

Nursing students' opinions and perceptions regarding the clinical simulation service: a qualitative study

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Abstract

Purpose – This study aimed to explore Nursing students' opinions and perceptions of their experiences with Clinical Simulation services at three centres affiliated with a public university in southern Spain.

Design/methodology/approach – A qualitative, descriptive-interpretive design was applied with third-year Nursing students who had completed a ten-session Clinical Simulation-based “Life Support” course. Open-ended responses regarding their perceptions of the service were analysed through categorical content analysis using Atlas.ti. Two independent evaluators conducted the analysis to ensure and enhance the trustworthiness of findings.

Findings – Approximately one-third of students provided a total of 96 verbatim statements, classified into three categories: (1) Time, (2) Resources and infrastructures, and (3) Utility of Clinical Simulation and adequacy. Students valued clinical simulation as an effective learning strategy bridging theory and practice, yet identified shortcomings in session duration, material accessibility, and realism of scenarios. Conclusions: The study highlighted the need to expand clinical simulation session time, improve material quality and accessibility, and diversify clinical scenarios to enhance realism and student engagement. These findings provided actionable insights for educators and institutions to optimise clinical simulation implementation, ensuring that simulation-based education fulfilled its potential as a core pedagogical tool in Nursing curricula.

Originality/value – Students perceived clinical simulation as an effective learning method. More time and frequency for simulation sessions were widely requested access to simulation materials outside class time was considered insufficient. Students reported poor quality and limited variety in simulation scenarios. Smaller group sizes were recommended to improve simulation experience.

Keywords Perceptions, Students, Education, Nurse training

Paper type Research article

Introduction

Clinical Simulation (CS) is understood as a pedagogical methodology based on the deliberate and structured recreation of clinical situations through the use of manikins of varying fidelity, standardised patients, digital simulators or other technological resources. Its purpose is to reproduce, in a controlled, safe and assessable manner, the processes, decisions and skills required in professional practice. This strategy enables students to integrate theoretical knowledge, technical abilities and non-technical competencies—such as communication, teamwork and decision-making—within an environment that mirrors the complexity of real clinical settings, without posing any risk to patients (Corvetto *et al.*, 2013; Lindsey and Jenkins, 2013; Fenzi *et al.*, 2022).

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Different levels of simulation fidelity—low, medium, and high—allow for progressive competency development, ranging from basic psychomotor skills to complex clinical decision-making (Casal-Angulo *et al.*, 2016; Maran and Glavin, 2003; Palés-Argullós and Gomar-Sancho, 2010). High-fidelity simulation, in particular, has been recognised as an effective means of enhancing critical thinking, communication, and teamwork among nursing students (Li *et al.*, 2022; Lee *et al.*, 2023). Moreover, structured debriefing processes following simulation sessions foster reflection and self-assessment, which are key components of experiential learning (Dogu *et al.*, 2024; López-Sánchez *et al.*, 2013).

Despite the increasing integration of simulation-based learning worldwide, its implementation and evaluation within nursing curricula remain heterogeneous. Several studies have reported high levels of student satisfaction with simulation-based training (Alconero-Camarero *et al.*, 2020; Castillo-Arcos and Maas-Góngora, 2017; Sánchez-Maldonado *et al.*, 2022), while others have pointed out limitations related to time constraints, resource availability, or the realism of simulated scenarios (Arrogante *et al.*, 2021a; Ober, 2009; Juguera-Rodríguez *et al.*, 2014). These inconsistencies suggest that the educational impact of CS depends not only on technological resources but also on pedagogical design and institutional support (Carrero-Planells *et al.*, 2021; Tsiligiris *et al.*, 2021).

However, most existing studies have been conducted in private or single-centre contexts, with limited evidence on how students in public universities in southern Europe perceive the adequacy and usefulness of CS. Furthermore, while quantitative research has often assessed satisfaction and learning outcomes, fewer qualitative studies have explored students' in-depth perceptions of CS services and their potential for curricular improvement (Castillo-Núñez *et al.*, 2024; Pasay-An *et al.*, 2025; Szabo *et al.*, 2024).

Aim

The aim of the present study was to explore nursing students' opinions and perceptions regarding their experiences with Clinical Simulation services across three centres affiliated with a public university in southern Spain. Understanding these perceptions provided valuable insights for optimising simulation-based learning and informing future educational strategies in nursing curricula.

Theoretical background

Students' satisfaction is commonly used as an indicator of the perceived quality and educational value of CS experiences. Conceptually, satisfaction can be understood as a multidimensional construct that reflects learners' emotional responses, perceived realism, psychological safety and the perceived integration of theoretical knowledge with clinical practice (Alconero-Camarero *et al.*, 2016; Madhavanprabhakaran *et al.*, 2015).

The level of simulation fidelity has been frequently associated with students' satisfaction through its relationship with realism and immersion. Higher fidelity may enhance perceived realism and satisfaction (Baptista *et al.*, 2016; Cura *et al.*, 2020); however, this relationship is not linear. Studies have shown that students may report greater satisfaction with lower or medium levels of fidelity when high-fidelity scenarios exceed their level of competence or prior experience (Tosterud *et al.*, 2013; Alconero-Camarero *et al.*, 2021).

Beyond fidelity, scenario design and educational relevance play a central role in shaping students' satisfaction. Simulation activities that facilitate the application of theory to practice, prioritisation of clinical actions and development of critical thinking are consistently associated with higher satisfaction (Alconero-Camarero *et al.*, 2016, 2020; Sánchez-Maldonado *et al.*, 2022).

Psychological safety is another key dimension influencing satisfaction in CS. Learning environments that allow students to practise clinical skills without fear of causing harm have

been associated with higher satisfaction and perceived learning, particularly in early stages of training (Madhavanprabhakaran *et al.*, 2015; Sánchez-Maldonado *et al.*, 2022). Health Education

Debriefing functions as a core pedagogical mechanism linking the simulated experience with learning outcomes. Structured debriefing processes foster reflection and self-assessment and have been identified as one of the most highly valued components of CS, strongly associated with students' satisfaction and perceived learning gains (Alconero-Camarero *et al.*, 2016; Ming-Chow *et al.*, 2023; Martínez-Arce *et al.*, 2024).

Methods

Design and Participants: A qualitative study was conducted to explore the complexity and nuance third-year Nursing students' perceptions of Clinical Simulation, as recommended in qualitative educational research (Hernández-Sampieri *et al.*, 2014). The study population consisted of students enrolled at three centres affiliated with a public university in southern Spain during the 2022–2023 academic year.

Participants were invited to participate according to predefined inclusion criteria, ensuring diverse representation across the three centres. The inclusion criterion required students to have previously attended Clinical Simulation training sessions and to have completed the "Life Support" subject, which comprises ten two-hour simulation sessions. Out of a total of 192 eligible students, 180 were invited to participate, forming three groups corresponding to the three centres (Centre A, B, and C).

Sampling continued until thematic saturation was reached, meaning no new themes emerged from the data. Inclusion of students from three different centres provided contextual diversity, enhancing the richness of the findings.

Open-ended written responses were chosen instead of interviews or focus groups to allow participants to reflect individually on their experiences and to minimise interviewer bias. This format also facilitated the participation of a large number of students under comparable conditions across the three sites. It is acknowledged, however, that written responses may yield less in-depth and interactive data than oral methods, which represents a study limitation (Hansen and Świdarska, 2024).

Study Variables: The sample was initially characterised according to independent variables, namely gender, age, and educational centre. Participants were then asked to share their perceptions regarding the Clinical Simulation services at their respective centres. Additional variables and categories were identified following analysis of the verbatim responses. Verbatims were subsequently organised into three main themes: (1) Time, (2) Resources and Infrastructure, and (3) Utility and Adequacy of Clinical Simulation.

Data Collection: Data were collected through open-ended questions, enabling the capture of nuanced and rich information (Hansen and Świdarska, 2024). The three centres were situated in different geographical areas but shared similar characteristics in terms of student enrolment, curricula, and facilities, including dedicated spaces for simulation environments and rooms for debriefing sessions.

Academic coordinators at each centre were contacted, and, following consent, appropriate times and locations outside class hours were arranged for data collection. Data were collected in small group sessions (10–15 students per session) due to space constraints; however, each student provided responses individually on paper. This format was chosen to facilitate participation across three centres, allow individual reflection, and preserve anonymity. Students were instructed to respond independently and assured that their answers would have no consequences.

Data analysis: Data were analysed using a qualitative categorical content analysis approach. Participants were assigned an alphanumeric code consisting of the initials of their centre and a sequential number (e.g. C.A-S1–S65, C.B-S66–S110, C.C-S111–S180) to ensure anonymity and enable systematic tracking of verbatim statements throughout the analysis.

The coding process followed several structured steps. First, all verbatim statements were read repeatedly to ensure familiarisation with the dataset. Second, two independent evaluators developed an initial inductive codebook based on recurring ideas identified during an open reading of the data. Third, both evaluators independently coded the dataset in Atlas.ti (v.22) using this preliminary codebook. Following the first coding round, the evaluators met to compare coded segments and discuss discrepancies. Differences were resolved through iterative consensus meetings; if consensus could not be reached, a third researcher acted as an external adjudicator. The constant comparison method was employed to refine codes and ensure conceptual clarity and internal consistency across the dataset. To enhance trustworthiness, the research team maintained a detailed audit trail documenting codebook iterations, coding decisions, consensus discussions, and analytical reflections. Finally, codes were organised into broader categories and themes, which were interpreted to identify central patterns in students' perceptions of Clinical Simulation (Hernández-Sampieri *et al.*, 2014).

All verbatim statements were originally written in Spanish and subsequently translated into English by two researchers. Translations were cross-checked to ensure semantic accuracy and consistency.

Ethical considerations: The present study was conducted in accordance with the ethical principles out-lined in the Declaration of Helsinki. Prior to data collection, formal authorization was requested and obtained from the directors of each participating centre. Similarly, it was clearly stated that participation was voluntary and that informed consent could be withdrawn at any time, with the procedure for withdrawal duly explained. Students were assured that their participation in the study would not entail any risks or have any influence on their academic grades. Ethical approval was also obtained from the Andalusian Biomedical Research Ethics Committee (Date: November 24th, 2022, Internal code: 1310-N-22).

Results

Sociodemographic characteristics of the students

The study sample comprised 180 third-year Nursing students. The overall mean age was 22.17 ± 3.29 years (range: 19–45), with women representing 90.56% ($n = 163$) of participants. Students were distributed across three centres: Centre A ($n = 65$), Centre B ($n = 46$), and Centre C ($n = 70$). The mean age in Centre A was 22.75 ± 4.84 years (range: 19–40), in Centre B 21.74 ± 2.57 years (range: 20–33), and in Centre C 21.94 ± 1.48 years (range: 20–25). Women constituted the majority in all centres: 92.31% ($n = 60$) in Centre A, 91.11% ($n = 41$) in Centre B, and 88.57% ($n = 62$) in Centre C.

Nursing students' opinions or perceptions regarding the clinical simulation service

Of the 180 students invited to participate, 61 (33.9%) responded to the open-ended question. These 61 respondents provided multiple contributions across different subthemes, resulting in a total of 96 verbatim statements, which constituted the unit of analysis for the qualitative study. [Table 1](#) summarises the identified themes and subthemes, together with the frequency of the collected statements.

Theme 1 – Time: Most verbatim statements in this theme reflected concerns regarding time allocation across all centres. Several comments highlighted the need to extend the duration of sessions, allowing more time for simulation or group reflection during debriefing. Other statements suggested increasing the frequency of activities in this area, as they facilitate a practical understanding of theoretical content. [Table 2](#) presents examples of translated verbatim statements from each centre.

Theme 2 – Resources and infrastructures: Many verbatim statements ($n = 35$) in this theme expressed concerns about resources and infrastructure, regardless of the centre. Two subthemes were identified: 1. Availability: Several students noted limited access to Clinical

Table 1. Categories, subcategories and frequency of the verbatim statements relative to the total number collected

| Themes | Subthemes | Verbatim statements N (%) | Verbatim statements per centre |
|---|--------------|------------------------------|-----------------------------------|
| Time | – | 38 (39.58) | C.A: 17 C.B: 9 C.C: 12 |
| Resources and infrastructures | Availability | 23 (23.96) | C.A: 12 C.B: 5 C.C: 6 |
| | Quality | 12 (12.5) | C.A: 3 C.B: 4 C.C: 5 |
| Utility and Adequacy of clinical simulation | Content | 12 (12.5) | C.A: 3 C.B: 3 C.C: 6 |
| | Group size | 5 (5.21) | C.A: 4 C.B: 0 C.C: 1 |
| | Usefulness | 6 (6.25) | C.A: 4 C.B: 2 C.C: 0 |
| <i>Total</i> | | 96 (100) | 96 |

Table 2. Examples from theme 1 – time

| Centre | ID | Verbatim statements |
|--------|----------|--|
| C.A | C.A-S5 | <i>... they should devote more hours and allow us to spend more time there</i> |
| | C.A-S8 | <i>More time should be devoted to the simulation session in all years ...</i> |
| | C.A-S12 | <i>It would be a good option to spend more hours in simulation</i> |
| | C.A-S31 | <i>... I think that more time should be devoted to each session to assimilate the theoretical part much better and be able to practice more time</i> |
| C.B | C.A-S32 | <i>There should be more time allocated for clinical simulation</i> |
| | C.B-S73 | <i>Simulations should be more stretched in time; in other words, fixing knowledge in a short period doesn't help fix learning ...</i> |
| | C.B-S98 | <i>... The Clinical Simulation exercises should be implemented with more preparation time and more practice sessions, "not just a couple of times"</i> |
| | C.B-S99 | <i>... Increasing the time devoted to Clinical Simulation</i> |
| | C.B-S100 | <i>Often, there isn't enough time to properly conduct the workshops, which leaves some doubts ...</i> |
| C.C | C.B-S102 | <i>More clinical simulation sessions are needed before starting hospital rotations</i> |
| | C.C-S111 | <i>... Devoting more time to simulations</i> |
| | C.C-S132 | <i>I think that the sessions don't last enough for learning and the subsequent clinical practice ...</i> |
| | C.C-S160 | <i>I think the time devoted is not enough and that we forget the technique many times ...</i> |
| | C.C-S170 | <i>We need more hours of practical seminars in clinical simulation</i> |
| | C.C-S174 | <i>Increase the number of hours dedicated to clinical simulation</i> |

Simulation materials and equipment outside scheduled activities, highlighting the need for increased opportunities to practice and develop skills. 2. Quality: Numerous statements emphasised the poor condition of existing materials, particularly low-fidelity simulators, and expressed the need to update or acquire new materials. [Table 3](#) presents examples of translated verbatim statements for each subtheme.

Theme 3 – Utility of clinical simulation and adequacy: Three subthemes emerged: 1. Content: Most verbatim statements indicated that students perceived inadequacies in the content and realism of simulation sessions, suggesting a need to diversify the session content. 2. Group Size: Several statements advocated reducing the number of participants per simulation session. Comments in this subcategory were provided by students from Centres A and C. 3. Utility of Clinical Simulation: A small number of verbatim statements ($n = 5$) described Clinical Simulation as an effective tool for promoting learning, reported only in Centres A and B. [Table 4](#) presents examples of translated verbatim statements for each subtheme.

Discussion

Students expressed concerns regarding the duration and frequency of sessions in Clinical Simulation. This is consistent with the findings of [Arrogante et al. \(2021a\)](#) and [Sánchez-Maldonado et al. \(2022\)](#), who reported that insufficient time limited opportunities for

Table 3. Examples from Theme 2 – Resources and infrastructures

| Subthemes | Centre | ID | Verbatim statements | |
|--------------|---------|----------|--|--|
| Availability | C.A | C.A-S7 | <i>Update or provide more simulation materials (sterile gloves, catheters, systems, life support equipment) as they are scarce or completely unavailable</i> | |
| | | C.A-S13 | <i>... the students should be allowed to use the simulation area more, especially the materials</i> | |
| | | C.A-S25 | <i>We should be given more freedom when using simulation rooms and materials ...</i> | |
| | C.B | C.B-S74 | <i>... enjoying more freedom when using the resources</i> | |
| | | C.B-S91 | <i>... and enjoying more freedom to use the materials and facilities</i> | |
| | | C.B-S94 | <i>... expand the facilities for simulations as well as the materials needed for their use</i> | |
| | C.C | C.C-S126 | <i>Increasing and improving accessibility to the simulations' material resources</i> | |
| | | C.C-S143 | <i>We need more materials for different types of scenarios</i> | |
| | | C.C-S166 | <i>I'd start using this service already from first year ... allowing the students to access the resources</i> | |
| | Quality | C.A | C.A-S26 | <i>The materials we use for clinical simulation sessions should be of higher quality</i> |
| | | | C.A-S62 | <i>They should provide more material, and what they do give us should be of better quality ...</i> |
| | | C.B | C.B-S96 | <i>... the simulation material is not in good condition, is old-fashioned or unrealistic, which makes simulation lose its usefulness (C.B-S96)</i> |
| C.B-S97 | | | <i>In many of the sessions conducted using simulators, the equipment was not in good condition</i> | |
| C.C | | C.C-S119 | <i>... very old and broken material</i> | |
| | | C.C-S132 | <i>The devices and equipment we use in simulations are often poorly maintained or heavily worn</i> | |

Table 4. Examples from theme 3: Utility of clinical simulation and adequacy

| Subthemes | Centre | ID | Verbatim statements |
|--------------------------------|--------|----------|--|
| Content | C.A | C.A-S29 | <i>... they should vary the content and do more types of simulations (e.g.: giving bad news, communication with the patient ...)</i> |
| | | C.A-S61 | <i>Make them more realistic</i> |
| | C.B | C.B-S104 | <i>The settings should show more real cases ...</i> |
| | | C.B-S110 | <i>... greater preparation would be advisable to perform clinical simulation sessions more realistically</i> |
| | C.C | C.C-S114 | <i>We should become more familiar with the environment (the room), not just the simulator</i> |
| | | C.C-S142 | <i>... the contents could be improved to show different situations</i> |
| Group size | C.A | C.A-S25 | <i>... there should be a limited number of students</i> |
| | | C.A-S40 | <i>... sessions with fewer students at the same time</i> |
| | C.B | – | Not reported |
| | C.C | C.C-S119 | <i>..., the groups of people are too large, they should be smaller ...</i> |
| | | – | – |
| Utility of clinical simulation | C.A | C.A-S9 | <i>... it primarily helps the student approach real-life clinical practice</i> |
| | | C.A-S34 | <i>I find it a very useful work and learning tool ...</i> |
| | C.B | C.B-S87 | <i>It's a great tool for us to get closer to contexts that will later on help us in real life</i> |
| | | C.B-S96 | <i>I believe that simulation is a great tool for learning</i> |
| | C.C | – | Not reported |

deliberate practice and hindered skill consolidation. Similarly, these authors found that students perceived simulation time as inadequate for developing confidence in complex clinical procedures. In contrast, other authors observed that participants were satisfied with the allocated time when simulation activities were tightly aligned with learning objectives, suggesting that time adequacy may depend on curricular alignment rather than session length alone (Alconero-Camarero *et al.*, 2020; Arrogante *et al.*, 2021b).

Regarding resources and infrastructure, students highlighted limited access to materials and equipment outside scheduled sessions, and the perceived need to improve the quality of available resources. Previous research has shown that insufficient or deteriorated simulation equipment can undermine scenario realism and reduce student engagement. Similarly, these studies found that students felt constrained when material shortages prevented autonomous practice, emphasising the need for investment in up-to-date simulators and accessible skills laboratories (Castillo-Núñez *et al.*, 2024; Epuital *et al.*, 2025; Moncada *et al.*, 2023).

Students also reported that simulation settings lacked realism and that session content could be further diversified. Several participants noted the impact of group size on learning, suggesting smaller groups could enhance engagement and skill acquisition. This resonates with findings from Bø *et al.* (2021) and Gellerstedt *et al.* (2025), who found that realistic simulations enhanced emotional engagement and critical thinking, while excessively repetitive or simplistic scenarios reduced motivation. Furthermore, these studies demonstrated that scenario design plays a central role in promoting self-efficacy and clinical reasoning.

Finally, several verbatim statements emphasised the perceived usefulness of Clinical Simulation for fostering learning and bridging theory with practice, supporting prior evidence on its effectiveness in developing nursing competencies (Arrogante *et al.*, 2021a; Bø *et al.*, 2021; Chagas-Rosa *et al.*, 2020).

Taken together, these findings highlight that the effectiveness of Clinical Simulation depends not only on technological fidelity but also on pedagogical and organisational factors, such as time allocation, resource accessibility, scenario realism, and group management. These insights reinforce the importance of embedding simulation activities within curricula rather than treating them as supplementary experiences.

Limitations

This study has several limitations. First, the sample was predominantly female across all centres, which may limit the transferability of findings across genders; subgroup comparisons were not possible. Second, although data were collected in small group sessions due to space constraints, each student provided responses individually on paper. This format was chosen to facilitate participation, encourage individual reflection, and preserve anonymity. While peer influence was minimised, written responses may have been briefer than those obtained through interviews, potentially limiting depth and reflexivity. Third, there is the potential for researcher bias, as the positionality of the investigators may have influenced the coding and interpretation of the verbatim statements. This was mitigated by having two independent evaluators conduct the analysis and by maintaining iterative discussions to reach consensus. Fourth, thematic saturation was achieved when no new categories emerged during analysis; however, findings may be transferable only to similar nursing programmes and should be interpreted with caution in different contexts. Finally, the translation of verbatim statements into English, while intended to preserve meaning, may have introduced minor variations in interpretation.

Conclusions

This study provides insight into nursing students' perceptions of Clinical Simulation, underscoring its value as a bridge between theoretical knowledge and clinical practice. The findings highlight areas for improvement, including session duration, resource accessibility, scenario realism, and group management, while also recognising the perceived usefulness of Clinical Simulation for learning.

Educators should prioritise the systematic integration of simulation-based learning across curricula, ensuring adequate time for practice, smaller group sizes, and scenarios that reflect the complexity of real clinical environments. Prior research has shown that such conditions enhance learning transfer and support the development of clinical judgement (Li *et al.*, 2022; Lee *et al.*, 2023). Institutions should also invest in updating simulation equipment and expanding students' opportunities for independent practice, as recommended by recent evaluations of simulation programmes (Castillo-Nuñez *et al.*, 2024; Epuítai *et al.*, 2025).

Future research could examine how repeated exposure to high-quality simulation over time influences competence development and confidence, building on longitudinal designs. Similarly, exploring differences in perceptions across academic levels or clinical contexts could inform tailored implementation strategies. Strengthening these areas would help ensure that CS not only complements traditional learning but also contributes directly to improving students' preparedness for real-life clinical practice.

References

- Alconero-Camarero, A.R., Gualdrón-Romero, A., Sarabia-Cobo, C.M. and y Martínez-Arce, A. (2016), "Clinical simulation as a learning tool in undergraduate nursing: validation of a questionnaire", *Nurse Education Today*, Vol. 39, pp. 128-134, doi: [10.1016/j.nedt.2016.01.027](https://doi.org/10.1016/j.nedt.2016.01.027).

- Alconero-Camarero, A.R., Sarabia-Cobo, C.M., González-Gómez, S., Ibáñez-Rementería, I. and Alvarez-García, M.P. (2020), "Estudio descriptivo de la satisfacción de los estudiantes del Grado en Enfermería en las prácticas de simulación clínica de alta fidelidad", *Enfermería Clínica*, Vol. 30 No. 6, pp. 404-410, doi: [10.1016/j.enfcli.2019.07.007](https://doi.org/10.1016/j.enfcli.2019.07.007).
- Alconero-Camarero, A.R., Sarabia-Cobo, C.M., Catalán-Piris, M.J., González-Gómez, S.Y. and González-López, J.R. (2021), "Nursing students' satisfaction: a comparison between medium- and high-fidelity simulation training", *International Journal of Environmental Research and Public Health*, Vol. 18 No. 2, p. 804, doi: [10.3390/ijerph18020804](https://doi.org/10.3390/ijerph18020804).
- Arrogante, O., González-Romero, G.M., Carrión-García, L. and Polo, A. (2021a), "Reversible causes of cardiac arrest: nursing competency acquisition and clinical simulation satisfaction in undergraduate nursing students", *International Emergency Nursing*, Vol. 54, 100938, doi: [10.1016/j.ienj.2020.100938](https://doi.org/10.1016/j.ienj.2020.100938).
- Arrogante, O., González-Romero, G.M., López-Torre, E.M., Carrión-García, L. and Polo, A. (2021b), "Comparing formative and summative simulation-based assessment in undergraduate nursing students: nursing competency acquisition and clinical simulation satisfaction", *BMC Nursing*, Vol. 20 No. 1, p. 92, doi: [10.1186/s12912-021-00614-2](https://doi.org/10.1186/s12912-021-00614-2).
- Baptista, R.C.N., Paiva, L.A.R., Gonçalves, R.F.L., Oliveira, L.M.N., Pereira, M.F.C.R. and y Martins, J.C.A. (2016), "Satisfaction and gains perceived by nursing students with medium and high-fidelity simulation: a randomized controlled trial", *Nurse Education Today*, Vol. 46, pp. 127-132, doi: [10.1016/j.nedt.2016.08.027](https://doi.org/10.1016/j.nedt.2016.08.027).
- Bø, B., Madangi, B.P., Ralaitafika, H., Ersdal, H.L. and Tjøflåt, I. (2021), "Nursing students' experiences with simulation-based education as a pedagogic method in low-resource settings: a mixed- method study", *Journal of Clinical Nursing*, Vol. 31 Nos 9-10, pp. 1362-1376, doi: [10.1111/jocn.15996](https://doi.org/10.1111/jocn.15996).
- Carrero-Planells, A., Pol-Castañeda, S., Alamillos-Guardiola, M.C., Prieto-Alomar, A., Tomás-Sánchez, M. and Moreno-Mulet, C. (2021), "Students and teachers' satisfaction and perspectives on high-fidelity simulation for learning fundamental nursing procedures: a mixed-method study", *Nurse Education Today*, Vol. 104, 104981, doi: [10.1016/j.nedt.2021.104981](https://doi.org/10.1016/j.nedt.2021.104981).
- Casal-Angulo, M.C., Fernández-Garrido, J.J. and Ballestar-Tarín, M.L. (2016), "La simulación como metodol. Para el Aprendiz. De Habilidades No Técnicas en enfermería", available at: <https://core.ac.uk/download/pdf/71059825.pdf> (accessed 1 May 2022).
- Castillo-Arcos, L.C. and Maas-Góngora, L. (2017), "Percepción de satisfacción de los estudiantes de enfermería en el uso de la simulación clínica", *Ra Ximhai*, Vol. 13 No. 2, pp. 63-76, doi: [10.35197/rx.13.02.2017.05.lc](https://doi.org/10.35197/rx.13.02.2017.05.lc).
- Castillo-Nuñez, R., Zambrano-Bermeo, R.N., Bonilla-Casierra, N.F., Tusconi, M., Curcio, F. and Aviles-Gonzalez, C.I. (2024), "Perception of university nursing students and faculty Members regarding simulated practices: a mixed methods study", *Nursing Report*, Vol. 14 No. 4, pp. 2975-2989, doi: [10.3390/nursrep14040217](https://doi.org/10.3390/nursrep14040217).
- Chagas-Rosa, M.E., Vieira Pereira-Ávila, F.M., Bezerra Góes, F.G., Vieira Pereira-Ávila, N.M., Milanês Sousa, L.R. and Lemos Goulart, M.C. (2020), "Positive and negative aspects of clinical simulation in nursing teaching", *Esc Anna Nery*, Vol. 24 No. 3, e20190353, doi: [10.1590/2177-9465-EAN-2019-0353](https://doi.org/10.1590/2177-9465-EAN-2019-0353).
- Corvetto, M., Pía Bravo, M., Montaña, R., Utili, F., Escudero, E., Boza, C., Varas, J. and Dagnino, J. (2013), "Simulación en educación médica: Una sinopsis", *Rev. Médica Chile*, Vol. 141 No. 1, pp. 70-79, doi: [10.4067/S0034-98872013000100010](https://doi.org/10.4067/S0034-98872013000100010).
- Cura, Ş.Ü., Kocatepe, V., Yıldırım, D., Küçükakgün, H., Atay, S. and Ünver, V. (2020), "Examining knowledge, skill, stress, satisfaction and self-confidence levels of nursing students in three different simulation modalities", *Asian Nursing Research*, Vol. 14 No. 3, pp. 158-164, doi: [10.1016/j.anr.2020.07.001](https://doi.org/10.1016/j.anr.2020.07.001).
- Dogu, O., Bozkurt, R., Ziyai, N.Y., Elcin, M. and Aygin, D. (2024), "Use of different debriefing methods after in situ simulation with intensive care unit nurses", *Nursing in Critical Care*, Vol. 29 No. 5, pp. 953-961, doi: [10.1111/nicc.13075](https://doi.org/10.1111/nicc.13075).

- Eputai, J., Adongo, P.R., Oboth, P., Apili, F., Kumakech, E., Owusu-Sekyere, S. and Wandabwa, J.N. (2025), "Experiences and perceptions of students and faculty with clinical simulation in Uganda: an exploratory study", *BMC Medical Education*, Vol. 25 No. 1, p. 746, doi: [10.1186/s12909-025-07322-4](https://doi.org/10.1186/s12909-025-07322-4).
- Fenzi, G., Reuben, A.D., Díaz Agea, J.L., Hernández Ruipérez, T. and Leal Costa, C. (2022), "Self-learning methodology in simulated environments (MAES[®]) utilized in hospital settings. Action-research in an Emergency Department in the United Kingdom", *International Emergency Nursing*, Vol. 61, 101128, doi: [10.1016/j.ienj.2021.101128](https://doi.org/10.1016/j.ienj.2021.101128).
- Gellerstedt, L., Gustafsson, C. and Rooth, K. (2025), "Nursing students' perspectives of learning at clinical skills centers: a cross-sectional study", *Teaching and Learning in Nursing*, Vol. 20 No. 4, pp. 1222-1226, doi: [10.1016/j.teln.2025.07.002](https://doi.org/10.1016/j.teln.2025.07.002).
- Hansen, K. and Świdarska, A. (2024), "Integrating open- and closed-ended questions on attitudes towards outgroups with different methods of text analysis", *Behavior Research Methods*, Vol. 56 No. 5, pp. 4802-4822, doi: [10.3758/s13428-023-02218-x](https://doi.org/10.3758/s13428-023-02218-x).
- Hernández-Sampieri, R., Fernández-Collado, C. and Baptista-Lucio, P. (2014), *Metodología de la Investigación*, 6th ed., McGraw-Hill, Mexico City, México.
- Juguera-Rodríguez, L., Díaz Agea, J.L., Pérez Lapuente, M.L., Leal Costa, C., Rojo-Rojo, A. and Echevarría Pérez, P. (2014), "La simulación clínica como herramienta pedagógica. Percepción de los alumnos de Grado en Enfermería en la UCAM (Universidad Católica San Antonio de Murcia)", *Enfermería Global*, Vol. 13 No. 1, pp. 175-190, doi: [10.6018/eglobal.13.1.157791](https://doi.org/10.6018/eglobal.13.1.157791).
- Lee, S.E., Repsha, C., Seo, W.J., Lee, S.H. and Dahinten, V.S. (2023), "Room of horrors simulation in healthcare education: a systematic review", *Nurse Education Today*, Vol. 126, 105824, doi: [10.1016/j.nedt.2023.105824](https://doi.org/10.1016/j.nedt.2023.105824).
- Li, Y.L., Au, M.L., Tong, L.K., Ng, W.I. and Wang, S.C. (2022), "High-fidelity simulation in undergraduate nursing education: a meta-analysis", *Nurse Education Today*, Vol. 111, 105291, doi: [10.1016/j.nedt.2022.105291](https://doi.org/10.1016/j.nedt.2022.105291).
- Lindsey, P.L. and Jenkins, S. (2013), "Nursing students' clinical judgement regarding rapid response: the influence of a clinical simulation education intervention", *Nursing Forum*, Vol. 48 No. 1, pp. 61-70, doi: [10.1111/nuf.12002](https://doi.org/10.1111/nuf.12002).
- López-Sánchez, M., Ramos-López, L., Pato-López, O. and López-Álvarez, S. (2013), "La simulación clínica como herramienta de aprendizaje", *Asoc. Española Cirugía Mayor Ambulatoria*, Vol. 18, pp. 25-29.
- Madhavanprabhakaran, G., Al-Khasawneh, E. and Wittmann, L. (2015), "Perceived benefits of pre-clinical simulation-based training on clinical learning outcomes among Omani undergraduate nursing students", *Sultan Qaboos University Medical Journal*, Vol. 15 No. 1, pp. 105-111, doi: [10.18295/2075-0528.1661](https://doi.org/10.18295/2075-0528.1661).
- Maran, N.J. and Glavin, R.J. (2003), "Low-to high-fidelity simulation—a continuum of medical education?", *Medical Education*, Vol. 37 No. s1, pp. 22-28, doi: [10.1046/j.1365-2923.37.s1.9.x](https://doi.org/10.1046/j.1365-2923.37.s1.9.x).
- Martínez-Arce, A., Rodríguez-Almagro, J., Vélez-Vélez, E., Rodríguez-Gómez, P., Alconero-Camarero, A.R. and Hernández-Martínez, A. (2024), "The impact of incorporating a simulation program into the undergraduate nursing curricula: a cross-sectional descriptive study", *Nurse Education in Practice*, Vol. 77, 103972, doi: [10.1016/j.nepr.2024.103972](https://doi.org/10.1016/j.nepr.2024.103972).
- Ming-Chow, K., Ahmat, R., Leung, A.W.Y. and Chan, C.W.H. (2023), "Is high-fidelity simulation-based training in emergency nursing effective in enhancing clinical decision-making skills? A mixed methods study", *Nurse Education in Practice*, Vol. 69, 103610, doi: [10.1016/j.nepr.2023.103610](https://doi.org/10.1016/j.nepr.2023.103610).
- Moncada, A., García, R., Rodríguez Marino, V.I., Fernández, A., Varela, C.L. and Terán, A.J. (2023), "La simulación como herramienta de enseñanza y aprendizaje quirúrgico", *Revista Venezolana de Cirugía*, Vol. 76 No. 2, pp. 142-147, doi: [10.48104/RVC.2023.76.2.14](https://doi.org/10.48104/RVC.2023.76.2.14).
- Ober, J.K. (2009), "Student nurses' experience of learning with human patient simulation", [Doctoral Thesis, University of Massachusetts Medical School, United States], available at: https://repository.escholarship.umassmed.edu/bitstream/handle/20.500.14038/34359/Ober__Jay_Reduced.pdf?sequence=3

-
- Palés-Argullós, J.L. and Gomar Sancho, C. (2010), “El uso de las simulaciones en educación médica”, *Health Education Education in the Knowledge Society*, Vol. 11 No. 2, pp. 147-169, doi: [10.14201/eks.7075](https://doi.org/10.14201/eks.7075).
- Pasay-An, E., Alqarni, A.S., Sacgaca, L., Alsulami, A., Pangket, P., Gonzales, F., Gonzales, A., Benjamin, L.S., Estadilla, L., Alreshidi, M.S., Mostoles, R. and Alshammari, S.A. (2025), “Exploring students’ perceptions of cutting-edge NursingSimulation: a phenomenological study”, *Journal of Nursing Management*, Vol. 1, 4040984, doi: [10.1155/jonm/4040984](https://doi.org/10.1155/jonm/4040984).
- Sánchez-Maldonado, H.A., Gallardo Casas, C.Á. and Pérez Elizondo, E. (2022), “Satisfacción de la simulación clínica como herramienta pedagógica para el aprendizaje en estudiantes de pregrado en Enfermería”, *Medicina e Investigación Universidad Autónoma del Estado de México*, Vol. 10 No. 2, pp. 32-37, doi: [10.36677/medicinainvestigacion.v10i2.20083](https://doi.org/10.36677/medicinainvestigacion.v10i2.20083).
- Szabo, R.A., Molloy, E., Allen, K.J., Francis, J. and Story, D. (2024), “Leaders’ experiences of embedding a simulation-based education programme in a teaching hospital: an interview study informed by normalisation process theory”, *Advances in Simulation*, Vol. 9 No. 1, p. 21, doi: [10.1186/s41077-024-00294-3](https://doi.org/10.1186/s41077-024-00294-3).
- Tosterud, R., Hedelin, B.Y. and Hall-Lord, M.L. (2013), “Nursing students’ perceptions of high- and low-fidelity simulation used as learning methods”, *Nurse Education in Practice*, Vol. 13 No. 4, pp. 262-270, doi: [10.1016/j.nepr.2013.02.002](https://doi.org/10.1016/j.nepr.2013.02.002).
- Tsiligiris, V., Kéri, A. and Cheah, J.E. (2021), “Exploring the relationship between student individual culture and service quality expectations in higher education”, *Quality Assurance in Education*, Vol. 30 No. 1, pp. 51-72, doi: [10.1108/QAE-11-2020-0137](https://doi.org/10.1108/QAE-11-2020-0137).

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