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Virtual Reality Simulation in Nursing Education: A Call for Integration in Nursing Curricula

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Introduction

Simulation remains essential in healthcare, particularly nursing education, enhancing clinical competence, patient care, healthcare outcomes, and safety. According to Shorey et al. [1], Simulation has been a part of nursing education for over five decades and has been shown to improve cognitive outcomes such as theoretical knowledge. Today, we live in a digital age coupled with rapid technological advancements, making virtual Simulation, particularly virtual standardized patient simulations, increasingly prominent in nursing training/education. The COVID-19 global pandemic accelerated the adoption of simulation-based education in nursing programs, as restrictions on in-person clinical placements limited traditional hands-on training opportunities.

In 2015, the National League for Nursing (NLN) highlighted Simulation as an effective instructional strategy, emphasizing that it enables students to build clinical skills through hands-on practice in environments that closely replicate real-world healthcare settings [2]. The Integration of simulations has proven an effective teaching strategy, allowing students to develop critical thinking, communication, and clinical decision-making skills in a controlled, nonjudgmental environment. Simulation in nursing education enables the students to replicate real-life clinical experiences in a safe, monitored environment until they can reach competency through constructive feedback and self-correction [1]. Ultimately, this will decrease clinical errors and improve patient care outcomes.

Purpose

This commentary article highlights the significance of virtual reality simulation in nursing education. It emphasizes the role of simulation in preparing future nurses for real-world experiences in the evolving technological landscape, particularly the world of artificial intelligence (AI). Simulation education offers comprehensive training to nursing students and practicing nurses, equipping them with the necessary skills to effectively serve diverse and vulnerable populations. By integrating virtual reality simulations into nursing curricula, we can promote the development of a more adaptable and inclusive nursing workforce while also helping to bridge the gap between traditional nursing educational methods and the evolving demands of modern healthcare practices.

Virtual Reality Simulation in Nursing Education

A review of the available literature indicates that VR simulation is favorable among many nursing students and faculty. In a 2022 systematic review and meta-analysis of VR simulation in enhancing critical thinking, Sim and colleagues determined that significant research supports the benefits of VR simulation among nursing students. The analysis highlighted improvements in applied knowledge and nursing students' clinical performance using VR simulations [3].

In a 2024 scoping review following the established methodology, Vogelsang and colleagues concluded that VR simulation experiences supported increased student self-confidence [4]. Virtual reality allows students to apply and practice acquired skills in a stress-free, low-risk, standardized environment, allowing them to explore, practice, and refine their clinical skills while receiving immediate instructor feedback [5]. According to a cross-sectional study of 111 undergraduate nursing students, Garcia-Pazo and colleagues discovered that the nursing students of the study reported the experience of VR simulation as highly immersive, and the collected data supported the student's view of skill enhancement in the areas of assessment, analysis, and care planning skills [6]. Furthermore, VR simulation allows for immersive clinical simulation experiences that can be repeated to enhance student learning [5].

Forms of Virtual Reality Simulation Used in Nursing Education

Nursing interventions and procedures can be complex and require delicate skill and precision. Virtual reality simulation offers a safe environment where nursing students can practice procedures before performing them on real-life patients when the stakes are high. Examples of procedures that can be effectively completed using VR simulation include:

- Foley catheter insertions
- Injections

- Dressings
- IV placements
- NG- tube placement
- Head-to-toe assessments
- Childbirth

Virtual reality simulation is practical for practicing nursing skills and has been successfully used to teach anatomy and physiology. Mastering the components of the human body and how the human body functions serves as the foundation for nurses and other healthcare providers. The benefits of anatomy and physiology learning experiences using VR simulation have surpassed traditional lecture-based, textbook learning models [7]. Exposing nursing students to virtual 3-D anatomical models promotes understanding of the content while fostering engagement. Utilizing VR simulation to teach anatomy and physiology reduces the need for cadavers, which may be difficult to obtain due to regulatory and budgetary constraints [7].

Impact On Nursing Curriculum Development and Outcomes

As virtual reality technology evolves, it could bridge the education gap between the classroom and clinical practice, particularly through improved virtual reality simulation software and the further development of High-Fidelity Human Simulation training [8]. A 2022 mixed-method study suggested that nursing students who participated in VR simulation gained knowledge, while those who studied in HFHS gained skills [9]. The novelty of virtual reality offers an exceptional opportunity to engage nursing students in their education, as a 2021 qualitative descriptive study indicated [10]. The impact of virtual reality on nursing curriculum development and outcomes is ever-growing, and educators may find students immersed in active learning with the possibility of improved educational outcomes through the integration of simulation in the academic landscape [11].

The Role of Virtual Reality in Promoting Psychological Wellness and Active Learning Among Nursing Students

Virtual reality simulation promotes psychological wellness and active learning among nursing students in many ways. Traditionally, teacher-based learning methods relied on teachers to deliver content using lectures and textbooks. Contrarily, recent learning methods have evolved into a student-based approach where students actively participate in their learning experiences. Student-based learning enables students to co-create their educational journey and decide how they interact with the informational content [12]. VR simulation aligns with the purpose of student-based learning. Using VR modalities improves student satisfaction, attention spans, active learning, and student-teacher communication [13]. Virtual experiences improve memory retention, resulting in better learning outcomes.

Implications for Nursing Practice

Technological advances will influence the future of healthcare. Therefore, technology must be integrated into the nursing curricula. Instructional strategies that offer engaging and interactive learning experiences are pivotal to the future of education. Incorporating technology may be costly for the institution; however, the benefits include increased student attraction and improved educational quality [7]. Educational methods such as distance learning and virtual reality simulation are innovative solutions to enhance learning experiences and foster active learning.

Conclusion

Today, numerous studies have shown the importance of simulation in nursing education [14]. Bozkurt et al. [15] emphasize the importance of utilizing standardized patient (SP) simulations in well-established theoretical frameworks to ensure the delivery of high-quality educational experiences. They also highlight the need to evaluate outcomes beyond the learner level—specifically those related to patients, systems, and SPs—to inform and enhance educational policies regarding clinical training requirements (p. 16). The methods by which nursing students acquire clinical skills today have evolved significantly compared to two decades ago. Integrating virtual reality (VR) simulation into nursing curricula can help improve student learning outcomes and position the nursing profession at the forefront of healthcare technology and innovation. As the landscape of healthcare and health education continues to advance, it is essential that nursing keeps up with the technological strides seen in medicine and other allied health sciences.

Conflicts of Interest: The authors declare no conflict of interest.

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