The perspective of undergraduate nursing students regarding simulation learning: Insights from Botswana

G Lubinda,[1] PhD; **W B Tshiamo,**[1] PhD; **D B Maripe-Perera,**[1] PhD; **M Sabone,**[2] PhD

[1] *School of Nursing, University of Botswana, Gaborone, Botswana*
[2] *Independent researcher, Gaborone, Botswana*

Corresponding author: *G Lubinda (sinombeg@ub.ac.bw)*

Background. Simulation is used in nursing education to help students attain practical skills before they are placed in a clinical setting. Its effectiveness in bridging the gap between theory and practice has been documented. Simulation mimics the real clinical area situation and fosters nursing students' learning. Globally the demand for nurses and nurse educators has increased. The scarcity of nurse educators has created an enormous shortage, resulting in a high student-to-educator ratio. During the COVID-19 pandemic, simulation-based learning was appreciated, yet the perspectives of undergraduate nursing students regarding simulation-based learning remain under-researched in Botswana and low-income countries.
Objective. To explore undergraduate nursing students' perceptions regarding the use of low-fidelity simulation learning.
Methods. The study used a descriptive qualitative design to explore undergraduate nursing students' perceptions regarding simulation learning. The sample for the survey was twenty (n=20) third- and fourth-year Bachelor of Nursing Science students registered for a simulation-based course in the academic years 2020-2021 and 2021-2022. Three focus group interviews were conducted between 15 and 30 May 2024. Thematic data analysis was done.
Results. Twenty participants, comprising 35% (n=7) males and 65% (n=13) females, aged between 18 and 24 with a mean age of 22.18 (standard deviation 0.87), were interviewed. Three themes emerged: perception of the benefits of simulation-based learning, students' experiences, and challenges regarding simulation-based learning.
Conclusion. Generally, participants appreciated simulation learning, because it allowed them to acquire nursing care skills in a non-threatening and safe environment. However, the researcher's perspective and self-selection bias of participants may have influenced the study findings.

Keywords: Simulation, learning, nursing students, nursing art laboratory

Afr J Health Professions Educ 2025;17(4):e2648. https://doi.org/10.7196/AJHPE.2025. v17i4.2648

To date, one of the challenges nurse educators face is assisting students to implement theoretical knowledge in clinical practice. Simulation promotes the attainment of competencies while facilitating interactive learning, clinical reasoning, and critical thinking among nursing students.[1] Simulation-based learning in nursing education is indispensable, as it allows realistic recreations of real-world situations, used for training, thus reducing reality shock.[2]

Simulation has grown over time in nursing education because of the shortage of nurse educators, and lack of time and clinical placement sites.[3] There is a need to expose students to acute and complex nursing care before they are placed in the clinical setting.[3-5] The COVID-19 pandemic experience made it even more compelling for nurse educators to consider simulation-based learning to bridge the gap between theory and practice.[6] The technology utilised in simulation varies from low- to high-fidelity manikins in realistic patient environments. Low-fidelity simulation involves static manikins, case studies, and role-play scenarios, while high-fidelity simulation uses high-tech manikins to generate highly advanced realistic clinical environments.[5] Both low- and high-fidelity simulations serve a purpose in delivering practical content to nursing students. Simulation-based learning has proved to be an appropriate pedagogical approach in the 21st century in universities globally.[7]

Simulation-based learning has many benefits. Besides bridging the gap between theory and practice,[4,8] it assists students in developing knowledge, nursing care skills, attitudes, and a sense of security, improved skill performance, knowledge acquisition, clinical performance, self-confidence, critical thinking, and communication skills.[2,5]

In response to the societal need to increase human resources for health,[9] the nursing school inadvertently experienced a 100% increase in student enrolment in 2020. However, the student population increase was not commensurate with the number of nurse educators, resulting in a skyrocketing educator-student ratio of 1:33 against the recommended 1:15 in the nursing skills laboratory.[10] As a result of challenges such as low educator-to-student ratios and a lack of infrastructure to accommodate all student learners, and later, COVID-19's social isolation protocols, simulation-based learning and teaching strategies were adopted to meet the clinical training needs of nursing students. The perceptions and experiences of undergraduate nursing students are under-researched in Botswana and low-income countries. The study aims to explore undergraduate nursing students' perceptions regarding the use of low-fidelity simulation learning.

Methods

Design

This was an exploratory qualitative study.

The study was conducted in the School of Nursing at the University of Botswana. The school offers a 4-year-long Bachelor of Nursing Science (BNS) degree programme. The BNS programme has a total enrolment of >900 students and provides training that includes general education and core nursing courses. Simulation teaching and learning enhance nursing

skills acquisition. The laboratory-based course: 'Introduction to Nursing and Health Practice 1' is a core requisite module offered at level 1. The students were taught activities such as handwashing, history-taking, bed-making, personal hygiene, checking vital signs, donning and doffing gloves, and wearing protective clothing. Activities were performed on static manikins and selected basic nursing skills were observed on YouTube videos. The course is 8 hours per week, a total of 224 hours per semester.

Sampling method and size

Purposive sampling was used to select 20 third- and fourth-year students who had taken basic nursing courses in the academic years 2020-2021 and 2021-2022. Students who had taken the course were approached by research assistants and those who were willing to participate were recruited. The sample was pre-determined to be 20, and saturation was reached in the third focus group session when no more new themes emerged. Data were collected between 15 and 30 May 2024. Each focus group was determined by the availability of the participants. In Group 1 there were 6 participants, 6 in Group 2, and 8 in Group 3. This was acceptable given that a recommended focus group size should be between 6 and 8.[11]

Data collection

The third- and fourth-year students were purposively recruited by the trained research assistants, with the help of student class representatives. The two research assistants were trained by the principal investigator regarding the details of the study. Twenty participants were given information about the study and had a chance to ask questions before they signed a written consent. Three face-to-face and audio-recorded focus group interviews were conducted until saturation was reached. Each interview took about 40 minutes. Field notes were also taken to complement data capturing.

Focus groups

The researchers developed a three-item semistructured interview guide based on the literature review. Examples of questions from the interview were: '1. What are your perceptions about simulation learning? 2. What are the challenges that you have experienced during simulation learning? 3. Has simulation-based learning affected your critical thinking ability?'

Three focus group interviews, two with fourth-year students and one with third-year students were conducted.

Pilot-testing

The questions were pilot-tested on five former Bachelor of Nursing Science students who had taken a similar simulation-based learning course in the academic year 2018-2019. These participants were not in the same cohort as those in the main study. There were no modifications made to the questions, or the study design, as the questions were easily understood.

Data analysis

The analysis followed a thematic content analysis used by Braun and Clarke.[12] Initial codes were read and re-read, then collapsed into categories that were further collapsed into themes or subheadings that organised the study findings.[12] Themes and subthemes were generated by an independent qualitative researcher who was not involved in teaching the simulated-based learning course that participants had taken. The transcripts were read and re-read to understand a phenomenon, common units among the data were identified, categories identified, and the themes developed.

Rigor

Credibility, confirmability and dependability were enhanced by an independent researcher who analysed the data. Participants were selected purposively, and their narratives were recorded verbatim, read, and re-read several times to deduce the meaning of the data. The codes were shared with some of the participants who approved them. The saturation was reached during the interview of the third focus group, which was composed of participants 13 - 20.[13]

Ethical considerations

Permission to conduct the study was obtained from the Office of Research Development (ORD) (ref. no. UBR/RES/IRB/BIO/356). In addition, the Head of the School of Nursing approved the study. The study was explained to participants before written consent was obtained. Codes were used instead of participants' names and data could not be linked to the participants. Data and audio tapes were kept in a locked cabinet and only researchers had access.

Results

Twenty participants, comprising 35% (*n*=7) males and 65% (*n*=13) females, aged between 18 and 24 years with a mean age of 22.18 (standard deviation 0.87), were interviewed. The sample consisted of 65% (*n*=13) fourth-year and 35% (*n*=7) third-year nursing students.

Table 1 summarises the themes and subthemes that emerged. The participants generally appreciated simulation learning. Findings indicate that participants reasoned that simulation teaching and learning made them learn nursing care skills in a non-threatening and safe environment. However, participants noted that they experienced challenges and that the teaching strategy had limitations.

Table 1. Themes and subthemes from undergraduate nursing students regarding simulation

Themes	Subthemes
Benefits of simulation learning	Ability to rehearse and hone nursing skills, in a non-threatening environment
	Solution to lack of clinical sites
	Use of YouTube for watching and practising on a manikin
	Reduces the risk of harming the patient
Students' experience with simulated learning as it was obtained in the simulation laboratory	Positive experiences
	Bridge the gap between theory and practice
	Lecturers were commended for support and the set-up of the simulation laboratory
	Negative experiences
	Prolonged time with manikins leads to a negative attitude toward real patients
Challenges experienced during simulation learning	Shortage of resources – teaching staff, manikins, laboratory space; and the student-to-educator ratio was high
	Unstandardised nursing activities
	Delay in timetabling of the course
	Simulation cannot provide a replica of the real clinical situation

Students' perception of the benefits of simulation learning

On the question 'What are your perceptions about simulation learning?', the benefits of simulation were a theme that emerged with subthemes. The participants reported that simulation learning allowed students to rehearse and hone skills to alleviate the challenge of limited clinical learning sites.

> *… simulation gives me a chance to rehearse and perfect nursing skill on manikin before I nurse the real patient.* (Group 2, P 9)

The absence of the risk of harming or inconveniencing patients cushioned learners from some negative reactions of patients and staff, and YouTube in simulation-based learning allowed students not only instruction on how to perform a skill but also gave a step-by-step guide of how a skill is performed.

> *I feel like YouTube videos augmented our learning of nursing activities… coz it guides on doing the procedure step by step.* (Group 2, P 7)

One participant provided an example of a video on how to identify injection landmarks to provide a safe injection.

> *Sometimes we are rushed during our laboratory sessions… and we did not have enough time to practise nursing skills on manikins; we watched YouTube videos to learn more on identifying injection landmarks… to provide safe care to patients in the hospital* (Group 1, P 6)

Students' actual experiences of simulated learning as it was provided in the simulation laboratory

When asked about their experience with simulation-based learning, participants reported both positive experiences and challenges. Positive experiences were related to the laboratory set-up and lecturer support to students, which showed general appreciation of what they learned in the simulation laboratory.

> *I have had good experiences with simulation learning… I perfected skills on the manikins.* (Group 1, P 4)
>
> *I had an opportunity to learn different kinds of procedures such as inserting a cannula and drawing blood on a manikin. If it was a human being, they might have said they are tired or feeling pain.* (Group 2, P 11)

Generally, participants in group 3 observed that the space in the skills laboratory was small but appreciated that it was less overwhelming to students than the hospital environment, which though spacious, was teeming with all sorts of personnel, some of whom did not have a positive attitude toward university students.

Participants commended the lecturers for the set-up of the simulation laboratory, noting that the set-up was good in that it simulated the clinical environment well, with the only difference being that students were not practising on real human beings.

> *Although the staff does not address the reality in the real world as real patients react differently to procedures, I would not say that it's bad; I would say it's fine.* (Group 2, P 10)

The participants appreciated lecturers who would give students another chance to rehearse skills. Such lecturers would make themselves available outside the scheduled time to support the student in learning a given skill.

Challenges that students experienced with simulated learning

In response to the question 'What are the challenges you experienced during simulation?', participants reported that simulation experiences were fraught with challenges. Such resource challenges included teaching staff, manikins, and space housing manikins. These resources are intertwined, and they are therefore addressed together.

The ratio of lecturer to students was reported to be about 1:33, with each lecturer assisting 8 - 11 students for each laboratory session because of limited space in the simulation laboratory. The same lecturer would have different groups of students rotating for the sessions that lasted 1 or 2 hours.

The demonstrations and return demonstrations tended to be rushed because each of the 11 or so students in each session had to have a chance to practise a given skill. Each student usually took about 10 - 15 minutes to practise a skill; sometimes not all of them would get a chance, because students needed varied lengths of time for some skills, resulting in differing time needs. The participants reported that the time allotted for skill practice was suitable for short procedures while skills like catheterisation and cannula insertion tended to require more time and repeated attempts. Inadequate time for practising skills was an obvious concern for all participants.

> *… sometimes during our labs, we didn't have a lot of time, and we would be rushing through everything. So, you don't get a chance to understand what is …* (Group 3, P 13)
>
> *I feel like contact time was inadequate as compared to content we had to do at the time… if we are given an hour to practise, others will end up not getting a chance to practise.* (Group 3, P 15)
>
> *… we are rushed, and the lecturers did not see to it that you know what you are doing.* (Group 1, P 4)

Participants reported that once the lecturers had demonstrated a skill for the first time, they did not usually coach on how best to succeed in practising that skill. They would continue to inform a student that she/he had not done it right. For instance, a student who missed the 90° angle for intramuscular injection would not be briefed on why she/he was missing that. The student would continue repeating the same mistake because she/he was not given clues as to why she/he was missing the 90° angle. One participant reported that simulation did not help much in easing his transition to the clinical laboratory.

> *Simulation was not that beneficial to me… I was a little bit scared doing procedures like administering injections.* (Group 1, P 5)

One observation that participants felt was partly to blame for the limited time to rehearse the skill was the delay in starting work in the skills laboratory. Participants stated that ideally, as the semester begins, a schedule for laboratory simulation should be available for planning purposes. However, there were often delays, and students would not start clinical practice sessions because of delayed timetabling, resulting in reduced contact hours per semester.

> *… the school … has a problem setting the timetable. Sometimes the semester would end while issues of time and place for simulation are being figured out. And by the time we start, time would have been lost, and they would rush through, which is a challenge.* (Group 2, P 8)

Regarding the support and method of teaching the participants received during simulation-based learning, one participant reported an incident that he/she believed was a lack of consistency among lecturers on methods of skill practice. Besides lecturers' inconsistency in assessing students to perform nursing skills, participants expressed concern that sometimes lecturers would only demonstrate the skill and leave them without guidance, either because they had other matters to attend to or were overwhelmed. The frequent absence of lecturers meant that students often had to depend on their fellow students, who, like themselves, did not really 'have it'.

Another challenge expressed by participants was about over-engagement with manikins. They stated that limited interaction with real patients for a long time harmed their learning.

> *I feel we spend too much time on simulation, and they honestly must fix that. I feel that the sooner we go into the real world, the better.* (Group 2, P 10)

One participant reported that, because of prolonged time with manikins, she had developed an attitude of being detached from real patients.

> *I would wipe the area for injection and administer medication. After that, I would immediately leave or detach from the patient. Whether the patient cried or showed pain was irrelevant to me; that's not good…* (Group 2, P 7)
> *It's bad because at one point, it got boring, and I didn't even take it seriously. I just went there because I had to.* (Group 2, P 10)

Participants also noted that when they finally got to the hospital or clinic, they were lost when it came to collaboration with various personnel in real-life settings and understanding the hierarchies among staff. Participants were not adequately prepared to deal with conflicts that often arise in collaborative practice. Also, their learning exposure in simulation did not sensitise them to ethical and cultural issues they meet when working with real-life patients.

Furthermore, participants reported simulation-based learning limitations. The participants opined that simulation-based learning could not provide a replica of the clinical situation; rather, it allowed only a glimpse of the real thing. Participants noted that the claim that simulation prepares students for real-life situations is not always true, as different patient care situations present various challenges.

> *Simulation doesn't account for things like pain and real-life emotions. In real life, you administer … and they end up having an allergic reaction; you panic because simulation would not have prepared you for that situation.* (Group 2, P 8)

Another participant provided an example of learning an injection skill v. learning an intravenous cannula insertion skill, arguing that injection could be closer to real life than cannula insertion because, with the latter, one pushes the cannula into a pre-prepared tunnel that in no way mimics locating a vein in a human being. The participant further stated that in real situations some veins are hard to find, and some are rubber-like.

Discussion

The current study's objective was to explore the perceptions of undergraduate nursing students on simulation-based learning. Participants perceived simulation as having benefits and challenges. They reported positive and negative perceptions about simulation-based learning.

Participants perceived simulation as a beneficial strategy that assisted them in rehearsing a skill until they became competent, served as a solution to the lack of clinical sites, and provided a way to reduce the risk of harming patients. The opportunity for students to practise the skill in the laboratory before clinical placement cushioned students from some negative reactions that might arise in caring for patients in the clinical environment. These findings are similar to those of the studies conducted in SA[8] and Lesotho[14] and reported in systematic reviews.[2,15] The findings highlight that participants are aware of the purpose of simulation-based learning.

The participants appreciated YouTube as a resource for gaining nursing skills since it allowed them to watch the videos repeatedly to perfect their skills so that by the time they went to the clinical area, the risk that they might harm patients would be reduced. Repetition promotes learning, and skill rehearsal over time enhances understanding.[1] Given that the current study exposed participants to low-fidelity simulation, YouTube was an additional resource that assisted students in learning basic nursing skills in their spare time. Similarly, in a Filipino study, students used YouTube as a resource to share their experiences in performing nursing skills using low-cost simulators during the COVID-19 pandemic.[16] Therefore, nurse educators should select relevant YouTube videos that will enhance low-fidelity simulation-based learning.

Challenges associated with simulated-based learning that emerged related to the inability of the strategy to be a true replica of real clinical situations.[17] This assertion was reported in a Singapore study,[17] that debunked the claim that simulation prepared students for real-life situations. The basis of the argument was that different patient care skills presented various challenges. Fundamentally, low-fidelity simulation lacks realism and context, and only basic skills are taught, while moderate- to high-fidelity simulation resembles a real clinical environment, where more complex skills are not taught.[18] Perhaps the reason for viewing simulation as not providing the true replica of the clinical environment could be that the participants in this current study were only exposed to low-fidelity simulation where case studies, role plays, and YouTube were used as strategies to impart nursing knowledge and skill. As such, simulation learning in low-resourced countries may not provide real situations compared with the clinical environment in well-resourced countries because of a shortage of resources.[15,19]

Nevertheless, the current study has indicated some positive experiences. Simulation-based learning bridges the gap between theory and practice as has been reported in nursing education literature. For instance, a systematic review by McKitterick *et al.*[2] revealed that bridging the gap between theory and practice was one major strength of simulated learning and teaching. Using case studies and role plays promote the alignment of theory and practice in decision-making and problem-solving, fostering teamwork and communication skills among nursing students. In case studies and role plays, experiential learning is proven.[20]

Furthermore, some participants in the current study indicated that nurse educators supported them during simulation-based learning, a similar finding to that of Moabi and Mtshali[14] and Benchadlia *et al.*[18] Instructional support is crucial during simulation-based learning to guide students in bridging the gap between theory and practice.[14] The other positive experience was that the physical learning simulation environment was safe and conducive compared with the real laboratory. Participants indicated the availability of soap dispensers, washing basins, and Kleenex supported learning basic nursing skills such as handwashing and infection control. This may motivate participants' learning ability.

Consistent with findings from other limited-resource countries like SA[8] and Lesotho,[14] simulation learning requires resources such as space, time, human resources, and high- and low-fidelity manikins. Furthermore, a sub-Saharan Africa systematic review on simulation highlighted that less-resourced healthcare training institutions faced a high student-to-educator ratio and unavailability of equipment.[15] The cross-cutting findings were also reported in Morocco[21] where unavailability of equipment was a challenging factor in simulation-based teaching and learning. An adequately resourced skills laboratory is needed for the attainment of psychomotor, cognitive, and affective skills.[21]

A finding incongruent with other studies was inadequate time for the laboratory sessions. Participants indicated that inadequate time for laboratory sessions was due to delays in timetabling skill-based courses, which in turn affected the amount of time to practise expected nursing activities. The result would be not reaching skill competency. Effective use of students' learning time in the skill laboratory is most influential in attaining skill competency. Participants' concerns are valid because they showed that they were committed to learning and that their learning outcomes were high.[22] Nurse educators are responsible for simulation sessions to meet the course goals. The effective use of students' learning time spent in the laboratory was ranked as the sixth most influential factor in the achievement of skill competency.[23] This calls for proper timetabling of the skill-based course.

Participants raised concerns about unstandardised YouTube teaching aids and inconsistencies among nurse-educator styles of teaching nursing skills. This required nurse educators to identify the relevant selection of YouTube resources for augmenting skill teaching. Cloud computing such as YouTube has become a reality in the education landscape. Technology in nursing education offers an opportunity to learn and practise clinical skills which should be embraced by students and educators.[24] However, consistency in imparting skills to students is paramount to ensure that students receive the same clinical instructions. It is the responsibility of nurse educators to create ways to engage with students and make tools available to empower students to master learning outcomes.

The participants reported that they were bored because they took too long in the nursing skills laboratory, a situation that raised feelings of detachment from reality. During the first year of the BNS programme, the curriculum structure allows students to practise skill-based laboratory activities on manikins for the whole academic year. They take 8 hours per week in the skills laboratory for 14 weeks, which translates into 224 hours. This turns out to be a long time as reported by the participants. Nevertheless, from the perspective of nurse educators, it is not regarded as a long time because skills acquisition requires prolonged engagement. However, the participants' concerns could be pointing to a need to further examine the simulation-based teaching and learning environment, and the complexity and fidelity of manikins that need to be improved for effective learning.[25] Informed by a survey conducted in Botswana that evaluated the BNS program in 2017, the clinical learning and duration of exposure were insufficient.[26] Hence, the attempt to increase simulation-based teaching practice time was meant to address the gap of inadequate clinical hours. The study findings imply that the strategy used to address this gap may not have been effective; hence the need for future research. The novelty of this study is that the experiences of students who practised basic nursing skills on low-fidelity manikins during the COVID-19 era were explored in terms of time allocated to the simulation-based course, availability of resources, and methods of skill-based teaching, which adds to the body of knowledge. The teaching methods of using YouTube in low-fidelity simulation make the study different from previous studies.

Implications for nursing

The study findings have several important implications for nursing education and nursing research. Various resources are needed to improve the quality of simulated learning and teaching for nursing students. The findings indicated that the nursing skills laboratory needed to be improved to transform the current skills laboratory into a moderate- or high-fidelity simulation laboratory. The development of local skill performance videos is crucial. This requires the school to work on developing local YouTube videos to suit the context and for standardised teaching to improve consistency. Timely scheduling of simulated teaching sessions would improve the contact hours that students desperately need for their skills rehearsal and development of confidence in the performance of care activities. In addition, a reduction in the student-to-lecturer ratio would ease learner-centred teaching. The study results have implications for the education system, not only for the University of Botswana but other health training institutions. Although many factors affected the quality of practical teaching (space, staff-student ratio, use of low-fidelity manikins, curriculum implementation deficits), simulation-based learning is still the best pedagogical approach to deliver practical knowledge. The need to invest in simulation-based teaching and learning is crucial and should be addressed.

The current study highlights the need to ensure effective training, augmenting skill teaching with YouTube, and revisiting skills at other levels of training to assist in closing the skill gaps. Implementation of the curriculum subscribes to the premise of simple to complex skills. At the moment, the high enrolment of students into nursing school hinders their effective training. Strategies such as standardised interactive videos to improve skill learning are needed. Also, the employment of more clinical educators can help to offset unfavourable staff-student ratios. There is a need for nurse educators to ensure the integration of ethical principles and cultural diversity during simulation-based teaching. This can be achieved by the clinical scenarios that require the application of ethical and cultural principles. It is the responsibility of nurse education to foster interdisciplinary collaboration at level one and ensure it in later years.

Limitations of the study

Given the nature of the current study, the results cannot be generalised to all nursing students in the school of nursing. Quantitative studies with larger sample sizes are needed to include students in various levels of the programme of study and other training institutions. Nursing care may carry a considerable risk to patients if students fail to attain basic nursing skills during training.

Conclusion

Generally, participants appreciated simulation learning, reasoning that it provided them with an opportunity to learn nursing care skills in a non-threatening and safe environment. However, participants noted that simulation had limitations that must be taken into consideration when it is used. Participants lamented resource constraints that cost them reasonable skill rehearsal 'contact time.' Participants shared some suggestions that they believed could improve students' simulated learning experiences.

Declaration. None.

Acknowledgments. We acknowledge the students who participated in the study and shared their perspectives. We also appreciate the independent researcher who analysed the data for us and the research assistants who collected the data.

Authors contributions. GL and DP developed the proposal, and WT aided the proposal development. MS analysed the data. GL supervised the execution of the study and drafted the manuscript, and WT and DP edited the manuscript. Data are available as supplementary material.

Funding. None.

Conflicts of interest. None.

1. Koukourikos K, Tsaloglidou A, Kourkouta L. Muscle atrophy in intensive care unit patients. Acta Inform Med 2014;22(6):406. https://doi.org/1.0.5455/aim.2014.22.406-410
2. McKitterick DJ, Jayasekara R, Parker B. Effectiveness of simulation in undergraduate nursing programs: Systematic review. Science Talks 2023; 6:100186. https://doi.org/10.1016/j.sctalk.2023.100186
3. Wheeler CA, McNelis AM. Nursing student perceptions of a community-based home visit experienced by a role-play simulation. Nurs Educ Perspect 2014;35(4):259-261. https://doi.org/10.5480/12-932.1
4. Khalid AF, George MA, Eggen C, Sritharan A, Wali F, Viens AM. Using simulation-based experiential learning to increase students' ability to analyze increasingly complex global health challenges: A mixed methods study. MedRxiv 2023. https://doi.org/10.1101/2023.12.19.23300262
5. Teni MT, Gebretensaye T. Knowledge and perception towards clinical simulation in teaching undergraduate nursing students among nurse educators working at teaching institutions in Addis Ababa, Ethiopia. Int J Afr Nurs Sci 2019; 10:81-86. https://doi.org/10.1016/j.ijans.2019.01.007
6. Alshutwi S, Alsharif F, Shibily F, Wedad MA, Almotairy MM, Algabbashi M. Maintaining clinical training continuity during COVID-19 pandemic: Nursing students' perceptions about simulation-based learning. Int J Environ Res Public Health 2022;19(4):2180. https://doi.org/10.3390/ijerph19042180
7. Le KDR. Principles of effective simulation-based teaching sessions in medical education: A narrative review. Cureus 2023;15(110):e49159. https://doi.org/10.7759/cureus.49159
8. Mothiba TM, Bopape MA, Mbombi MO. The emergence of a clinical skills laboratory and its impact on clinical learning: Undergraduate nursing students' perspective in Limpopo Province, South Africa. Afr J Health Professions Educ 2020;12(4):197. https://doi.org/10.7196/ajhpe.2020.v12i4.1375
9. Human Resource Development Council (2016-2024). Top occupation in high demand. http://www.hrdc.org.bw (accessed 12 August 2024).
10. World Health Organization. Regional Office for the Eastern Mediterranean. A guide to nursing and midwifery education standards. WHO, 2015. Regional Publications, Eastern Mediterranean Series, 37. https://iris.who.int/handle/10665/195726 (accessed 26 June 2025).
11. Guest G, Namey E, McKenna K. How many focus groups are enough? Building an evidence base for nonprobability sample sizes. Field Methods 2016;29(1):3-22. https://doi.org/10.1177/1525822x16639015
12. Braun V, Clarke V. Conceptual and design thinking for thematic analysis. Qualitative Psychology 2022;9(1):3-26. https://doi.org/10.1037/qup0000196
13. Rahimi S, Khatooni M. Saturation in qualitative research: An evolutionary concept analysis. Int J Nurs Studies Advances 2024:100174. https://doi.org/10.1016/j.ijnsa.2024.100174
14. Moabi PS, Mtshali NG. Simulation-based education model for under-resourced nursing education institutions in Lesotho. Health SA Gesondheid 2022;27. https://doi.org/10.4102/hsag.v27i0.1889
15. Msosa A, Msiska M, Mapulanga P, Mtambo J, Mwalabu G. Simulation-based education in classroom and clinical settings in sub-Saharan Africa: A systematic review. Higher Education Skills and Work-Based Learning 2023;13(6):1126-1141. https://doi.org/10.1108/heswbl-02-2023-0043
16. Alinier G, Oriot D. Simulation-based education: Deceiving learners with good intent. Adv Simul 2022;7(1). https://doi.org/10.1186/s41077-022-00206-3
17. World Health Organization. (2024) Simulation in nursing and midwifery education. WHO Regional Office Europe. 2024. http://www.iris.who.intel/handle/10665/345156 (accessed 16 August 2024).
18. Benchadlia F, Rabia Q, Abderrahim K. Simulation in basic nursing student education: Uses and barriers. Open Nurs J 2023:1-7. https://doi.org/10.1016/j.nedt.2024.106103.
19. Chernikova O, Heitzmann N, Stadler M, Holzberger D, Seidel T, Fischer F. Simulation-based learning in higher education: A meta-analysis. Rev Educ Res 2020;90(4):499-541. https://doi.org/10.3102/0034654320933544
20. Bouriami A, Boussaa S, El Adib AR. Effects of role-play simulation-based case studies on motivation and learning strategies in healthcare sciences: A randomized controlled trial. Simulation & Gaming 2024;56(2):192-209. https://doi.org/10.1177/10468781241301103
21. Madlala ST, Mvandaba AN. Experiences of nurse educators regarding the use of the clinical skills laboratory at the School of Nursing in the Free State province. Health SA Gesondheid 2023;28. https://doi.org/10.4102/hsag.v28i0.2077
22. Essfadi H, Khyati A, Abidi O, Radid M. Exploration of clinical learning challenges among Moroccan undergraduate nursing students. Open Nurs J 2024;18:18744346295835. https://doi.org/10.2174/0118744346295835240405071522
23. Hamash K. Student evaluation of nursing simulation lab learning experience. Iris J Nurs Care 2020;3(2). https://doi.org/10.33552/ijnc.2020.03.000559
24. McMullan T, Williams D, Lagos Ortiz Y, Lollar J. Is consistency possible? Course design and delivery to meet faculty and student needs. Curr Issues Educ 2022;23(3). https://doi.org/10.14507/cie.vol23iss3.2092
25. Reedy GB. Using cognitive load theory to inform simulation design and practice. Clin Simulation Nurs 2015;11(8):355–360. https://doi.org/10.1016/j.ecns.2015.05.004
26. Sabone MB, Lubinda-Sinombe G, Swart N, Lekone L. Graduates' experiences of the Bachelor of Nursing Science Programme – 2003 - 2017. Lonaka J Learn Teach 2020;11(2). https://journals.ub.bw/index.php/jolt/article/view/1913 (accessed 26 June 2025).

Received 21 September 2024. Accepted 8 June 2025.