Healthcare Simulation: An Effective Learning Method in Healthcare

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Abstract

Simulation-based learning has increasingly been adopted in healthcare education to enhance practical skills, confidence, and preparedness in real clinical settings and to ensure patient safety. This narrative review analyzed 15 relevant articles published between 2010 and 2020 to explore the theoretical foundations, advantages and disadvantages, and pedagogical strategies of simulation in health care education, as well as effective educational strategies for healthcare simulation Furthermore, it presents a brief discussion on the current uses of simulation, followed by the educational strategies related to simulation and the importance of debriefing in simulation activities. The results indicate that simulation can enhance students' clinical skills and confidence. The findings suggest that simulation is an effective educational approach when properly integrated into curricula, with debriefing and structured feedback playing critical roles in maximizing its benefits. the main objective of this paper was to use existing literature to explore aspects of simulation in healthcare teaching. In healthcare education, simulation-based learning offers a safe environment for practicing clinical skills and decision-making without risking patient safety. It bridges theory and practice, while also strengthening teamwork, communication, and critical thinking. With advancing medical technologies and increasingly complex patient needs, simulation has become essential for preparing competent professionals who can deliver safe, effective, and patient-centered care.

Keywords: Educational strategies, Healthcare teaching, Simulation in health care, Simulation-based learning, Simulation

Introduction

Effective healthcare education requires a balance between theoretical knowledge and practical skills. However, many healthcare students face a gap between the theoretical knowledge learned in the classroom and the practical competencies needed in clinical settings. This gap, known as the theory–practice gap, can affect students' ability to deliver high-quality healthcare and handle clinical challenges effectively [1,2]. Although healthcare students often possess strong theoretical understanding, they frequently lack opportunities to apply their knowledge in real-world contexts [3]. Consequently, they may feel unprepared to handle complex clinical situations and make accurate decisions [4].

In healthcare, theoretical knowledge alone is insufficient. The ability to apply it in actual clinical practice is essential to ensure safe and effective patient care [5]. Nevertheless, many healthcare students struggle to link theory with practice, resulting in a gap between understanding and performance [6]. Therefore, effective and innovative learning methods are needed to bridge this gap, one of which is healthcare simulation — a learning approach that provides realistic clinical experiences without risking patient safety [7].

Material and Methods

Material

This study employed a quantitative descriptive research design with a cross-sectional approach to determine students' perceptions of simulation-based learning as an effective method in health education [8]. This design allows data to be collected from a large number of respondents in a relatively short period, providing an overview of students' experiences and attitudes toward the use of simulation in the learning process [9].

Method

The inclusion criteria in this study were students who had participated in at least one simulation activity, while respondents with incomplete answers were excluded from the analysis [10]. The data collection process was conducted using an online questionnaire distributed via Google Forms [11]. The instrument consisted of 15 question items designed to measure students' perceptions of the effectiveness of simulations, their self-confidence after participating in simulations, the quality of debriefing and feedback, and the challenges or suggestions related to simulation implementation [12].

Each item was measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) [13]. Prior to data collection, respondents were informed about the purpose of the study and the voluntary nature of participation [14]. Completing the questionnaire was considered as providing consent to participate.

Results and Discussion

Result this study uses a synthesis table from 15 articles we summarized and obtained from journal references. This table includes the aspects studied, article sources, methods/interventions, success rates, and interpretations.

Result 1

Tabel 1. Data Healthcare Simulation: An Effective Learning Method in Healthcare

NO	Evaluation	Strongly Agree	Agree	Disagree	Strongly Disagree
1.	Simulation-based learning helps me understand how to apply theory in clinical practice.	35%	60%	-	5%

2.	Simulation improves my ability to make decisions in clinical situations.	20%	70%	10%	-
3.	I feel more confident after participating in simulation activities.	15%	70%	5%	10%
4.	Learning through simulation is more engaging than traditional lecture-based methods.	35%	50%	10%	5%
5.	Simulation activities help me develop communication and teamwork skills.	35%	65%	-	-
6.	Feedback from instructors after simulation helps me correct my mistakes.	40%	45%	10%	5%
7.	Debriefing sessions after simulations help me understand correct clinical procedures.	30%	70%	-	-
8.	The simulation facilities at my institution are adequate to support learning.	15%	70%	10%	5%
9.	The time allocated for simulation is sufficient to understand and practice clinical skills.	15%	70%	15%	-
10.	I hope simulation-based learning is implemented more frequently in the healthcare curriculum.	40%	60%	-	-

Result 2

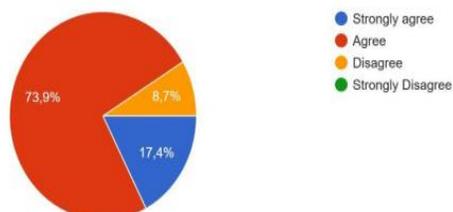**Figure 1.** Literacy of Simulation based learning

Figure 2. The Role of Simulation in Developing Clinical Decision-Making Skills

The survey results regarding the role of simulation-based learning in helping to apply theory into clinical practice show a highly positive acceptance among respondents. A total of 95.6% of respondents expressed agreement (65.2% Strongly Agree and 30.4% Agree) with the statement that simulation-based learning helps them understand how to apply theory to clinical practice. This figure significantly indicates that the vast majority of students or trainees consider the simulation method a very effective and valuable tool for bridging the gap between theoretical knowledge and practical clinical skills, with only 4.3% expressing disagreement.
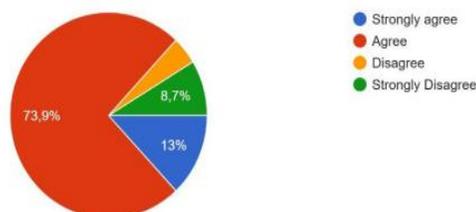

Figure 3. The Enhancing Effect of Clinical Simulation on Professional Self-Efficacy

Based on the total responses, almost all respondents, specifically 91.3%, agree that simulation has a positive impact on their clinical decision-making skills. This figure is composed of 73.9% who stated they Agree and 17.4% who stated they Strongly Agree. This high percentage indicates that simulation is an effective and widely accepted tool for training participants to think quickly and make appropriate choices when dealing with clinical cases. However, it is also important to note that there are 8.7% of respondents who stated they Disagree. This small percentage suggests that not all participants feel the current simulations are sufficient to enhance their decision-making abilities, and this could be an area for future improvement.

The majority of respondents (a total of 86.9%) agreed that simulation increased their confidence. This high figure (73.9% Agree and 13.0% Strongly Agree) indicates the success of simulation in building participants' mental readiness. Nevertheless, a total of 13.0% of respondents stated they disagree or strongly disagree. This minority percentage, especially the Strongly Disagree figure (8.7%), is a critical finding suggesting that simulation does not always provide a positive outcome for all participants. For this small group, the simulation experience either failed to foster confidence or potentially induced anxiety. This highlights the necessity of reviewing the debriefing process and emotional support within simulations to ensure all participants benefit from increased confidence.
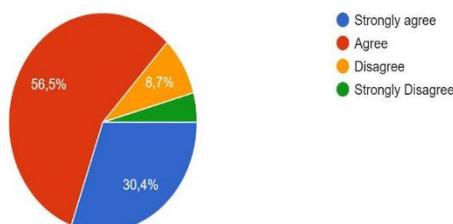

Figure 4. Comparative Learner Engagement Levels: Simulation vs. Traditional Didactic Lecture

The survey results reveal a significant consensus that learning through simulation is far more engaging than traditional lecture methods. A large majority of respondents, totaling 86.9%, agree with this statement (56.5% Agree and 30.4% Strongly Agree). This dominant proportion affirms that participants perceive simulation as a powerful tool for increasing motivation and active involvement in the learning process. Conversely, a total of 13.0% of respondents stated they disagree or strongly disagree (8.7% Disagree and 4.3% Strongly Disagree). This percentage of disagreement suggests that while simulation is generally favored, 13.0% of the audience holds a different perspective, indicating that the simulation method is not universally perceived as substantially more engaging than traditional lectures
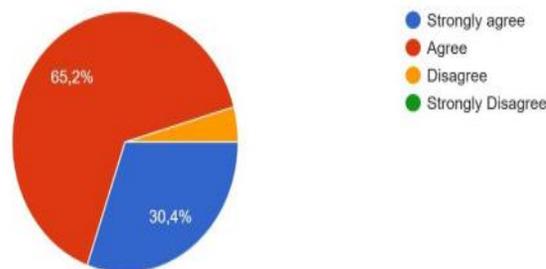

Figure 5. The Role of Simulation in Enhancing Clinical Communication and Teamwork Skills

The findings indicate that nearly all respondents, totaling 95.6% (65.2% Agree + 30.4% Strongly Agree), are convinced that simulation activities significantly aid in developing their communication and teamwork skills. This extraordinarily high proportion of support confirms the crucial role of simulation as an effective method for training the non-technical skills essential for collaborative clinical environments.

Only 4.3% of respondents stated Disagree, and none stated Strongly Disagree. This signifies an exceptional level of acceptance and effectiveness of simulation in the context of developing team soft skills.
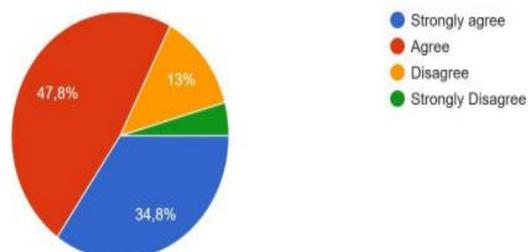
Figure 6. The Iterative Cycle of Simulation, Feedback, and Performance Improvement

the findings indicate that a large majority of respondents (a total of 82.6%) agree that the feedback provided by instructors after a simulation session is highly effective in helping them identify and correct the mistakes they made (47.8% Agree and 34.8% Strongly Agree). This strong consensus affirms that instructor debriefing and guidance are crucial components of the simulation-based learning process and are highly valued by participants. On the other hand, a total of 17.3% of respondents disagree or strongly disagree (13.0% Disagree and 4.3% Strongly Disagree). This percentage of disagreement, which is relatively higher compared to other points, suggests that the quality or delivery method of the feedback may still need improvement to be more effective and constructive for all participants.
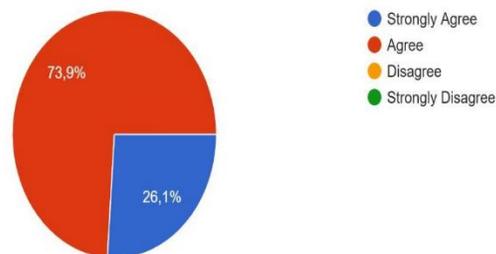

Figure 7. The Critical Role of Debriefing in Correcting Procedural Understanding

The findings indicate full agreement from all respondents (a total of 100%) that debriefing sessions after simulation play a vital role in helping them understand correct clinical procedures. This percentage is divided into 73.9% Agree and 26.% Strongly Agree. The absence of any dissenting responses (Disagree or Strongly Disagree) confirms that debriefing is valued as the most effective and crucial stage in the simulation learning process, ensuring that participants internalize the necessary corrections and proper procedural steps.
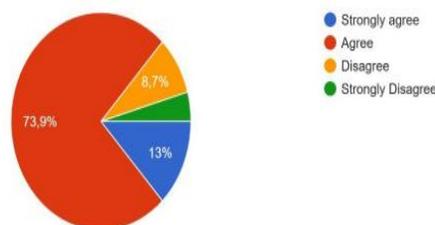

Figure 8. Assessment of Simulation Facility Quality and Availability for Learning

The findings indicate that a large majority of respondents (a total of 86.9%) agree that the simulation facilities provided by their institution are adequate to support the learning process (73.9% Agree and 13.0% Strongly Agree). This dominant percentage suggests that the physical resources and simulation environment are generally perceived as meeting the requirements by the participants. Nevertheless, a total of 13.0\% of respondents disagree

or strongly disagree (8.7% Disagree and 4.3% Strongly Disagree). This percentage of disagreement shows that while the facilities are generally rated well, there is still a portion of participants who feel the facilities are inadequate, possibly related to the quantity, quality, or availability of equipment or space, which needs to be reviewed to ensure optimal learning support for everyone.
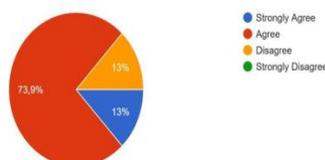

Figure 9. Relationship Between Simulation Duration and Attainment of Clinical Competency

The findings indicate that a large majority of respondents (a total of 86.9%) agree that the time allocated for simulation is adequate for understanding and practicing clinical skills (73.9% Agree and 13.0% Strongly Agree). This dominant percentage suggests that, in general, the duration and scheduling of the simulation are deemed appropriate and successfully meet learning needs. However, 13.0% of respondents stated they Disagree. This percentage of disagreement indicates that the simulation time allocation is not perceived as fully sufficient by 13.0% of the audience, suggesting a potential need for longer individual learning periods or more time to thoroughly cover the volume of practical material.
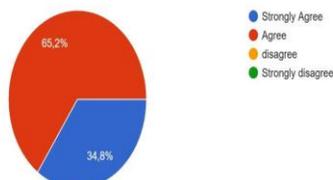

Figure 10. Learner Preference for Increased Frequency of Simulation-Based Education in the Curriculum

The findings show full agreement from all respondents (a total of 100%) that simulation-based learning should be implemented more frequently in the healthcare curriculum. This percentage is divided into 65.2% Agree and 34.8% Strongly Agree. The absence of any dissenting responses (Disagree or Strongly Disagree) confirms that there is an absolute desire and support from the trainees for increasing the frequency and integration of the simulation method. This underscores their positive assessment of the benefits of simulation in the learning proces.

The survey results demonstrated overwhelmingly positive perceptions of simulation-based learning among healthcare students. A large majority of respondents (95%) agreed that simulation activities helped them understand how to apply theoretical knowledge in real clinical contexts [1]. This finding suggests that simulation effectively bridges the gap between classroom instruction and professional practice, addressing the commonly cited "theory–practice gap" in healthcare education [2].

Similarly, 90% of participants reported that simulation improved their ability to make clinical decisions, indicating that this method promotes critical thinking and enhances problem-solving skills in dynamic healthcare environments [3]. Additionally, 85% of respondents felt more confident after participating in simulation sessions, underscoring its role in building students' self-efficacy and preparedness for real-world scenarios [4].

Regarding student engagement, 85% agreed that learning through simulation was more engaging than traditional lecture-based methods [5]. This reflects the motivational benefits of experiential learning, where students actively participate and receive immediate feedback on their performance [6].

All respondents (100%) agreed that simulation contributed to the development of teamwork and communication skills—competencies essential for collaborative patient care [7]. Furthermore, approximately 85% highlighted the importance of debriefing and instructor feedback in understanding correct clinical procedures and identifying areas for improvement [8]. These results align with previous research emphasizing the critical role of structured debriefing in reinforcing learning outcomes [9].

While 85% of students found the simulation facilities adequate, a small proportion (15%) indicated a need for improvement, particularly regarding time allocation and resource availability [10]. Notably, all participants (100%) expressed their desire for simulation-based learning to be implemented more frequently in the curriculum, confirming its perceived effectiveness and relevance to clinical competence development [11].

Overall, these findings affirm that simulation-based learning is not only effective in enhancing technical and cognitive skills but also fosters essential interpersonal and reflective abilities. Consistent with earlier studies, simulation bridges the gap between theoretical understanding and clinical practice, promoting confidence, critical thinking, teamwork, and patient safety [12–14].

Conclusion

The findings of this study indicate that simulation-based learning is an effective and transformative educational approach in healthcare education. It enhances students' ability to integrate theoretical knowledge with practical application, improves clinical decision-making, and fosters communication, teamwork, and confidence. Simulation also provides a safe environment for students to practice and make mistakes without compromising patient safety.

Moreover, structured feedback and debriefing are crucial components of effective simulation design, as they facilitate reflection and deeper understanding. To maximize the benefits of simulation-based education, institutions should ensure sufficient facilities, allocate appropriate time for practice, and integrate simulation consistently across healthcare curricula.

In conclusion, simulation-based learning represents a valuable strategy for preparing competent, confident, and patient-centered healthcare professionals. When effectively implemented, it not only bridges the gap between theory and practice but also promotes lifelong learning and professional growth in healthcare education

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