"Clinical Simulation in Undergraduate Medical Training in the Clinical Simulation Laboratory (Lasic) of the Faculty of Medical Sciences, University of Buenos Aires: A Different Model for Learning Abilities and Skills."

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ABSTRACT

Introduction: Clinical simulation has become an essential tool in medical education, providing a controlled environment for students to develop skills without the ethical and legal risks of real patient care. This study at LaSiC explores how simulation is used, its objectives, and instructors' perspectives, aiming to evaluate its role in medical training.

Methodology: This qualitative study examines teaching strategies used at the LaSiC Clinical Simulation Laboratory, focusing on clinical simulation as a key method for medical training. Data collected from in-depth interviews with five experienced instructors explore the advantages, selection criteria, and purpose of simulation, along with other teaching techniques and curricular formats.

Results: Clinical simulation in medical education provides advantages like a controlled, risk-free learning environment and opportunities for repeated practice. However, it faces challenges such as high costs and limited realism. Simulation aims to develop practical skills and confidence, with evaluations combining theoretical exams and practical assessments using checklists to ensure competency.

Discussion: This study highlights the importance of clinical simulation in medical education, emphasizing its role in developing both technical and non-technical skills. While it offers a safe, controlled environment for skill-building, challenges like high costs and limited realism persist. Instructors at LaSiC focus on integrating simulation to clarify theoretical concepts and improve practical techniques. The study suggests adding a specialized emergency course to the curriculum, emphasizing the value of simulation for hands-on learning. It underscores the need for ongoing evaluation and reflective learning to enhance teaching methods, curriculum design, and ultimately, student preparation for real-world medical practice.

INTRODUCTION

Introduction

Medical education has traditionally taken place at the patient's bedside, where direct interaction with patients plays a central role in the learning process. However, the organizational structure of modern healthcare facilities has made it increasingly difficult for students to engage in prolonged patient contact. The high turnover rates in hospitals, the increasing complexity of medical cases, and the legal implications surrounding patient care have all contributed to the challenge of providing adequate hands-on training for medical students. Furthermore, the multidisciplinary approach to the management of critically ill patients—often involving complex and invasive procedures—limits the opportunities for students to actively participate in patient care. The scarcity of real-world cases that match specific educational objectives further complicates this issue.

In this context, clinical simulation has emerged as a vital educational tool, offering a controlled environment where students can practice medical procedures, develop essential skills, and gain confidence in their abilities.

Clinical simulation allows students to learn without the ethical and legal risks inherent in real patient care, and it is not constrained by patient availability, disease progression, or the patient's willingness to participate in educational activities.

Having been involved in medical education for over eight years, I have utilized clinical simulation as a key strategy for training physicians and medical students. As a member of the teaching staff at the Clinical Simulation Laboratory (LaSiC) of the Free Chair in Simulated Emergency and Disaster Training at the Faculty of Medical Sciences, University of Buenos Aires (UBA), I have witnessed first-hand the transformative potential of simulation-based training. This laboratory is part of a free chair, meaning it is not part of the mandatory medical curriculum, but it offers courses and workshops accessible to all students within the Faculty. We aim to ensure that all medical students, regardless of their specialization, receive foundational training in clinical simulation.

Given this backdrop, I have often questioned whether my colleagues at LaSiC truly regard simulation as an essential element of medical training, or if it is perceived simply as an additional teaching strategy.

This research will be conducted at LaSiC, where I will explore how clinical simulation is utilized by instructors, its objectives, and its perceived value in the broader context of medical education. The research will focus on the following questions:

1. How is medical simulation used by LaSiC instructors?
2. What are the objectives of clinical simulation, according to LaSiC instructors?
3. Why do instructors prioritize simulation as a teaching strategy?
4. How is student knowledge assessed within LaSiC?

The general objective of this study is to analyze the application of clinical simulation in medical training at LaSiC and to determine its intended purposes. Specifically, the study aims to:

1. Describe how clinical simulation is applied in LaSiC.
2. Investigate the goals instructors seek to achieve through clinical simulation.
3. Identify the reasons for using simulation as a primary teaching strategy.
4. Explore the methods of knowledge assessment employed at LaSiC.

Several key concepts will be examined in this work, particularly regarding teaching strategies. For instance, Davini (2015) identifies 10 general teaching methods, which include:

1. Meaningful transmission method
2. Reflective dialogue method
3. Conceptual conflict change method
4. Basic inductive method
5. Didactic research method
6. Case study method
7. Problem-solving method
8. Project method

9. Demonstration and exercise method

10. Scenic or instrumental simulations

In addition, it is important to understand how students construct knowledge in a university setting. Zabalza (2002) suggests that students build knowledge using metaphors like the puzzle, choir, and Lego, and he distinguishes between three learning styles: superficial, deep, and strategic. These metaphors and styles inform our understanding of the diverse approaches students take to learning in clinical simulation.

The need for specialized simulators is another critical aspect of clinical simulation. According to Bordogna et al. (2017), simulators can be categorized into:

1. Simulated patients

2. Task trainers

3. Full-body patient simulators

4. Virtual reality simulators

Simulators can also vary in fidelity, ranging from low-fidelity models to high-fidelity systems, each serving different educational needs.

Theoretical Framework

History of the Creation of LaSiC

LaSiC was founded as part of the Teaching and Ongoing Instruction Program of the Emergency Medical Care System (PDIP-SAME) of Buenos Aires. The program began offering simulation-based training for physicians over eight years ago at the Luis Pasteur Zoonosis Hospital. However, due to infrastructural limitations, the program was relocated to several municipal hospitals in 2010. In 2011, LaSiC was formally established under an agreement between SAME and the University of Buenos Aires (UBA). This partnership allowed the laboratory to expand its clinical simulation offerings, integrating advanced technology and simulators for a wide array of medical specialties, such as trauma, cardiology, obstetrics, and gynecology.

Over time, LaSiC expanded its reach to include medical students and healthcare professionals from diverse fields. However, recent internal divisions have led to some instructors moving to other institutions. Despite this, LaSiC continues to be a key player in medical simulation, offering courses and workshops with assessments conducted through theoretical exams, case resolution, and simulated practical scenarios.

Conceptual Framework

Clinical simulation is an educational strategy that replicates real clinical situations in a controlled environment, allowing students to develop both technical and attitudinal skills essential for medical practice. This method facilitates hands-on experience and provides students with the opportunity to practice complex tasks without the ethical, legal, or emotional consequences of real patient interactions. According to UNESCO (1998), clinical simulation helps bridge the gap between theoretical knowledge and practical application, fostering skills like communication, decision-making, and teamwork. Additionally, it provides a safe environment for students to practice invasive procedures and other critical medical tasks (Davini, 2015).

Simulation-based learning also facilitates reflective practice, allowing students to recognize and correct their mistakes in real-time. This reflective process is grounded in Piaget's (1997) theories of cognitive development, where assimilation and accommodation play key roles in knowledge construction. Instructors guide students within their "zone of proximal development" (Vygotsky, 1997), enabling them to acquire the skills necessary for effective medical practice.

At UBA, the LaSiC laboratory provides students with a comprehensive learning experience that blends technical skills development with critical reflection. This integrated approach ensures that students not only acquire procedural expertise but also develop a deeper understanding of their professional responsibilities (Gimeno Sacristán et al., 1988).

Clinical Simulation in Medical Education: Advantages, Challenges, and Pedagogical Considerations

Clinical simulation is a crucial educational tool in medical training, offering students the opportunity to practice medical skills in a controlled, risk-free environment. Simulation enhances the development of key competencies such as technical proficiency, communication, teamwork, leadership, and decision-making, particularly under stress (Gomar et al., 2011).

However, clinical simulation is not without its challenges. While it offers a realistic representation of clinical practice, it cannot fully replicate the complexities of real-world patient care. Cognitive skills such as clinical reasoning and knowledge synthesis are difficult to simulate with high fidelity. Gomar et al. (2011) suggest that educators must adapt their teaching methods to integrate simulation effectively into medical curricula, balancing the benefits of simulation with its inherent limitations.

Advantages of Clinical Simulation

Clinical simulation offers several educational advantages. It provides students with the opportunity to apply theoretical knowledge in practical settings, thus reinforcing learning through hands-on experience. Furthermore, simulation allows for repeated practice, enabling students to refine their skills and learn from mistakes without compromising patient safety. It also enhances students' confidence and reduces anxiety when interacting with real patients.

Simulation promotes not only technical skills but also behavioral and attitudinal competencies, such as stress management and teamwork. It fosters resilience and self-assurance, ensuring that students are better prepared for the demands of real-world medical practice (Zabalza, 2002; UNESCO, 1998).

Challenges and Limitations of Clinical Simulation

Despite its benefits, simulation presents challenges, particularly in terms of resource requirements. High-fidelity simulators and virtual reality devices can be costly to maintain, and educators must be proficient in using these advanced technologies to ensure a meaningful simulation experience. Additionally, over-reliance on simulation may lead to overconfidence, as students may assume that their clinical reasoning skills are more refined than they are in reality (Gomar et al., 2011).

Types of Simulation Devices

Simulation devices vary in complexity, ranging from simple task trainers to advanced virtual reality systems. According to Bordogna et al. (2017), these devices can be categorized into simulated patients, task trainers, full-body mannequins, and virtual reality simulators, each serving different educational purposes.

Preparing for and Conducting Simulation Sessions

Successful simulation sessions require careful planning, involving the preparation of the physical environment, the creation of relevant case scenarios, and the structuring of debriefing sessions. Reflection during debriefing is essential for reinforcing learning and encouraging critical thinking (Salas Perea et al., 1995).

Reflection and Critical Thinking

Reflective practice is integral to the learning process in simulation, helping students analyze their actions and improve their clinical reasoning and decision-making abilities (Anijovich et al., 2009).

Evaluation of Learning in Simulation

Evaluation in simulation not only serves as a grading mechanism but also as a tool for reinforcing learning. It helps educators assess how well students have integrated theoretical knowledge into practice and provides valuable feedback for future improvement (Celman et al.,2004).

METHODOLOGY

Methodological Framework

This study adopts a descriptive, qualitative, and microsocial approach, focusing on a case study to explore the teaching actions implemented at the LaSiC (Clinical Simulation Laboratory) at the Faculty of Medical Sciences of the University of Buenos Aires (UBA). The research specifically examines the use of clinical simulation as a teaching strategy for training medical students within the operational framework of this laboratory.

The sample for this study consists of the teaching staff at LaSiC, which operates under the Free Chair of Emergencies and Disasters at the Faculty of Medicine, UBA. The research will aim to determine how clinical simulation is employed by instructors, its intended purposes, and how it contributes to medical education within the laboratory setting.

This study follows a cross-sectional design, where data will be collected at a specific point in time. In-depth interviews with LaSiC instructors will be the primary data collection method. The interview guide (Annex I) includes personal information about each instructor (e.g., name, age, professional background), followed by 12 main questions that will guide the interview. Additional questions may be added as necessary to gain a deeper understanding of the phenomenon under study.

The sampling will consist of LaSiC instructors who have substantial experience with clinical simulation and are willing to participate in the study. The target population is finite, comprising only those instructors who regularly use clinical simulation as a teaching strategy. In total, five instructors will be included in the study. Given the structure of LaSiC and the fact that its teaching strategies are almost exclusively centered around clinical simulation, the scope of this study is inherently narrow.

Data Analysis

The analysis categories for this study include:

1. Teaching Strategy
2. Types of Strategies and Selection Criteria
3. Curricular Formats Used
4. Clinical Simulation as a Strategy – Advantages and Disadvantages
5. Purpose of Clinical Simulation
6. Development of Clinical Simulation and Evaluation

The responses from the instructors will be coded and anonymized using their initials (first and last name). This will ensure privacy while maintaining clarity in the presentation of the data.

Teaching Strategy

The concept of "teaching strategy" was explored with the question: "What do you understand by didactic strategy?" Teaching strategies are specific plans or methods employed by instructors to facilitate student

learning, using a variety of techniques and resources tailored to the students' needs, interests, and abilities. Unlike teaching methods, which are more structured, strategies are flexible and can be adjusted during the lesson based on the evolving dynamics of the class.

One instructor, who is the head of the department and has extensive teaching experience, emphasized that a teaching strategy is a "set of planned actions aimed at facilitating the construction of knowledge and meaningful learning to achieve the established objectives" (Annex II). This definition aligns with the theoretical framework of Davini (2015), who describes teaching strategies as plans for transmitting knowledge. According to Davini, a didactic strategy involves guiding students to discover knowledge through logical reasoning, fostering deep, lasting learning rather than rote memorization.

Other instructors linked the concept of strategy to more specific teaching methods, such as lectures or practical exercises, but they also acknowledged the adaptability and flexibility required in choosing the appropriate strategy based on the learning context.

Types of Strategies and Criteria for Selection

The use of various teaching strategies was explored through the questions: "Do you use any strategies other than simulation in your daily teaching? Which ones?" and "What criteria do you use to select teaching strategies, especially clinical simulation?" In addition to clinical simulation, other strategies mentioned include expository lessons, where theoretical concepts are explained through narration, metaphors, and examples. Pedagogical questioning is also used to assess prior knowledge or to confirm understanding during lesson delivery.

Additionally, instructors use case analysis, in which students review how a particular case was managed, analyzing both successful and unsuccessful aspects. This helps students develop critical thinking and encourages problem-solving. Instructors also incorporate problem-solving exercises, where students explore different approaches to resolving medical cases and justify their reasoning.

The selection of teaching strategies is guided by the specific learning objectives of each session. For example, if the goal is to develop technical skills, a theoretical lecture may be less effective, and simulation might be the preferred strategy. Similarly, when assessing critical thinking or clinical decision-making, a problem-solving session or case analysis may be more appropriate than a lecture.

At LaSiC, clinical simulation is primarily used as a teaching strategy, often combined with other techniques like explanation, theoretical exposition, and pedagogical questioning. This integrated approach helps ensure that students engage in active learning and reflection, reinforcing the concepts and skills taught during the simulation.

Curricular Formats Used at LaSiC

The question "What curricular formats do you use during classes?" was explored to identify how the teaching process is structured. At LaSiC, the main formats used are workshops and seminars. The seminar format allows for the analysis of clinical cases, where students draw on prior knowledge or conduct research to resolve a given issue. This is often followed by theoretical exposition and pedagogical questioning to conclude the session.

In contrast, workshops provide a more hands-on approach, where students apply the skills they have learned in simulated clinical environments, using simulated patients in real-life scenarios. These workshops are particularly valuable for fostering both technical skills and interpersonal skills, as students navigate the complexities of medical practice in a controlled, risk-free setting.

Some instructors noted that, although the primary format is workshop-based, certain classes resemble seminar-style sessions, where theoretical content is discussed in greater depth.

RESULTS

Clinical Simulation as a Strategy: Advantages and Disadvantages

The category of clinical simulation as a didactic strategy was explored through the questions: "Do you consider simulation a didactic strategy?" and "What are three advantages and three difficulties associated with using clinical simulation?"

The advantages of clinical simulation are multiple. First, it provides the ability to recreate real-world scenarios in a controlled, risk-free environment, enabling students to develop both technical and interpersonal skills without jeopardizing patient safety. Second, it offers the opportunity for repeated practice, allowing students to learn from their mistakes and continually refine their clinical skills. Finally, simulation provides an environment where learners can engage in complex scenarios that might be difficult to replicate in clinical settings.

On the other hand, the disadvantages are primarily related to the challenges of fully replicating the sensory experience of interacting with real patients, which may limit the realism of the simulation. Additionally, the high costs associated with purchasing, maintaining, and updating simulators are significant barriers to widespread use. All instructors interviewed agreed that the primary advantage of clinical simulation is the safe learning environment it provides, while the main disadvantage is the financial burden and the need for instructors with specialized training to manage complex simulation scenarios effectively.

This observation aligns with the findings of Gomar et al. (2011), who also noted the difficulty in perfectly replicating real-life scenarios and the substantial costs involved in clinical simulation. However, they also highlighted the potential for discovery-based learning and the bridging of theory and practice, which is often challenging to achieve with real patients.

The Purpose of Clinical Simulation

This category was explored with the question: "What do you consider to be the purpose of medical simulation in the education of medical students?" The primary objective of clinical simulation is to foster the development of practical skills and critical thinking through experiential learning. Students learn by identifying their mistakes, reflecting on them, and using that reflection to improve their decision-making skills in real-world clinical settings.

Instructors at LaSiC emphasized the importance of building student confidence and preparing them for actual medical challenges in a controlled environment. Repeated exposure to simulated cases enables students to refine their skills and develop a sense of security when encountering similar situations with real patients.

As stated by PP, “It allows students to engage with cases they might encounter in their future practice, in a safer, more controlled environment, where mistakes do not harm real patients. With repetition, they gain confidence in applying techniques to real patients” (Annex V).

However, none of the instructors directly mentioned the significance of discovery-based learning or critical reflection during debriefing, despite the fact that these elements are central to self-directed learning, as noted by Salas Perea et al. (1995) and Bordogna et al. (2017). These researchers emphasized the role of reflection in improving future practices and promoting continuous learning.

Development of Clinical Simulation

This category was investigated through the question: *"Can you explain step by step the process of a class using simulation?"*

The development and implementation of clinical simulation typically follow these steps:

a. Planning and Preparation: This stage involves creating clinical cases or problems, including potential resolutions and diagnostic tests, and preparing evaluation and debriefing checklists. Additionally, scripts are developed for any actors involved in the simulation, such as patients, family members, or healthcare staff.

b. Preparing the Scene: The physical environment is set up to mimic real-life scenarios as closely as possible. If actors are involved, they are trained to follow pre-established scripts and engage appropriately with the students.

c. Explaining the Scenario: The instructor introduces the scenario, explains the problem case, and outlines the features of the simulator and the strategy to be used.

d. The Simulation: The actual simulation takes place, with students actively participating in the scenario using the simulator and other resources.

e. Debriefing: After the simulation, a critical reflection session is conducted. The instructor and students discuss the strengths and weaknesses of the simulation, focusing on areas of improvement and clarifying concepts.

Most instructors, however, did not mention the initial preparation phase (case creation, script writing, and scene setup) in their descriptions. Instead, they typically began by explaining the scenario, followed by the simulation and concluding with the debriefing. As FP noted, the preparation phase includes setting clear objectives, familiarizing students with the simulator, providing a theoretical introduction, followed by practical engagement and concluding with an evaluation or debriefing session that identifies strengths and areas for improvement (Annex IV).

Some instructors also intervene during the simulation to correct errors or clarify concepts, often asking theoretical questions to assess students' understanding. GB described the process as starting with outlining class objectives, listing the simulator's features, and introducing necessary skills. Students then engage in the simulation, with the instructor observing and providing corrections as needed. GB also emphasized the importance of theoretical questioning during the simulation to ensure that students are applying proper knowledge rather than acting on instinct or mimicry (Annex III). This approach, however, does not entirely align with Bordogna et al. (2017), who highlighted the importance of thoroughly preparing the scene and scripts before initiating the simulation.

Bordogna et al. (2017) delineated the simulation process into three key phases: preparation, action (simulation), and debriefing. Preparation involves not only organizing the physical space but also developing scripts and selecting appropriate cases that match the students' educational level. The action phase integrates theoretical knowledge with practical application, and the debriefing phase focuses on reflecting on what was done during the simulation to identify alternative strategies for improving outcomes.

Evaluation

This category was explored with the question: *"How do you conduct the evaluation?"*

Evaluation in medical education should be an ongoing process, familiar to students, and aligned with the course's learning objectives. To be effective, evaluation must reduce student anxiety by using well-established strategies. Instructors should employ evaluations throughout the course to help students become familiar with the process.

For assessing theoretical knowledge, instructors commonly use multiple-choice exams, true/false tests, or combinations of both. If the goal is to assess the students' reasoning process and decision-making skills, case resolution exercises may be used. When evaluating technical skills, simulator-based assessments (either in segments or in crisis scenarios) are employed.

At LaSiC, all instructors agreed on the use of a theoretical-practical evaluation approach. The theoretical assessment consists of a 50-question multiple-choice exam, while the practical evaluation involves a checklist

to assess students' performance during the simulation. As FP stated, “Evaluations combine theoretical exams with practical simulations. For the theoretical part, students answer multiple-choice questions, and for the practical component, the checklist ensures that they complete necessary steps and demonstrate leadership during the simulation” (Annex IV).

In the event of failure, students are given the opportunity to retake either the theoretical or practical exam. However, if they fail both components, they must retake the entire course, in accordance with the guidelines set by Celman et al. (2017), who argue that evaluation is crucial for certifying professional competence in higher education.

GB clarified that LaSiC’s evaluation system is standardized, consisting of an integrative theoretical-practical exam. The theoretical portion is assessed through a 50-question multiple-choice exam, while the practical portion involves a simulator-based assessment evaluated through a checklist. Students may recover one part of the evaluation if they fail it, but if both parts are failed, the student must retake the entire course (Annex III).

Celman et al. (2017) emphasized that university evaluations are designed to ensure that students possess the necessary professional training to practice in their field. This requires alignment between the curriculum, teaching methods, and assessment strategies, all aimed at certifying professional competence.

However, none of the instructors mentioned using evaluation as a learning tool, as suggested by Camillioni et al. (1998). They argued that evaluation should not only assess the content learned but also serve as a further learning opportunity. Evaluation should promote self-esteem and confidence in students, encouraging self-assessment and reflection.

In line with this, none of the instructors referenced the importance of students understanding the evaluation strategy itself. This might be because simulation is a core component of the curriculum, and students are already familiar with the simulators. A 2017 study on the "Impact of Simulation on Nursing Students' Self-Efficacy and Locus of Control" highlighted the gradual introduction of advanced technologies throughout the curriculum, ensuring that students become familiar with them, thus preventing any negative impact from unfamiliar technology on their clinical skills development.

DISCUSSION

Conclusions

Conducting interviews with my colleagues and the department head was a unique experience that evoked various emotions. In some cases, the interviews were simple, pleasant, and almost like an informal conversation; in others, they were uncomfortable, as some colleagues seemed to feel they were being evaluated on their knowledge or teaching abilities. Nevertheless, in all instances, I sensed that they were all trying to find the "right words" to express themselves, avoiding the perception of being ill-prepared instructors.

The predominant idea among LaSiC instructors regarding the concept of "strategy" is that of a method, technique, or approach used to impart knowledge. However, the concept of "didactic strategy" is broader and encompasses a more integrated vision. According to Litwin (2008), a teaching strategy, understood as an action plan, requires continuous evaluation by the instructor to assess whether the chosen methods are effective in relation to the subject matter, the students, and the learning objectives. It also involves evaluating the course in real-time to determine whether partial or full adjustments need to be made to the strategy to ensure the student can successfully build knowledge.

At LaSiC, the selection of teaching strategies is relatively restricted. The activities are determined by the department and course programs, which focus mainly on practical training through clinical simulation. In this context, instructors do not select the strategy for each case but adapt it to the group and the objectives. This sometimes requires altering the course of the simulation to clarify theoretical concepts or correct practical techniques.

A notable observation is that, despite being part of a simulation laboratory, none of the instructors described a "laboratory" format within the curricular structure. Regarding the advantages and disadvantages of clinical simulation, instructors agree that it is a valuable strategy for developing technical skills and attitudinal competencies, such as leadership in simulation scenarios. Furthermore, simulation allows for repeated practice of specific techniques, ensuring both patient and student safety. However, high costs are mentioned as a significant disadvantage, limiting access to the necessary tools for effective implementation.

From the perspective of LaSiC instructors, the primary goal of simulation is to provide a safe, controlled, and comfortable environment for both students and patients, where repeated practice leads to technical improvement and increased confidence. This aligns with the idea that simulation facilitates active, discovery-based learning, which results in meaningful and lasting knowledge construction.

As one instructor succinctly summarized the success of simulation in teaching: "…I hear and forget, I see and remember, I do and understand. This sums up the success of simulation in the teaching-learning process…" (Annex IV).

Regarding interventions during practice to clarify concepts or assess knowledge through questioning, this is not part of the original strategy. Instructors often modify the practice moment to gather theoretical knowledge, which can disrupt the discovery-based learning process, preventing students from identifying their errors and understanding the consequences of poor technique or incorrect treatment decisions.

Regarding assessment, there is no explicit reference to the need to align strategy selection with objectives. However, assessment combines theoretical knowledge with practical skills. Analysis of the evaluation strategy suggests that, in line with Celman et al. (2017), greater emphasis is placed on certifying or accrediting specific skills or knowledge rather than tracking students' progress over time. Since knowledge cannot be constructed instantly, students should be evaluated repeatedly during the process to gauge their development throughout the course, rather than simply assessing whether they have met predefined goals.

In conclusion, at LaSiC, instructors primarily use clinical simulation to clarify theoretical concepts and correct practical techniques. The teaching approach, as outlined in the course structure, focuses on skill development through discovery, guided by instructors, with a theoretical foundation that students are expected to bring with them as prior knowledge. Simulation serves as the primary strategy in this context due to the historical development of LaSiC, which was created to provide practical training for students who, after completing the medical curriculum, had no prior hands-on experience before their hospital internships.

Knowledge is assessed in two ways: theoretical knowledge is tested via a multiple-choice exam with case scenarios, while practical knowledge is evaluated through simulated exercises using checklists to determine whether the simulation was performed correctly and aligned with the learning objectives.

Final Thoughts

Upon completing this study and reviewing the literature and related publications, it seems necessary to introduce a course on emergencies and disasters at the Faculty of Medical Sciences of the University of Buenos Aires. This course could include content on emergency management, using simulated training.

It does not seem appropriate for medical students to begin direct patient care during their annual rotations without first completing a clinical simulation course, especially when a Clinical Simulation Laboratory is available within the faculty. As highlighted in the literature, clinical simulation is essential for developing both technical and non-technical skills, such as leadership, managing legal conflicts, and fostering confidence, as well as encouraging critical reflection on clinical practices.

The curriculum of the Faculty of Medical Sciences includes several subjects lasting 1 to 4 months, typically for non-core specialties. Basic specialties such as Clinical Medicine, Surgery, and Pediatrics run for 6 months, while secondary specialties, often derived from Clinical or Surgical Medicine, are shorter (e.g., Neurosurgery, Urology). Given this structure, it would be sensible to include a short 2-3 month course in the final year on

common emergency conditions, covering cross-disciplinary topics relevant to various specialties. This course should focus on simulated practice to develop the competencies needed for initial treatment before specialists take over.

Incorporating this curriculum structure would help students approach patient care holistically, encouraging diagnostic thinking based on symptoms rather than isolating pathologies, which is currently the pedagogical focus in textbooks.

Importance of Clinical Simulation as a Teaching Strategy

The introduction of clinical simulation in medical education is crucial to facing the challenges of modern professional practice. Traditional teaching often fails to provide enough hands-on experience in real-world scenarios due to time constraints or patient safety concerns. Clinical simulation offers a safe avenue for students to develop and refine their technical and decision-making skills without putting patients at risk. Moreover, it allows the integration of theory and practice, promoting active learning and meaningful knowledge construction.

This study underscores the growing relevance of clinical simulation as a pedagogical tool in medical education. Understanding how simulation is applied and evaluating its impact helps refine teaching strategies, improving the overall quality of medical training and, ultimately, healthcare delivery.

Impacts of the Study

This study has several important implications in the field of medical education:

1. **Improvements in teaching practices**: The study provides valuable insights into the effective use of clinical simulation, allowing instructors to refine their teaching methods and better support students' skill development.

2. **Curriculum enhancement**: By understanding how simulation is applied in teaching, curriculum designers can ensure that training programs align with the evolving needs of medical practice, incorporating more innovative and effective learning methods.

3. **Promoting reflective learning**: The study highlights the importance of reflection, particularly during debriefing sessions, to help students internalize their experiences and improve their future performance.

Implications for Teaching Practice

This study has profound implications for educators and the teaching profession in general. It demonstrates that clinical simulation is not just a complementary tool, but a crucial component of medical education, helping students integrate theoretical knowledge with clinical practice. For educators, this implies the need to continuously adopt and refine innovative teaching strategies to ensure that students are well-prepared to face the challenges of modern healthcare.

As the healthcare landscape continues to evolve, medical education must also adapt, and clinical simulation provides a dynamic and flexible way to meet these challenges. This study emphasizes the need for ongoing professional development for educators to ensure that they are equipped to manage and optimize simulation-based teaching, which will improve student outcomes and, ultimately, patient care.

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