores, with 43.9% demonstrating good perception and a mean score of 90.49. Perception also improved progressively with academic advancement. Internship students demonstrated the highest positive perception (65.2%) and the highest mean perception score (97.87), followed by third-year students (55.2%; mean score 93.51). Second-year students showed comparatively lower perception levels, with only 44.5% demonstrating favourable attitudes towards simulation-based learning. Previous exposure to simulation-based learning appeared to influence students' perception considerably. Among students who had prior simulation experience, 57.8% demonstrated good perception with a mean score of 94.65. Conversely, only 45.9% of students without previous simulation exposure reported good perception, with a lower mean score of 90.74. These findings suggest that repeated exposure to simulation-based education positively influences students' acceptance and appreciation of this teaching methodology.

Overall Perception Towards Simulation-Based Learning

The overall perception of simulation-based learning among healthcare professional students is summarized in Table 2. Among the 850 participants, 498 students (58.6%) demonstrated a positive perception towards simulation-based learning, whereas 341 students (40.1%) expressed a neutral perception. Only 11 students (1.3%) reported a negative perception. These findings indicate that simulation-based learning is widely accepted among undergraduate healthcare professional students and is generally perceived as an effective educational strategy that complements conventional clinical teaching.

The predominance of positive responses observed in the present study reflects students' confidence in simulation as a valuable educational approach for improving clinical competence, communication skills, patient safety, and professional preparedness.

VARIABLE	TOTAL N	GOOD N (%)	POOR N (%)	MEAN SCORE
AGE GROUP				
18-20 years	646	321 (49.7%)	325 (50.3%)	92.15
21-23 years	188	114 (60.6%)	74 (39.4%)	95.29
24 years and above	13	9 (69.2%)	4 (30.8%)	98.15
TOTAL	847	444 (52.4%)	403 (47.6%)	92.83
GENDER				
Female	547	297 (54.3%)	250 (45.7%)	93.39
Male	302	148 (49.0%)	154 (51.0%)	91.99
TOTAL	849	445 (52.4%)	404 (47.6%)	92.86
DEPARTMENT				
Allied Health Science	512	225 (43.9%)	287 (56.1%)	90.49
Nursing	175	120 (68.6%)	55 (31.4%)	97.56
Physiotherapy	163	100 (61.3%)	63 (38.7%)	95.22
TOTAL	850	445 (52.4%)	405 (47.6%)	92.86
YEAR OF STUDY				
II Year	290	129 (44.5%)	161 (55.5%)	90.56
III Year	491	271 (55.2%)	220 (44.8%)	93.51
Internship	69	45 (65.2%)	24 (34.8%)	97.87
TOTAL	850	445 (52.4%)	405 (47.6%)	92.86
PRIOR SBL EXPERIENCE				
Yes	460	266 (57.8%)	194 (42.2%)	94.65
No	390	179 (45.9%)	211 (54.1%)	90.74
TOTAL	850	445 (52.4%)	405 (47.6%)	92.86

Table 1: Association between sociodemographic variables and perception towards simulation-based learning.

Perception Level	Frequency (n)	Percentage (%)
Positive Perception	498	58.6
Neutral Perception	341	40.1
Negative Perception	11	1.3
Total	850	100

Table 2: Overall perception towards simulation-based learning.

Distribution of Responses to Individual Perception Statements: Responses to the twenty perception statements are presented in Table 3. Students demonstrated overwhelmingly positive attitudes across nearly all domains of simulation-based learning. The highest level of agreement was observed for the statement that simulation supports the development of clinical skills, with 76.8% of participants either strongly agreeing or agreeing. Likewise, 63.3% believed that repeated simulation practice improves user performance, while 61.4% agreed that simulation increases confidence when managing real patients. Approximately 60.9% of participants agreed that simulation minimizes stressful learning environments encountered during clinical ward postings, and 60.0% believed that simulation contributes to improved patient safety. More than half of the respondents also agreed that simulation facilitates the management of rare clinical cases (62.0%), reduces overcrowding during clinical teaching (59.5%), minimizes learner fatigue (57.5%), and assists students in managing uncooperative patients (56.7%). Students also recognised the educational value of simulation in reducing difficulties encountered during practical examinations. Around 60.4% agreed that simulation helps overcome the problem of obtaining suitable patients for clinical examinations, while 55.5% believed that simulation could reduce language barriers during clinical training. The majority of respondents supported curricular integration of simulation-based learning, with 57.8% agreeing that simulation should become an integral component of healthcare education. Similarly, 57.3% believed that simulation provides a realistic, safe, and reproducible learning environment, whereas 56.4% reported that simulation makes learning healthcare subjects easier. Although students expressed favourable perceptions regarding most educational benefits, several statements concerning the replacement of conventional teaching methods received comparatively higher neutral responses.

Nearly half of the respondents remained uncertain regarding the replacement of live patients in practical examinations, the reduction of teachers' roles, the replacement of animals in medical experiments, and the effect of simulation on empathy towards patients. These findings suggest that students predominantly perceive simulation as an adjunctive educational strategy rather than a complete substitute for traditional bedside teaching and direct patient interaction.

Overall Interpretation of Perception Domains:

The overall distribution of responses demonstrates that undergraduate healthcare professional students possess a favourable perception of simulation-based learning across multiple educational domains. Students particularly appreciated simulation for its contribution to clinical skill development, performance improvement through repetitive practice, enhancement of confidence, patient safety, and creation of a safe learning environment. Furthermore, positive perceptions were consistently observed across different healthcare disciplines, although Nursing students demonstrated comparatively higher acceptance than Allied Health Sciences and Physiotherapy students. Collectively, the findings indicate that simulation-based learning is widely accepted among undergraduate healthcare professional students and is regarded as an effective supplementary educational strategy capable of enhancing competency-based healthcare education.

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Question	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)	Total
1. Can simulation support the development of clinical skills?	211 (24.8%)	442 (52.0%)	167 (19.6%)	19 (2.2%)	11 (1.3%)	850
2. Can simulation help to see and manage even the rarest cases in medicine?	127 (14.9%)	400 (47.1%)	270 (31.8%)	38 (4.5%)	15 (1.8%)	850
3(i). SBL can help minimize standing hours during clinical postings	122 (14.4%)	376 (44.2%)	300 (35.3%)	44 (5.2%)	8 (0.9%)	850
(ii). SBL can help reduce overcrowding	110 (12.9%)	396 (46.6%)	274 (32.2%)	63 (7.4%)	7 (0.8%)	850
(iii). SBL can help reduce learner's fatigue	97 (11.4%)	392 (46.1%)	295 (34.7%)	50 (5.9%)	16 (1.9%)	850
(iv). SBL can overcome problem of uncooperative patients	115 (13.5%)	367 (43.2%)	289 (34.0%)	58 (6.8%)	9 (1.1%)	850
(v). SBL can solve the problem of getting patients during exams	116 (13.6%)	397 (46.7%)	275 (32.4%)	50 (5.9%)	12 (1.4%)	850
(vi). SBL can minimize the stressful learning environment in wards	127 (14.9%)	391 (46.0%)	270 (31.8%)	45 (5.3%)	8 (0.9%)	850
(vii). SBL can overcome language barrier	115 (13.5%)	357 (42.0%)	282 (33.2%)	71 (8.4%)	10 (1.2%)	850
4. Constant SBL usage will deteriorate communication skills with patients	109 (12.8%)	333 (39.2%)	312 (36.7%)	74 (8.7%)	12 (1.4%)	850
5. Repeated SBL practice will improve performance of the user	179 (21.1%)	359 (42.2%)	251 (29.5%)	30 (3.5%)	17 (2.0%)	850
6. SBL might improve patient safety	143 (16.8%)	367 (43.2%)	278 (32.7%)	42 (4.9%)	11 (1.3%)	850
7. SBL can replace live patients in practical examinations	109 (12.8%)	315 (37.1%)	321 (37.8%)	76 (8.9%)	15 (1.8%)	850
8. SBL will hamper the role of team efforts in an emergency	95 (11.2%)	344 (40.5%)	317 (37.3%)	69 (8.1%)	17 (2.0%)	850
9. Feedback from SBL is better than bedside teaching	100 (11.8%)	355 (41.8%)	303 (35.6%)	61 (7.2%)	15 (1.8%)	850
10. SBL should be integrated into the medical educational curriculum	140 (16.5%)	351 (41.3%)	291 (34.2%)	39 (4.6%)	15 (1.8%)	850
11. SBL will increase confidence levels while dealing with real patients	171 (20.1%)	351 (41.3%)	257 (30.2%)	37 (4.4%)	16 (1.9%)	850
12. SBL can be used as an adjuvant for clinical practice (not a replacement)	119 (14.0%)	343 (40.4%)	308 (36.2%)	48 (5.6%)	14 (1.6%)	850
13. SBL makes learning medicine easier	129 (15.2%)	350 (41.2%)	293 (34.5%)	50 (5.9%)	11 (1.3%)	850
14. SBL can create a highly realistic, safe, and reproducible learning environment	140 (16.5%)	347 (40.8%)	291 (34.2%)	43 (5.1%)	15 (1.8%)	850
15. SBL will minimize the role of the teacher	96 (11.3%)	326 (38.4%)	295 (34.7%)	95 (11.2%)	20 (2.4%)	850
16. SBL will be costlier than employing a trained resource person	95 (11.2%)	341 (40.1%)	313 (36.8%)	66 (7.8%)	17 (2.0%)	850
17. Importance of ethical issues will be reduced by repeated SBL usage	112 (13.2%)	332 (39.1%)	309 (36.4%)	69 (8.1%)	17 (2.0%)	850
18. Teacher will minimize efforts if SBL becomes part of curriculum	95 (11.2%)	339 (39.9%)	316 (37.2%)	72 (8.5%)	13 (1.5%)	850
19. SBL should replace the use of animals in medical experiments	95 (11.2%)	296 (34.8%)	320 (37.6%)	104 (12.2%)	20 (2.4%)	850
20. More SBL will minimize empathy among doctors towards patients	102 (12.0%)	341 (40.1%)	320 (37.6%)	56 (6.6%)	20 (2.4%)	850

Table 3: Distribution of responses to the 20-item simulation-based learning questionnaire.

DISCUSSION

The present study assessed the perception of simulation-based learning (SBL) among undergraduate healthcare professional students from Allied Health Sciences, Nursing, and Physiotherapy programmes. The findings demonstrated an overall favourable perception towards simulation-based education, with 58.6% of students reporting a positive perception, 40.1% expressing a neutral perception, and only 1.3% exhibiting a negative perception. These findings indicate that simulation-based learning is well accepted by healthcare professional students and is increasingly recognized as an effective supplementary educational strategy for improving clinical competence, confidence, and patient safety.

The positive perception observed in the present study reflects the growing integration of simulation into competency-based healthcare education and highlights its value in preparing students for real clinical practice. One of the most important findings of the present study was the overall favourable perception towards simulation-based learning among healthcare professional students. More than half of the participants demonstrated positive attitudes, while only a very small proportion reported negative perceptions. This finding is consistent with the study conducted by Joseph et al., who reported that 72.5% of undergraduate medical students had favourable perceptions regarding simulation-based learning [20]. Although the proportion of positive perception in the present study was comparatively lower, this difference may be explained by the inclusion of students from multiple healthcare disciplines, including Allied Health Sciences, Nursing, and Physiotherapy, each of which possesses varying degrees of exposure to simulation-based education. Furthermore, a considerable proportion of neutral responses observed in the present study suggests that many students may still be in the early stages of exposure to simulation-based learning and therefore require additional orientation and repeated simulation experiences to fully appreciate its educational benefits. Simulation-based learning has become an indispensable component of healthcare education because it allows students to practise repeatedly in a safe, controlled environment without compromising patient safety. Previous systematic reviews have consistently demonstrated that simulation enhances knowledge acquisition, procedural competence, communication skills, teamwork, and clinical decision-making [13,16].

Cook et al. conducted a comprehensive meta-analysis involving healthcare professionals and concluded that technology-enhanced simulation significantly improves knowledge, clinical skills, and learner satisfaction when compared with traditional educational approaches [13]. Similarly, Issenberg et al. identified repetitive practice, immediate feedback, curriculum integration, and varying levels of clinical difficulty as essential characteristics contributing to the effectiveness of simulation-based education [28]. These observations strongly support the favourable perceptions reported by students in the present investigation.

The present study demonstrated that 76.8% of students agreed that simulation supports the development of clinical skills, representing the highest level of agreement among all questionnaire items. This finding highlights students' recognition of simulation as an effective educational tool for improving procedural competence before encountering real patients. Similar observations have been reported by Motola et al., who described simulation as an evidence-based educational strategy capable of improving psychomotor performance, clinical reasoning, and technical competence through deliberate practice and structured debriefing [16]. Weller et al. further emphasized that simulation enables students to repeatedly perform complex procedures, receive immediate feedback, and progressively improve competency while minimizing patient risk [12]. Collectively, these findings indicate that simulation provides an ideal learning environment for acquiring clinical skills before direct patient contact.

Another important observation of the present study was that 63.3% of students believed repeated simulation practice improves user performance, while 61.4% agreed that simulation increases confidence when dealing with real patients. Confidence is a critical determinant of clinical performance because students who lack confidence often experience anxiety when performing procedures independently. Previous studies have demonstrated that repeated simulation exposure significantly reduces performance anxiety while improving procedural confidence and clinical judgement [22,28]. Laschinger et al. reported that simulation-based education improves students' confidence, competence, satisfaction, and readiness for clinical practice [22,23]. Likewise, Gordon et al. observed that high-fidelity simulation allows learners to develop self-confidence in a controlled environment before performing procedures in actual clinical settings [24,25].

The present findings therefore reinforce existing evidence supporting simulation as a confidence-building educational strategy. Patient safety has become a major priority in modern healthcare education, and simulation plays an important role in minimizing medical errors before students enter clinical practice. In the present study, 60.0% of participants agreed that simulation improves patient safety, whereas 60.9% believed that simulation minimizes stressful ward-based learning environments. Similar findings have been reported by Lateef, who emphasized that simulation enables learners to practise clinical procedures repeatedly without exposing patients to avoidable risks [1]. Okuda et al. also concluded that simulation significantly improves patient safety by reducing preventable medical errors and promoting standardized procedural training [7]. These findings support the incorporation of simulation into undergraduate healthcare curricula as an essential strategy for promoting safe clinical practice.

The present study also demonstrated that students appreciated simulation for its ability to improve learning efficiency. More than half of the participants agreed that simulation reduces learner fatigue, minimizes overcrowding during clinical postings, assists in managing rare clinical scenarios, and creates a realistic learning environment. Similar observations have been reported in previous studies evaluating simulation across different healthcare disciplines. Perkins highlighted the importance of simulation in resuscitation training by allowing learners to repeatedly manage high-risk emergency situations that may occur infrequently during clinical rotations [9]. Likewise, Bonnetain et al. demonstrated that computer-assisted simulation significantly improved students' ability to manage cardiac arrest procedures through repeated practice and immediate feedback [29-36]. These findings indicate that simulation effectively compensates for limited clinical exposure by providing standardized educational experiences that may not always be available in hospital settings.

Department-wise comparison revealed that Nursing students demonstrated the highest perception scores, followed by Physiotherapy students, whereas Allied Health Sciences students reported comparatively lower scores. These differences may reflect variability in curriculum structure, duration of simulation exposure, faculty expertise, and opportunities for hands-on clinical practice. Previous investigations have similarly reported discipline-specific variations in students' perceptions of simulation.

Sigalet et al. found that nursing students generally demonstrate higher acceptance of simulation because their curricula frequently integrate simulation-based teaching throughout undergraduate education [35]. Nevertheless, despite these departmental differences, students from all healthcare disciplines in the present study expressed favourable attitudes towards simulation, indicating widespread acceptance across healthcare programmes. An important finding of the present study was the progressive improvement in perception scores with increasing academic level. Internship students demonstrated the highest perception scores, followed by third-year students and second-year students. This trend suggests that repeated exposure to simulation-based learning throughout undergraduate education enhances students' understanding of its educational value. Similar findings have been reported by Watson et al., who demonstrated that increasing exposure to simulation improves students' confidence, competence, and readiness for independent clinical practice [17]. As students gain greater clinical experience, they are more likely to recognize the advantages of simulation in reinforcing theoretical knowledge and improving procedural performance. Students with previous simulation experience demonstrated better perception scores than those without prior exposure. This finding indicates that familiarity with simulation positively influences learners' attitudes and acceptance of simulation-based education. Similar observations have been reported by Gallagher, who emphasized that repeated proficiency-based simulation training substantially improves learner confidence, skill acquisition, and educational satisfaction [15]. Continuous exposure to simulation throughout undergraduate education may therefore strengthen students' confidence and encourage active participation in experiential learning. Although the majority of students expressed favourable opinions regarding simulation, several questionnaire items related to replacing live patients, minimizing teachers' roles, reducing empathy, and replacing animal experiments received comparatively higher neutral responses. These findings indicate that students do not perceive simulation as a replacement for conventional clinical education. Instead, they consider simulation to be a complementary educational strategy that enhances learning while preserving the essential role of bedside teaching. Similar conclusions were reported by Bokken et al., who found that students valued both simulated and real patients because each provides unique educational benefits [26,27]. Likewise, Gordon et al. concluded that simulation should supplement rather than replace direct patient interaction during undergraduate healthcare education [24,28].

The findings of the present study have important implications for curriculum development. Integration of simulation into undergraduate healthcare education provides students with standardized clinical experiences, improves confidence, strengthens clinical reasoning, promotes patient safety, and enhances interprofessional collaboration. Educational institutions should therefore consider expanding simulation facilities, increasing faculty training in simulation pedagogy, and incorporating structured debriefing sessions following simulation exercises to maximize educational outcomes. Furthermore, regular simulation exposure across all years of undergraduate education may improve students' competence and facilitate smoother transition into professional clinical practice. The present study has several strengths. It included a relatively large sample of 850 undergraduate healthcare professional students representing multiple healthcare disciplines, thereby providing a comprehensive assessment of students' perceptions toward simulation-based learning. Inclusion of students from Allied Health Sciences, Nursing, and Physiotherapy enabled comparison across disciplines and enhanced the applicability of the findings within multidisciplinary healthcare education. The use of a standardized questionnaire and uniform data collection procedures further strengthened the reliability of the results. However, certain limitations should be acknowledged. The study was conducted at a single institution, which may limit the generalizability of the findings to other educational settings. Within the Allied Health Sciences programme, participants were recruited only from Anaesthesia Technology and Physician Assistant courses, limiting representation of other allied health disciplines. The cross-sectional design prevented evaluation of changes in perception over time or assessment of causal relationships. In addition, perceptions were measured using self-reported responses, which may be influenced by response bias. Future multicentre longitudinal studies involving a wider range of healthcare disciplines and objective assessment of learning outcomes are recommended to validate and expand upon these findings. Overall, the present study demonstrates that simulation-based learning is highly valued by undergraduate healthcare professional students and should continue to be integrated into competency-based healthcare education. The positive perceptions observed across multiple domains including clinical skill development, confidence, patient safety, and learning effectiveness support the growing role of simulation as an essential adjunct to traditional clinical teaching rather than a replacement for direct patient care experiences.

Conclusion: The present study demonstrated that undergraduate healthcare professional students have an overall positive perception of simulation-based learning (SBL), with most participants recognizing its value in enhancing clinical skills, confidence, patient safety, and learning effectiveness. Students viewed simulation as a realistic and safe educational approach that complements traditional clinical teaching by providing opportunities for repeated practice without compromising patient safety. Perception was more favourable among Nursing students and those with previous simulation experience. Although students strongly supported the integration of SBL into healthcare curricula, they considered it a supplementary rather than a replacement for real patient interactions. These findings support the continued incorporation of simulation-based learning into undergraduate healthcare education to strengthen clinical competence and better prepare students for professional practice.

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References:

1. *Lateef, F. (2010). Simulation-based learning: Just like the real thing. Journal of Emergencies, Trauma, and Shock, 3(4), 348–352. https://doi.org/10.4103/0974-2700.70743*
2. *Ali, L., Nisar, S., Ghassan, A., & Khan, S. A. (2011). Impact of clinical skill lab on students' learning in preclinical years. Journal of Ayub Medical College Abbottabad, 23(1), 114–117.*
3. *MedEdPublish. (2026). Perceptions on simulation-based learning and clinical preparedness among 4th year medical students: A cross-sectional study. MedEdPublish, 15(223). https://mededpublish.org/articles/15-223/pdf*
4. *MedEdu. (2026). From realism to learner engagement: Rethinking fidelity in simulation-based education. JMIR Medical Education, 12(1), e84684. https://mededu.jmir.org/2026/1/e84684*

5. *Frontiers in Education. (2026). Immersive equity: Virtual reality and agentic artificial intelligence as catalysts for equity in education. Frontiers in Education, 11, 1761456. https://doi.org/10.3389/feduc.2026.1761456*
6. *IJMPR. (2026). Students' perception about simulation-based learning as a teaching tool in medical education at a tertiary care hospital, Assam. International Journal of Medical and Pharmaceutical Research, 7(1), 1861.*
7. *Okuda Y, Bryson EO, DeMaria S, Jr, Jacobson L, Quinones J, Shen B, et al. The utility of simulation in medical education: What is the evidence? Mt Sinai J Med. 2009;76:330–43. doi: 10.1002/msj.20127.*
8. *Gordon JA, Pawlowski J. Education on-demand: The development of a simulator-based medical education service. Acad Med. 2002;77:751–2. doi: 10.1097/00001888-200207000-00042.*
9. *Perkins GD. Simulation in resuscitation training. Resuscitation. 2007;73:202–11. doi: 10.1016/j.resuscitation.2007.01.005.*
10. *Okuda Y, Quinones J. The use of simulation in the education of emergency care providers for cardiac emergencies. Int J Emerg Med. 2008;1:73–7. doi: 10.1007/s12245-008-0034-2.*
11. *Gaba DM. The future vision of simulation in health care. Qual Saf Health Care. 2004;13(Suppl 1):i2–10. doi: 10.1136/qshc.2004.009878.*
12. *Weller JM, Nestel D, Marshall SD, Brooks PM, Conn JJ. Simulation in clinical teaching and learning. Med J Aust. 2012;196:594. doi: 10.5694/mja10.11474.*
13. *Cook DA, Hatala R, Brydges R, Zendejas B, Szostek JH, Wang AT, et al. Technology-enhanced simulation for health professions education: A systematic review and meta-analysis. JAMA. 2011;306:978–88. doi: 10.1001/jama.2011.1234.*
14. *Cook DA, Hamstra SJ, Brydges R, Zendejas B, Szostek JH, Wang AT, et al. Comparative effectiveness of instructional design features in simulation-based education: Systematic review and meta-analysis. Med Teach. 2013;35:e867–98. doi: 10.3109/0142159X.2012.714886.*
15. *Gallagher AG. Metric-based simulation training to proficiency in medical education: What it is and how to do it. Ulster Med J. 2012;81:107–13.*

16. *Motola I, Devine LA, Chung HS, Sullivan JE, Issenberg SB. Simulation in healthcare education: A best evidence practical guide. AMEE Guide No 82. Med Teach. 2013;35:e1511–30. doi: 10.3109/0142159X.2013.818632.*

17. *Watson K, Wright A, Morris N, McMeeken J, Rivett D, Blackstock F, et al. Can simulation replace part of clinical time? Two parallel randomised controlled trials. Med Educ. 2012;46:657–67. doi: 10.1111/j.1365-2923.2012.04295.x.*

18. *Bogossian F, McKenna L, Higgins M, Benefer C, Brady S, Fox Young S, et al. Simulation based learning in Australian midwifery curricula: Results of a national electronic survey. Women Birth. 2012;25:86–97. doi: 10.1016/j.wombi.2011.02.001.*

19. *Gallagher AG, Cates CU. Approval of virtual reality training for carotid stenting: What this means for procedural-based medicine. JAMA. 2004;292:3024–6. doi: 10.1001/jama.292.24.3024.*

20. *Rosenthal ME, Ritter EM, Goova MT, Castellvi AO, Tesfay ST, Pimentel EA, et al. Proficiency-based fundamentals of laparoscopic surgery skills training results in durable performance improvement and a uniform certification pass rate. Surg Endosc. 2010;24:2453–7. doi: 10.1007/s00464-010-0985-2.*

21. *Sahu S, Lata I. Simulation in resuscitation teaching and training, an evidence based practice review. J Emerg Trauma Shock. 2010;3:378–84. doi: 10.4103/0974-2700.70758.*

22. *Laschinger S, Medves J, Pulling C, McGraw DR, Waytuck B, Harrison MB, et al. Effectiveness of simulation on health profession students' knowledge, skills, confidence and satisfaction. Int J Evid Based Healthc. 2008;6:278–302. doi: 10.1111/j.1744-1609.2008.00108.x.*

23. *Moule P, Wilford A, Sales R, Lockyer L. Student experiences and mentor views of the use of simulation for learning. Nurse Educ Today. 2008;28:790–7. doi: 10.1016/j.nedt.2008.03.007.*

24. *Gordon JA, Wilkerson WM, Shaffer DW, Armstrong EG. "Practicing" medicine without risk: Students' and educators' responses to high-fidelity patient simulation. Acad Med. 2001;76:469–72. doi: 10.1097/00001888-200105000-00019*

25. *Baglin J, Bedford A, Bulmer M. Students' Experience and Perceptions of Using a Virtual Environment for Project Based Assessment in an Online Introductory Statistics Course. [Viewed on 2014 Feb 02]. Available on: http://www.iaseweb.org/documents/papers/rt2012/IASE2012_Baglin_Bedford_Bulmer.pdf .*

26. *Bokken L, Rethans JJ, Scherpbier AJ, van der Vleuten CP. Strengths and weaknesses of simulated and real patients in the teaching of skills to medical students: A review. Simul Healthc. 2008;3:161–9. doi: 10.1097/SIH.0b013e318182fc56.*

27. *Rai MR, Popat MT. Evaluation of airway equipment: Man or manikin? Anaesthesia. 2011;66:1–3. doi: 10.1111/j.1365-2044.2010.06567.x.*

28. *Issenberg SB, McGaghie WC, Petrusa ER, Lee Gordon D, Scalese RJ. Features and uses of high-fidelity medical simulations that lead to effective learning: A BEME systematic review. Med Teach. 2005;27:10–28. doi: 10.1080/01421590500046924.*

29. *Bonnetain E, Boucheix JM, Hamet M, Freysz M. Benefits of computer screen-based simulation in learning cardiac arrest procedures. Med Educ. 2010;44:716–22. doi: 10.1111/j.1365-2923.2010.03708.x.*

30. *Kakora Shiner N. Using ward-based simulation in cardiopulmonary training. Nurs Stand. 2009;23:42–7. doi: 10.7748/ns2009.05.23.38.42.c6975.*

31. *Founds SA, Zewe G, Scheuer LA. Development of high-fidelity simulated clinical experiences for baccalaureate nursing students. J Prof Nurs. 2011;27:5–9. doi: 10.1016/j.profnurs.2010.09.002.*

32. *Shapiro MJ, Morey JC, Small SD, Langford V, Kaylor CJ, Jagminas L, et al. Simulation based teamwork training for emergency department staff: Does it improve clinical team performance when added to an existing didactic teamwork curriculum? Qual Saf Health Care. 2004;13:417–21. doi: 10.1136/qshc.2003.005447.*

33. *Gaba DM, Howard SK, Flanagan B, Smith BE, Fish KJ, Botney R. Assessment of clinical performance during simulated crises using both technical and behavioral ratings. Anesthesiology. 1998;89:8–18. doi: 10.1097/00000542-199807000-00005.*

34. *Duran C, Bismuth J, Mitchell E. A nationwide survey of vascular surgery trainees reveals trends in operative experience, confidence, and attitudes about simulation. J Vasc Surg. 2013;58:524–8. doi: 10.1016/j.jvs.2012.12.072.*

35. *Sigalet E, Donnon T, Grant V. Undergraduate students' perceptions of and attitudes toward a simulation-based interprofessional curriculum: The KidSIM ATTITUDES questionnaire. Simul Healthc. 2012;7:353–8. doi: 10.1097/SIH.0b013e318264499e.*

36. *Brett-Fleegler MB, Vinci RJ, Weiner DL, Harris SK, Shih MC, Kleinman ME. A simulator-based tool that assesses pediatric resident resuscitation competency. Pediatrics. 2008;121:e597–603. doi: 10.1542/peds.2005-1259.*

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