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## Research Article

# Developing clinical leadership through high-fidelity obstetric simulation: A multimethods study in Thai nursing students

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## Keywords

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Experiential learning;  
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Leadership resilience;  
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## Abstract

**Background:** Effective clinical leadership is essential for healthcare, particularly in high-stakes environments like obstetrics. Simulation-Based Learning (SBL) offers a controlled, replicable setting for students to engage in leadership roles. This study evaluates the effectiveness of SBL in enhancing clinical leadership skills among nursing students and explores how they apply leadership competencies within high-fidelity obstetric scenarios.

**Methods:** A multimethod study was conducted with 23 fourth-year undergraduate nursing students attending two leadership simulation scenarios. Quantitative data comprised a validated clinical leadership skills assessment tool, with pre- and postintervention scores analyzed using paired t-tests. Focus group discussions provided qualitative insights into students' learning experiences.

**Results:** The SBL yielded statistically significant improvements in cognitive competency, interpersonal competency and intrinsic competency (all  $p < .001$ ). Thematic analysis identified "Building Leadership Resilience through Obstetric Nursing SBL" as the core theme and four accompanying themes.

**Conclusion:** The SBL intervention seems an effective method for enhancing clinical leadership among nursing students in obstetrics. Thematic analysis identified that leadership resilience is fostered through decision-making under pressure, team trust and delegation, and emotional composure.

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## Introduction

The increasing complexity of healthcare systems demands that nurses develop both technical and non-technical skills to provide comprehensive care. Consequently, nursing curricula now emphasize the development of clinical leadership skills, vital for preparing students for professional roles in healthcare (Wakefield et al., 2023, 2021). These leadership skills—encompassing problem-solving, decision-making, communication, teamwork, individual empowerment, emotional intelligence, and self-awareness—are critical for ensuring efficient and effective patient care (Guibert-Lacasa & Vázquez-Calatayud, 2022).

Recent studies highlight the significance of clinical leadership in nursing. Guibert-Lacasa and Vázquez-Calatayud (2022) identified three essential components for leadership development: cognitive competency, interpersonal competency, and intrinsic competency. Cognitive competency focuses on applying knowledge in practice, including problem-solving and decision-making. For example, Ahmady and Shahbazi (2020) demonstrated that structured problem-solving training significantly enhances nursing students' critical thinking and decision-making abilities, underscoring the value of targeted educational interventions in leadership development.

Interpersonal competency is essential for fostering effective communication and teamwork within leadership roles. However, traditional clinical placements often provide inconsistent opportunities for developing these skills, particularly in specialized areas such as obstetrics (Curtis et al., 2011). The variability in students' exposure to complex clinical situations across different wards can result in unequal learning outcomes in leadership training (Curtis et al., 2011). This inconsistency underscores the need for more structured and standardized educational methods such as SBL, which offers a controlled environment to develop leadership competencies (Pearce et al., 2022).

SBL provides a structured, interactive approach to nursing education, engaging students in role-playing, teamwork, and complex clinical scenarios in a safe environment. This method promotes critical thinking, problem-solving, and the application of theoretical knowledge to real-world situations, thus enhancing collaborative skills and providing direct experiential learning (Amod & Brysiewicz, 2019; Cant & Cooper, 2017). For optimal effectiveness, a strong conceptual framework is essential.

Kolb's Experiential Learning Theory (ELT) serves as a foundation for SBL, proposing that learning occurs through experience transformation. ELT's four stages—concrete experience, reflective observation, abstract conceptualization, and active experimentation—align with nursing students' developmental needs as they progress through simulated environments (Davitadze et al., 2022; Ross, 2021).

The effectiveness of SBL in nursing education is well-documented. For instance, Labrague (2021) synthesized outcomes from simulation within prelicensure nursing management and leadership courses, identifying key benefits such as improved decision-making, enhanced teamwork and better communication skills. Similarly, Spigelmyer and Loughran (2022) found that low-fidelity simulation provided a safe environment for students to practice leadership skills, resulting in positive learning outcomes while meeting clinical hour requirements. These studies highlight the potential of simulation to significantly enhance leadership competencies in nursing students (Huynh, 2021; Labrague, 2021; Spigelmyer & Loughran, 2022).

Despite the well-documented benefits of SBL in general nursing education, its specific impact on developing clinical leadership skills in obstetrical nursing remains underexplored. Obstetric care, where rapid decision-making and effective team coordination are paramount, presents distinct challenges that traditional educational methods may not adequately address. Therefore, this study explores how high-fidelity simulation, grounded in Kolb's ELT, can be leveraged to develop clinical leadership skills specifically within the context of obstetric nursing. By focusing on this specialized area, the study aimed to contribute to deeper understanding of how simulation can be utilized to prepare nursing students for leadership roles in critical clinical settings.

## Objectives

- 1) To evaluate the development of clinical leadership competencies in fourth-year Thai nursing students through assessment during and after high-fidelity obstetrical simulation scenarios – using quantitative data.
- 2) To explore the learning experiences and leadership skills acquisition of fourth-year Thai nursing students during and after high-fidelity obstetrical simulation-based practice- using qualitative interview data.

## Study design

This study employed a multimethod approach to evaluate the effectiveness of simulated high-fidelity obstetric simulation scenarios in developing clinical leadership competencies among fourth-year Thai nursing students. A combination of quantitative and qualitative methods provided a comprehensive understanding of both measurable changes in leadership competencies and student's subjective learning experiences. The quantitative component involved a pre-test and a post-test to assess changes in clinical leadership competencies using a validated leadership assessment tool. The qualitative component included postcourse focus group discussions (FGDs) to explore students' learning experiences and leadership skills acquisition, offering insights into how they internalized the skills learned during the simulations.

## Participants

The study included 23 fourth-year undergraduate nursing students enrolled in a leadership practice course during the second semester of the 2023 academic year. Participants were required to be registered for this course and to provide informed consent. The sample size was determined based on the available student cohort and the feasibility of conducting both qualitative and quantitative analyses, ensuring a balance between data robustness and practical constraints.

A purposive sampling method was employed to recruit participants. Inclusion criteria required active enrollment in the course and willingness to participate in all research activities. Exclusion criteria included any illness or injury issues that could interfere with participation, or failure to complete at least 80% of the simulated scenario activities. These criteria were established to ensure that data reflected meaningful engagement with the intervention. Participants for the FGDs were selected to represent a diverse range of experiences in different obstetrical settings.

## Research tools

This study employed two sets of tools: one for conducting the research and another for data collection. Two high-fidelity simulation scenarios were developed based on Kolb's Experiential Learning Theory (ELT) (Kolb, 1984) and aligned with the International Nursing Association for Clinical Simulation and Learning (INACSL) standards of healthcare simulation (INACSL Standards Committee et al., 2021). These scenarios replicated critical clinical obstetric situations, specifically preterm labor in a twin pregnancy and postpartum infection, and adhered to INACSL guidelines to ensure simulation fidelity, participant engagement, and structured debriefing.

## Application of Kolb's ELT in SBL

Kolb's ELT was applied to guide the development of clinical leadership skills in nursing students through four stages: Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation (Kolb, 1984).

- Concrete experience: Students engaged in high-fidelity simulation scenarios utilizing advanced manikins and realistic clinical environments to replicate complex obstetrical conditions. These simulations provided immersive learning experience, fostering real-time decision-making and critical problem-solving (Society for Simulation in Healthcare [SSH], 2024). The preterm labor scenario required decisions on tocolytic administration and cesarean section preparation, while the postpartum infection scenario involved managing antibiotic administration and responding to deteriorating patient conditions. Leadership skills and experiential problem-solving were applied throughout both scenarios in a controlled, high-stakes setting.
- Reflective observation: After each simulation, debriefing sessions using the GAS (Gathering information, analyzing, summarizing) model (Phrampus & O'Donnell, 2013) allowed students to reflect on their performance, leadership roles, and decision-making.
- Abstract conceptualization: Students applied simulation experiences to leadership frameworks in order to help students use theory and logic to promote understanding, including situational leadership and effective communication. Situational leadership emphasizes adaptability to team needs and clinical contexts (Hersey & Blanchard, 1982; Thompson & Glasø, 2018), while effective communication fosters collaboration and improved patient outcomes (Arnold & Boggs, 2019). Reflecting on these frameworks, students derived transferable leadership principles for diverse clinical scenarios.
- Active experimentation: Insight gained from the preterm labor scenario were tested and refined in subsequent simulations, such as the postpartum infection scenario, allowing students to improve their leadership strategies.

## SBL scenario contents

The scenarios were designed to provide meaningful, immersive experiences that required immediate decision-making, followed by structured reflection, theoretical abstraction, and practical application. This approach fostered the comprehensive development of clinical leadership skills. Each scenario incorporated detailed obstetric histories, evolving clinical symptoms, vital signs, and fetal heart

**Table 1** – Scenarios in Simulation-Based Approach to Enhance Clinical Leadership Skills

Characteristic of Scenario	Scenario 1: Preterm Labor and Twin Pregnancy	Scenario 2: Postpartum Infection
Objective	Develop clinical leadership by managing a 32-year-old pregnant woman at 32 weeks gestation with dichorionic-diamniotic twins. Focus on preterm labor management, where Twin A is in breech presentation, and Twin B is in vertex presentation.	Enhance clinical leadership by managing a 30-year-old postpartum mother with infection following a cesarean section. Focus on the identification, assessment, and management of postpartum infection and team communication.
Patient presentation	Regular uterine contractions every 7-8 minutes, mild to moderate intensity, lower back pain. Stable vital signs and fetal heart rates.	Presents with fever, abdominal pain, and an infected surgical wound with redness, swelling, discharge, and foul odor. Condition worsens to septic shock.
Scenario progression	Despite tocolytics, cervix dilates to 5 cm, and fetal heart rate drops. Team prepares for an emergency cesarean section.	Infection progresses to septic shock, requiring urgent transfer to OB-ICU for advanced management.
Team leader role	<ul style="list-style-type: none"> <li>• Coordinate with NICU, OR, Pediatrician, and patient's family.</li> <li>• Assign tasks: blood group matching, IV fluids, oxygen administration, and surgery preparation.</li> </ul>	<ul style="list-style-type: none"> <li>• Coordinate with OB-ICU for emergency transfer.</li> <li>• Communicate with patient's family.</li> <li>• Ensure lab tests, IV fluids, and additional support are in place.</li> </ul>
Outcome	Prepares for an emergency cesarean section, testing leadership under pressure, communication, and management of rapidly changing patient conditions.	Stabilizes patient for ICU transfer, testing leadership in critical conditions and comprehensive care management.

sounds to simulate realistic clinical environments. Structured guidelines were developed to facilitate FGDs and to explore students' reflections and experiences in depth. Refer to [Table 1](#) for a detailed description of the scenarios.

The first scenario emphasized leadership development by requiring critical decision-making, coordination, and managing an evolving clinical situation requiring an emergency cesarean section. The second scenario focused on rapid assessment, timely intervention, and clear, effective communication with both the healthcare team and the patient's family. Both scenarios, with 30-minute simulation sessions (including prebriefing and active practice), provided realistic, high-pressure environments that required students to demonstrate leadership, make decisive clinical judgements, and manage complex patient care confidently.

## Tools for data collection

Data were collected using a demographic questionnaire and a clinical leadership skill assessment. The demographic questionnaire captured participant details, such as age, GPA, and prior simulation experience. The clinical leadership skills assessment, adapted from the framework by [Guibert-Lacasa and Vázquez-Calatayud \(2022\)](#), evaluated three core competencies: cognitive competency (problem-solving, decision-making, behavior management), interpersonal (communication, teamwork), and intrinsic (empower-

ment, emotional intelligence, self-awareness). This assessment consisted of 30-items rated on a Likert scale of 1-5, with total scores ranging from 30 to 150. Higher scores indicated stronger clinical leadership skills.

## Validity assessment

The validity of the research tools, including the simulation scenarios, FGD guidelines, and the clinical leadership skill assessment, was evaluated by a panel of three experts—two specializing in simulation-based nursing education and one in obstetrics. The panel assessed the tools for accuracy, relevance, and clarity, and revisions were made to achieve a Content Validity Index (CVI) of 1.0, indicating excellent content validity. The reliability of the clinical leadership skills assessment was tested through a pilot study involving 15 nursing students with similar demographics to the main study participants, resulting in a Cronbach's Alpha of 0.87.

## Research procedures

### Preparation phase

Two high-fidelity simulation scenarios based on IN-ACSL approach were designed to enhance clinical lead-

ership skills. Researchers received training in high-fidelity simulation techniques for consistent implementation. The simulation room was equipped with essential materials, including a birthing manikin, intravenous solutions, oxygen supplies, and labor documentation.

### Practice phase

Students were briefed on the study's objectives, methods, and ethical considerations and informed consent was obtained. A pretest assessment of clinical leadership skills was conducted to establish baseline competencies. Each SBL session followed a consistent structure: a 10-minute prebriefing to introduce the case, a 20-minute active simulation where students alternated between team leader and member roles to provide care, and a 30-minute debriefing to reflect on performance and review outcomes. The total session duration was 60 minutes. A post-test assessment was conducted at the end of the course to evaluate sustained impacts on clinical leadership skills.

### Evaluation phase

Learning outcomes were assessed through group discussions. Students were divided into three groups, aligned with clinical settings: two groups for the labor unit and one for the postpartum ward. Each group participated in a 1-hour discussion session, guided by preprepared questions, to explore their experiences and insights from the SBL.

### Ethical considerations

This study received ethical approval from the Research Ethics Committee, Faculty of Nursing, Chiang Mai University (Study Code: 2024-EXP003). Participants were fully informed about the research objectives, potential benefits, and their rights to voluntarily consent or decline participation, with assurances that nonparticipation or withdrawal would not impact their academic standing. Confidentiality was ensured by anonymizing all data, which was used solely for research purposes and reported in aggregate. Students who opted out of the research study continued participation in the standard SBL sessions as part of the curriculum but were excluded from data collection and analysis.

The FGDs participants were briefed on the objectives, procedures, and potential risks and benefits. The discussion was conducted in private settings to ensure comfort and confidentiality. A neutral and trained moderator underwent training to recognize and mitigate bias, foster inclusivity, and address cultural nuances in communication. A standardized script and structured guidelines were followed to minimize bias and promote consistent, fair interactions. While the complete removal of bias is challenging, these

measures created a respectful and inclusive environment for participant reflections.

### Data analysis

This is a multimethods study; therefore, quantitative and qualitative data were analyzed separately and were not combined/formally triangulated during analysis because they addressed different specific research objectives. Objective 1 (evaluating the development of clinical leadership competencies following high-fidelity obstetrical simulation scenarios) was addressed using PASW-SPSS software version 18.0 to analyze the quantitative data. Descriptive statistics, including frequencies and percentages, were used to analyze demographic data. Paired sample t-tests were used to evaluate significant differences in mean clinical leadership skills assessment scores before and after the course. The analysis for objective 2 (exploring the learning experiences and leadership skills acquisition of students) involved analyzing qualitative data (audio recordings and transcriptions) from three FGDs using an inductive approach for thematic analysis, as outlined by [Braun and Clarke \(2006\)](#).

## Results

### Quantitative findings

The study included a total of 23 participants, all of whom were female. The mean age of the participants was 22.48 years ( $SD = 2.39$ ). Participants' academic performance, measured by their Grade Point Average (GPA), showed a mean of 3.37 ( $SD = 0.42$ ).

The descriptive statistics presented in [Table 2](#) demonstrate a significant improvement in clinical leadership skills among nursing students following simulation-based practice. Across all categories—cognitive, interpersonal, and intrinsic competencies—students exhibited a marked increase in their mean scores from pretest to post-test. The total score for clinical leadership skills increased by 17.43 points, indicating the effectiveness of the simulation-based approach in enhancing these essential skills.

The data in [Table 3](#) demonstrates statistically significant improvements in overall clinical leadership skills and across all measured domains following simulation-based practice. Cognitive competency exhibited the largest improvement reflecting enhanced problem-solving and decision-making abilities.

### Qualitative findings

The overarching theme "*Building Leadership Resilience through Experiential Learning in Obstetric Nursing*" shows that SBL effectively develops critical leadership competencies. Leadership resilience, defined as the ability to main-

**Table 2** – Descriptive Statistics of Clinical Leadership Skills

Category	Range	Pretest Mean (SD)	Post-Test Mean (SD)
Cognitive competency	<b>11-55</b>	<b>41.09 (5.60)</b>	<b>49.65 (4.43)**</b>
Problem-solving	4-20	14.30 (2.08)	17.78 (1.68)
Decision-making	4-20	15.26 (2.34)	18.22 (1.50)
Behavior control	3-15	11.52 (1.78)	13.65 (1.77)
Interpersonal competency	<b>7-35</b>	<b>29.30 (2.75)</b>	<b>32.61 (2.48)**</b>
Communication skills	4-20	16.39 (1.95)	18.39 (1.47)
Teamwork	3-15	12.91 (1.50)	14.21 (1.13)
Intrinsic competency	<b>11-55</b>	<b>44.56 (5.03)</b>	<b>49.78 (4.28)**</b>
Psychological empowerment	4-20	14.52 (2.33)	17.43 (2.02)
Emotional intelligence	4-20	16.65 (1.94)	18.13 (1.79)
Critical reflexivity	3-15	13.39 (1.75)	14.22 (1.17)
Clinical leadership perception	<b>1-5</b>	<b>4.30 (0.64)</b>	<b>4.65 (0.49)**</b>
Total clinical leadership skills	<b>30-150</b>	<b>119.26 (12.12)</b>	<b>138.61 (11.28)**</b>

Bolded values indicate statistically significant improvements from pre-test to post-test. Significance determined via paired-sample t-tests.

\* *p* value < 0.05

\*\* *p* value < 0.001.

**Table 3** – Comparison of Clinical Leadership Skills Across Competency Domains

Competency Domain	Mean Difference Prepost	SD	95% CI	t	df	<i>p</i> -Value
Cognitive competency	−8.56	5.40	−10.90 to −6.22	−7.60	22	.000
Interpersonal competency	−3.30	2.58	−4.42 to −2.18	−6.133	22	.000
Intrinsic competency	−5.22	3.59	−6.77 to −3.66	−6.96	22	.000
Total clinical leadership skills	<b>−17.43</b>	<b>9.65</b>	<b>−21.61 to −13.26</b>	<b>−8.66</b>	<b>22</b>	<b><i>p</i> &lt; .0001</b>

Bolded values indicate statistically significant improvements from pre-test to post-test. Significance determined via paired-sample t-tests.

\* *p* value < 0.05, \*\* *p* value < 0.001.

tain effectiveness and adaptability under stress, uncertainty, or change (Cline, 2015), is crucial in obstetric nursing. SBL provides an experiential platform for developing this resilience by immersing nursing students in complex, high-pressure scenarios.

Four major themes emerged from the analysis, each reflecting key components of leadership resilience: (1) *Decision-making and prioritization*, (2) *Communication and team coordination*, (3) *Trust, delegation, and empowerment*, and (4) *Stress management, composure, and reflective practice*. These interconnected themes represent the holistic development of leadership resilience through the integrated cognitive, emotional, and behavioral skills. Refer to Table 4 for example quotes illustrating each theme and subtheme.

### Theme 1: Decision-making and prioritization

Effective leadership resilience involves making swift and effective decisions, particularly in high-stakes environments like obstetric care (Cummings et al., 2018). Participants noted SBL fostered prioritization and the ability to respond quickly to changing clinical conditions to ensure patient safety, forming the backbone of resilient decision-making.

#### Subtheme 1: Task prioritization

Participants highlighted the importance of prioritizing tasks in managing urgent clinical situations. The ability to identify and focus on critical tasks first was seen as central to leadership resilience. Quotes showed how prioritization is essential to avoid time mismanagement, maintain effective patient care and underscore how simulations help cultivate resilience by training students to handle multiple, conflicting demands.

#### Subtheme 2: Rapid response and adaptation

Participants described how simulations required quick decisions and strategy adjustments as new information emerged. Quotes showed the critical need for fast decision-making and the interconnection between adaptability and prioritization. The ability to prioritize enables quick decision-making, while rapid response often requires leaders to reassess tasks as situations evolve.

### Theme 2: Communication and team coordination

Effective communication and team coordination are crucial in high-stakes obstetric settings (Curtis et al., 2011; Gillespie et al., 2007). Resilient leadership is demonstrated through the ability to foster open communication, delegate

**Table 4** – Themes, Subthemes, and Example Quotes From Thematic Analysis on Leadership Resilience in Obstetric Nursing

Themes	Subthemes	Example Quotes
1. Decision-making and prioritization	Task prioritization	"You have to think about what needs to be done first, like starting an IV line or drawing blood. If you don't prioritize, you could waste valuable time on less important tasks." "In the heat of the moment, it's easy to get overwhelmed, but the simulation helped me practice putting first things first. I learned that not everything can be done at once."
	Rapid response and adaptation	"There was a time when we had to make a split-second decision about administering medication. The patient's condition was changing rapidly, and we had to act fast." "The scenarios were so realistic that they made you think on your feet. I had to adapt quickly when new symptoms emerged or when the patient's condition suddenly worsened."
2. Communication and team coordination	Clarity of instructions	"Clear instructions are crucial, especially when everyone is under stress. The simulation showed me that even small miscommunications can have big consequences." "I realized how important it is to be clear and direct when giving instructions. If I wasn't specific, people didn't know what to do, and that could lead to mistakes."
	Collaborative team coordination	"The simulation made me realize how important it is to keep everyone on the same page. Coordination is key, especially when different people are responsible for different tasks." "I learned that as a leader, you have to be aware of what everyone is doing and make sure that it all comes together smoothly. Team coordination is crucial."
3. Trust, delegation, and empowerment	Building trust within the team	"Trust is everything. If you don't trust your team, you'll end up trying to do everything yourself, and that's not sustainable." "Building trust takes time, but it's worth it. Once I knew I could rely on my team, it made everything else easier."
	Overcoming hesitation to delegate	"Letting go of control was hard, but once I did, I saw that the team was capable and even performed better when given responsibility."
4. Stress management, composure, and reflective practice	Maintaining Composure under Pressure	"If the leader starts panicking, it spreads to the entire team. Staying calm was something I learned to do, and it made a huge difference in how we handled emergencies."
	Using stress as a learning tool	"The stress of the simulation was intense, but it prepared me for the real thing. I learned to manage my stress and use it to focus better."
	Reflective practice for continuous improvement	"The debriefing sessions were really helpful in understanding what went well and where I could improve as a leader. Reflecting on the simulation made me more aware of my actions."

tasks effectively, and guide teams through complex clinical procedures (Curtis et al., 2011). Two subthemes were identified, *clarity of instructions* and *collaborative team coordination*, both reflecting behavioral resilience, which enables leaders to manage teams efficiently under pressure.

### Subtheme 1: Clarity of instructions

Clear instructions are essential for team cohesion and error prevention in high-risk obstetric settings (Guise & Segel, 2008; Manser, 2009). Resilient leadership relies on effective communication, ensuring structured guidance under stress (Manser, 2009). Structured communication protocols improve team coordination and reduce medical errors (Guise & Segel, 2008). Leaders who provide concise, step-by-step directives enhance team performance

and adaptability in obstetric emergencies. Interdisciplinary training further strengthens collaboration and rapid response (Guise & Segel, 2008).

### Subtheme 2: Collaborative team coordination

Leadership resilience emphasizes the ability to maintain cohesive and effective teamwork under pressure. Participants reflected on how the simulation enhanced their capacity to coordinate team members with distinct roles, ensuring task execution and adaptability in dynamic situations. This reflection aligns with definitions of resilient leadership, which focus on the capacity to manage both tasks and interpersonal dynamics while maintaining team cohesion and achieving goals (Gillespie et al., 2007; Harland et al., 2005). Participant quotes further illus-

trate how leaders balance task management with fostering smooth collaboration, even in high-stress scenarios.

### Theme 3: Trust, delegation, and empowerment

Resilient leadership in crises hinges on trust, strategic delegation, and empowerment. Leaders who cultivate trust foster accountability, collaboration, and high-impact decision-making (Dirks & Ferrin, 2002). Trust-based delegation allows leaders to prioritize complex tasks, ensuring efficient task distribution and enhanced team cohesion (Wang et al., 2014).

By delegating effectively, leaders shift focus to high-level strategy and promote a culture of shared responsibility (Wang et al., 2014). Well-structured delegation empowers team members, fosters autonomy, and optimizes resource use. However, poorly executed delegation weakens role clarity, reduces team efficacy, and amplifies leadership bottlenecks.

#### Subtheme 1: Building trust within the team

Participants described how developing trust enabled them to confidently delegate tasks and rely on their team to perform them effectively. This process fosters mutual empowerment and enhances team efficiency, reducing the leader's risk of overextending themselves. As noted by participants, the gradual process of building trust not only strengthens team cohesion but also ensures a balanced workload, allowing leaders to focus on strategic decision-making.

#### Subtheme 2: Overcoming hesitation to delegate

Initially, participants expressed hesitation in delegating tasks, but they recognized that effective leadership requires trusting others. Quotes illustrate how empowering others improves team performance and addresses the internal challenge of delegation.

Trust and delegation are symbiotic: trust enables delegation, and successful delegation reinforces trust. Leaders who delegate effectively show confidence in their team's abilities, which in turn strengthens team loyalty and performance. This subtheme reflects emotional resilience in leadership, demonstrating the ability to manage interpersonal relationships while maintaining control over the broader clinical environment.

### Theme 4: Stress management, composure, and reflective practice

A key indicator of leadership resilience is the ability to manage stress and maintain composure in high-pressure situations (Aitken et al., 2021; Manser, 2009). SBL strengthens leaders' ability to regulate stress, sustain emotional control, and make strategic decisions under pressure. Additionally, structured debriefing and reflective

practice foster critical self-assessment and drive continuous performance improvement.

#### Subtheme 1: Maintaining composure under pressure

Maintaining composure was seen as critical to effective leadership. Leaders who remain calm inspire confidence and improve overall team performance during stressful situations. A leader's emotional state impacts the team, with calmness fostering stability in emergencies.

#### Subtheme 2: Using stress as a learning tool

Participants viewed the controlled stress of simulation as an opportunity for growth, learning to manage stress through repeated exposure. Simulated stress builds resilience by turning pressure into an opportunity for focused decision-making.

#### Subtheme 3: Reflective practice for continuous improvement

Reflective practice was key in managing stress and improving leadership skills. Participants emphasized how postsimulation debriefs allowed them to critically reflect and adjust. The quote shows the importance of reflection in the leadership development process, enabling participants to continually refine their skills.

Stress management and reflective practice are closely related; managing stress leads to better performance, and reflection deepens learning. Together, these skills form the foundation of psychological resilience, allowing leaders to stay calm and grow from their experiences.

## Discussion

This study evaluated the impact of high-fidelity obstetrical simulation on the development of clinical leadership competencies in Thai nursing students. The quantitative results indicated a significant improvement in leadership skills across all measured domains, which is consistent with similar studies in SBL (Cant & Cooper, 2017; Uppor et al., 2024). Uppor et al. (2024) demonstrating the efficacy of experiential learning in enhancing clinical judgment, paralleling the cognitive and interpersonal skill improvements observed in this study.

Unlike existing studies, this research extends the analysis by highlighting the development of leadership resilience, an area not consistently emphasized in earlier findings (Cummings et al., 2018). While Uppor et al. focused primarily on clinical judgment, this study offers insights into adaptive leadership qualities, including decision-making under pressure, team coordination, and task delegation—critical components of leadership resilience in obstetric care (Gilmartin & D'Aunno, 2007). These findings suggest that SBL can foster a more comprehensive leadership development approach by addressing both cognitive and emotional dimensions.

Cant and Cooper (2017) provided evidence of the cognitive benefits of simulation but did not explore the emotional and behavioral aspects of leadership, which are essential in high-stakes clinical environments. This study bridges that gap by demonstrating that simulation fosters behavioral resilience, necessary for obstetric nursing, where rapid decision-making and effective team leadership are crucial. Thematic analysis of the FGDs showed that SBL enhanced cognitive and interpersonal skills whilst also developing leadership resilience—a critical ability to adapt and lead effectively under pressure. Leadership resilience is critical in obstetric nursing, where healthcare professionals must navigate rapidly changing clinical environments and make swift, informed decisions that significantly impact maternal and neonatal outcomes (Cummings et al., 2018). Effective leaders in obstetric care demonstrate adaptability, communication proficiency, and decision-making acuity, often in high-pressure situations (Cummings et al., 2018; Gilmartin & D'Aunno, 2007). However, cultivating these leadership qualities in nursing students presents challenges, particularly in ensuring that theoretical knowledge translates into practical, real-world skills. Developing resilience through decision-making, communication, delegation, and stress management reflects the practical application of these competencies, highlighting the comprehensive impact of the simulation training on both skill enhancement and leadership growth.

Non-technical competencies, such as task prioritization, rapid decision-making, communication and team coordination, delegation, and stress management, were all identified as being of paramount importance through analysis of the qualitative data. This concurs with previous work suggesting that these are essential for ensuring that nursing leaders can guide teams effectively and respond confidently to the dynamic and unpredictable nature of obstetric care (Manser, 2009; Schön, 1983).

Focusing on leadership resilience, this study contributes to the body of evidence supporting simulation as a valuable method for bridging the gap between theory and practice in nursing education (Cant & Cooper, 2010). The findings demonstrate how simulation training enhances clinical skills while fostering the emotional and cognitive resilience, necessary for effective leadership in high-stakes environments (Spence Laschinger & Fida, 2014). Ultimately, the results underscore the need for simulation-based curricula that prioritize development, preparing future nursing professionals to meet the complex demands of modern healthcare (Cummings et al., 2018).

## Implications for practice

The analysis revealed key themes related to clinical leadership, communication in healthcare, and decision-making, all of which align with existing literature on clinical skills development and leadership theory. These find-

ings provide important practical implications for enhancing leadership training in healthcare education and offer insights into improving decision-making processes within clinical teams.

## Study limitations and future research directions

This study has several main methodological limitations that require consideration. Although significant improvements were observed in quantitative outcome measures, we cannot confidently conclude that SBL was effective due to the absence of random group allocation and a control group. The single site study, lack of long-term follow-up and non-random recruitment strategy also cast doubt on the generalizability of findings and durability of any improvements. Future studies should therefore conduct a multisite randomized controlled intervention study with longer follow up and random selection of participants. Given the nature of the qualitative aspects of this study it is also important to note that the thematic analysis findings are unlikely to transfer beyond the study setting.

## Conclusion

The findings suggest that SBL fosters the development of leadership skills in obstetric nursing by providing students with the opportunity to practice and refine key skills in decision-making, communication, trust-building, delegation, and stress management. Each of these competencies is interconnected, forming a comprehensive framework for resilient leadership. By repeatedly engaging in these high-pressure scenarios, nursing students cultivate the cognitive, emotional, behavioral, and psychological resilience necessary to lead effectively in complex obstetric environments.

## CRedit authorship contribution statement

**Piyanut Xuto:** Writing – original draft, Supervision, Funding acquisition, Data curation, Conceptualization. **Piyaporn Prasitwattanaseree:** Validation, Supervision, Software, Project administration, Investigation, Data curation. **Tareewan Chaiboonruang:** Validation, Investigation, Formal analysis, Data curation. **Lawitra Khiaokham:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation, Conceptualization. **Karnjana Nimarangkul:** Validation, Methodology, Investigation, Data curation. **Daniel Bressington:** Writing – review & editing, Visualization, Validation, Supervision, Investigation, Conceptualization. **Chiharu Miyata:** Writing – review & editing, Validation, Methodology, Conceptualization.

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