Effects of Simulation-Based Teaching and Learning with Structured Debriefing on Nursing Students' Learning Experiences in a Maternal-Neonatal Nursing Course: A Mixed-Methods Study

ผลของการจัดการเรียนรู้โดยใช้สถานการณ์จำลองเสมือนจริงร่วมกับการสะท้อนผลแบบมีโครงสร้างต่อประสบการณ์การเรียนรู้ของนักศึกษาพยาบาลในรายวิชาการพยาบาลมารดาและทารก: การวิจัยแบบผสานวิธี

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Abstract

Teaching and learning in maternal and child health nursing present significant challenges due to the complexity and high-risk nature of patient care. These conditions limit nursing students' opportunities to engage in real clinical practice and to develop clinical

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reasoning skills. Therefore, simulation-based learning combined with structured debriefing has been implemented to enhance students' learning experiences. This study aimed to (1) examine the mean scores of nursing students' learning experiences following simulation-based learning with structured debriefing in a maternal and child health nursing course, and (2) explore nursing students' learning experiences after participation in this instructional approach.

Methods: A mixed-methods study was conducted with 36 fourth-year nursing students enrolled in a maternal and child health nursing course at a private university in Thailand. Research instruments included (1) quantitative data were collected using the Debriefing Experience Scale (DES), (2) qualitative data were obtained through focus group interviews and reflective observation; and (3) research intervention was a lesson plan integrating simulation-based learning with structured debriefing, consisting of three phases: 1) Pre-briefing 2) Simulation facilitation 3) Structured debriefing. Data were collected after completion of the learning activities. Quantitative data were analyzed using descriptive statistics and one-sample t-tests comparing observed mean scores with the corresponding subscale midpoint values. Qualitative data, obtained from focus group interviews and reflective observation during and after simulation-based learning, were analyzed using thematic analysis, and findings were integrated to provide a comprehensive understanding of students' learning experiences.

Results: The findings indicated that nursing students reported high levels of positive learning experiences following structured debriefing. The mean score for experience during debriefing was 87.36 (S.D. = 7.62), while the mean score for the importance of debriefing was 88.22 (S.D. = 9.84). The results showed that all DES subscale scores were significantly higher than the neutral midpoint values ($p < .001$). Qualitative findings indicated that structured debriefing enhanced clinical reasoning through guided reflection and emotional expression as a catalyst for learning during simulation. Facilitator behaviors fostered a psychologically safe learning environment. Simulation with structured debriefing enhanced perceived readiness for clinical practice.

Conclusion: Simulation-based learning combined with structured debriefing is associated with positive learning experiences among nursing students in maternal and child health nursing education.

Keywords: simulation-based learning, debriefing, maternal and child health, learning experience

บทคัดย่อ

การจัดการเรียนการสอนในรายวิชาการพยาบาลมารดาและทารกมีความท้าทาย เนื่องจากผู้รับบริการมีความซับซ้อนและมีความเสี่ยงสูง ส่งผลให้นักศึกษาพยาบาลมีโอกาสจำกัดในการฝึกปฏิบัติและพัฒนาการคิดวิเคราะห์ทางคลินิกในสถานการณ์จริง ดังนั้น การจัดการเรียนรู้โดยใช้สถานการณ์จำลองเสมือนจริงร่วมกับการสะท้อนผลแบบมีโครงสร้างจึงถูกนำมาใช้เพื่อส่งเสริมการเรียนรู้ของนักศึกษา การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อ (1) ศึกษาคะแนนเฉลี่ยของประสบการณ์การเรียนรู้ของนักศึกษาพยาบาลภายหลังได้รับการจัดการเรียนรู้โดยใช้สถานการณ์จำลองเสมือนจริงร่วมกับการสะท้อนผลแบบมีโครงสร้างในรายวิชาการพยาบาลมารดาและทารก และ (2) อธิบายประสบการณ์การเรียนรู้ของนักศึกษาพยาบาลภายหลังได้รับการจัดการเรียนรู้ดังกล่าว

วิธีการวิจัย: การวิจัยแบบผสานวิธีดำเนินการวิจัยกับนักศึกษาพยาบาลชั้นปีที่ 4 จำนวน 36 คน ที่ลงทะเบียนเรียนในรายวิชาการพยาบาลมารดาและทารกในมหาวิทยาลัยเอกชนแห่งหนึ่งในประเทศไทย เครื่องมือที่ใช้ในการวิจัย ประกอบด้วย (1) ข้อมูลเชิงปริมาณเก็บรวบรวมโดยใช้แบบประเมินประสบการณ์การสะท้อนผลการเรียนรู้ (Debriefing Experience Scale: DES) (2) ข้อมูลเชิงคุณภาพใช้การสนทนากลุ่มและการสังเกตแบบสะท้อนคิด และ (3) เครื่องมือที่ใช้ในการทดลอง คือ แผนการสอนร่วมกับการจัดกิจกรรมสถานการณ์จำลองเสมือนจริงร่วมกับการสะท้อนผลแบบมีโครงสร้าง ซึ่งประกอบด้วย 3 ระยะ: 1) การเตรียมความพร้อมก่อนการจำลองสถานการณ์ 2) การดำเนินกิจกรรมสถานการณ์จำลองโดยผู้สอนเป็นผู้อำนวยความสะดวก 3) การสะท้อนคิดอย่างมีโครงสร้างผ่านการสนทนาแบบชี้นำ เก็บรวบรวมข้อมูลภายหลังได้รับการจัดการเรียนรู้ วิเคราะห์ข้อมูลเชิงปริมาณด้วยสถิติเชิงพรรณนาและสถิติทดสอบทีแบบกลุ่มตัวอย่างเดียว โดยเปรียบเทียบค่าเฉลี่ยที่สังเกตได้กับค่ากึ่งกลางของแต่ละมิติย่อยของแบบวัด และข้อมูลเชิงคุณภาพใช้การวิเคราะห์เชิงประเด็น และบูรณาการผลการวิจัยเชิงปริมาณและเชิงคุณภาพ เพื่ออธิบายประสบการณ์การเรียนรู้ของนักศึกษาอย่างครอบคลุม

ผลการวิจัย: ผลการวิเคราะห์เชิงปริมาณ พบว่า นักศึกษาพยาบาลมีระดับประสบการณ์การเรียนรู้เชิงบวกในระดับสูงทุกมิติ ค่าเฉลี่ยด้านประสบการณ์ระหว่างสะท้อนผลการเรียนรู้ เท่ากับ 87.36 (S.D. = 7.62) และค่าเฉลี่ยของความสำคัญของการสะท้อนผลการเรียนรู้เท่ากับ 88.22 (S.D. = 9.84) ผลการทดสอบภายหลังเข้าร่วมโปรแกรม พบว่าคะแนนทุกมิติสูงกว่าค่ากลางของมาตรวัดอย่างมีนัยสำคัญทางสถิติ ($p < .001$) ข้อมูลเชิงคุณภาพ อธิบายว่า การสะท้อนผลการเรียนรู้แบบมีโครงสร้างช่วยส่งเสริมการคิดวิเคราะห์ การจัดการอารมณ์ การแลกเปลี่ยนเรียนรู้ในบรรยากาศที่ปลอดภัย และความพร้อมในการปฏิบัติการพยาบาล

สรุป การจัดการเรียนรู้โดยใช้สถานการณ์จำลองเสมือนจริงร่วมกับการสะท้อนผลแบบมีโครงสร้างมีความสัมพันธ์กับการเกิดประสบการณ์การเรียนรู้เชิงบวกของนักศึกษาพยาบาลในรายวิชาการพยาบาลมารดาและทารกได้

คำสำคัญ: การเรียนรู้โดยใช้สถานการณ์จำลองเสมือนจริง การอภิปรายหลังสถานการณ์จำลอง การพยาบาลมารดาและทารก ประสบการณ์การเรียนรู้

Introduction

Maternal and child health nursing is a complex area in undergraduate nursing education, requiring rapid clinical judgment, effective communication, and safe care for women, newborns, and families. However, opportunities for students to engage in complex maternal and neonatal care during clinical placements are often limited due to patient safety concerns and the acuity of clinical conditions. These constraints may hinder the development of essential competencies, contributing to the theory–practice gap in nursing education.[1]

To address these challenges, simulation-based learning (SBL) has been increasingly adopted to provide a safe environment for experiential learning. Simulation has been widely used in intrapartum care, obstetric emergency training, and maternal–newborn practice, demonstrating positive effects on knowledge, self-efficacy, and clinical skills.[2–6] Evidence also shows that simulation improves clinical performance in obstetric emergency management and midwifery care.[7,8] However, the effectiveness of simulation depends largely on the debriefing phase, where learners reflect on performance and integrate experience with theoretical knowledge.[9-11]

Debriefing is a structured reflective process that enables learners to analyze decisions, identify strengths and weaknesses, and construct meaning from their experiences.[9] Guided dialogue supports both cognitive and emotional reflection, enhancing clinical reasoning and deeper learning.[10,12,14] Although simulation-based education has expanded in Thailand, structured debriefing is not consistently implemented following simulation sessions, which may limit reflective learning and reduce educational effectiveness.[15,17]

In maternal and child health nursing, these challenges are intensified by the complexity and sensitivity of clinical situations. Although simulation-based learning has been shown to be effective, most studies focus on knowledge or skills rather than learning experiences. Evidence on students' learning experiences following structured debriefing in maternal and child health nursing remains limited, particularly in private university settings in Thailand.[18,19] Therefore, this study aimed to examine nursing students' learning experiences following simulation-based learning with structured debriefing and to explore how this approach supports meaningful learning. As educators and researchers in a private university, the authors expect that the findings of this study will provide valuable implications for optimizing teaching and learning strategies in a maternal-neonatal nursing course, particularly through the integration of structured debriefing, and inform the development of evidence-based instructional practices in the future.

Conceptual Framework

The conceptual framework of this study was informed by the Cornerstone Healthcare Simulation Standards of Best Practice (HSSOBP)[20] and the Debriefing for Meaningful Learning (DML) framework.[12] The HSSOBP provides guidance for the design and implementation of simulation-based learning, including learner preparation, simulation facilitation, and structured debriefing.[20] The DML framework emphasizes facilitator-guided reflection through purposeful questioning, exploration of learners' cognitive and emotional responses, and integration of experience with theoretical knowledge to support clinical reasoning and meaningful learning.[12]

Drawing upon these theoretical foundations, this study conceptualizes that the educational intervention, Simulation-Based Learning with Structured Debriefing, serves as the primary catalyst for shaping nursing students' learning experiences (Figure 1). The intervention was integrated into a simulation-based learning approach in a maternal–neonatal nursing course and operationalized through three sequential components.

First, in the pre-briefing phase, students were prepared for learning by being oriented to learning objectives, clinical scenarios, roles, and expectations, while psychological safety was established.[20,21]

Second, simulation facilitation phase, students engaged in maternal–neonatal clinical scenarios requiring assessment, decision-making, communication, and nursing interventions.[22,23]

Third, in the structured debriefing phase, facilitators used guided reflective questioning based on the DML approach to support reflection on actions, exploration of emotional responses, and integration of theory into practice.[12]

This structured process was expected to influence nursing students' learning experiences related to structured debriefing, including (1) learning and making connections, (2) analyzing thoughts and feelings, (3) facilitator skills, and (4) appropriate facilitator guidance, as conceptualized in the Debriefing Experience Scale (DES).[24,25] These components also reflect the dimensions of experience during debriefing and the perceived importance of debriefing. These constructs were further interpreted through qualitative findings, reflecting students' experiences in terms of clinical reasoning, emotional expression, facilitator support, and perceived preparedness for clinical practice.[13-14,19]

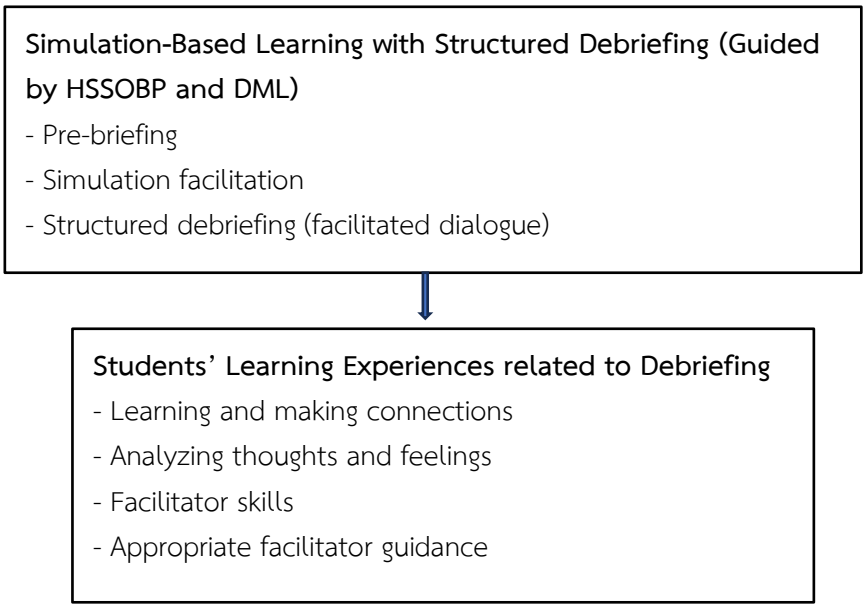


Figure 1: Conceptual Framework

Research Questions

1. What is the average score of nursing students' learning experiences following simulation-based learning with structured debriefing in a maternal-neonatal nursing course?

2. How did nursing students perceive and reflect on their learning experiences following simulation-based learning with structured debriefing?

Research Objective

1. To examine the average score of nursing students' learning experiences following simulation-based learning with structured debriefing in a maternal-neonatal nursing course.

2. To explain nursing students' learning experiences following simulation-based learning with structured debriefing.

Research Hypothesis

Nursing students who participated in simulation-based learning with structured debriefing reported significantly higher mean scores across all dimensions of the Debriefing Experience Scale (DES) compared to the corresponding subscale midpoint values, as determined by one-sample t-test.

Methods

This study employed a concurrent mixed-methods design to examine nursing students' learning experiences following simulation-based learning with structured debriefing in maternal and neonatal health nursing.

Population and Sample

Participants were 36 fourth-year nursing students enrolled in a maternal and child health practicum at a private university in Thailand, selected through purposive sampling. The sample size was determined using a power analysis conducted with G*Power. Based on a one-sample t-test, a medium effect size (d = 0.50) was assumed, with a significance level (α) of 0.05 and a desired statistical power of 0.80. The analysis indicated that a minimum sample size of 34 participants would be required to detect a statistically significant difference from the neutral midpoint of the scale.

Research Instrument for Data Collection

1. Quantitative data were gathered using 1.1) the Demographic Data Form, which comprises age, grade point average (GPA), and the quantity of previous simulation-based learning experiences; and 1.2) the Debriefing Experience Scale (DES), developed by Reed,[24] which was used to assess nursing students' learning experiences during the debriefing process following simulation-based learning. The DES is measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale includes two dimensions: (1) experience during debriefing (EP) and (2) importance of debriefing (IM). Each dimension includes four subscales namely, (1) learning and making connections (8 items), (2) analyzing thoughts and feelings (4 items), (3) facilitator skills (5 items), and (4) appropriate facilitator guidance (3 items). Total scores range from 20 to 100, with higher midpoint scores indicating more positive learning experiences during debriefing. The neutral midpoint of the scale is 3 (calculated as 3 × number of items per subscale), which was used as the test value for statistical comparison in this study. Total scores range from 20 to 100, with higher mean scores indicating more positive learning experiences during debriefing. The neutral midpoint of the scale is 3, which was used as the test value for statistical comparison in this study. 1.3) The intervention consisted of a structured lesson plan integrating simulation-based learning (SBL) with structured debriefing in a maternal–neonatal nursing course. The primary aim was to enhance students' clinical reasoning, reflective thinking, and preparedness for clinical practice. A total of 36 nursing students were divided into five groups (7–8 students per group). They were assigned to participate in the session. Each session consists of three scenarios, including 1) normal vaginal delivery, 2) conducting nurse, and 3) collaborating nurse. Each session lasted approximately 45–60 minutes, covering the childbirth process from the second stage of labor to immediate delivery.

Simulations were conducted in a simulation laboratory using standardized equipment, facilitated by trained faculty members. Each session included three phases:

(1) Pre-briefing phase: students were oriented to learning objectives, simulation scenarios, roles, expectations, and psychological safety were established.

(2) Simulation phase: students participated in maternal-neonatal clinical scenarios designed to reflect real-life situations; and

(3) Structured debriefing phase: debriefing was conducted using guided reflective questioning based on the Debriefing for Meaningful Learning (DML) approach.

The lesson plan for simulation-based learning, including the clinical scenarios and structured debriefing process, was reviewed by three experts in maternal and child nursing and simulation-based education to ensure content relevance and appropriateness. The activities were revised based on expert feedback prior to implementation.

2. For the qualitative data collection, a semi-structured interview guide was developed based on the study objectives, relevant theoretical frameworks, and a literature review to explore students' learning experiences following simulation-based learning with structured debriefing. Example guiding questions included "What did you learn from the simulation experience?"; "How did the structured debriefing help you understand your clinical decision-making?"; and "In what ways did the simulation and structured debriefing prepare you for real clinical practice?"

All discussions were audio-recorded with participants' consent and transcribed verbatim for analysis. Furthermore, reflective observation served as an additional qualitative data source. Instructors documented observations related to student engagement, interaction, reflective behaviors, and learning dynamics during and after debriefing sessions to provide contextual support for the interview data."

Validity and Reliability of the Research Instrument

Three experts in maternal-child nursing and simulation-based education evaluated the content validity of the qualitative interview guide and the simulation-based lesson plan, yielding an overall Content Validity Index (CVI) of 0.86. Additionally, the Debriefing Experience Scale (DES) demonstrated strong reliability in previous research, with Cronbach's alpha coefficients of 0.93 for the experience component and 0.91 for the importance component.[24]

Data Collection

Participants were recruited from fourth-year nursing students enrolled in the Maternal and Neonatal Nursing Practicum at a private university. All eligible students were invited, and those who agreed provided informed consent. Data collection proceeded in three phases:

1) Pre-briefing phase: students attended a pre-briefing session in the simulation laboratory, where they were oriented to learning objectives, clinical scenarios, roles, and expectations. No research data were collected at this stage.

2) Simulation learning and debriefing phase: students participated in three maternal-neonatal simulation scenarios in the simulation laboratory, followed by structured debriefing using the Debriefing for Meaningful Learning (DML) approach. Reflective observation data were collected during and after debriefing, focusing on student engagement, interaction, and reflective behaviors.

3) Post-simulation phase: after all sessions, quantitative and qualitative data were collected. Quantitative data were obtained once using the Debriefing Experience Scale (DES) and a demographic questionnaire.

"Qualitative data were collected through focus group interviews conducted in a designated classroom. Participants were purposively selected to ensure a diverse range of perspectives, and all interviews were audio-recorded and transcribed verbatim for analysis."

Data Analysis

Quantitative Data Analysis

Quantitative data were analyzed using IBM SPSS (version 26). Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize participants' demographic characteristics and DES scores. Prior to inferential analysis, assumptions of normality and independence were examined and met. A one-sample t-test was conducted to compare observed mean scores with the corresponding subscale midpoints (calculated as 3 × number of items per subscale). This analysis was performed to determine whether students' learning experiences were significantly higher than the subscale midpoint values, in accordance with the research hypothesis. Statistical significance was set at $p < .05$.

Qualitative Data Analysis

Qualitative data from focus group interviews and reflective observation were analyzed using thematic analysis. Audio-recorded data were transcribed verbatim and reviewed repeatedly for data familiarization. Initial codes were generated and organized into categories and themes. To ensure rigor, credibility was established through data triangulation, combining focus group interviews and reflective observations and by rechecking emerging themes against the original data through peer debriefing among the research team. Dependability was supported through consistent coding procedures while confirmability was ensured through peer review.

Ethical Consideration/Informed Consent

Prior to commencement, the study protocol was approved by the Institutional Review Board (IRB No. 32/2025, approved on August 27, 2025). All participants were informed about the study's purpose, procedures, potential risks and benefits, and their rights, including the right to withdraw at any time without academic or personal consequences. To minimize potential coercion, the informed consent process was conducted by an independent

individual who was not involved in teaching or evaluating the students. The instructors who facilitated the simulation and debriefing sessions did not participate in obtaining consent or accessing identifiable data. Participation in the study was voluntary and did not affect students' course grades or academic evaluation. All data were anonymized, and no identifying information was collected. Data were securely stored and accessible only to the research team. The data were used solely for research purposes, ensuring confidentiality and participants' privacy.

Results

Demographic Characteristics

Table 1: Demographic characteristics of the participants (n = 36)

Variable	Category	Frequency (n)	Percent (%)
Age (years)	20–23	27	75.0
	24–27	4	11.1
	>27	5	13.9
Total		*36*	*100.0*
Gender	Female	34	94.4
	Male	2	5.6
Total		*36*	*100.0*

Table 2: GPA and number of prior experiences in the simulation lab of the participants (n = 36)

GPA	Frequency (n)	Percent (%)
2.00-2.50	2	5.6
2.51-3.00	16	44.4
3.01-3.50	11	30.6
3.51-4.00	7	19.4
Number of prior simulation experiences before participation in the normal delivery simulation (times)		
3-4	5	13.9
5-6	10	27.8
7-8	5	13.9
> 8	16	44.4

A total of 36 participants provided informed consent to participate in this study. The majority were aged 20-23 years (75.0%), followed by those aged > 27 years (13.9%) and 24-27 years (11.1%). Most participants were female (94.4%). Regarding academic performance, 44.4% of participants had a GPA between 2.51-3.00, and 36.1% had a GPA between 3.01-3.50. In terms of prior experience, 44.4% of participants had attended more than eight simulation sessions before this study, while 13.9% had participated in only 3-4 sessions. This indicates that most participants had moderate to high levels of prior simulation exposure from other courses. The distributions of participants' characteristics are illustrated in Tables 1 and 2.

The results of the debriefing process, as measured by the Debriefing Experience Scale (DES) following the simulation sessions, are presented in Table 3. Overall, nursing students reported highly positive learning experiences during the structured debriefing sessions. In the **Experience during Debriefing (EP)** dimension, the highest mean score was observed for the *Learning and Making Connections' subscale* (Mean = 35.36, S.D. = 3.40), indicating that students actively engaged in reflective thinking regarding their clinical actions and emotional responses. This was followed by *Facilitator Skill in Conducting Debriefing* (Mean = 21.50, S.D. = 2.44) and *'Analyzing Thoughts and Feeling'* (Mean = 16.81, S.D. = 1.92). The lowest mean score within this dimension was for *'Appropriate Facilitator Guidance'* (Mean = 13.69, S.D. = 1.28), However, this value still reflects a positive perception of the debriefing experience.

Similarly, within the Importance of Debriefing (IM) dimension, all subscales were rated highly, suggesting that students perceived debriefing as an essential component of their learning. The highest mean score was found for 'Learning and Making Connections' (Mean = 35.00, S.D. = 4.49), followed by 'Facilitator Skill in Conducting Debriefing' (Mean = 22.36, S.D. = 2.67) and 'Analyzing Thoughts and Feelings' (Mean = 17.08, S.D. = 2.20). The lowest mean score was observed for 'Appropriate Facilitator Guidance' (Mean = 13.78, S.D. = 1.51).

One sample t-tests were conducted to compare the observed mean scores of each DES subscale with their respective midpoint values. The overall DES scores indicated high levels of Perceived Experience during Debriefing (EP) (Mean = 87.36, S.D. = 7.62) and Importance of Debriefing (IM) (Mean = 88.22, S.D. = 9.84). These results indicated that all subscale scores were significantly higher than their corresponding midpoints ($p < .001$), reflecting consistently positive student perceptions. These findings suggest that structured debriefing was perceived as a valuable component of simulation-based learning. However, these results should be interpreted as reflecting perceived learning value rather than the causal effectiveness of the intervention. The substantial differences between observed scores and midpoint values further underscore strong student engagement and the perceived effectiveness of structured debriefing.

Table 3: One-sample t-test Results for Debriefing Experience Scale (DES) after receiving the intervention (n = 36)

DES Dimension	Mean	S.D.	μ	t	95% CI (Mean)	*p*	Cohen's d
1. Overall Experience during Debriefing (EP)	87.36	7.62	60	21.54	24.78-29.94	<.001	3.59
1.1 Learning and making connections (EP_Sub1)	35.36	3.40	24	20.05	34.21–36.51	<.001	3.34
1.2 Analyze thoughts and feelings (EP_Sub2)	16.81	1.92	12	15.03	16.16–17.46	<.001	2.51
1.3 Facilitator skill in conducting debriefing (EP_Sub3)	21.50	2.44	15	15.98	20.68–22.32	<.001	2.66
1.4 Appropriate facilitator guidance (EP_Sub4)	13.69	1.28	9	21.99	13.26–14.12	<.001	3.66
2. Overall Importance of Debriefing (IM)	88.22	9.84	60	17.21	24.89-31.55	<.001	2.87
2.1 Learning and making connections (IM_Sub1)	35.00	4.49	24	14.70	33.48–36.52	<.001	2.45
2.2 Analyze thoughts and feelings (IM_Sub2)	17.08	2.20	12	13.86	16.34–17.82	<.001	2.31
2.3 Facilitator skill in conducting debriefing (IM_Sub3)	22.36	2.67	15	16.54	21.46–23.26	<.001	2.76
2.4 Appropriate facilitator guidance (IM_Sub4)	13.78	1.51	9	18.99	13.27–14.29	<.001	3.17

Remark (s): EP = Experience during debriefing; IM = Importance of debriefing. Values are presented as mean (M) and standard deviation (S.D.). All tests were two-tailed, with statistical significance set at p < .05. Effect sizes were calculated using Cohen's d.

Qualitative Findings

Qualitative results from focus group interviews and reflective observations were analyzed using thematic analysis, resulting in four distinct themes that reflect students' learning experiences following simulation-based learning with structured debriefing.

Theme 1: Structured debriefing enhanced clinical reasoning through guided Reflection

Students reported that structured debriefing facilitated their ability to analyze clinical situations and justify their nursing actions. Guided questioning enabled them to bridge the gap between theoretical knowledge and clinical practice, thereby refining their reasoning processes. Reflective observations further corroborated these findings, as students were seen revisiting their decisions and engaging in deeper analytical discussions during the debriefing sessions.

"The debriefing helped me understand why I chose that intervention and how I should think step by step in similar cases." (P3)

"I realized that I missed some important assessment points, and now I understand how to think more systematically." (P6)

Reflective observations showed that students revisited their decisions and engaged in deeper analytical discussions during debriefing.

Theme 2: Emotional expression as a catalyst for learning during simulation

Students described experiencing emotions such as anxiety and uncertainty during simulation. Opportunities to express these emotions during debriefing helped them process their experiences and continue learning.

"I felt nervous during the simulation, especially when caring for the mother and baby during delivery period." (P7)

"Talking about my feelings helped me understand myself better and made me less stressed." (P9)

Observation data indicated that students openly expressed emotions, which fostered emotional awareness and facilitated the learning process.

Theme 3: Facilitator behaviors fostered a psychologically safe learning environment. Students emphasized that facilitator behaviors, such as being supportive and non-judgmental, contributed to a safe learning environment that encouraged participation.

"The instructor made me feel comfortable to speak, so I was not afraid to share my ideas." (P2)

"Even when we made mistakes, the instructor guided us to think instead of blaming us." (P5)

Reflective observations confirmed that students exhibited higher levels of engagement when facilitators encouraged open dialogue and mutual respect.

Theme 4: Simulation with structured debriefing enhanced perceived readiness for clinical practice

Students reported increased confidence and a heightened sense of preparedness for real-world clinical situations following their participation in the simulation and structured debriefing. They felt better equipped to apply their skills in actual practice.

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"After the debriefing, I feel more confident to handle similar situations in real practice." (P10)

"I think I can apply what I learned to real patients more effectively now." (P8)

Observation supported this, as students demonstrated improved clinical fluency and a more proactive approach during the final stages of the session**.**

Discussion

This mixed-methods study highlights the effectiveness of simulation-based learning with structured debriefing in enriching nursing students' learning experiences within the maternal and child health nursing context.

Consistent with Objective 1, the quantitative findings demonstrated that students reported scores significantly higher than the subscale midpoint across all dimensions of the Debriefing Experience Scale (DES), thereby supporting the research hypothesis.[24,25] These results may be attributed to the three-phase simulation-based learning process implemented in this study.

During the pre-briefing phase, students were oriented to learning objectives, expected roles, and psychological safety and participation, which likely enhanced their readiness for learning. During the simulation phase, students engaged in maternal–neonatal clinical scenarios that necessitated application of theoretical knowledge, assessment, decision-making, and communication skills. Subsequently, in the structured debriefing phase, facilitator-led questioning and reflective dialogue supported the analysis of actions, exploration of cognitive and emotional responses, and the integration of theory into clinical reasoning.

Together, these sequential processes contributed to the positive learning experiences observed, aligning with previous studies which report that learner preparation, active simulation engagement, and guided debriefing enhance reflection and clinical judgment.[24–27] This interpretation is further supported by the Debriefing for Meaningful Learning (DML) framework, which identifies reflective dialogue as a key mechanism for developing clinical reasoning.[12] Furthermore, existing evidence suggests that structured debriefing promotes deeper reflection, active engagement, and improved learning outcomes compared to unstructured approaches.[10,11]

In addition, students participated in three simulation scenarios, which likely facilitated progressive learning development. Repeated exposure to both simulation and debriefing enabled students to refine their clinical reasoning, bolster their confidence, and become more familiar with the learning process. This aligns with prior studies indicating that repeated simulation experiences enhance knowledge acquisition, self-confidence, and reflective learning among nursing students.[23,26,27]

Consistent with Objective 2, the qualitative findings further elucidated how structured debriefing supported students' learning processes. Four themes emerged: (1) enhanced clinical reasoning through guided reflection, (2) emotional expression, (3) facilitator support and psychological safety, and (4) increased preparedness for clinical practice. These qualitative findings align with the two dimensions of the Debriefing Experience Scale (DES).[24]

First, the 'Experience during Debriefing' dimension was reflected in themes pertaining to guided reflection, emotional expression, and facilitator support. Students' narratives demonstrated that structured debriefing created opportunities for active engagement, critical reflection on actions, and open dialogue within a supportive learning environment. Second, the 'Importance of Debriefing' dimension was manifested in students' perceived preparedness for clinical practice. Students recognized the significant value of structured debriefing in bolstering their confidence, strengthening clinical reasoning, and improving their readiness to manage real-life maternal and neonatal situations.

Furthermore, these findings highlight that the effectiveness of structured debriefing is closely linked to its underlying mechanisms. The use of structured questioning, facilitator guidance, and the establishment of a psychologically safe environment distinguishes this approach from informal debriefing methods. These elements enable students to critically reflect on their performance, process emotional experiences, and effectively integrate knowledge into practice. This is supported by previous studies emphasizing the importance of structured debriefing and psychological safety in enhancing learning outcomes and reflective practice.[10,12,21]

Overall, the integration of quantitative and qualitative findings demonstrates that structured debriefing plays a critical role in transforming simulation experiences into meaningful learning and improving students' readiness for clinical practice. These findings align with previous research demonstrating that structured debriefing enhances reflective learning, clinical reasoning, and professional confidence in nursing education.[10-13,19]

Implications of the Results

The findings of this study have significant implications for nursing education and curriculum design, particularly within maternal and child health nursing. The positive learning experiences reported by students underscore the value of integrating simulation-based learning with structured debriefing that aligns with international standards and is underpinned by the DML approach. Nursing programs should consider adopting standardized simulation frameworks that emphasize learner analysis, scenario development, instructor preparation, and psychological safety to ensure consistency and quality across all simulation activities. Embedding structured debriefing as a core instructional component rather than an optional

activity may enhance students' reflective thinking, emotional processing, and clinical reasoning, all of which are essential competencies for clinical practice.

From a faculty development and institutional perspective, these results highlight the necessity of investing in instructor training for effective debriefing facilitation. Educators require specific competencies in guided dialogue, reflective questioning, and the creation of psychologically safe learning environments to maximize the educational impact of simulation.[19]

Limitations

This study has several limitations. First, it was conducted with a relatively small sample size from a single institution, which restricts the generalizability of the findings to broader nursing student populations. Second, the reliance on self-reported measures may not fully reflect actual improvements in students' objective clinical performance. Third, variations in participants' prior simulation experience in maternal and child health nursing were not controlled for, which may have confounded the learning outcomes.

Recommendations

Structured debriefing should be integrated into maternal and child health nursing curricula as a primary instructional strategy to enhance reflective learning, clinical reasoning, and perceived readiness for clinical practice. Future research should incorporate objective performance assessments and longitudinal designs to evaluate the long-term impact and sustainability of learning outcomes associated with structured debriefing.

Conclusion

This study contributes to the growing body of evidence supporting the role of facilitator-led structured debriefing in simulation-based nursing education, specifically within maternal and child health practice. The findings demonstrate that nursing students perceive simulation combined with structured debriefing guided by trained instructors and aligned with international standards and DML principles as a meaningful learning experience that fosters reflective thinking, emotional processing, and clinical readiness. By integrating quantitative and qualitative data, this study underscores the value of instructor guided structured debriefing as a critical pedagogical strategy for enhancing learning outcomes in nursing education.

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