Nursing Current: Jurnal Keperawatan

Journal Homepage: https://ojs.uph.edu/index.php/NCJK/

Original Research

The Role of Laboratory Simulation in The Development of Caring Behavior in Nursing Students: A Scoping Review

Heman Pailak[1*], Yakobus Siswadi[2]

1-2 *Faculty of Nursing, Universitas Pelita Harapan*

A R T I C L E I N F O

Keywords:

Caring behavior

Empathy

High-fidelity

Nursing students

Simulation

A B S T R A C T

Caring behavior is a fundamental value in nursing practice and education. Simulation has emerged as an effective strategy to enhance not only clinical competence but also empathy, communication, and self-awareness in nursing students. This scoping review aims to explore the role of laboratory simulation in developing caring behaviors among nursing students and to identify the types of simulation used and related outcomes. Following the Joanna Briggs Institute (JBI) methodology, literature was searched in four databases (PubMed, EBSCO, ScienceDirect, and ProQuest) for studies published between 2015 and 2025. Inclusion criteria focused on nursing students, simulation-based learning, and caring or empathy outcomes. Twelve studies were included, predominantly quantitative in design (n = 10), along with one qualitative and one mixed-method study. Sample sizes ranged from 26 to 248 participants. Simulations used included high-fidelity (n = 4), virtual reality (n = 3), standardized patients (n = 3), and low-fidelity or role-play (n = 2). Most studies showed positive effects on empathy, communication skills, and caring behavior, especially with immersive or high-fidelity simulations. Overall, simulation-based learning, particularly high-fidelity and immersive methods, supports the development of caring behavior in nursing students. Its integration into nursing curricula is essential to prepare nurses for patient-centered, empathetic care.

Received 05 June 2025;
Received in revised form 03 November 2025;
Accepted 13 November 2025

https://doi.org/10.19166/nc.v13i2.9927

* Corresponding author.
E-mail addresses: heman.pailak@uph.edu

INTRODUCTION

The use of simulation in nursing programs is a common practice and continues to evolve due to its well-documented benefits (Koukourikos et al., 2021). Both high- and low-fidelity simulations in nursing education have been shown to support the development of Non-Technical Skills (NTS), such as caring and empathy, both individually and within teams, through experiential and reflection-based learning approaches (Kaur, 2022; Juniarta et al., 2024). As educational tools, high- and low-fidelity simulations can enhance caring or empathic responses to patients, as well as promote more effective team collaboration in nursing practice (Hayden et al., 2014; Raghunathan et al., 2025; Thorp and Bassendowski, 2018; Liebrecht & Montenery, 2016; Ayed et al.,2021).

Literature indicates that the most frequently researched NTS in

laboratory simulation learning are communication and teamwork skills, while the caring aspect has received comparatively little attention (Raghunathan et al., 2025). Low levels of caring behavior and respect for patients' rights among nursing students have been reported by Putri et al. (2023), whereas Rakinaung (2023) found that students' caring behavior in the "being with" dimension was relatively low. However, caring is an essential component of nursing practice that significantly influences the quality of care and patient satisfaction (Watson, 2018; Wuwung et al., 2020). Accordingly, Leach et al. (2021) emphasize that the implementation of simulations integrated with caring science has the potential to provide substantial benefits for academia, healthcare systems, and patients, while also strengthening the development of Evidence-Based Practice (EBP) in nursing.

Despite its potential, efforts in nursing education to develop caring behavior through simulation have faced several challenges (Jafarian-Amiri et al., 2020). Factors such as environmental pressure and stress during initial interactions with educators may diminish caring values during simulation activities (Ben-Ahmed et al., 2024). Moreover, students' caring behavior may be negatively affected by fear, feelings of insecurity, communication limitations, and negative experiences that emerge during the simulation process (Putri et al., 2023).

The limited emphasis of previous studies on the role of simulation in developing caring behavior suggests a clear knowledge gap. Therefore, this scoping review aims to identify the types of laboratory simulations (SimLab) used in nursing education and to examine their role in fostering caring behavior among nursing students based on the existing literature. Accordingly, this review addresses the following research questions:

1. What types of laboratory simulations have been used in nursing education to improve *students'* caring behavior?
2. What is the role of laboratory simulation (Simlab) in developing caring behavior in nursing students as reported in the literature?

METHOD

Search strategy

The search strategy was designed to find both published evidence relevant to the topic. An initial limited search was first conducted on PubMed to identify articles on the subject. The initial search strategy for PubMed was developed using text words from relevant article titles, abstracts, and index terms. The search strategy, which included all identified keywords and index terms, was tailored to each database and information source included. Reference lists of included sources of evidence were also examined for further studies. Only English-language studies were considered. Studies published between 2015 and 2025 were included. The databases searched included PubMed, EBSCO Full Text, ScienceDirect, and ProQuest. The search applied Boolean operators (AND, OR) to combine keywords. Table 1 presents the main concepts, context, and population used in the search strategy.

Table 1. Framework Research Question PCC

Criteria	Details
Population (P)	Nursing Student OR Nursing Students OR Student, Nursing OR Pupil Nurse OR Baccalaureate Education
Concept (C)	Caring OR Empathy OR Attitude
Context (C)	Simulation-learning OR High-Fidelity Simulation Training OR Patient Simulation OR Simulation Training

The search strategy was designed to identify primary research studies employing quantitative, qualitative, or mixed methods approaches. Only articles published in English within the last 10 years (2015–2025) were considered eligible. To ensure comprehensive coverage, Boolean operators (AND, OR) were applied to combine keywords. The final Boolean search string was constructed as follows: *(Nursing Student OR Nursing Students OR Student, Nursing OR Pupil Nurse OR Baccalaureate Education) AND (Caring OR Empathy OR Attitude) AND (Simulation-learning OR High-Fidelity Simulation Training OR Patient Simulation OR Simulation Training).*

Study/Source of Evidence Selection

All citations obtained from the search results were collected and entered the Covidence platform, with duplicates removed before screening. All sources deemed potentially relevant were initially screened. Subsequently, two reviewers conducted a full-text review of each selected citation to confirm eligibility. A clearly documented rationale accompanied any sources excluded during the selection process. In cases of disagreement between reviewers, the issue was resolved through discussion. The final scoping review included a comprehensive report of the search results and study selection process, accompanied by a flowchart following the PRISMA-ScR (Figure 1) guidelines (the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) as described by Tricco et al (2018).

Quality appraisal

The included studies were appraised using the Quality Assessment with Diverse Studies (QuADS) tool, a validated instrument designed to evaluate the methodological and reporting quality of diverse study types within systematic reviews (Harrison et al., 2021).

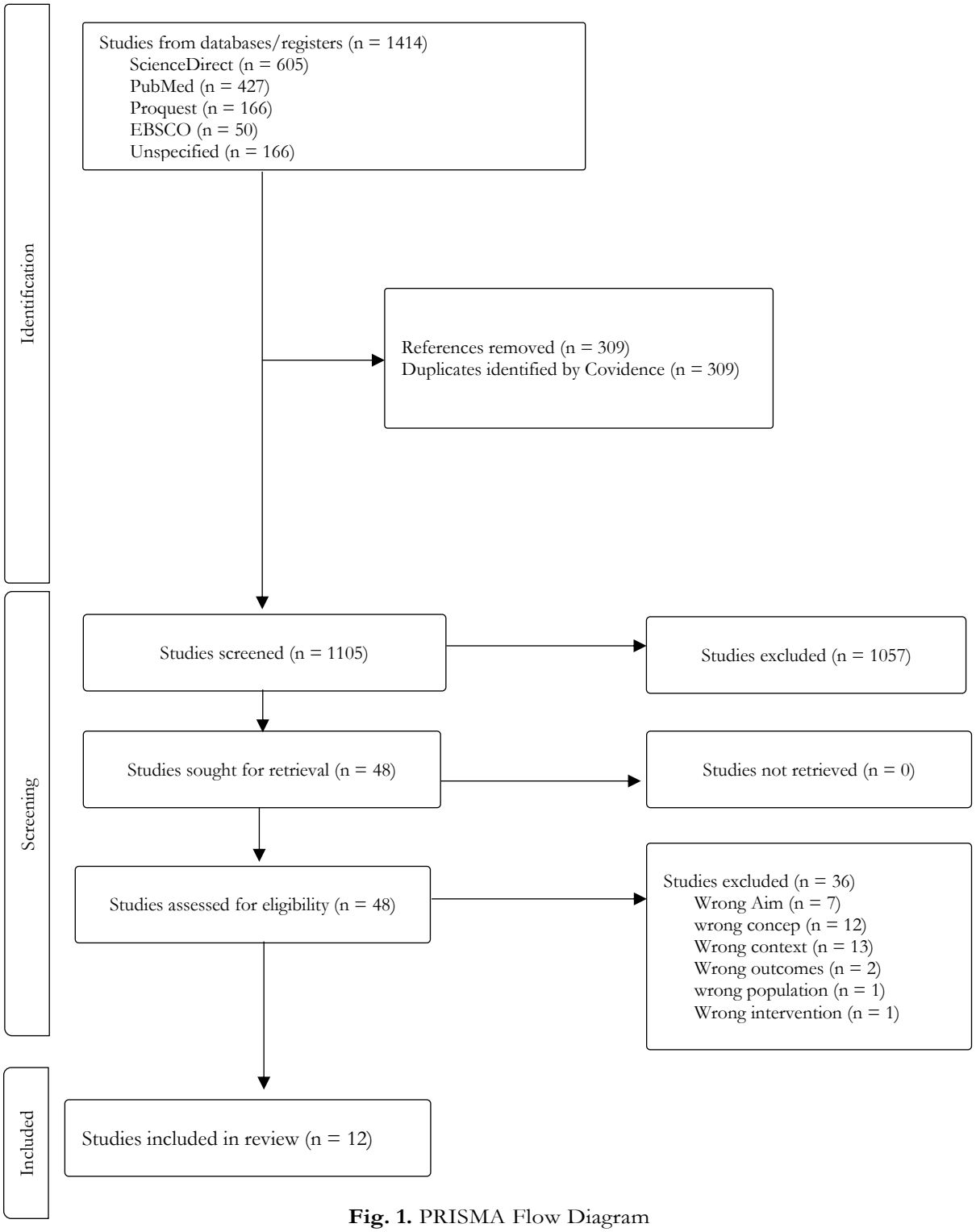

Fig. 1. PRISMA Flow Diagram

The QuADS tool employs a scoring system ranging from zero to three across 13 criteria, with a maximum possible score of 39. Each criterion assesses key aspects such as clarity of aims, appropriateness of study design, data collection methods, and relevance to the review question. The total score is subsequently converted into a percentage to facilitate comparison across studies. Furthermore, a critical appraisal of each source of evidence was conducted using the QuADS tool to assess the methodological rigor and relevance of the included studies. The appraisal protocol is openly available on OSF https://doi.org/10.17605/OSF.IO/65NJH.

Data Extraction

Two independent reviewers extracted data from the articles included in this scoping review using pre-developed data extraction tools. The extracted data included information on study participants, key concepts explored, contextual details, research methodologies employed, and principal findings relevant to the research question. The extraction tools were refined iteratively throughout the review process to ensure consistency and completeness, and any modifications were transparently reported in the final review. In cases of discrepancies between reviewers, resolution was achieved through discussion.

RESULT

A total of 12 articles were included following rigorous screening based on eligibility criteria focused on the population, context, and the core concept of caring behavior among nursing students. These articles were identified through a combination of database searches and full-text screening. The characteristics of the included studies are summarized in Table 2. Geographically, the studies originated from diverse settings: the United States (n = 6), China (n = 2), Spain (n = 2), Oman (n = 1), and Palestine (n = 1), reflecting a broad international perspective on simulation-based learning in nursing education. Methodologically, most of the studies employed quantitative approaches (n = 10), while one adopted a qualitative design (n = 1) and another utilized a mixed-methods approach (n = 1). Common research designs included pretest–posttest studies without control groups (n = 9), a correlational descriptive study (n = 1), and a mixed-methods study that incorporated thematic analysis and statistical testing (n = 1).

Type of Simulation Used to Assess Caring Behavior

The included studies employed a variety of simulation modalities to examine the development of caring behaviors among nursing students. These simulation strategies, summarized in Table 2, varied in both fidelity and interactivity. High-Fidelity Simulations (HFS) (n = 4) were commonly used because of their realistic clinical scenarios and ability to replicate actual patient care environments. Role-playing activities (n= 2) were applied to strengthen interpersonal and empathetic skills in settings with lower technological dependence. Standardized patients (n = 3) provided opportunities for students to practice therapeutic communication in realistic yet controlled encounters. Virtual simulations (n= 3), including immersive digital platforms, enabled flexible and interactive learning, particularly in remote or hybrid educational contexts. Low-fidelity simulations (n = 1) were also utilized, often serving as introductory exercises for basic skill development.

The Role of Simulation in Developing Nursing Students' Caring Behaviour

The included studies highlighted the significant role of simulation-based learning in nurturing caring behavior among nursing students. Simulation was found to be an effective educational strategy for cultivating empathy, self-awareness, communication, and teamwork, which are core components of caring in nursing practice. Several studies emphasized the importance of simulation in enhancing both cognitive (perspective-taking) and affective (empathic concern) empathy, enabling students to understand and respond more sensitively to patients' experiences (n = 6). Some studies focused on encouraging self-awareness through guided reflection and analysis of patient encounters, helping students internalize caring attitudes and ethical sensitivity (n = 2). Other simulations provided immersive experiences where students assumed the roles of elderly, patients with dementia, or individuals with mental illness, fostering deeper understanding and compassion toward vulnerable populations (n = 4). Additionally, simulation activities were designed to strengthen interpersonal communication and therapeutic relationships by promoting active listening, empathy, and trust-building (n = 2). Interprofessional simulations further contributed to the development of caring behavior by encouraging collaboration, teamwork, and mutual respect among healthcare professionals (n = 2).

DISCUSSION

Figure 2 summarizes the key findings discussed in this section.

Various Simulation Approaches in Nursing Education to Improve Caring

HFS were commonly used because of their realistic clinical scenarios and ability to replicate actual patient care environments however, when compared to VR simulations, HFS present several limitations, including higher costs, technical constraints (Park et al., 2025), longer preparation and implementation time (Jacobs et al., 2019), and the potential to foster overconfidence among students (Massoth et al., 2019). In recent years, various simulation technologies, including virtual reality (VR), immersive VR simulations, and game-based learning simulations, have been increasingly utilized in nursing education. Although evidence from optometry education, virtual simulation has been identified as a valuable training and assessment strategy due to its ability to provide contextual, cognitive, functional, task, and psychological fidelity (Edgar et al., 2022). These technologies create an immersive experience that helps students understand the patient's condition more deeply, thus encouraging caring behaviour. Simulations such as the Virtual Dementia Tour (VDT) or auditory hallucination simulations allow students to experience firsthand the perspectives of patients with dementia or psychiatric disorders, which can significantly enhance empathy and compassion (Fernández-Gutiérrez et al., 2022; Liu et al., 2024)

Depth and Rigour of Simulation

The Role of Simulation in Developing Nursing Students' Caring Behaviour

Strengthening Student Empathy

Simulation is an effective method for improving the cognitive and affective empathy of nursing students. When students play the role of patients, they gain a deeper understanding of the patient's experiences and emotions (Deprey and Kobiske, 2023; Al Yazeedi et al., 2025). This process enables students to view caregiving from a personal perspective, often by relating patient experiences to those of loved ones, thereby strengthening their caring identity (Fitzgerald & Ward, 2019). Caring behaviour can be physical, mental, or emotional, verbal or non-verbal, empathy, and support (Cho and Kim, 2024).

Self-Awareness and Reflection Development

Through reflective simulations, students are encouraged to recognize their personal and professional values. As aspiring nurses, nursing students must be aware of and able to apply professional values in decision-making when faced with ethical challenges that arise in the field of healthcare (Poorchangizi et al., 2019). Such self-awareness is fundamental to the development of compassionate and empathetic nursing practice (Ayed et al., 2021; Liu et al., 2024). The development of student self-awareness through reflection can increase concern for patient needs through appropriate nursing care (Tseng et al., 2025).

Immersive Experience of Patient Condition

Simulations provide hands-on experience in understanding patient conditions such as dementia or sensory disorders, which strengthens students' situational empathy (Witherspoon et al., 2023). Human patient simulation, as an evolving educational strategy, allows learners to develop, refine, and apply knowledge and skills in realistic clinical contexts through interactive learning experiences designed to meet specific educational objectives.

Table 2. Results of the Literature Characteristics

Study	Country	Study aim	Study design and participants	Type of Simulation	Quality Appraisal result %
(Huang et al., 2025)	United States	Investigates the influence of VR and perspective-taking on affective empathy in nursing education, focusing on 4 psychological factors: perceived self-location, narrative transportation, emotional engagement, and affective empathy.	Pre-postest experimental design with a control group. Sample size: 26 nursing students	Virtual Reality (VR) narrative media	90
(Holland et al., 2024)	United States	Explore nursing students' experiences in empathy-based interprofessional Simulation, and how these experiences may shape their future practice.	Exploratory qualitative design. 31 final year nursing students	Patient standards	85
(Deprey & Kobiske, 2023)	United States	Assessing the impact of the dementia simulation experience on nursing and physical therapy students' empathy	Cross-sectional descriptive design. Sample 248 nursing student	Virtual Dementia Tour (VDT)	92
(Qu et al., 2024)	China	Compare the effects of Simulation with problem-based learning (SPBL) and Problem-based learning (PBL) in nursing ethics education on nursing students' moral sensitivity, empathy, critical thinking, test scores, and teaching satisfaction.	Quasi-experimental, non-equivalent control group pre-post design. Sample: 61 Nursing students	Patient Standard Make Simulation Base Learning (SPBL)	87
(Sideras et al., 2015)	United State	Assess the impact of a two-stage simulation on nursing students' attitudes, empathy, behavioural intentions, and knowledge towards individuals with schizophrenia.	Quasi-experimental, pre-post test with control group. Sample: 145, 80 Interventions and control 65	Auditory hallucination simulation (Hearing Voices) dan Standardized Patient (SP)	87

(Haley et al., 2017)	United State	Testing the effect of Advancing Care Excellence for Seniors (ACES) simulation on improving active listening, self-awareness, empathy, and patient-centred care (PCC) in nursing students.	Randomised Controlled Trial (RCT) with 3 measurements (baseline, post-intervention, and 4-week follow-up) Sample: 53	High fidelity simulation (HFS)	90
(Liu et al., 2024)	Hongkong	This study aims to evaluate the impacts of IVR-assisted experiential learning on the empathy of undergraduate health care students toward older people with cognitive impairment as the primary outcome (objective 1), on their learning experience (objective 2), and on their attainment of learning outcomes as the secondary outcomes (objective 3).	Thematic qualitative mixed-methods and t-test	Immersive Virtual Reality (IVR):	90
(Witherspoon et al., 2023)	United State	Assessing the impact of patient-role Simulation on nursing students' empathy using Comprehensive State Empathy Scale (CSES)	quasi-experimental, pre-post test Sampel: 83	a role-play patient simulation	87
(Al Yazeedi et al., 2025)	Oman	To determine the effectiveness of high-fidelity Simulation on self-awareness and empathy in undergraduate nursing students.	quasi-experimental with one group pre-posttest, one-way ANCOVA Sample: 67 nursing students	HFS	79
(Arrogante et al., 2022)	Spanyol	To evaluate the effects of high-fidelity simulation training on attitudes towards older people and empathy among undergraduate nursing students.	Quasi experimental longitudinal design with a single group and a pre and post-intervention Sample: 80 nursing students	HFS	84
(Fernández-Gutiérrez et al., 2022)	Spanyol	Develop a multimodal intervention according to the NLN Jeffries Simulation Theory, planned to improve attitudes and empathy towards older adults in undergraduate nursing students using theoretical contents, age simulation suits, and storytelling of old participants, and (2) to	crossover randomised controlled trial with an experimental group, a control group (that transitions to a delayed experimental group) Sample: 83 Nursing Student	Multimodal Simulation dan low Fidelity	95

		evaluate the influence of the simulation flow on the effectiveness of this intervention in improving attitudes and empathy towards older adults			
(Ayed et al., 2021)	Palestina	Evaluate the effect of high-fidelity Simulation on students' perception of self-awareness, empathy, and patient-centered care at pre- and post-intervention in undergraduate' pediatric nursing students at Arab American University in Palestine.	Quasi experiment one group of pretest-posttest design was used. Sample: 83 Nursing Student	High Fidelity Simulation	79

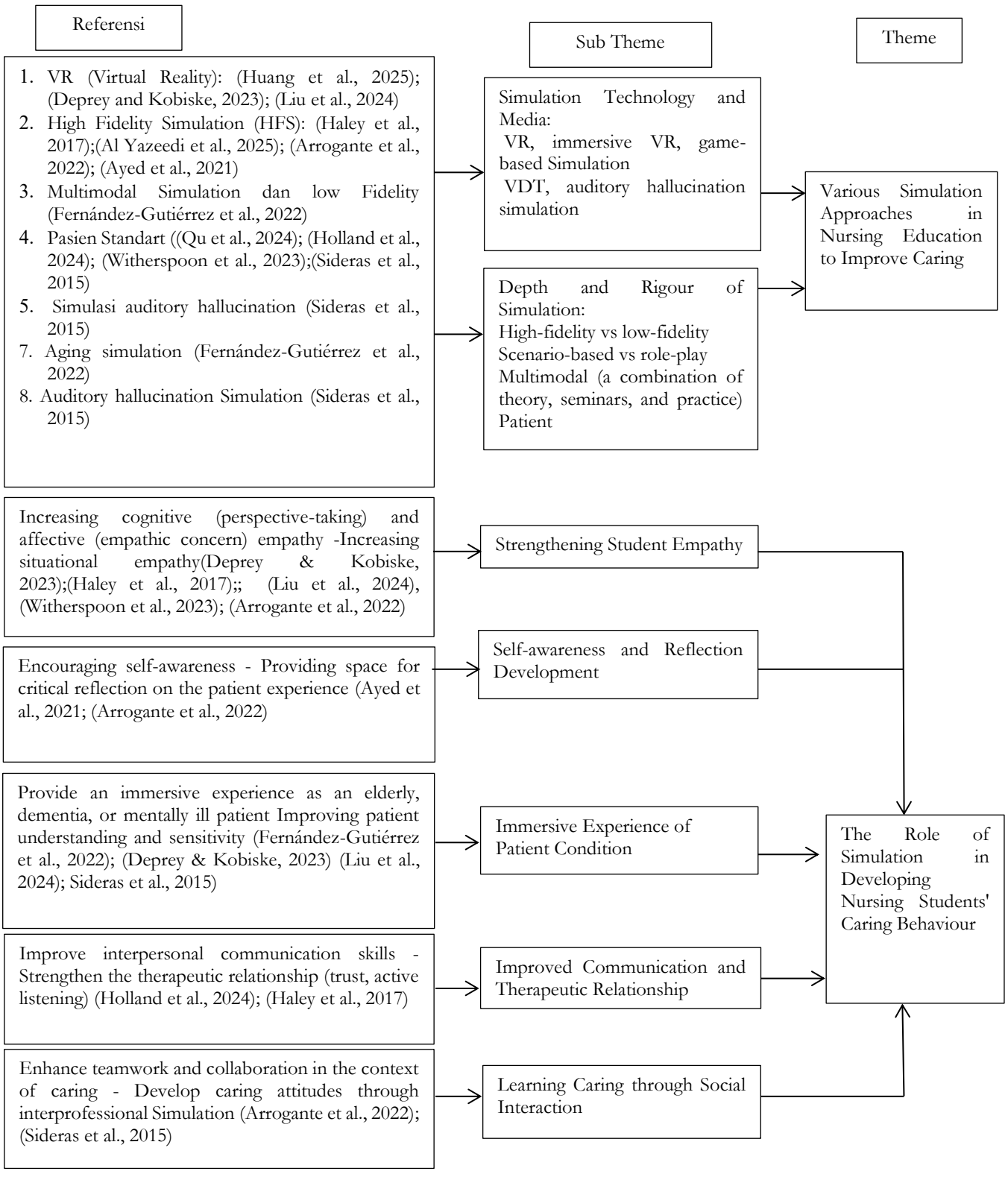

Fig. 2. Mapping themes: Various Simulation Approaches in Nursing Education to Improve Caring

Improved Communication and Therapeutic Relationships

Simulation plays an important role in helping nursing students develop effective therapeutic communication skills, including active listening skills and person-centered care approaches (Haley et al., 2017; Ayed et al., 2021). Active listening is one of the most powerful and meaningful communication tools for expressing concern and empathy. Caring expressions in communication are shaped by individual characteristics, which influence perspectives and word choices (Mercan & Mersin, 2025). Effective communication skills have been shown to significantly influence students' caring behavior (Inocian et al., 2022). In addition, standardized intradisciplinary communication is essential to improve the quality of nursing services and enhance patient safety (Durham, 2008).

Caring Learning through Social Interaction

Group simulation allows students to learn the values of caring through social interaction, including teamwork, caring for others, and interprofessional relationships (Hovland et al., 2024). This approach also enhances advocacy and fosters deeper interpersonal and social empathy, along with greater awareness (Holland et al., 2024). In addition, Holst et al. (2017) stated that good interpersonal relationships between patients, students, and supervisors can improve cooperation, mutual respect, and independence.

The literature review shows that simulation-based learning effectively enhances nursing students' caring behavior by improving empathy, self-awareness, communication, and teamwork. High-fidelity and immersive simulations, such as virtual reality and standardized patients, are particularly effective in promoting empathy and reflective understanding of patients.

Limitations

This study has several limitations. The number of included studies was relatively small, with most employing quasi-experimental designs and self-reported measures, which may introduce response bias. Variations in simulation types, duration, and assessment tools also limit direct comparisons across studies. Additionally, most research was conducted in high-income countries, potentially limiting the generalizability of the findings. Future studies should use standardized tools, larger samples, and diverse settings to strengthen evidence on the long-term impact of simulation on caring behavior.

Implications

Simulation should be integrated as a core learning strategy in nursing education to develop students' caring behavior. By using HFS and immersive technologies such as VR and simulated patients, educators can create realistic learning experiences that enhance empathy, communication, and self-awareness. Nursing curricula should include reflective sessions after simulations to help students internalize caring values and ethical sensitivity. Additionally, simulation-based learning can prepare students to deliver holistic, patient-centered care while improving their confidence and clinical decision-making skills in a safe and supportive environment.

CONCLUSION

Simulation in nursing education, especially those using high technology such as VR and simulated patients, is effective in developing students' caring behavior. Through immersive and reflective learning, students can enhance their empathy, self-awareness, therapeutic communication skills, and holistic understanding of patients. Simulation also offers a safe environment for hands-on practice without risking real patients. Therefore, simulation is an essential teaching method for shaping nurses who are compassionate, competent, and patient-centered. Future research should involve larger and more diverse samples to strengthen the generalizability of findings on simulation-based learning and caring behavior.

ACKNOWLEDGEMENT

This research was funded by Universitas Pelita Harapan (UPH) through institutional research support.

REFERENCES

Arrogante, O., Velarde-García, J.F., Blázquez-González, P., Nieves Moro-Tejedor, M., 2022. The effects of high-fidelity simulation training on empathy and attitudes toward older people among undergraduate nursing students: A quasi-experimental study. Nurse Education in Practice 64, 103441. https://doi.org/10.1016/j.nepr.2022.103441

Ayed, A., Malak, M.Z., Al-amer, R.M., Batran, A., Salameh, B., 2021. Fffect of high-fidelity simulation on perceptions of self-awareness, empathy, and patient-centered care among university pediatric nursing classes. Clinical Simulation in Nursing 56, 84–90. https://doi.org/10.1016/j.ecns.2021.04.005

Durham, K.R.A., 2008. Chapter 51. Enhancing patient safety in nursing education through patient simulation. in: hughes rg, editor. Patient safety and quality: An evidence-based handbook for nurses. rockville (md): Agency for Healthcare Research and Quality (US); 2008 Apr. Chapter 51. Available from: https://www.ncbi.nlm.nih.gov/books/NBK2628/

Cho, M.-K., & Kim, M.Y., 2024. Effectiveness of simulation-based interventions on empathy enhancement among nursing students: a systematic literature review and meta-analysis. BMC Nursing 23, 319. https://doi.org/10.1186/s12912-024-01944-7

Deprey, S.M., & Kobiske, K.R., 2023. Dementia simulation impact on empathy of nursing and physical therapy students: A

quantitative study. Clinical Simulation in Nursing 81, 101412. https://doi.org/10.1016/j.ecns.2023.03.005

Edgar, A.K., Macfarlane, S., Kiddell, E.J., Armitage, J.A., Wood-Bradley, R.J., 2022. The perceived value and impact of virtual simulation-based education on students' learning: a mixed methods study. BMC Medical Education 22, 823. https://doi.org/10.1186/s12909-022-03912-8

Fernández-Gutiérrez, M., Bas-Sarmiento, P., del Pino-Chinchilla, H., Poza-Méndez, M., Marín-Paz, A.J., 2022. Effectiveness of a multimodal intervention and the simulation flow to improve empathy and attitudes towards older adults in nursing students: A crossover randomised controlled trial. Nurse Education in Practice, 64, 103430. https://doi.org/10.1016/j.nepr.2022.103430

Fitzgerald, M. & Ward, J., 2019. Using standardized actors to promote family-centered care. Journal of Pediatric Nursing, 45, 20–25. https://doi.org/10.1016/j.pedn.2018.12.002

Haley, B., Heo, S., Wright, P., Barone, C., Rettigantid, M.R., Anders, M., 2017. Effects of Using an Advancing Care Excellence for Seniors Simulation Scenario on Nursing Student Empathy: A Randomized Controlled Trial. Clinical Simulation in Nursing 13, 511–519. https://doi.org/10.1016/j.ecns.2017.06.003

Harrison, R., Jones, B., Gardner, P., Lawton, R., 2021. Quality assessment with diverse studies (QuADS): an appraisal tool for methodological and reporting quality in systematic reviews of mixed- or multi-method studies. BMC Health Services Research 21, 144. https://doi.org/10.1186/s12913-021-06122-y

Hayden, J. K., Smiley, R.A., Alexander, M., Kardong-Edgren, S., Jeffries, P.R., 2014. The NCSBN national simulation study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. Journal of Nursing Regulation 5, S3–S40. https://doi.org/10.1016/S2155-8256(15)30062-4

Holland, T., Walter, L., Langevin, K., Bourgoin, A., McKelvey, M., Kirk, C., Thomas, C., 2024. Nursing students' experience of a poverty simulation and its impact on empathy and social justice awareness: A descriptive qualitative study. Creative Nursing 30, 65–73. https://doi.org/10.1177/10784535241229143

Holst, H., Ozolins, L.-L., Brunt, D., Hörberg, U., 2017. The learning space—interpersonal interactions between nursing students, patients, and supervisors at developing and learning care units. International Journal of Qualitative Studies on Health and Well-being 12, 1368337. https://doi.org/10.1080/17482631.2017.1368337

Hovland, C., Gergis, M., Milliken, B., DeBoth Foust, K., Niederriter, J., 2024. The value of learning virtual interprofessional collaboration during a pandemic and the future "new normal": health professions students share their experiences. Journal of Interprofessional Care 38, 87–94. https://doi.org/10.1080/13561820.2023.2232401

Huang, K.T., & Ma, Z., Yao, L., 2025. Media-Induced and Psychological Factors That Foster Empathy Through Virtual Reality in Nursing Education: 2×2 Between-Subjects Experimental Study. JMIR Medical Education 11. https://doi.org/10.2196/59083

Inocian, E.P., Hill, M.B., Felicilda-Reynaldo, R.F.D., Kelly, S.H., Paragas, E.D., Turk, M.T., 2022. Factors in the clinical learning environment that influence caring behaviors of undergraduate nursing students: An integrative review. Nurse Education in Practice 63, 103391. https://doi.org/10.1016/j.nepr.2022.103391

Jacobs, S., Taylor, C., Dixon, K., Wilkes, L., 2019. The advantages and disadvantages of using High Fidelity Simulation as an environment to observe undergraduate nurses' actions and their alignment with clinical judgement characteristics. Clinical Nursing Studies 8, 15. https://doi.org/10.5430/cns.v8n1p15

Jafarian-Amiri, S., Zabihi, A., Qalehsari, M., 2020. The challenges of supporting nursing students in clinical education. Journal of Education and Health Promotion 9, 216. https://doi.org/10.4103/jehp.jehp_13_20

Juniarta, Eka, N.G.A., Ferawati Sitanggang, Y., 2024. Empathy in nursing students: a scoping review. Journal of Holistic Nursing 42, S59–S86. https://doi.org/10.1177/08980101231163966

Kaur, A., 2022. All about simulation in nursing: The Indian scenario. Bulletin of Environment, Pharmacology and Life Sciences, 11(Special Issue 4), 190–197

Koukourikos, K., Tsaloglidou, A., Kourkouta, L., Papathanasiou, I., Iliadis, C., Fratzana, A., Panagiotou, A., 2021. Simulation in clinical nursing education. Acta Informatica Medica 29, 15. https://doi.org/10.5455/aim.2021.29.15-20

Liu, J.Y.W., Mak, P.Y., Chan, K., Cheung, D.S.K., Cheung, K., Fong, K.N.K., Kor, P.P.K., Lai, T.K.H., Maximo, T., 2024. The effects of immersive virtual reality–assisted experiential learning on enhancing empathy in undergraduate health care students toward older adults with cognitive impairment: Multiple-Methods Study. JMIR Medical Education 10, e48566. https://doi.org/10.2196/48566

Massoth, C., Röder, H., Ohlenburg, H., Hessler, M., Zarbock, A., Pöpping, D.M., Wenk, M., 2019. High-fidelity is not superior to low-fidelity simulation but leads to overconfidence in medical students. BMC Medical Education 19, 29. https://doi.org/10.1186/s12909-019-1464-7

Mercan, N., Mersin, S., 2025. Evaluating the therapeutic communication skills of nursing students in the clinical setting: The experiences of students, patients, and patients' relatives. Heliyon 11, e41677. https://doi.org/10.1016/j.heliyon.2025.e41677

Park, Y., Lee, S.-J., Hur, Y., 2025. Facilitators, barriers, and future direction of high-fidelity simulation in nursing education: a qualitative descriptive study. BMC Nursing 24, 881. https://doi.org/10.1186/s12912-025-03541-8

Poorchangizi, B., Borhani, F., Abbaszadeh, A., Mirzaee, M., Farokhzadian, J., 2019. The importance of professional values from nursing students' perspective. BMC Nurs 18, 26. https://doi.org/10.1186/s12912-019-0351-1

Qu, Z., Sun, J., Li, L., Zhao, L., Jiang, N., Fan, J., Zhang, J., Liang, B., 2024. The effect of simulated problem learning in nursing ethics on moral sensitivity, empathy and critical thinking of nursing students: A quasi-experimental study. Nurse Education in Practice 80, 104119. https://doi.org/10.1016/j.nepr.2024.104119

Raghunathan, K., Houghty, G.S., Siswadi, Y., Eka, N.G.A., Bourke, S., Cardwell, R., Copnell, B., Duncan, R., Moss, C., 2025. The use of simulation to improve non-technical skills in undergraduate nurse education: A scoping review. Clinical Simulation in Nursing 99, 101686. https://doi.org/10.1016/j.ecns.2025.101686

Sideras, S., McKenzie, G., Noone, J., Dieckmann, N., Allen, T.L., 2015. Impact of a simulation on nursing students' attitudes toward schizophrenia. Clinical Simulation in Nursing 11, 134–141. https://doi.org/10.1016/j.ecns.2014.11.005

Tseng, T.-J., Ray, M.A., Wu, C.-J., 2025. Examining nursing students' learning through reflective analysis using ray's transcultural caring dynamics in nursing and health care theory. BMC Medical Education 25, 559. https://doi.org/10.1186/s12909-025-07123-9

Witherspoon, M., Pankonien, C.A., Baldwin, J., Hunter, C., 2023. The impact of a role-play patient simulation on nursing students as measured by the comprehensive state empathy scale. Teaching and Learning in Nursing 18, e79–e83. https://doi.org/10.1016/j.teln.2023.04.016

Yazeedi, B., Azri, Z., Prabhakaran, H., John, S.E., Shakman, W L.M., Raghavan, D., Roach, E.J., Sabari, S., Arulappan, J., 2025. Efficacy of high-fidelity pediatric simulation on nursing students' self-awareness and empathy in a Middle Eastern Country. Heliyon 11, e42524. https://doi.org/10.1016/j.heliyon.2025.e42524