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การจัดการเรียนการสอนด้วยสถานการณ์จำลองเสมือนจริงในการศึกษาพยาบาลสำหรับประชากรหลายช่วงวัย

Simulation-Based Learning in Nursing Education across Different Populations

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บทคัดย่อ

การจัดการเรียนการสอนด้วยสถานการณ์จำลองเสมือนจริง (Simulation-based Learning: SBL) เป็นองค์ประกอบสำคัญของการศึกษาพยาบาล ช่วยเสริมสร้างทักษะทางคลินิก การคิดเชิงวิพากษ์ และการตัดสินใจในสภาพแวดล้อมที่ปราศจากความเสี่ยง บทความวิชาการนี้ทบทวนองค์ความรู้เกี่ยวกับแนวปฏิบัติการใช้สถานการณ์จำลองเสมือนจริง ความท้าทายและโอกาสในการใช้ SBL ในประชากรผู้ป่วยที่หลากหลายทั้งในระดับนานาชาติและบริบทของประเทศไทย ในการดูแลการตั้งครรภ์และทารกแรกเกิด การใช้การจำลองที่มีความเสมือนจริงสูงและการใช้ผู้ป่วยจำลอง ช่วยให้ผู้เรียนเรียนรู้การจัดการภาวะฉุกเฉินทางสูติศาสตร์และการทำงานเป็นทีมระหว่างวิชาชีพ การใช้สถานการณ์จำลองในการพยาบาลผู้ป่วยเด็กเน้นในด้านพัฒนาการและอารมณ์ของเด็กในแต่ละช่วงวัย พัฒนาทักษะในการให้ยา และการสื่อสารกับครอบครัว สำหรับผู้ป่วยผู้ใหญ่และผู้สูงอายุ การใช้สถานการณ์การจำลองที่มีความเสมือนจริงสูงจะช่วยในการพัฒนาความสามารถในการจัดการโรคเรื้อรัง การดูแลและการให้การพยาบาลในระยะเฉียบพลัน และกลุ่มอาการเฉพาะของผู้สูงอายุ การใช้สถานการณ์จำลองในการพยาบาลจิตเวช ผ่านการใช้ SPs หรือเทคโนโลยีการจำลองเสมือนจริง ช่วยเสริมสร้างทักษะการสื่อสารเชิงบำบัดและการดูแลในสถานการณ์วิกฤต การใช้สถานการณ์จำลองในการพยาบาลชุมชนช่วยในการเตรียมนักศึกษาให้พร้อมสำหรับการดูแลสุขภาพที่บ้าน การตอบสนองทางสาธารณสุข และการพยาบาลในโรงเรียน โดยเน้นการดูแลเชิงป้องกันและความร่วมมือระหว่างวิชาชีพ ความท้าทายในการใช้ SBL ได้แก่ การมีส่วนร่วมของผู้ที่เกี่ยวข้องและการได้รับการสนับสนุนจากสถาบันและการจัดทำนโยบาย ทิศทางในอนาคตของ SBL ได้แก่ การนำเทคโนโลยีขั้นสูงมาใช้ การเพิ่มความร่วมมือด้านการใช้สถานการณ์จำลองระหว่างวิชาชีพ การใช้ SPs และการจัดการเรื่องการเข้าถึงในสถานที่ที่มีทรัพยากรจำกัด การวิจัยและการทำนวัตกรรมอย่างต่อเนื่องเป็นสิ่งจำเป็นเพื่อเพิ่มประสิทธิภาพและความเท่าเทียมของการใช้ SBL ในการศึกษาพยาบาล

คำสำคัญ: การจัดการเรียนการสอนด้วยสถานการณ์จำลองเสมือนจริง การศึกษาพยาบาล ความหลากหลายของประชากร เทคโนโลยี

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Abstract

Simulation-based learning (SBL) is an essential component of nursing education, providing a risk-free environment for developing clinical skills, critical thinking, and decision-making. This review synthesizes research on simulation practices and examines their challenges and opportunities across diverse patient populations, both internationally and within Thailand. In pregnancy and neonatal care, high-fidelity simulators and standardized patients (SPs) enhance students' ability to manage obstetric emergencies and facilitate interdisciplinary teamwork. Pediatric nursing simulations emphasize developmental considerations, medication safety, and effective family communication. For adult and geriatric care, high-fidelity scenarios improve competency in chronic disease management, acute care, and geriatric syndromes. Psychiatric nursing simulations, utilizing SPs or virtual technologies, strengthen therapeutic communication and crisis intervention skills. Community nursing simulations prepare students for roles in home health, public health responses, and school nursing, with a focus on preventive care and interprofessional collaboration. Key challenges include engaging stakeholders, securing institutional, and policy support. Future directions for SBL include integrating advanced technologies, expanding interprofessional collaboration, increasing SP utilization, and improving accessibility in resource-limited settings. Continued research and innovation are essential to enhance the effectiveness and equity of SBL in nursing education.

Keywords: Simulation-Based Learning, Nursing Education, Diverse Populations, Technology

Introduction

Simulation-based learning (SBL) has emerged as a critical component in nursing education, revolutionizing the way nursing learners acquire and refine their clinical skills. SBL is a pedagogical method that allows learners to engage in hands-on learning without the risks associated with real-life clinical practice, by providing a realistic and controlled environment (Mishra, Hemlata, & Trivedi, 2023). The integration of SBL in nursing curricula addresses the growing need for competent and confident healthcare professionals capable of delivering high-quality patient care in various clinical settings (Curl, Smith, Chisholm, McGee, & Das 2016; Mishra, Hemlata, & Trivedi, 2023).

SBL encompasses a wide range of modalities, including low-fidelity task trainers, high-fidelity manikins, standardized patients, virtual reality (VR), and augmented reality (AR) (Choi & Kim, 2020). These diverse simulation tools cater to various learning needs and objectives, enabling learners to practice procedures, develop critical thinking skills, and enhance their communication and teamwork skills (Choi & Kim, 2020). The use of debriefing sessions following simulations further reinforces learning by allowing learners to reflect on their performance, receive feedback, and identify areas for improvement (Mishra, Hemlata, & Trivedi, 2023).

The effectiveness of SBL in nursing education has been well-documented. Various research indicate that simulation-based training significantly improves learners' clinical competence, confidence, and readiness for nursing practice (Curl, Smith, Chisholm, McGee, & Das 2016; Liaw, Palham, Chan, Tan, & Goh, 2014). Moreover, SBL has been shown to reduce anxiety and stress that

are associated with clinical placements, thereby enhancing learners' overall learning experience (Koukourikos, Tsaloglidou, Kourkouta, 2021). Given these benefits, it is not surprising that SBL has become essential of nursing education programs worldwide.

As the healthcare landscape continues to evolve, with increasingly diverse patient demographics and complex clinical conditions, there is an urgent demand for nursing education to incorporate innovative and effective teaching methodologies. Despite the growing body of evidence supporting the efficacy of SBL, there remains a notable gap in comprehensive literature that specifically addresses its application across the full spectrum of patient populations. This article aims to fill that gap by synthesizing existing research, identifying practices of simulation in nursing education within the context of Thailand, and highlighting the challenges and opportunities associated with SBL in nursing education. By providing a detailed examination of how simulation can be adapted to meet the educational needs of nursing learners across diverse clinical contexts, this article seeks to inform educators, policymakers, and researchers, thereby contributing to the enhancement of nursing curricula globally and particularly in Thailand.

SBL in Nursing Education Within the Context of Thailand

In Thailand, the integration of SBL into nursing education has seen significant progress in recent years. Thai nursing schools have increasingly implemented simulation technologies to enhance the training of nursing learners, recognizing the value of SBL in improving clinical competence and patient care outcomes (Chansungnoen, 2021; Piyaman, Rattanakanlaya, & Tiansawad, 2021). The move towards incorporating simulation in nursing education aligns with global trends and reflects the commitment of Thai educational institutions to meet international criteria in healthcare education (Wongkietkachorn & Wongkietkachorn, 2020). The application of SBL enables nursing students to practice and refine their skills in realistic, risk-free environments, which is particularly valuable given the diverse health needs across the Thai population (Chansungnoen, 2021).

Various forms of simulation have been implemented, from low-fidelity task trainers for basic skills practice to high-fidelity manikins for complex clinical scenarios. For example, high-fidelity birthing simulators are used to train learners in managing a range of health situations such as chronic illnesses (Suttineam & Rungsa, 2022; Wuttisakpisarn, Chudjuajeen, & Taonol, 2020), critical illness or emergency conditions (Kumkong, Leejareon, Aramrom, & Jitviboon, 2016). The use of standardized patients, often played by actors, is also prevalent, providing learners with opportunities to practice communication skills and patient interaction in a controlled setting (Sriwongwan, Sattawatcharawanij, & Pandang, 2020). In geriatric care, simulations replicate real-life interactions with older adult patients suffering from chronic diseases, dementia, or mobility issues, aligning with Thailand’s focus on caring for its aging population (Warangkana, Orruethai, Jutatip, Nongnutch, Anunya, & Angkana, 2023). For mental health, SBL equips learners with critical skills for crisis intervention, psychiatric assessments, and patient de-escalation, addressing the country’s growing mental health concerns (Nueangjaknak, 2024). This multifaceted use of SBL in Thailand

helps learners gain hands-on experience across a spectrum of patient populations, fostering improved patient outcomes and better preparing them for real-world challenges in an evolving healthcare landscape.

Despite these advancements, the implementation of SBL in Thailand faces various obstacles. One major challenge is the substantial financial burden of acquiring and maintaining high-fidelity simulation equipment, which can be a significant financial burden for educational institutions (Wuttisakpisarn, Chudjuajeen, & Taonol, 2020). Additionally, there is a need for ongoing faculty development to ensure that instructors are adequately trained to effectively use simulation tools and conduct debriefing sessions (Boonmak, Suraseranivongse, Pattaravit, Boonmak, Jirativanont, Lertbunnaphong, et al., 2022). Another challenge is the limited access to simulation resources in rural and underserved areas, where nursing schools may lack the infrastructure and funding to implement comprehensive simulation programs (Tippayanate, Chaiprom, Kamya, Thornsao, Wijakkanalan, Aopasi, et al., 2020).

Simulation Across Different Groups of Populations

SBL plays a pivotal role in nursing education by offering a versatile framework for training that caters to the diverse needs of various patient populations. As healthcare becomes increasingly complex, nurses must be equipped with the knowledge and skills necessary to provide high-quality care across all stages of life, from prenatal care to geriatric support. SBL enables nursing students to engage in realistic clinical scenarios that reflect the unique challenges faced by different demographic groups, including those with specific physical, mental, or cultural considerations. This section delves into the application of SBL across a spectrum of populations, highlighting its significance in areas such as maternal health, pediatric care, adult and geriatric nursing, psychiatric nursing, and community health, ultimately illustrating how simulation can bridge the gap between theoretical knowledge and practical application in diverse clinical contexts (Mishra, Hemlata, & Trivedi, 2023).

Pregnancy and Neonatal Simulation

The complexities of childbirth and neonatal care necessitate a high level of preparedness and proficiency from healthcare providers, yet traditional clinical education may fall short of offering the essential hands-on experience due to the unpredictable nature and varying frequency of obstetric emergencies and neonatal complications (Curl, Smith, Chisholm, McGee, & Das 2016). Simulation in obstetric and neonatal nursing is essential for preparing learners to handle the complexities of childbirth and newborn care.

High-fidelity birthing simulators, such as those mimicking labor and delivery scenarios, allow learners to practice managing obstetric emergencies, including shoulder dystocia, postpartum hemorrhage, and neonatal resuscitation (Cibulka, Crane-Wider, & Foley, 2016; Huang, Tang, Tang, Shi, Wang, & Xiong, 2019). Trained actors (SPs) represent pregnant women experiencing different conditions, enabling learners to practice communication, assessment, and patient-centered care. This method is particularly useful for developing empathy and interpersonal skills (Rutherford-

Hemming, Alfes, & Breymier, 2019; Ton, Duong, Tran, Nguyen, Mai, Nguyen, et al., 2024). Emerging technologies like AR and VR enhance the realism and interactivity of simulations. These technologies allow learners to visualize and interact with complex anatomical structures and physiological processes in a 3D space, providing a deeper understanding of maternal and neonatal health.

Simulation scenarios in pregnancy and neonatal care are designed to cover a broad spectrum of clinical situations, including labor and delivery management (e.g., normal and complicated deliveries, induction of labor, and using of assistive devices like forceps and vacuum extractors), obstetric emergencies (e.g., shoulder dystocia, eclampsia, post-partum hemorrhage, and uterine rupture), neonatal resuscitation (e.g., immediate assessment and intervention for newborns with respiratory distress, bradycardia, or other life-threatening conditions), prenatal care (e.g., routine antenatal visits, managing gestational diabetes, and monitoring fetal growth and development), and post-partum care (e.g., assessment and management of postpartum complications, breastfeeding support, and maternal mental health) (Cibulka, Crane-Wider, & Foley, 2016; Huang, Tang, Tang, Shi, Wang, & Xiong, 2019).

Pediatric Simulation

Pediatric patients present distinct challenges due to their varying developmental stages and physiological differences compared to adult patients. Pediatric simulations address the unique physiological and developmental needs of children (Kim, Song, & Kim, 2023). Research has shown that simulation-based training improves learners' confidence and competence in pediatric nursing, ultimately enhancing patient safety and care quality (Kim, Song, & Kim, 2023).

High-fidelity pediatric manikins can simulate various clinical conditions, from common illnesses to critical emergencies like asthma attacks and sepsis. These simulations help learners develop skills in pediatric assessment, medication administration, and communication with both children and their families (Adler, Trainor, Siddall, & McGaghie, 2007; Kim, Song, & Kim, 2023). A low-fidelity manikin, such as the ALS Baby, is designed to simulate the process of intubation by allowing the insertion of an endotracheal tube and demonstrating chest rise in response to successful intubation (Wael, Barakeh, Atta, Shabaan, Alshehri, & Basurrah, 2022). Actors (SPs) trained to portray pediatric patients and their families provide a realistic, interactive experience. Technology like VR and AR can replicate various pediatric clinical situations, from routine check-ups to emergency care (Chen & Liou, 2023; Kim, Song, & Kim, 2023).

The commonly used or recommended scenario topics include pediatric assessment (e.g., conducting comprehensive physical exams, growth and development assessments, and recognizing signs of illness or injury), chronic illness management (e.g., asthma, diabetes), emergency care (e.g., anaphylaxis, seizures, airway management, and stabilization techniques), growth and development assessments (e.g., developmental delays, autism spectrum disorders, and behavioral issues), and family-centered care (e.g., engaging with patients' families, providing education and support, and involving them in care planning and decision-making) (Adler, Trainor, Siddall, & McGaghie, 2007; Kim, Song, & Kim, 2023).

Adult and Geriatric Simulation

SBL in adult and geriatric nursing is critical due to the diverse health needs and complex conditions often encountered in these populations. Adults and aging patients present with a wide range of chronic illnesses, acute conditions, and age-related health issues. More specifically, geriatric care encompasses a complex interplay of physical, psychological, and social factors. Furthermore, conditions such as chronic illnesses, polypharmacy, frailty, and cognitive decline require a nuanced understanding and a comprehensive approach (World Health Organization [WHO], 2015). Traditional educational methods often fall short in preparing learners to effectively manage the complexities of geriatric care. By exposing learners to a variety of geriatric patient scenarios, simulation can foster the development of empathy, compassion, and a patient-centered approach essential for providing optimal care to older adults (Bouwmeester Stjernetun, Gillsjö, Odzakovic, & Hallgren, 2024).

High-fidelity simulators and SPs are used to practice a wide range of clinical skills, from wound care, myocardial infarction, stroke, diabetes management, respiratory distress, and medication management to dementia care and end-of-life discussions (Hernández-López, Ruzafa-Martínez, Leal-Costa, Ramos-Morcillo, Díaz-García, López-Pérez, et al., 2023; Siew, Wong, & Chan, 2021). These simulations emphasize critical thinking, clinical decision-making, and patient-centered care. Virtual platforms offer interactive and scenario-based learning experiences that replicate real-world clinical situations. These simulations can include managing oral care, chronic diseases, acute care scenarios, and geriatric syndromes such as delirium and dementia (Avci & Kilic, 2024; Kiegaldie & Shaw, 2023).

Scenarios commonly used and recommended include, but not limited to chronic disease management (e.g., chronic obstructive pulmonary disease, heart failure, hypertension), acute care (e.g., myocardial infarction, stroke), geriatric syndromes (e.g., falls, delirium, polypharmacy), dementia care, and palliative care (e.g., pain management, symptom control, communication with patients and families, and ethical decision-making in end-of-life situations) (Hernández-López, Ruzafa-Martínez, Leal-Costa, Ramos-Morcillo, Díaz-García, López-Pérez, et al., 2023; Siew, Wong, & Chan, 2021).

Psychiatric Simulation

Simulation in psychiatry primarily involves managing a wide range of mental health issues and disorders, including depression, anxiety, schizophrenia, bipolar disorder, and substance abuse. The unique challenges of psychiatric nursing, such as building therapeutic relationships, conducting mental health assessments, and intervening in crises, require nurses to possess a blend of clinical skills, empathy, and effective communication strategies (Bell, Bull, & Cullen, 2018). Traditional clinical placements alone may not provide learners with sufficient exposure to the variety and intensity of psychiatric cases they will encounter in practice. Simulation in psychiatric nursing aims to develop therapeutic communication skills, crisis intervention techniques, and the ability to manage psychiatric emergencies (Bell, Bull, & Cullen, 2018; Goodman & Winter, 2017).

SPs are often used to portray individuals with mental health conditions, such as depression, anxiety, schizophrenia, and substance abuse disorders (Goodman & Winter, 2017; Piot, Dechartres, Attoe, Romeo, Jollant, Billon, & et al., 2022). These simulations help learners practice de-escalation strategies, conduct mental status exams, and provide patient-centered care in a safe environment, allowing them to practice therapeutic communication, develop rapport, and conduct detailed mental health assessments (Goodman & Winter, 2017). Virtual simulation technologies offer immersive environments where learners can experience and respond to psychiatric emergencies, de-escalate violent situations, and gain insight into patients' perspectives (Kim, Lim, Kim, & Yeom, 2024; Piot, Dechartres, Attoe, Romeo, Jollant, Billon, & et al., 2022). Scenario topics commonly used or recommended in psychiatric nursing include mental status examinations, crisis intervention (e.g., suicidal ideation or self-harm behavior), therapeutic communication, managing psychiatric emergencies, and substance abuse treatment (Goodman & Winter, 2017; Kim, Lim, Kim, & Yeom, 2024; Piot, Dechartres, Attoe, Romeo, Jollant, Billon, & et al., 2022).

Community Simulation

Given the broad and dynamic nature of community nursing, SBL is essential in preparing nursing learners to meet these demands. SBL provides a realistic, interactive learning environment where learners can develop critical thinking skills, practice clinical procedures, and engage in community-based health interventions without risking patient safety. Community nursing simulations prepare learners to provide care in diverse settings, including homes, schools, and community centers (Schwindt & McNelis, 2015). Rural and underserved communities, often faced with limited healthcare resources, benefit from SBL that trains learners to respond effectively to emergencies and provide culturally sensitive care with minimal equipment (Chansungnoen, 2021). Simulations are also tailored to reflect the needs of various ethnic groups, ensuring that nurses develop the cultural competence necessary for effective communication and trust-building (Uppor, Klunklin, Viseskul, Skulphan, & Turale, 2023).

The integration of SBL into community nursing education has been driven by the need for practical, and hands-on training that mirrors real-world community health scenarios (Aslan, 2021; Ladee, Jantraporn, & Meekusol, 2021). SPs, for example, can simulate community members with various health issues, allowing learners to practice health assessments, patient education, and community outreach (Ladee, Jantraporn, & Meekusol, 2021). High-fidelity manikins are used for simulating emergency situations and advanced clinical skills in a community setting, such as managing asthma attacks or diabetic emergencies during home visits. Virtual simulation platforms offer scenario-based learning that replicates community health settings, including conducting community health assessments, developing care plans, and managing public health emergencies (Rojo-Rojo, Soto-Castellón, García-Méndez, Leal-Costa, Adánez-Martínez, Pujalte-Jesús, & et al., 2021). AR and VR technologies provide immersive environments for practicing community nursing interventions, such as health screenings, immunization drives, and disaster response (Hoffman, Wu, & Argeros, 2023).

Community simulations often involve scenarios related to public health issues, such as infectious disease outbreaks (e.g., responding to an outbreak of a communicable disease in a community and conducting contact tracing and immunization drives), health promotion activities (e.g., conducting a health education session on preventing diabetes and promoting healthy lifestyles in a community center), and chronic disease management in the community (e.g., managing a home visit for a patient with uncontrolled hypertension and providing education on lifestyle modifications) (Aslan, 2021; Ladee, Jantraporn, & Meekusol, 2021).

Challenges of Simulation-Based Learning in Nursing

SBL has become a fundamental component of nursing education, offering learners a safe and controlled environment to develop and hone their clinical skills. Despite its numerous advantages, the integration of SBL into nursing curricula is accompanied by several challenges. These challenges range from resource constraints and faculty training to the need for continuous technological updates and the integration of realistic scenarios.

Resource Allocation

Implementing and maintaining high-quality simulation programs requires significant financial investment. High-fidelity manikins, virtual reality (VR) systems, and other advanced simulation technologies are costly. Additionally, the ongoing costs of maintenance, software updates, and replacement parts can strain institutional budgets (Foronda, Liu, & Bauman, 2013). Further, adequate physical space is necessary to house simulation labs. This includes rooms for simulated hospital environments, control rooms, and debriefing areas. Institutions may face difficulties in securing and maintaining such spaces (Baayd, Heins, Walker, Afulani, Sterling, Sanders, et al., 2023). In Thailand, one significant challenge in implementing SBL in Thailand is the availability of resources, including simulation equipment and technological infrastructure. Many Thai nursing schools, especially those in rural or underfunded areas, face budgetary constraints that limit their ability to invest in high-fidelity simulators and up-to-date facilities (Benchadlia, Rabia, & Abderrahim, 2023).

Faculty Training and Development

Faculty members need to be proficient in operating sophisticated simulation equipment and software. This requires ongoing training and professional development, which can be time-consuming and expensive (Lippe & Becker, 2015). However, there is a shortage of faculty with specialized training in simulation pedagogy, particularly in the context of Thailand, which can impact the quality and consistency of SBL experiences for students (Benchadlia, Rabia, & Abderrahim, 2023). Faculty must possess both clinical expertise and an understanding of educational principles to create effective simulations and facilitate reflective discussions that help learners learn from their simulation experiences (Benchadlia, Rabia, & Abderrahim, 2023).

Integration into Curriculum

Integrating simulation into the nursing curriculum in a way that complements traditional learning methods and clinical placements requires careful planning and coordination (Jarvill,

Jenkins, Akman, Astroth, Pohl, & Jacobs, 2018). Nursing programs are already intensive, and making the time to incorporate simulation sessions without overloading learners and faculty is a significant challenge (Baayd, Heins, Walker, Afulani, Sterling, Sanders, & et al., 2023). In Thailand, Integrating SBL into existing nursing curricula poses specific logistical challenges influenced by the structure and demands of the Thai education system. This includes aligning simulation activities with course objectives and clinical competencies, as well as coordinating scheduling with other educational activities (Chansungnoen, 2021).

Cultural Consideration

Cultural norms and student attitudes can affect the effectiveness of SBL. In Thailand, students may initially feel uncomfortable with the highly interactive nature of simulations, especially when it involves role-playing or direct feedback, which may contrast with more traditional, lecture-based learning approaches (Uppor, Klunklin, Viseskul, Skulphan, & Turale, 2023).

Implications and Future Directions of Simulation-Based Learning in Nursing

Technological Advancements

The integration of AI into simulation can enhance the realism and adaptability of scenarios. AI-driven manikins and virtual patients can respond more realistically to student actions, providing a more immersive learning experience (Jung, 2023). Moreover, the use of VR and AR in nursing education is expected to grow. These technologies can create highly realistic, interactive, and immersive environments that enhance student engagement and learning outcomes (Kim, Lim, Kim, & Yeom, 2024).

Interprofessional Education

Future SBL programs will likely emphasize interprofessional education, where nursing students participate in simulations alongside medical, pharmacy, and other healthcare students. This approach fosters teamwork, communication, and collaborative problem-solving skills essential for the effective healthcare delivery (Hughes, 2018; Ryall, Judd, & Gordon, 2016).

Expanded Use of Standardized Patients

The use of standardized patients (SPs) will continue to expand, offering students opportunities to practice communication, empathy, and cultural competence in a wide range of clinical scenarios. SPs can provide immediate feedback, enhancing the learning experience (Ton, Duong, Tran, Nguyen, Mai, Nguyen et al., 2024)

Global Collaboration and Standardization

International collaboration among nursing schools can facilitate the sharing of best practices, resources, and expertise in simulation-based education. Developing global standards for SBL can help ensure consistency and quality across diverse institutions (Au, Li, Lee, Leung, & Pan, 2019; McCarthy, Trace, O'Donovan, 2018).

Research and Innovation

Future research should focus on designing and assessing the effectiveness of faculty development programs that equip nursing educators with the skills needed to integrate SBL

effectively (Benchadlia, Rabia, & Abderrahim, 2023). These programs should cover not only technical operation but also scenario development, facilitation techniques, and debriefing strategies. Training programs tailored to the Thai context, emphasizing local case studies and cultural relevance, would improve faculty confidence and competency. Future practice should include developing SBL scenarios that reflect the unique health challenges found in the particular contexts.

Enhancing Access and Equity

To address resource constraints, particularly in low-income settings, the development of remote and low-cost simulation solutions will be crucial. Web-based simulations and low-fidelity manikins can provide valuable learning experiences without the high costs associated with high-fidelity systems (Choi & Kim, 2020).

Conclusion

SBL in nursing is a powerful tool for preparing learners to meet the diverse needs of various patient populations. By offering immersive, hands-on learning experiences, SBL helps bridge the gap between classroom instruction and clinical practice, enhancing learners' skills, confidence, and readiness for real-world patient care. This article highlights the essential role of SBL in nursing education, particularly in addressing the needs of diverse patient populations. Through a comprehensive review of existing literature, we identified simulation practices in the contexts of diverse populations that enhance clinical training and preparedness among nursing students. The findings underscore that SBL not only fosters critical skills and competencies but also allows for the adaptation of learning experiences to meet the unique challenges presented by different demographic groups. Additionally, while SBL presents significant opportunities for enriching nursing curricula, the article also acknowledges the barriers to its effective implementation, such as resource limitations, the necessity for faculty training, and the alignment with educational objectives. By addressing these challenges and leveraging the potential of SBL, nursing education can better prepare future practitioners to deliver high-quality care across the healthcare spectrum, particularly in the context of Thailand and similar healthcare environments.

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