Practice Rational Care Model: It's Effect on Students' Clinical Reasoning and Practical Skills at Maternity Nursing Department

Amira Morsy Yousif [(1)], Sanaa Ghareeb Ahmed[(2)]

(1) Assistant Professor of Maternal and Neonatal Health Nursing, Faculty of Nursing, Ain Shams University.
(2) Lecturer of Maternal and Neonatal Health Nursing, Faculty of Nursing, Ain Shams University.

Abstract

Clinical reasoning is the dominant of clinical practice, strengthening nursing students' abilities to gather, analyze, and interpret information, leading to hypothesis generation. Crucially, it is necessary for patient safety and a vital component of nursing competence. **Aim of the study:** To evaluate the impact of the Practice Rational Care (PRC) model on the clinical reasoning and practical skills of students in the maternity nursing department. **Study design:** A quasi-experimental design was employed in this study. **Setting**: The study was conducted in the inpatient postnatal departments at Ain Shams Maternity University Hospital. **Sample:** simple random sampling method was utilized to select 66 maternal nursing students from a total of 266 students enrolled in the Maternal and Neonatal Health Nursing Department during the first semester of the 2024-2025 academic years. **Tools of data collection:** Three instruments were utilized in this study: a self-administered interview questionnaire, the Clinical Reasoning Assessment Tool (CRAT), and a rubric-based evaluation tool for clinical performance. **Results:** Prior to implementing the Practice Rational Care (PRC) model, 50.0% of the participants demonstrated a need to enhance their clinical reasoning skills. After implementation, 51.6% of the students exhibited strong clinical reasoning abilities. Additionally, 54.2% of the students showed unsatisfactory clinical practical skills before the intervention, whereas 62.5% achieved an excellent level of clinical practical skills following the PRC model implementation. Statistical analysis revealed a highly significant increase in the overall mean scores for clinical reasoning skills and the content knowledge subsection after applying the PRC model (P=0.002 and P=0.001, respectively). Moreover, there were significant improvements in the mean scores for procedural knowledge/psychomotor skills and the conceptual reasoning subsection post-intervention (P=0.01 for both).**Conclusion:** The implementation of the Practice Rational Care (PRC) model had a positive impact on the clinical reasoning and practical skills of maternity nursing students. **Recommendations:** It is recommended to integrate the Practice Rational Care model as an innovative teaching strategy within maternity nursing clinical education to enhance students' clinical reasoning abilities.

Keywords: Clinical reasoning skills, maternity nursing, practical skills, practical rational care model.

Introduction

Clinical reasoning (CR) refers to an extensive cognitive process that helps nursing students comprehend patient conditions accurately and determine the most suitable nursing interventions. This flexible and evolving process enhances students' situational awareness and helps them connect theory with practical experience. As an essential skill for nursing professionals, the development of CR should start during foundational education. Crucial CR abilities demonstrated in clinical practice include data analysis, prioritizing patient needs, formulating care plans, and evaluating patient outcomes. To effectively build these competencies, nursing students need hands-on experience with patient care and active participation in collaborative healthcare teams during their clinical rotations **(Ana Perez-Perdomo, and Zabalegui, 2023).**

Fundamental aspect of clinical reasoning involves the integration of both cognitive and metacognitive abilities. The cognitive aspect encompasses gathering patient history, conducting physical examinations, and analyzing the findings to develop an appropriate nursing care plan **(Leal et al., 2024).** These cognitive skills are acquired through studying and applying relevant healthcare literature and are further refined by employing critical thinking to deeply understand and utilize previously learned information. On the other hand, metacognitive skills involve reflective practices and self-awareness regarding the

competencies gained by the student in patient care. Through reflection on the patient's condition and the use of critical thinking, the student is able to identify and implement the most suitable care plan **(Choi, et al, 2020).**

Clinical reasoning is therefore considered a continuous and iterative process in clinical settings, with evaluation and reflection playing key roles. The Clinical Reasoning Cycle (CRC) provides a contemporary and systematic framework for clinical decision-making that prioritizes patient-centered care. This eight-stage model directs students through the phases of collecting information, analyzing data, and executing care plans, thereby enhancing critical thinking and problem-solving abilities. Following the assessment of patient needs and goal setting, students develop and carry out interventions, assess the results, and reflect on their experiences to inform and improve their future clinical practice **(Maguire, et al, 2022)**.

Clinical reasoning (CR) is a vital skill within healthcare professions, playing an essential role in both clinical practice and ensuring patient safety. It represents a fundamental competency that students must develop throughout their education. There is widespread consensus among health educators about the importance of explicitly and continuously teaching CR in professional training programs **(Kononowicz et al., 2020).** Insufficient clinical reasoning abilities among nurses can lead to flawed decision-making, jeopardizing patient safety. Conversely, strong clinical reasoning skills contribute to faster patient recovery and enhance the overall quality of care (Gunderson et al., 2020). Therefore, it is crucial for students to acquire the necessary knowledge, skills, and behaviors for effective clinical reasoning through practical experience and mentorship. Consequently, nurse educators have a responsibility to implement teaching strategies that foster the development of clinical reasoning and judgment, beginning with integrating these competencies into nursing curricula **(Thasaneesuwan and Promlek, 2023)**

Several previous studies have emphasized various educational approaches aimed at enhancing the structured knowledge of clinical reasoning, including reflection and feedback methods, contextual learning, and problem-based learning. Despite the implementation of these strategies, challenges remain in effectively improving clinical reasoning knowledge among undergraduate nursing students. While the concept of clinical reasoning has been extensively explored, there is limited research addressing the critical importance of clinical reasoning skills or the educational interventions necessary to cultivate these abilities, especially within the field of maternity nursing education **(Gonzalez, Nielsen, and Lasater, 2021).**

Incorporating modern teaching strategies into nursing curricula serves as an effective means to reduce errors, enhance knowledge acquisition, and foster the development of clinical reasoning skills in nursing education. Various instructional methods and approaches have been identified in the literature as beneficial during nursing training **(Giuffrida et al., 2023).** The primary objective of nursing education is to equip future nurses with the necessary knowledge and clinical skills to deliver safe and competent care to diverse patient populations across various healthcare environments. For nursing students to perform effectively, they must be able to retrieve theoretical knowledge acquired in the classroom and apply it in clinical contexts. Consequently, nurse educators bear the responsibility of selecting and implementing effective teaching strategies that support the seamless transition of learning from academic settings to practical clinical experiences **(Mechtel et al., 2024).**

The Practice Rational Care (PRC) Model, also known as the rational decision-making model, offers a comprehensive approach that integrates clinical reasoning, decision-making, and judgment - key components in nursing care aimed at preventing iatrogenic harm. This model follows a sequence of steps, starting with identifying a problem or an opportunity for intervention, processing relevant information and alternatives, and concluding with actions directed toward achieving the desired outcome. The PRC Model represents a system of clinical reasoning and decision-making that is informed by clinical judgment. It is introduced during undergraduate nursing education and significantly refined throughout professional practice **(Arisudhana, 2022).**

Significant of the Study

Maternal and neonatal health serves as key indicators of a nation's economic development, cultural status, and healthcare quality. The significance of high-quality maternity nursing education is well recognized, with strong evidence supporting the role of skilled care in reducing preventable maternal and neonatal mortality rates. Clinical practice demands advanced clinical reasoning abilities to enhance decision-making, problem-solving, critical thinking, and clinical judgment. Research has shown that nurses lacking proficient clinical reasoning skills are often unable to effectively analyze patient problems, which can worsen patient outcomes and result in errors during care decisions **(Xing et al., 2021).**

Nurses constitute a vital component of the healthcare system, representing the largest segment of the healthcare workforce. Globally, nurses and midwives make up nearly half of all healthcare professionals, with approximately 20.7 million out of the total 43.5 million healthcare workers falling into these categories. To meet sustainable development goals, an estimated additional 9 million nurses and midwives will be required by 2030. The enhancement of clinical reasoning skills among nursing students serves as a key indicator of their readiness to provide effective nursing care. Clinical reasoning remains especially crucial in maternity nursing, given the persistently high maternal mortality rates and incidences of midwifery malpractice **(Metha, Oktalia, and Desristanto, 2021).** Nurses and midwives caring for patients with complex and varied conditions must quickly adapt to challenges by making informed decisions to optimize patient outcomes and minimize errors. Clinical reasoning supports this adaptive decision-making process by involving critical thinking and judgment within clinical practice and patient care contexts **(Paden et al., 2023).**

Research in clinical reasoning highlights its role as a fundamental element of clinical competence. The evolving demands of modern nursing practice necessitate clinical reasoning skills at unprecedented levels, requiring even recent graduates to make complex patient care decisions **(Mohammadi Shahboulaghi, Khankeh, and HosseinZadeh, 2021).**

Consequently, it is essential to design nursing education programs that effectively develop clinical reasoning abilities and provide learning environments where both novices and experienced practitioners can apply diverse reasoning strategies **(Tekin et al., 2022; Thasaneesuwan and Promlek, 2023).** Given this context, there is an urgent need for research focused on creating and assessing educational interventions aimed at enhancing clinical reasoning within maternity nursing education. Accordingly, this study aims to evaluate the impact of the Practice Rational Care model on students' clinical reasoning and practical skills in the maternity nursing department, with outcomes expected to influence student competency, patient safety, and quality of care.

Aim of the Study:

This study aims to evaluate the impact of the Practice Rational Care (PRC) model on the clinical reasoning and practical skills of students in the maternity nursing department. This objective will be accomplished by:

- Measuring maternity students' clinical reasoning and practical skills before the application of the PRC model.

- Applying the PRC model as a teaching approach to enhance students' clinical reasoning and practical skills during their clinical training in the postnatal care setting.

- Assessing the effectiveness of the PRC model implementation on improving students' clinical reasoning and clinical practical skills.

Research Hypothesis:

The clinical reasoning and practical skills of maternity nursing students will show improvement following the implementation of the Practice Rational Care (PRC) model compared to their performance prior to its application.

Subjects and Methods

Study design: A quasi-experimental pretest-posttest design was employed to achieve the study objectives. This design involves evaluating the effect of an intervention on a target group without random assignment **(Iowa State University of Science and Technology, 2020).** Specifically, the

dependent variables were measured twice: once before the implementation of the intervention and once afterward (Spurlock, 2018).

Study setting: The research was conducted in the inpatient postnatal departments at Ain Shams Maternity University Hospital, where student clinical training takes place. The hospital comprises six inpatient units, each containing a postnatal department

Sampling type, size and technique: A simple random sampling method was used to select 66 maternal nursing students from a total of 266 students enrolled in the Maternal and Neonatal Health Nursing Department during the first semester of the 2024-2025 academic year. The sample size was determined using statistical formulas.

n = Z21- /2p (1-p)/d2.

Z: statistic for a level of confidence. (For the level of confidence of 95%, which is conventional, Z value is 1.96).

P: expected prevalence or proportion. (P is considered 0.5)

d: precision. (d is considered 0.05 to produce smaller error of estimate and good precision)

Tools of data collections: Three instruments were employed for data collection in this study.

Tool I: Self-Administered Interviewing Questionnaire: This tool was designed to gather information regarding the general characteristics of the participants, including age, gender, place of residence, and educational background.

Tool II: The Clinical Reasoning Assessment Tool (CRAT): adapted from Riopel et al. (2022), was utilized to evaluate students' progress in acquiring and applying clinical reasoning skills. The CRAT is divided into three subsections:

1. **Content Knowledge:** This subsection assesses the student's ability to recognize essential foundational knowledge and factual information, focusing on identification rather than interpretation.

2. **Procedural Knowledge / Psychomotor Skills:** This measures the capacity to select appropriate tests, interventions, or measurements, as well as the psychomotor execution of these skills.

3. **Conceptual Reasoning:** This involves integrating and synthesizing information to make clinical judgments, emphasizing reflection and self-awareness in the decision-making process.

Scoring system, based on the three domains

The Clinical Reasoning Assessment Tool (CRAT) evaluates three key domains, each scored on a scale from 0 to 5 points:

1. **Content Knowledge (0-5 points):** 0: No knowledge or understanding of relevant clinical content.1: Very limited knowledge with significant gaps.2: Basic knowledge of relevant content but with notable omissions.3: Adequate understanding, though some minor details may be missing.4: Solid and comprehensive knowledge with only minor gaps.5: Exceptional, thorough, and accurate grasp of the relevant content.

2. **Procedural Knowledge (0-5 points):** 0: No understanding of relevant procedures or processes.1: Limited procedural knowledge, often selecting incorrect procedures.2: Basic procedural understanding but applied incorrectly or with major errors.3: Appropriate application of procedures with minor mistakes or omissions.4: Correct and efficient application of procedures, with minor issues.5: Full mastery of procedural knowledge, executing clinical processes accurately and efficiently.

3. **Conceptual Reasoning (0-5 points):**0: No understanding of clinical concepts or reasoning.1: Difficulty linking concepts and making appropriate decisions.2: Partial understanding of clinical reasoning with significant gaps or illogical conclusions.3: Adequate conceptual reasoning but with occasional inconsistencies.4: Strong reasoning skills with minor lapses in application.5: Clear, logical, and comprehensive reasoning with a well-organized thought process.

The **total score** across these three domains ranges from 0 to 15 points. Scores are then categorized as follows:

- **Exceptional Clinical Reasoning:** 13–15 points
- **Strong Clinical Reasoning:** 10–12 points
- **Adequate Clinical Reasoning:** 7–9 points

- **Needs Improvement:** 4–6 points
- **Deficient Clinical Reasoning:** Less than 4 points

Tool III: Rubric evaluation of clinical performance Tool:

This clinical performance evaluation tool, adapted from Esmaeili et al. (2014), was used to assess students' clinical competencies. The questionnaire comprises 49 items distributed across seven domains: patient-centered care (6 items), safety and risk minimization (9 items), evidence-based practice (3 items), teamwork (7 items), quality improvement (7 items), informatics and data management (6 items), and professionalism (11 items).

Scoring System: Each item is rated on a scale from 1 to 3 points: Excellent performance receives 3 points, satisfactory performance receives 2 points, and unsatisfactory performance receives 1 point.

The total score for each student ranges from 49 to 147 points. The overall scores are categorized as follows:

- **Pass:** Scores of 75% or higher (111–147 points), indicating safe and adequate fulfillment of clinical course objectives within the required timeframe with minimal assistance.

- **Needs Improvement:** Scores below 75% but above 50% (74–110 points), reflecting inconsistent achievement of clinical objectives and the need for moderate assistance in integrating knowledge and skills.

- **Fail:** Scores below 50% (1–73 points), demonstrating unsafe or inadequate clinical performance, significant gaps in knowledge or critical thinking, and frequent or near-constant assistance required for knowledge and skill integration.

Tools validity and reliability: Five experts specializing in maternity and gynecological nursing evaluated the data collection tools for content and face validity, focusing on their comprehensiveness, clarity, applicability, and ease of understanding. The reliability of the tools was assessed using Cronbach's alpha coefficient, with Tool II achieving a value of 0.96 and Tool III demonstrating a value of 0.98. Additionally, four clinical reasoning cases were developed by the researchers to support the study.

Administrative Design: he Dean of the Faculty of Nursing at Ain Shams University officially approved the research proposal, which included the study's title, objectives, and scope.

Ethical consideration: Ethical approval for the study was granted by the Scientific Research Ethical Committee of the Faculty of Nursing at Ain Shams University. Additionally, written informed consent was obtained from all participants after they were assured that the study posed no harm, confidentiality and anonymity would be maintained, and they had the right to withdraw at any time. To protect participant privacy, a coding system was used to anonymize and secure the data.

Pilot study: pilot study was conducted prior to data collection involving seven students, representing 10% of the total sample size. The purpose of the pilot was to assess the tools' efficiency and content validity, identify potential challenges during data collection, and estimate the time required to complete the instruments. Students who participated in the pilot study were excluded from the main sample to prevent contamination and were subsequently replaced.

Field work: The research was carried out over a period of six months, beginning in October 2024 and concluding at the end of March 2025. The investigator was present at the designated setting three days per week - Sunday, Monday, and Tuesday - from 9:00 a.m. to 2:00 p.m. The study was conducted in five phases: preparatory phase, development of clinical reasoning cases, interviewing and assessment, implementation, and evaluation.

Preparatory phase:

Thorough review of both theoretical and empirical literature from national and international sources was conducted. This included textbooks, scholarly articles, journals, research studies, and internet databases to obtain a comprehensive understanding of all aspects related to the research topic.

Development of Clinical Reasoning Cases:

The development of clinical reasoning (CR) cases involved a detailed drafting process followed by expert validation to ensure content validity and relevance. Priority nursing diagnoses were identified with input from a reference group of experienced nurses and qualified professionals in maternity nursing.

- The cases were created by researchers possessing professional clinical experience in maternity nursing to guarantee authenticity and practical relevance. Each case included comprehensive details such as patient demographics, risk factors, presenting complaints, symptoms, laboratory results, treatments, and critical early warning signs designed to aid in nursing diagnosis identification. Special emphasis was placed on "early warning" signs indicating patient deterioration, with the goal of enhancing students' ability to prioritize nursing problems through clinical reasoning.

- One case was reserved for assessing students' clinical reasoning and practical skills during the initial evaluation (pre-implementation of the PRC model) and the final assessment, while the other three cases were employed throughout the educational intervention. The cases were crafted with varying degrees of complexity to challenge students appropriately.

- **Expert Review:** Five faculty members specializing in maternity and gynecological nursing with clinical expertise reviewed the CR cases to validate their clinical accuracy, realism, and clarity. These experts assessed the cases based on specific criteria, including the extent to which the cases reflected authentic clinical scenarios, the complexity and engagement level sufficient to promote problem-solving skills, and their alignment with the learning objectives for third-year nursing students.

Interviewing and Assessment phase:

At the outset of the interview, the researcher introduced herself to the participants and clearly explained the study's purpose to reassure them. Verbal and written informed consent was obtained from all maternity nursing students. The researcher conducted meetings with the participants in a classroom setting at the Faculty of Nursing during the first semester of the 2024-2025 academic years.

The initial assessment began with the collection of general demographic and background information using Tool I. Subsequently, the researcher evaluated the students' clinical reasoning and practical skills within the inpatient postnatal unit using Tools II and III. This baseline assessment was conducted on the first day of clinical rotation for each group as part of their practical training.

Implementation phase:

This phase involved explaining the clinical reasoning (CR) process, which includes recognizing problems within clinical cases, gathering relevant information, analyzing the data, considering multiple potential solutions, and implementing the chosen intervention to achieve the desired outcomes. The phase consisted of two theoretical sessions followed by one practical session.

First Theoretical Session: The researcher conducted this session in a classroom setting with all participating students at the start of the first semester of the 2024-2025 academic year. The session began with an orientation covering the study's objectives, its purpose, and the significance of clinical reasoning competency for maternity nurses.

An interactive lecture was then delivered focusing on the Practice Rational Care (PRC) model. The lecture included an introduction to the model, its definition, process, conceptual framework, benefits, areas of application, common barriers to effective implementation, and practical guidance on applying the PRC model in clinical settings through clinical reasoning skills. The content was presented using clear and simple language appropriate to the students' educational level. The session concluded with a summary of the key points and a feedback segment to engage students. This session lasted approximately 20 minutes.

The second theoretical session was conducted at the clinical setting for each student group according to their clinical rotation schedule. During this session, the researchers presented one of the developed clinical cases and guided students through the application of

the clinical reasoning process. This took place on the second day of clinical training.

The educational case included key components such as patient information (age, previous obstetric history, current pregnancy and delivery history, and risk factors for disease), pathophysiological issues identified during physical examination, and clinical consequences including complaints, signs, and symptoms.

The researchers facilitated the application of the five steps of the Practice Rational Care (PRC) model: Problem identification, Literature search, Data evaluation, Data analysis, Presentation of findings. This session lasted approximately 40 minutes.

The practical session conducted in the clinical setting using the same educational case presented during the second theoretical session. The session employed a demonstration method, including role play. The researchers began by outlining the learning objectives and emphasizing the importance of nursing competency in managing atonic postpartum hemorrhage (PPH).

The researchers divided into two teams along with the students to practice the management of the case. This included assessing the patient's condition, performing bimanual uterine compression, administering uterotonic medications, and managing intravenous fluids and blood transfusions.

At the conclusion of the session, a debriefing was held. The researchers highlighted that both teams demonstrated competence in patient-centered care, safety and risk minimization, evidence-based practice, and professionalism. However, there was a need for further improvement in teamwork, informatics and data management, and quality improvement skills.

Evaluation Phase:

At the end of each clinical rotation, the researcher assessed the impact of implementing the Practice Rational Care (PRC) model on the clinical reasoning and practical skills of maternity nursing students. This evaluation was conducted using Tools II and III, based on the application of the PRC model to real clinical cases.

Application example for educational cases:

Mrs. D is a 38-year-old gravida 4, para 4 who delivered 30 minutes ago. Her pregnancy was uncomplicated. She has a known allergy to penicillin. Labor was induced at 41 weeks and 5 days gestation due to post-term pregnancy. She received one dose of misoprostol (Cytotec) followed by oxytocin augmentation. Epidural anesthesia was administered; however, she did not void before catheter insertion, and a Foley catheter was not placed. She delivered a 4.3 kg female infant with a tight nuchal cord, assisted by vacuum extraction due to fetal bradycardia. Apgar scores were 6 at one minute and 9 at five minutes. The placenta was delivered spontaneously and intact immediately after delivery. A second-degree midline perineal laceration was repaired. Oxytocin infusion is running at 500 mL/hr.

Her vital signs upon assessment were: temperature 37.2°C, blood pressure 120/70 mmHg, heart rate 100 beats per minute, respiratory rate 20 breaths per minute. The uterine funds was firm at the level of the umbilicus, and lochia was moderate rubra. She has no significant past medical history aside from her penicillin allergy.

Fifteen minutes later, the patient reported feeling faint. She appeared pale and vomited. Vital signs at this time were temperature 36.7°C, blood pressure 80/50 mmHg, heart rate 125 beats per minute, and respiratory rate 25 breaths per minute. The head of the bed was lowered. On examination, the fundus was boggy, deviated to the right, and positioned 2 centimeters above the umbilicus. Lochia was heavy, with the perineal pad saturated and clots expressed during fundal massage. Approximately 1000 mL of clots were measured.

Laboratory results on admission included: hemoglobin 12.2 g/dL, hematocrit 36.6%, white blood cell count 12,000/mm³, and platelet count 218,000/mm³.

Process	Description	Example
Consider the patient situation	Describe or list facts, context, objects or people.	✓ Mrs. D is a 38-year-old gravida 4, para 4 woman at 41 weeks and 5 days of gestation. ✓ She underwent a scheduled induction of labor due to post-term pregnancy and received epidural anesthesia. ✓ Mrs. D did not void prior to epidural administration and did not have a Foley catheter inserted. ✓ She delivered a 4.3 kg female infant with a tight nuchal cord, assisted by vacuum extraction because of fetal bradycardia. Apgar scores were 6 at one minute and 9 at five minutes. ✓ The placenta was spontaneously delivered intact immediately following delivery. ✓ Mrs. D sustained a second-degree midline perineal laceration, which was subsequently repaired.
Collect cues/information	Review all current information, including handover reports, patient history, medical charts, results of investigations, and prior nursing and medical assessments	✓ Mrs. D had an uncomplicated pregnancy. ✓ Her past medical history is unremarkable. ✓ She delivered a live female infant weighing 4.3 kg. ✓ On admission, her vital signs were: blood pressure 120/70 mmHg, pulse 100 beats per minute, respiratory rate 20 breaths per minute, and temperature 37.2°C. ✓ The uterine fundus was firm at the level of the umbilicus, and lochia was moderate rubra. ✓ Laboratory results included hemoglobin of 12.2 g/dL, hematocrit 36.6%, white blood cell count 12,000/mm³, and platelet count 218,000/mm³.
	Collect new information by conducting a thorough patient assessment.	✓ The uterus was boggy and deviated to the right. ✓ Vital signs 15 minutes later were blood pressure 80/50 mmHg, pulse 125 beats per minute, respiratory rate 25 breaths per minute, and temperature 36.7°C. ✓ The uterine fundus was palpated two fingerbreadths above the umbilicus (2+U). ✓ Lochia was heavy, with the perineal pad saturated and clots expressed upon fundal massage, measuring approximately 1000 mL.
	Recall knowledge (e.g. physiology, pathophysiology, pharmacology, epidemiology, therapeutics, culture, context of care, ethics, law etc.)	Postpartum hemorrhage (PPH) is characterized by blood loss exceeding 500 mL following vaginal delivery or more than 1000 mL after cesarean section. Primary PPH occurs within the first 24 hours postpartum, whereas secondary PPH develops after this period **(Escobar et al., 2022)**. The causes of PPH include uterine atony, genital tract lacerations, retained placental tissue, uterine inversion, abnormal placentation, and coagulation disorders **(Escobar et al., 2022)**. Clinically, PPH presents with symptoms such as sudden bleeding, rapid heart rate (tachycardia), increased respiratory rate (tachypnea), low blood pressure, dizziness, and sensations of coldness. As hemorrhage progresses towards shock, patients may experience loss of consciousness, confusion, blurred vision, clammy skin, and generalized weakness **(Günaydın, 2022)**. Recognized risk factors for PPH include induced or augmented labor, intra-amniotic infection, cesarean delivery, Hispanic ethnicity, prolonged labor - especially during the second stage—preeclampsia, magnesium sulfate therapy, extremes of maternal age and parity (nulliparity and parity greater than four), uterine overdistension due to conditions like polyhydramnios, multiple gestations, or fetal macrosomia, uterine rupture, prior exposure to oxytocin, and instrument-assisted vaginal delivery **(Günaydın, 2022)**.
Process information	Interpretation involves analyzing data to understand the patient's signs and symptoms by distinguishing between normal	The patient exhibited decreased blood pressure, tachycardia, tachypnea, pallor, and heavy vaginal bleeding. Additionally, the presence of a boggy and deviated uterine fundus suggests that the hemorrhage is most likely due to uterine atony.

Process	Description	Example
	and abnormal findings.	
	"Discrimination involves identifying pertinent information while filtering out irrelevant details, detecting inconsistencies, prioritizing the most critical data, and recognizing any missing cues within the collected information."	* "Interpretation entails examining the data to comprehend the patient's clinical signs and symptoms, differentiating between normal and abnormal observations."
	"Relating involves uncovering new connections by grouping cues to recognize the associations among them."	"The patient presented with risk factors for uterine atony, including a gravida 4, para 4 status and delivering a macrosomic infant. Additionally, she did not urinate before the epidural was administered, nor was a Foley catheter inserted."
	"Inference involves drawing logical conclusions by analyzing both subjective and objective information, while also evaluating possible alternatives and their potential outcomes."	**Subjective data;** Mrs. D appears pale and reports nausea and vomiting. She stated, "I feel like I am going to faint." **Objective Data:** Her vital signs showed blood pressure at 80/50 mmHg, pulse rate of 125 beats per minute, respiratory rate of 25 cycles per minute, and temperature of 36.7°C. She exhibited heavy vaginal bleeding with a fully soaked pad and the passage of large blood clots.
	"<u>Match</u> present situation to previous situations or current patient to past patients (usually an expert thought process) "	• Immediately after delivery, Mrs. D's vital signs were: blood pressure 120/70 mmHg, pulse 100 beats per minute, respiratory rate 20 cycles per minute, and temperature 37.2°C. • The uterine fundus was firm at the level of the umbilicus, and lochia was moderate and rubra in color. • Fifteen minutes post-delivery, her vital signs changed to blood pressure 80/50 mmHg, pulse 125 beats per minute, respiratory rate 25 cycles per minute, and temperature 36.7°C. • The fundus was palpated 2 fingers above the umbilicus, the uterus felt boggy and was displaced to the right. There was heavy vaginal bleeding with a saturated pad and clots expelled during fundal assessment, measuring approximately 1000 cc. • Laboratory tests showed normal complete blood count and coagulation profiles, and ultrasound confirmed an empty uterus. • Mrs. D exhibited classic clinical features consistent with atonic postpartum hemorrhage.
	<u>Predict</u> an outcome (usually an expert thought process)	• The patient is expected to experience lochia bleeding that does not exceed one fully soaked perineal pad per hour. • The patient will show signs of improved fluid balance, indicated by normal capillary refill, sufficient urine output, and healthy skin elasticity. • The patient will maintain pulse, blood pressure, and neurological status within normal limits, without any respiratory issues.
<u>Identify problem / issue</u>	Synthesize facts and inferences to make a definitive diagnosis of the patient's problem.	• Mrs. D is at risk of deficient fluid volume due to active hemorrhage, as indicated by low blood pressure and elevated heart rate. • She is at risk of developing shock resulting from significant postpartum blood loss. • Mrs. D faces a risk of anxiety associated with the acute health situation, demonstrated by her expressed worries and heightened tension. • She is also at risk of impaired parenting caused by her medical condition and separation from her newborn.
<u>Establish goals</u>	Describe what you want to happen, a desired outcome, a time frame.	A client will maintain optimal fluid balance and vital signs within normal limits <u>Hemodynamic Stability:</u>

Process	Description	Example
		Achieve and maintain stable vital signs within normal ranges, including blood pressure, heart rate, and respiratory rate (within 2 hours). Ensure effective tissue perfusion and oxygenation (within 2 hours). <u>Return of Uterine Function:</u> Attain effective uterine contraction to control and reduce excessive bleeding (within 2 hours). <u>Restoration of Blood Volume:</u> Restore and maintain adequate blood volume to prevent or address hypovolemia (within 4 hours). Monitor laboratory values, including hemoglobin and hematocrit, to assess for improvements. <u>Prevention of Complications:</u> Prevent or promptly address complications associated with PPH, such as disseminated intravascular coagulation (DIC) or infection. <u>Psychosocial Support:</u> Provide emotional support and reassurance to the client and their family, demonstrate effective parenting skills, express confidence in caregiving, and promoting a positive birthing experience (within 24 hours).
<u>Take action</u>	Select a course of action between different alternatives available	1. Conduct a rapid assessment to identify the bleeding source, with signs indicating uterine atony. 2. Perform fundal massage to stimulate uterine contractions and help control hemorrhage. 3. Continuously monitor vital signs and patient condition; vital signs should be checked every 5 minutes, and total blood loss assessed every 5 to 15 minutes. 4. Encourage the patient to urinate at least every 4 hours by offering a bedpan, assisting to the bathroom if possible, or inserting a Foley catheter if necessary. 5. Carefully record all fluid intake and output. 6. Output monitoring should account for both urine and blood loss. 7. Elevate the patient's legs using pillows to enhance blood flow to vital organs. 8. If respiratory distress or rapid breathing occurs, provide oxygen via face mask at 10–12 liters per minute. 9. Offer emotional support and reassurance to the patient throughout care.
<u>Evaluate</u>	Evaluate the effectiveness of outcomes and actions. Ask: "has the situation improved now?"	After two hours of intervention, the patient's vital signs stabilized, with oxygen saturation maintained at appropriate levels. Bleeding was effectively controlled and managed. The patient demonstrated restored fluid volume and showed psychosocial well-being, with no evidence of disseminated intravascular coagulation (DIC) or infection.
<u>Reflect on process and new learning</u>	Contemplate what you have learnt from this process and what you could have done differently.	This case emphasizing the critical role of attentive nursing assessment, rapid clinical reasoning, and timely intervention in preventing adverse outcomes in the postpartum period. • I need to quick thinking, prioritization of interventions, and efficient communication with the healthcare team. • I need to anticipate potential complications in the postpartum period.

Statistical design:

The data collected from the sample was reviewed, coded, and entered into a personal computer. Data entry and statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics were used to summarize the data, including frequencies, percentages, means, and standard deviations. The T-test was applied to examine relationships between categorical variables. To evaluate the correlation between two continuous variables, the Pearson correlation coefficient was used. Statistical significance was determined as

follows: results were considered highly significant if P ≤ 0.01, significant if P < 0.05, and not significant if P > 0.05.

Results

Table (1): Displays that 69.7% of the studied students are female. Concerning place of residence 81.8% of students are from urban area. In addition, the mean age of the studied students is 21.48 ± 0.22.

Table (2): Points out that there is highly statistical significant improvement in the total mean score of clinical reasoning skills and content of knowledge subsection post-implementation of practical rational care model (P=0.002 & 0.001). In addition, there is a statistical significant improvement in the mean score of procedural knowledge /psychomotor skills and conceptual reasoning subsection post-implementation of practical rational care model (P=0.01 & 0.01)

Figure (1): Demonstrate that 50.0% of the studied students need to improve their clinical reasoning skills pre-implementation of practical

rational care model. While, 51.6% of the studied students have strong clinical reasoning skills post-implementation of practical rational care model.

Table (3): Indicate that there is highly statistical significant improvement in the total mean score of clinical practical skills and all seven domains post-implementation of practical rational care model (P=0.001, 0.002 & 0.003).

Figure (2): Reveals that 54.2% of the studied students have unsatisfactory level of clinical practical skills pre-implementation of practical rational care model. Meanwhile, 62.5% of the studied students have excellent level of clinical practical skills post-implementation of practical rational care model.

Table (4): Display that there is a moderate statistical significant positive correlation between total score of clinical reasoning skills and clinical practical skills pre-implementation of practical rational care model. While, there is a highly statistical significant positive correlation between total score of clinical reasoning skills and clinical practical skills post-implementation of practical rational care model.

Table (1): Number and percent distribution of the studied students according to their demographic characteristics (n= 66)

Items	Number	Percent
Gender		
Female	46	69.7
Male	20	30.3
Place of residence		
Urban	54	81.8
Rural	12	18.2
Age (years old) X̄± SD	21.48 ±0.22	

Table (2): Distribution of the studied students according to their clinical reasoning skills pre and post implementation of Practice rational care model as teaching strategy during the clinical training (n= 66)

CRAT subsection	Pre implementation of PRC model X̄ ± SD	Post implementation of PRC model X̄ ± SD	Paired T-test	P value
Content knowledge	6.21±2.02	13.54±2.87	14.10	0.001**
Procedural knowledge /psychomotor skills	5.83±1.66	11.21±3.08	10.29	0.01*
Conceptual reasoning	4.75±1.43	10.83±3.48	9.76	0.01*
Total	16.79± 4.07	36.08± 8.30	14.17	0.002**

CRAT = Clinical Reasoning Assessment Tool
PRC= Practice Rational Care   X̄ ± SD = Mean ± Standard deviation

Figure (1): Distribution of the studied students according to their categories of clinical reasoning skills pre and post implementation of Practice rational care model as teaching strategy during the clinical training (n= 66)
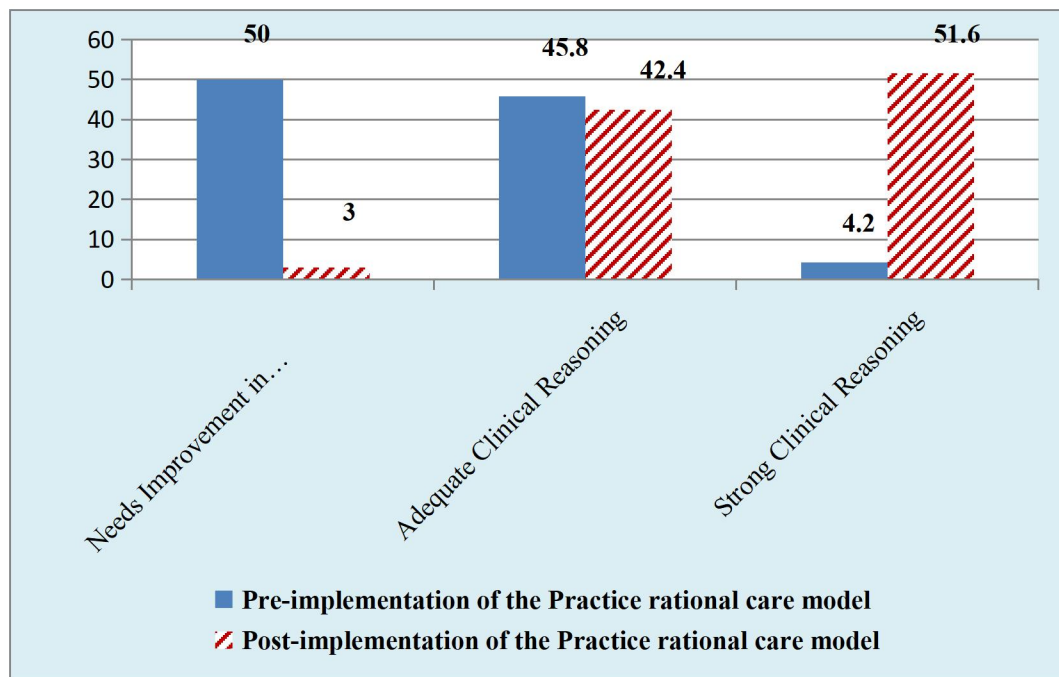

Table (3): Distribution of the studied students according to their clinical practical skills pre and post implementation of Practice rational care model as teaching strategy during the clinical training (n= 66)

Domains	Pre-implementation of PRC model	Post-implementation of PRC model	Paired T-test	P value
	$X^- \pm SD$	$X^- \pm SD$		
Patient centered care (6 items)	9.62±3.57	14.54±3.40	12.06	0.001**
Safety and minimizing risks (9 items)	19.58±0.79	26.25±0.70	14.68	0.001**
Evidence based practice (3 items)	6.25±1.60	11.75±0.24	15.96	0.001**
Team work (7 items)	16.79±0.62	20.75±0.14	16.67	0.001**
Quality improvement (7 items)	10.62±0.54	20.87±0.12	17.25	0.002**
Informatics and manage data (6 items)	6.95±1.41	16.62±1.88	15.87	0.001**
Professionalism (11 items)	11.20±2.36	31.54±1.11	19.11	0.002**
Total	82.04± 3.16	143.32± 4.53	21.17	0.003**

PRC = Practice Rational Care $X^- \pm SD$ = Mean ± Standard deviation

Figure (2): Distribution of the studied students according to their total clinical practical skills pre and post implementation of Practice rational care model as teaching strategy during the clinical training (n= 66)
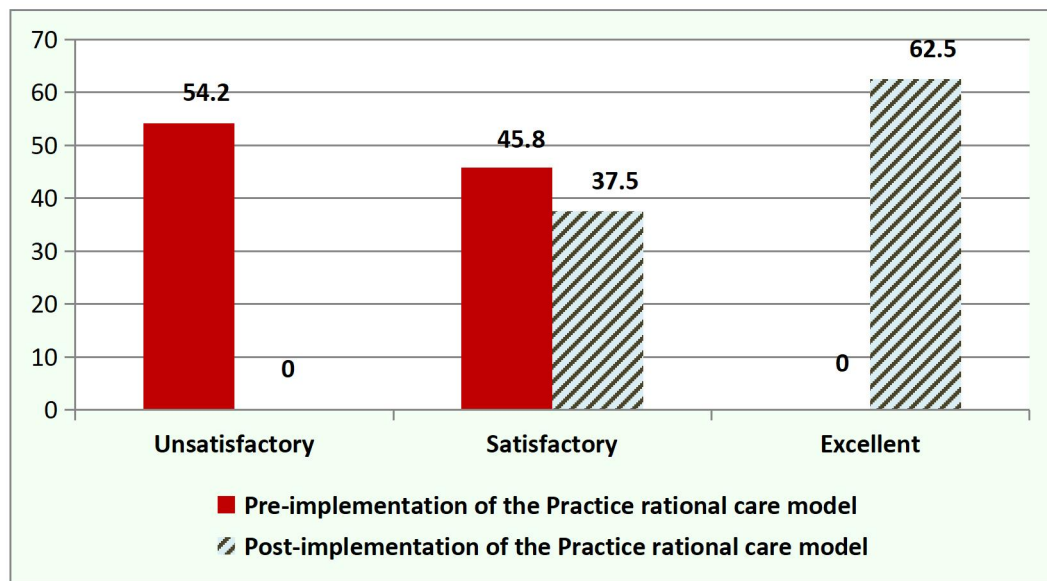

Table (4): Correlation between the studied students' clinical reasoning and clinical practical skills pre and post implementation of Practice rational care model as teaching strategy during the clinical training (n= 66)

Items	Total clinical practical skills pre-implementation of PRC model	Total clinical practical skills post-implementation of PRC model
Total clinical reasoning skills pre-implementation of PRC model	r = 0.48 P value = 0.01*	
Total clinical reasoning skills post-implementation of PRC model		r = 0.97 P value = 0.004**

Discussion

The capacity to make effective clinical decisions is vital for proficient nursing practice, positioning clinical reasoning as a central component of nursing education. Although clinical reasoning is acknowledged as fundamental to quality and safety in healthcare education, many newly graduated nurses remain inadequately prepared (Kononowicz et al., 2020). Consequently, nurse educators are tasked with implementing teaching methods that enhance students' clinical reasoning abilities and, ultimately, their clinical judgment (Schuwirth, Durning, and King, 2020). Integrating innovative teaching approaches, such as the Practice Rational Care model, may be beneficial in fostering the development of students' clinical judgment (Gonzalez, Nielsen, & Lasater, 2021). Therefore, this study aims to evaluate the impact of the Practice Rational Care model on the clinical reasoning and practical skills of students within the maternity nursing department.

Concerning the demographic characteristics of the students in this study, more than two-thirds were female. This aligns with the traditional predominance of females in the nursing profession, although male participation has been increasing in recent years. Additionally, the majority of students resided in urban areas, with a mean age of 21.48 ± 0.22 years. This distribution might reflect the coordination office's assignment of students based on their geographic location. These findings are consistent with those of Hong et al. (2021), who examined factors influencing clinical reasoning competency among 206 undergraduate nursing students across four nursing schools in South Korea, reporting that 86.4% of participants were female with a mean age of 22.38 years (SD = 1.68). Similarly, Li et al.

(2022) observed that female nursing students generally performed better in clinical reasoning tasks than males, though the difference was not statistically significant. Furthermore, Kim et al. (2023) found that students from urban areas had greater access to educational resources, which positively influenced their clinical reasoning abilities. Regarding age, research indicates that younger nursing students tend to derive greater benefits from structured educational programs designed to enhance clinical reasoning (Park et al., 2022). Therefore, the average age of 21.48 years in the present study suggests that these students are well-positioned to gain from targeted interventions such as the Practical Rational Care model.

Regarding the students' average scores in content knowledge, procedural knowledge/ psychomotor skills, and the conceptual reasoning subsection of clinical reasoning, there was a highly significant improvement in the total mean score for content knowledge following the implementation of the Practical Rational Care model (P = 0.001). Additionally, statistically significant enhancements were observed in the mean scores for procedural knowledge/psychomotor skills and conceptual reasoning subsections after the intervention (P = 0.01 for both). These results align with previous research emphasizing the benefits of structured educational programs in boosting clinical reasoning abilities. For instance, Chen, Liu, and Li (2022) examined the effects of a simulation-based education program on nursing students' clinical reasoning and reported significant gains in content knowledge, procedural knowledge, and conceptual reasoning, with mean score increases of 35%, 28%, and 32%, respectively—findings comparable to those of the current study. Similarly, Park et al. (2023) assessed the impact of a clinical reasoning framework on nursing students' critical thinking and documented significant improvements in overall clinical reasoning scores post-intervention (p < 0.001). Their study concluded that structured clinical reasoning frameworks effectively enhance nursing students' critical thinking and clinical judgment capabilities. The researchers contend that these findings add to the growing evidence supporting the Practical Rational Care model as a valuable tool for improving clinical reasoning skills and equipping nursing students to meet the demands of contemporary healthcare.

Furthermore, this research finding, demonstrating a significant improvement in clinical reasoning skills among nursing students after the implementation of the Practice Rational Care (PRC) model as a teaching strategy during clinical training, strongly aligns with and expands upon existing research in nursing education and pedagogical innovation. As there is highly statistical significant improvement in the total mean score of clinical reasoning skills post-implementation of practical rational care model (P=0.002). **From researchers' perspective**; the enhanced clinical reasoning skills observed in maternity students can be attributed to their engagement with a PRC model-based atonic postpartum hemorrhage case study. This learning experience improved students' abilities in key clinical reasoning areas: collecting information, identifying problems, delivering interventions, and assessing outcomes.

The result is in line with those of the previous studies; integrating the Diagnostic and Reasoning Tool (DaRT), which combines evidence-based strategies for knowledge, metacognition, and logical reasoning in patient care, improves diagnostic reasoning in advanced practice nurses. A study at one university demonstrated that using DaRT led to significant improvements (28–55%) in advanced health assessment skills and diagnostic reasoning, as measured by end-of-program Health Education Systems Incorporated scores **(Nordick, 2021).** Likewise, **Brown; (2021)** who carried out study to investigate the influence of questioning as a problem-based teaching/learning strategy on clinical reasoning in undergraduate nursing students at small community college in the southeastern United States and reported that the paired t test analysis indicated a significant difference (p < 0.05) in clinical judgment in the pre (M = 26.57, SD = 3.432) and post (M = 31.00, SD = 3.106) intervention scores indicating an increase in clinical reasoning. Furthermore, **Pérez-Perdomo and Zabalegui; (2023)** performed a systematic review to identify the randomized controlled trials studies in the literature that concern with clinical reasoning in the context of nursing students and reported that the use of mobile apps, digital simulations, and learning games has a positive

impact on nursing students' clinical skills and their motivation.

Additionally, F these findings are consistent with those of Yasir and Nasir (2024), who examined the effect of strategic questioning on the development of clinical reasoning skills. They reported that the experimental group scored a mean of 63.50 on the nurse clinical reasoning scale, compared to 57.25 in the control group, with the difference being statistically significant. Additionally, Neethling and Roets (2025) implemented a cooperative clinical reasoning activity where students used real patient health data to enhance their reasoning abilities. Their results demonstrated that students who engaged in this collaborative learning task showed significantly greater improvement in clinical reasoning compared to those who did not participate. From the researchers' perspective, implementing the Rational Care model supports students in assessing patient needs, prioritizing care, and improving their capacity to provide high-quality, patient-centered care, which positively influences their confidence and competence.

On the topic ofstudied students' clinical reasoning skills pre and post implementation of practice rational care model as teaching strategy during clinical training; this study demonstrated that half of the studied students need to improve their clinical reasoning skills pre-implementation of practical rational care model. While, slightly more than half of thembecome have strong clinical reasoning skills post-implementation of practical rational care model.**From researcher viewpoint** these positive results likely stem from the application of the practice rational care model. This model emphasizes a structured, logical approach to patient care, guiding undergraduate nursing students to analyze various alternatives based on credible facts focusing on objectivity. This approach is logical and brings order, this way ensuring consistency and discipline.This study result agreed with **Marcomini, Terzoni, and Destrebecq; (2021)**who conducted a before-after pilot study to assess impact of an unfolding case study that integrates quality- and safety-related content on second-year baccalaureate nursing students clinical reasoning skills at the University of Milan in February 2021 and found that the nurses clinical reasoning scale (NCRS) mean score was 50.80 ± 5.92 before the

intervention. While, after intervention the score was 61.40 ± 8.11a statistically significant increasein post-intervention (t = 5.48; p < 0.001).

Regarding clinical practical skills, the current study demonstrated highly significant improvements across all seven domains—patient-centered care, safety and risk reduction, evidence-based practice, teamwork, quality improvement, informatics and data management, and professionalism—following the implementation of the Practical Rational Care model (P = 0.001 and 0.002). These results align with previous research by Kim et al. (2022), who reported similar enhancements in patient-centered care and safety competencies among nursing students through simulation-based education. The observed advancement in evidence-based practice is supported by Dang et al. (2022), who emphasize the necessity of incorporating evidence-based frameworks into nursing curricula. Improvements in teamwork and quality improvement mirror findings from Foronda et al. (2022), who highlight the significance of interprofessional education in fostering collaborative practice and enhancing quality outcomes among healthcare providers. Similarly, the notable progress in informatics and data management aligns with Nguyen et al. (2023), who stress the importance of integrating health informatics training to prepare nursing students for contemporary healthcare demands. Lastly, the increase in professionalism concurs with Smith et al. (2022), underscoring the value of role modeling and mentorship in cultivating professional growth among nursing students.

With reference to clinical practical skills the current study indicated that there is highly statistical significant improvement in the total mean score of clinical practical skills and all seven domains post-implementation of practical rational care model (P=0.001, 0.002 & 0.003).This study's findings bring into line with previous research conducted by **Riopel, et al; (2022)**Who studied clinical reasoning assessment tool to determine if there would be correlations between physical therapy (PT) and occupational therapy (OT) student and faculty ratings of CR skills after an SP experience at a small private liberal arts university in the northeastern U.S. in 2021, and stating that the students report better learning outcomes related to CR from active participation in clinical simulations where they

can initiate their learning through independent facilitation of a patient scenario from start to finish and later reflect on the experience with their educator.**From my regard this may be due to** clinical reasoning as a manner of nurses observing the status of the patients, processing relevant data/records, comprehending the problem of the patients, planning and implementing involvements, evaluating results, reflecting from the results, and learning from the methods.

Similarly, Amin et al. (2023) explored the impact of utilizing a clinical judgment rubric as a tool for enhancing clinical reasoning. Their study revealed a highly significant improvement in students' abilities to build rapport, engage in open discussions, and comprehend patients' perspectives between pre- and post-intervention assessments ($p < 0.01$). Additionally, there was a modest but significant improvement in patient care skills ($p < 0.05$). Regarding overall skill performance, the mean score increased from 10.27 ± 3.11 before the intervention to 14.99 ± 2.89 after, with the change reaching statistical significance ($p < 0.05$).

This study also identified a moderate statistically significant positive correlation between the total clinical reasoning skills score and clinical practical skills prior to the implementation of the Practical Rational Care model. Post-implementation, the correlation between these two measures became highly statistically significant and positive. These results align with earlier research by Lee et al. (2022), who observed a strong association between clinical reasoning and practical skills among nursing students undergoing structured clinical training similar to the PRC model, reporting a correlation coefficient of $r = 0.85$ ($p < 0.001$). Similarly, Kim et al. (2023) examined the influence of a clinical reasoning framework on nursing students' practical abilities and found a significant positive correlation post-intervention ($r = 0.92$, $p < 0.001$). Their findings support the notion that clinical reasoning frameworks enhance nursing students' capacity to translate theoretical knowledge into practical application.

In line with this, Reis da Silva (2024) highlighted that the Rational Care model, grounded in the clinical reasoning cycle, effectively addresses the growing demands of today's healthcare environment, where nurses must exhibit advanced clinical reasoning and decision-making abilities. Incorporating the Rational Care model into nursing education enables educators to better prepare students for the complexities of modern clinical practice, ensuring they deliver safe, effective, and patient-centered care. From a research perspective, the PRC model is a valuable educational tool that fosters essential clinical competencies by integrating structured frameworks with active learning. This approach equips students to manage the challenges of patient care more effectively, thereby improving patient outcomes and safety. Ultimately, the findings of this study emphasize the critical role of adopting teaching strategies like the PRC model to equip future nurses with the necessary skills for competent practice.

Conclusions:

The implementation of the Practice Rational Care (PRC) model had a positive impact on the clinical reasoning and practical skills of maternity nursing students.

Recommendations:

The following was suggested in light of the study's findings:

• It is recommended to integrate the Practice Rational Care model as an innovative teaching strategy within maternity nursing clinical education to enhance students' clinical reasoning abilities.

• Future studies could compare the effectiveness of the PRC model with other established teaching strategies (case script, simulation, and problem-based learning) to determine its relative benefits.

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