International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

# Usefulness of High-Fidelity Simulation to Nursing Students' Critical Thinking Disposition and Clinical Performance

**Louie Jay O. Adlao[1], Cynthia S. Superable[2]**

[1]Professor, College of Nursing, Midwifery and Radiologic Technology, Misamis University, Ozamiz City, Philippines
[2]Dean, Graduate School, Misamis University, Ozamiz City, Philippines

**Abstract**
High-fidelity simulation provides students with realistic and immersive scenarios, allowing them to develop clinical skills and critical thinking. This study explored the usefulness of high-fidelity simulation on nursing students' critical thinking disposition and clinical performance following the intervention. A quasi-experimental design was employed, utilizing both controlled and experimental groups, each consisting of 30 students selected through purposive sampling. The study was conducted in a higher education institution in Ozamiz City, Philippines. The data were collected through a researcher-made Critical Thinking Disposition questionnaire while a documentary analysis for nursing students' clinical performance. The data were analyzed using frequency, weighted mean, standard deviation, and t-test. Nursing students in both the control and experimental groups exhibited a strong critical thinking disposition. However, they differ in terms of open-mindedness, inquisitiveness, and analytical thinking. Most of the participants in the control group received a fair rating, whereas approximately half of the experimental group attained a satisfactory level of clinical performance. No notable gap in clinical performance was observed among the participants in the control and experimental groups. Both groups consistently demonstrated high levels of critical disposition, indicating a shared proficiency in critical thinking skills. Although there was a significant difference in participants' open-mindedness, inquisitiveness, and analytical thinking between the groups, no substantial distinction was observed in reflectiveness. The varying levels of clinical performance suggest potential disparities in the efficacy of instructional approaches or intervention, though there were no discernable differences in clinical performance between the control and experimental groups. Nursing educators may develop laboratory activities centered on real-life scenarios and problem-solving to enhance students' critical thinking, while future researchers could focus on evaluating clinical skills independently rather than of the overall grades, which are often influenced by exams, quizzes, and students' attitudes.

**Keywords**: High-Fidelity, Critical Thinking, Clinical Performance

## 1. Introduction

Nursing education is pivotal in acquiring competencies crucial for producing competent graduate nurses. Competencies are essential in safeguarding and enhancing patients' lives. To ensure that students are

adequately prepared for their clinical exposure, nursing education needs laboratory experiences that involve the demonstration and return demonstration of nursing procedures.

High-fidelity simulation, in this context, emerges as a valuable tool. It enables students to practice nursing procedures without the risk of harming human beings. It enhances their technical skills and cultivates critical thinking, decision-making, and problem-solving abilities. Simulation in the field of health sciences is an innovative pedagogy. It helps students to apply their knowledge in clinical settings, thus reducing the gap between knowing and doing [1].

The most prominent benefits of the simulation activities were the improvement of knowledge gained, skill performance, team coordination, and retention of competency by the participants [2]. Integrating high-fidelity simulation into nursing education safeguards patients and empowers students with the competencies needed to excel in their future roles as dedicated and skilled healthcare providers. The use of simulation in replacement of the traditional clinical experience promotes enhanced learning and alleviates the limitations of traditional clinical placement [3]. Improving patient safety is the major impetus behind the widespread uptake of simulation-based education throughout undergraduate and postgraduate clinical curricula, both nationally and internationally [4]. However, in the Philippines, the use of high-fidelity simulation in nursing education is still in its early stages. Few nursing colleges have laboratories where students can practice nursing skills and competencies with high-fidelity mannequins [5].

High-fidelity simulation uses computer-driven mannequins with physiological and pharmacological modeling to mimic real scenarios, allowing students to assess findings, make clinical decisions, and experience team-based resuscitation. It offers repeated feedback opportunities, safely transitioning students from theory to practical experience. It enhances nursing students' satisfaction, self-confidence, self-efficacy, knowledge, and performance, thanks to deliberate practice and escalating task complexities [6, 7].

Novice nursing students often fear entering a patient's room in the clinical area. Fears of harming a patient or being unprepared to answer a patient's or family member's question often are found to cause initial jitters, which can compromise student self-confidence. The use of high-fidelity patient simulation in a clinical scenario can help students develop critical thinking and clinical reasoning skills [8]. Critical thinking skills are important to provide effective care to patients [9].

Nursing students' critical thinking disposition is pivotal in providing optimal patient care, enabling them to effectively assess, diagnose, and address complex healthcare situations. Ideal critical thinkers possess curiosity, broad knowledge, trust in reason, open-mindedness, and honesty in confronting personal biases. They excel in judgment, problem formulation, information seeking, and criteria selection. These thinkers focus on investigation and persistently seek relevant information. In nursing care, critical thinking is indispensable. It involves actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating information acquired through observation, experience, reflection and reasoned communication. This process enhances students' critical thinking skills, a vital aspect of nursing education, where students are encouraged to build their knowledge [10].

Nursing interns undergo clinical training as part of their education to ensure practice readiness. However, considering the nature of their work and lack of experience in the clinical environment, nursing interns pose a risk of harm to both the health of their patients and their reputation as nurses [11]. Simulation has been used in clinical education and evaluation of clinical competency. Simulation-based assessment enables direct assessment of clinical performance and provides an opportunity to simultaneously assess knowledge, clinical reasoning, and teamwork. It has the advantage of being able to present scenarios that

are not visible and allow students to perform the entire treatment process in a safe environment with no risk to patients, which provides treatment evaluation and feedback [12]. The high-fidelity simulation laboratories demonstrate an efficient outlet for nurses to practice the competencies required to take care of complicated, highly critical cases, drill for emergency preparedness, or function collaboratively among a team of healthcare providers [13].

Good clinical performance means appropriate nursing care has been provided to the patients. Nursing students' clinical performance depends on the accumulation of theoretical knowledge and practical training. It draws from the combination of knowledge, skills, and attitudes that nursing students achieve before graduating [14].

High-fidelity simulation can bridge the gap between theoretical knowledge and nursing practice and improve the safety and quality of patient care in baccalaureate nursing education. However, despite the benefits of high-fidelity patient simulation, the transferability of skills was not assured, as incompatibilities were identified between the simulated and clinical settings. Furthermore, high-fidelity patient simulation needs a more comprehensive measurement of the clinical competence of the students. Seventy percent of new graduate nurses are involved in a medical error [15].

This study investigates the usefulness of high-fidelity simulation to nursing students' critical thinking disposition and clinical performance after treatment. Specifically, it sought to:

1. Determine the critical thinking disposition between the control and experimental groups.
2. Determine the significant difference in the critical thinking disposition between the control and experimental group.
3. Determine the clinical performance of the control and experimental groups as to the level of confidence and grades.
4. Determine the significant difference in the clinical performance of the control and experimental group.

## 2. Methodology

### 2.1 Design

A quasi-experimental design was employed to assess the impact of high-fidelity simulation on the critical thinking disposition and clinical performance of nursing students. This research was relevant in the context of nursing education and training, as it sought to bridge the gap between theoretical knowledge and practical application. The study comprised two distinct groups: a controlled group, where students did not experience high-fidelity simulation, and an experimental group, where students actively engaged in high-fidelity simulation exercises. By comparing these groups, the study provided valuable insights into the effectiveness of high-fidelity simulation as an educational tool, potentially enhancing the nursing curriculum and student learning outcomes**.**

### 2.2 Setting

This study was conducted in one of the private non-sectarian Higher Education Institution in Ozamiz City, Misamis Occidental, Ozamiz City, Philippines

### 2.3 Participants

The study's participants consisted of 60 nursing selected through purposive sampling. The 60 participants were distributed to the Control Group and Experimental Group, of which purposive sampling was used to determine to which group the participants belonged. The following were the selection criteria: (1) enrolled in the nursing program during the first semester of the Academic Year 2023-2024, (2) a third-year nursing

students with active involvement in clinical exposure, and (3) gave the consent to participate in the research.

### 2.4 Instruments

A researcher-made research instrument was used to gather data on Critical Thinking Disposition. This tool investigated the critical thinking disposition of nursing students who underwent pilot testing. This tool contains categories with each Cronbach Alpha result, such as open-mindedness (α=0.7870), curiosity (α=0.9707), reflectiveness (α=0.9705), and analytical thinking (α=0.9779). The continuum was used in interpreting and analyzing the data:

| Continuum | Responses | Interpretation |
|---|---|---|
| 3.26-4.00 | Strongly Agree (SA) | Very High (VH) |
| 2.26-3.25 | Agree (A) | High (H) |
| 1.26- 2.25 | Disagree (DA) | Low (L) |
| 1.00-1.26 | Strongly Disagree (SDA) | Very Low (VL) |

On the other hand, a documentary analysis was used to determine the participants' clinical performance. The nursing students' midterm and semifinal grades in the clinical area were taken from their respective clinical instructors.

| Clinical Grades | Interpretation |
|---|---|
| 1.25-1.00 | Outstanding |
| 1.75-1.50 | Very Satisfactory |
| 2.25-2.00 | Satisfactory |
| 2.75-2.50 | Fair |
| 3.00 | Poor |

### 2.5 Data Gathering Procedure

Before the study commenced, the researcher secured a letter of permission from the Dean of the Graduate School to conduct the study. Another letter of request was given to the Dean of the College of Nursing, Midwifery and Radiologic Technology to allow the use of high-fidelity simulation and permit the identified students to participate in the study. After the approval of the letter of request, the researcher also sought the consent of the identified participants.

After all requests were approved, the researcher identified a cohort of potential participants, ensuring they met the inclusion criteria. A total of sixty participants were then selected through purposive sampling from the third-year nursing student population. Subsequently, the 60 participants were divided into two groups: 30 for the experimental group and 30 for the control group using purposive sampling. Before the final group assignment, participants were paired based on equivalent qualifications or profiles, specifically considering grades in professional subjects and clinical performance.

Upon identifying all participants, the researcher demonstrated the specified procedures, such as catheterization, lung sound assessment, and skin assessment, using high-fidelity simulation as the educational intervention for the experimental group. Following this, participants in the experimental group engaged in a return demonstration to gain hands-on experience before applying the procedure in the clinical setting. Conversely, no demonstration or return demonstration using high-fidelity simulator was conducted for the control group. Following a week of demonstration and return demonstration within the experimental group, both control and experimental group participants were assigned to the clinical area to provide nursing care to their designated patients. Clinical instructors observed and graded participants based on their clinical performance throughout their clinical exposure.

After one month of clinical exposure, experimental and control groups completed a questionnaire on critical thinking disposition, evaluating their critical thinking skills in patient care. In addition to the critical thinking questionnaire, participants' theory and clinical performances were assessed to ascertain the impact of high-fidelity simulation on students' critical thinking skills. When all necessary data were collected, they were tallied and analyzed using appropriate statistical methods to determine the intervention's effect on critical thinking disposition and clinical performance

### 2.6 Ethical Consideration

This study obtained permission from the Dean of the Graduate School, securing approval from the Dean of the College of Nursing, seeking informed consent from the participants before data gathering, fully articulating the study's purpose, benefits, and potential risks to the participants, providing assurance that they could withdraw from the study at any time with a confidentiality guarantee for the information provided, encouraging open communication with the researcher throughout the study for queries and concerns, and ensuring participants that their identity would always remain anonymous, and their information confidential throughout the study. Additionally, the Misamis University-Research Ethics Board reviewed and approved the conduct of this study.

### 2.7 Data Analysis

To analyzed and interpret the gathered data, various statistical tools were employed:

Frequency and Percentage. This tool was used to determine the distribution of clinical performance among participants in both the control and experimental groups.

Weighted Mean and Standard Deviation. The weighted mean assessed individual scores of students in both groups, assigning specific weights to various components to indicate their importance in evaluating critical thinking disposition. Meanwhile, the standard deviation was employed to gauge the variability or dispersion of scores within each group, providing insights into how critical thinking disposition scores differed among individuals in the control and experimental groups.

T-test. This statistical method determined the significance of the difference in critical thinking disposition and clinical performance between the control and experimental groups.

## 3. Results and Discussion

### 3.1 Critical Thinking Disposition for the Control and Experimental Group

Table 1 provides a comprehensive overview of the critical thinking disposition of participants in both the control and experimental groups.

Control Group: The overall weighted mean of 3.62 (SD=0.0754) suggests a high level of critical thinking disposition within the control group.

Open-mindedness. The weighted mean of 3.66 suggests that nursing students in the Control Group possess. A very high degree of open-mindedness. Nursing students are likely to work well in the diverse teams, fostering an environment where different viewpoints are valued and considered. Nursing students who approach diverse patient populations with an open mind are more likely to understand and appreciate the cultural nuance that influence healthcare decisions.

Inquisitiveness. The very high weighted mean of 3.51, indicating a heightened level of curiosity, suggests that nursing students within the Control Group possesses a natural inclination for active engagement with their studies. Inquisitive nursing students are more likely to seek a comprehensive understanding of their patient’s needs, conditions, and the latest advancement in healthcare.

Reflectiveness. The very weighted mean of 3.65 signifies a strong tendency toward reflectiveness within the Control Group. Nursing students who exhibit a thoughtful and contemplative approach to information are likely to engage in critical self-assessment, allowing them to evaluate their clinical experiences, decision-making processes, and interactions with patients.

Analytical Thinking. The weighted mean of 3.67 indicates a substantial level of analytical thinking within the Control Group. The finding implies that students in the group possess a robust capacity for logical and structured reasoning, essential attributes for healthcare professionals who must navigate intricate patient cases and diagnostic challenges.

Experimental Group. Table 1 shows an Overall Weighted Mean of 3.62 (SD=0.0754), categorized as very high (VH) in the experimental group's Critical Thinking Disposition. This indicates a robust collective disposition toward critical thinking within the Experimental Group.

Open-mindedness is exceptionally high, with a weighted mean of 3.99, showcasing an extraordinary willingness among nursing students to embrace diverse perspectives and ideas.

Analytical thinking with a Weighted Mean of 3.83 implies that students possess a strong ability for logical and structured reasoning.

Inquisitiveness, with a weighted mean of 3.77, indicates a high level of curiosity and eagerness to explore among nursing students.

Reflectiveness, with a weighted mean of 3.75, suggests a cohort that critically assesses their thinking processes and experiences.

The overall very high critical thinking disposition observed in the Experimental Group underscores that the nursing students are highly capable and adaptive professionals.

**Table 1. Critical Thinking Disposition for the Control and Experimental Group**

| Critical Thinking Disposition | Control Group | | | Experimental Group | | |
|---|---|---|---|---|---|---|
| | WM | StDev | I | WM | StDev | I |
| **Open-Mindedness** | 3.66 | 0.3607 | VH | 3.99 | 0.0507 | VH |
| **Inquisitiveness** | 3.51 | 0.3550 | VH | 3.77 | 0.3565 | VH |
| **Reflectiveness** | 3.65 | 0.3785 | VH | 3.75 | 0.2609 | VH |
| **Analytical Thinking** | 3.67 | 0.4759 | VH | 3.83 | 0.2412 | VH |
| **Overall Weighted Mean** | **3.62** | **0.0754** | **VH** | **3.62** | **0.0754** | **VH** |

Legend: 3.26-4.00-Very High (VH) 1.26-2.25 – Low (L)
2.26-3.25 – High (H) 1.00-1.26 -Very Low (VL)

### 3.2 Significant Difference in the Critical Thinking Disposition Between the Control and Experimental Groups

Table 2 shows that the critical thinking disposition in terms of open-mindedness, inquisitiveness, and analytical thinking between the control group and experimental group differs. Open-mindedness (t-value: 4.89, p-value: 0.00**) has substantial and statistically significant differences, implying that the experimental interventions have a considerable impact on fostering an open-minded approach among nursing students in the Experimental Group. The experimental interventions of the high-fidelity simulations as an innovative teaching strategy expose nursing students to a variety of perspectives, challenging traditional norms and fostering a more open-minded outlook. Active learning methodologies and real-world case studies could be instrumental in broadening students' perspectives. Debriefing made

learning clearer and more comprehensive, resulting in improved critical thinking among nursing students [16].

Inquisitiveness (t-value: 2.74, p-value: 0.01) has a significant difference between the groups. The experimental interventions contribute to a heightened level of curiosity and eagerness to explore within the Experimental Group, suggesting a positive impact on this critical thinking disposition.

The significant difference between the two groups in analytical thinking (t-value -4.99; p-value 0.00) underscores the impact of interventions on enhancing nursing students' ability to break down complex issues into components and analyze them systematically.

The Experimental Group intervention, which used high-fidelity simulations to enhance the students' analytical thinking, specifically targeted the enhancement of analytical skills. The incorporation of high-fidelity simulations provided students with a comprehensive toolkit, enabling them to approach intricate healthcare scenarios in a more organized and structured manner.

**Table 2. Significant Difference on the Critical Thinking Disposition Between the Control and Experimental Group**

| Control and Experimental Group | t value | p-value | Decision |
|---|---|---|---|
| **Open-Mindedness** | 4.89 | 0.00** | Reject Ho |
| **Inquisitiveness** | 2.74 | 0.01** | Reject Ho |
| **Reflectiveness** | 1.34 | 0.191 | Accept Ho |
| **Analytical Thinking** | -4.99 | 0.00** | Reject Ho |

Ho: There is no significant difference in the critical thinking disposition between the control and experimental groups.

Legend: 0.00-0.01**Highly Significant, 0.02-0.05*Significant above 0.05 Not Significant

### 3.3 Clinical Performance of the Students in the Control and Experimental Group

Control Group. The data in Table 3 reveals that 43.33% of the nursing students in the control group obtained a rating of “fair.” The sizable percentage in the "Fair" category suggests a notable portion of students may be facing challenges or gaps in their clinical performance.

Experimental Group. 3.33% of the nursing students rated their clinical performance as very satisfactory. The focus on practical applications and skill-building activities may contribute to a robust level of competence among most students. It suggests that experimental interventions place a strong emphasis on developing foundational clinical skills.

Debriefing sessions following simulation activities are crucial in enhancing learning and performance. Debriefing is important as a means of reflection and identifying its positive impact on student performance. It allows students to analyze their actions, identify areas for improvement, and make connections between theory and practice [17].

**Table 3. Clinical Performance of the Students in the Control and Experimental Group**

| Clinical Performance | Control Group | | Experimental Group | |
|---|---|---|---|---|
| | Frequency | Percentage | Frequency | Percentage |
| **Outstanding** | - | - | - | - |

| | | | | |
|---|---|---|---|---|
| **Very Satisfactory** | 1 | 3.33 | 1 | 3.33 |
| **Satisfactory** | 8 | 26.67 | 15 | 50.00 |
| **Fair** | 13 | 43.33 | 10 | 33.33 |
| **Poor** | 6 | 26.67 | 4 | 13.33 |
| **Total** | **30** | **100.00** | **30** | **100.00** |

### 3.4 Significant Difference in the Clinical Performance Between the Control and Experimental Groups

Table 4 presents the statistical analysis of the clinical performance of nursing students in both the Control and Experimental Groups (t-value of -1.73 and a p-value of 0.094), which accepts the null hypothesis (Ho)—no statistically significant difference in clinical performance between the two groups. This outcome prompts a closer examination of the factors contributing to the observed similarities in clinical performance. Both the Control and Experimental Groups may have been homogenous in terms of educational background, prior clinical exposure, or baseline clinical skills.

The relatively small sample size may influence the statistical analysis. With a larger sample, subtle differences may become more apparent, potentially affecting the significance of the results. The small sample size could contribute to the non-significant findings. The absence of a significant difference suggests the need for a critical evaluation and potential refinement of experimental interventions.

Further, the clinical performance assessment shall necessarily align with the skills development imparted during Simulation activities. The assessment used in this study covered the general outcomes evaluation. The customized assessment may explain why the experimental group has a larger number of Satisfactory achievers.

**Table 4. Significant Difference in the Clinical Performance Between the Control and Experimental Groups**

| **Clinical Performance** | **t value** | **p-value** | **Decision** |
|---|---|---|---|
| **Control and Experimental Group** | -1.73 | 0.094 | Accept Ho |

## 4 Conclusion and Recommendations

The nursing students in the control and experimental groups demonstrate an exceptionally high level of critical disposition. The two groups are homogenous and proficient in critical thinking skills. The groups differ in their critical thinking disposition in terms of open-mindedness, inquisitiveness, and analytical thinking. The clinical performance after the treatment differs, leading the experimental group to achieve much better. This is even though the study found no significant difference in clinical performance between the control group and the experimental group. The clinical performance tool used in this study is designed in the class for general outcomes evaluation and is not specific to the skill development imparted during the simulation activities. Thus, it is strongly recommended that the use of high-fidelity simulation in the nursing program be maintained and enhanced. The nursing clinical coordinators may design laboratory activities that emphasize real-life scenarios and problem-solving exercises to enhance students' critical thinking abilities. The nursing faculty designs classroom and laboratory activities that enhance open-mindedness, inquisitiveness, and analytical thinking. Nursing educators continuously review and enhance their teaching methods to accommodate the varying levels of clinical performance demonstrated by

students, with the goal of achieving more uniform and impactful learning outcomes. Future researchers could explore the evaluation of clinical competencies as a separate measure, rather than relying solely on overall academic grades, which may be affected by factors such as written assessments, classroom tests, and student behavior.

**References**

1. K. El-Mouhdi, K. Et-tayyeby, F. Dahmani, F. Milouk and A. El Ouali Lalami: Training Based on Simulation Pedagogy: Evaluation of Participants' Satisfaction with the First National Forum on Simulation in Nursing in Morocco. In Nursing Forum. (2023).
2. A.Y. Sami, A.Y. Nabeel and A. Amatullah: Simulation-Based Training to Improve Obstetric/Perinatal Nurses Competency in Managing Obstetric Emergencies in Saudi Arabia (KSA). In International Journal of Caring Sciences, 12(3), 1788. (2019)
3. J. Roop: Replacing the Pediatric Traditional Clinical Experience with High-Fidelity Simulation in an Associate Degree Nursing Program (Order No. 28971060). Available from ProQuest Central. (2642919368). https://www.proquest.com/dissertations-theses/replacing-pediatric-traditional-clinical/docview/2642919368/se-2. (2022).
4. O.M. Leng. C. Rothwell, A. Buckton, C. Elmer, J. Illing and J. Metcalf: Effect of In Situ High-Fidelity Simulation Training on the Emergency Management of Pneumonia (INSTEP): A Mixed-Methods Study. In BMJ Simulation & Technology Enhanced Learning, 4(4), 190. (2018).
5. J.M. Pananganan. Use of High-Fidelity Simulation in Clinical Teaching: Nurse Educators' Perspective. The Malaysian Journal of Nursing (MJN), 14(4), 73-82. (2023).
6. J. Huang, Y. Tang, J. Tang, J. Shi, H. Wang, T. Xiong, B. Xia, L. Zhang, Y. Qu and D. Mu: Educational Efficacy of High-Fidelity Simulation in Neonatal Resuscitation Training: A Systematic Review and Meta-Analysis. BMC Medical Education, 19, 1-10. (2019).
7. C. La Cerra, A. Dante, V. Caponnetto, I. Franconi, E. Gaxhja, C. Petrucci, C. Alfes and L. Lancia: Effects of High-Fidelity Simulation Based on Life-Threatening Clinical Condition Scenarios on Learning Outcomes of Undergraduate and Postgraduate Nursing Students: A Systematic Review and Meta-Analysis. In BMJ open, 9(2), e025306. (2019).
8. M. Craft-Blacksheare and Y. Frencher: Using High Fidelity Simulation to Increase Nursing Students' Clinical Postpartum and Newborn Assessment Proficiency: A Mixed-Methods Research Study. Nurse Education Today, 71, 198-204. (2018).
9. M. Hasanpour, M. Bagheri, M. Bagheri and F.G. Heidari: The Relationship Between Emotional Intelligence and Critical Thinking Skills in Iranian Nursing Students. In Medical Journal of the Islamic Republic of Iran, 32, 40. (2018).
10. H. Fitriani, M. Asy'Ari, S. Zubaidah and S. Mahanal: Critical Thinking Disposition of Prospective Science Teachers at Ikip Mataram, Indonesia. In Journal of Physics: Conference Series (Vol. 1108, No. 1, p. 012091). IOP Publishing. (2018, November).
11. J. Guerrero, A.H. Hafiz, N.A.E. Eltohamy, N. Gomma and I. Al-Jarrah: Repeated Exposure to High-Fidelity Simulation and Nursing Interns' Clinical Performance: Impact on Practice Readiness. Clinical Simulation in Nursing, 60, 18-24. (2021).
12. J.H. Yu, M.J. Lee, S.S. Kim, M.J. Yang, H.J. Cho, C.K. Noh and Y.J. Jung: Assessment of Medical Students' Clinical Performance Using High-Fidelity Simulation: Comparison of Peer and Instructor

Assessment. BMC Medical Education, 21, 1-6. (2021).
13. A. Ayed, I. Khalaf, I. Fashafsheh, A. Saleh, H. Bawadi, J. Abuidhail, ... and H. Joudallah: Effect of High-Fidelity Simulation on Clinical Judgment among Nursing Students. INQUIRY: The Journal of Health Care Organization, Provision, and Financing, 59. (2022).
14. M.S. Kim and S.K. Sohn: Emotional Intelligence, Problem-Solving Ability, Self-Efficacy, and Clinical Performance among Nursing Students: A structural equation model. Korean Journal of Adult Nursing, 31(4), 380-388. (2019).
15. A. Johnson: The Impact of Multi-Academic Level Student Simulation on Clinical Judgment in Prelicensure Nursing Students. https://www.proquest.com/dissertations-theses/impact-multi-academic-level-student-simulation-on/docview/2863683337/se-2. (2023).
16. H.Y. Koo, B.R. Lee, and H. An: Development and Evaluation of Case Video-Based Debriefing on a Simulation of High-Risk Neonatal Care for Nursing Students in South Korea: A mixed-methods study. BMC Nursing, 22, 1-11. doi: https://doi.org/10.1186/s12912-023-01507-2. (2023).
17. Y.J. Oh., H.Y. Kang, Y. Song and R. Lindquist: Effects of a Transformative Learning Theory Based Debriefing in Simulation: A Randomized Trial. Nurse Education in Practice, 50, 102962. (2021).