






■ Original Article

Exploring student satisfaction and factors influencing simulation-based learning in nursing education

Hafid Saadi ^{1*} , Ahmed Kharbach ^{1,2} , Abdelkader Amchghal ³ , Abdelmajid Lkoul ^{1,2} ,
Fouad Khiri ⁴ 

¹ Higher Institute of Nursing Professions and Technical Health of the Agadir, Agadir, MOROCCO

² Laboratory of Biostatistics, Clinical Research and Epidemiology (LBRCE), Faculty of Medicine and Pharmacy of Rabat, Mohammed V University of Rabat, MOROCCO

³ High Institute of Nursing Professions and Technical Health, Laâyoune, MOROCCO

⁴ Department of Life and Earth Sciences, Regional Center for Careers of Education and Training CRMEF Souss-Massa, Inzegane, MOROCCO

* Corresponding author: Hafid Saadi E-mail: saadihafid83@gmail.com ORCID: 0000-0002-0216-8662

Received: 23 January 2023 Accepted: 29 September 2023

ABSTRACT

Introduction: Simulation-based learning is an excellent alternative to teaching and learning in nursing. The study aimed to assess student satisfaction with simulation-based learning and identify associated factors.

Materials and Methods: A cross-sectional study in an academic setting was conducted on 26 May 2022. Satisfaction was measured using a questionnaire with five dimensions and 32 items developed according to the Kirkpatrick model. Linear regressions were used to identify factors associated with student satisfaction with simulation-based learning.

Results: Student satisfaction towards simulation-based learning exceeded 80% for all items. The latter increases when students felt psychologically safe ($t=3.014$; $p=0.004$). Students who perceived that the methods their teachers taught to demonstrate skills were appropriate for their learning styles had increased their satisfaction ($t=7.781$; $p<0.01$).

Conclusions: The psychological safety of students during the demonstration of skills and the adequacy of teaching methods to student's learning styles were factors statistically associated with student satisfaction with simulation-based learning.

Keywords: satisfaction, associated factors, simulation-based learning, nursing students, Morocco

INTRODUCTION

Currently, with the development of technology and the complexity of care situations encountered in various clinical settings, the role of the instructor towards their students is evolving considerably to enable them to develop the necessary skills to meet the current needs of health care [1].

As a result, many university nursing institutions have reformed their educational programs, especially regarding teaching strategies [2]. Like the educational sciences, nursing has also initiated a paradigmatic shift from a traditional approach to a competency-based one [3]. Indeed, the conventional method, rooted in the teaching paradigm, is essentially characterized by a passive

transmission of knowledge from the instructor to the students [3]. While the competency-based approach situated in the learning paradigm, evokes a different vision centered on the mobilization of knowledge, where the learner actively constructs their knowledge, accompanied by the trainer [4]. Following this paradigm shift, various active teaching methods, which have demonstrated favorable results in terms of student learning, have been implemented in certain nursing education programs [2]. Clinical simulation remains one of the most relevant strategies in nursing education and health care teaching [5].

In this sense, many scientific studies conducted to date have highlighted the benefits of simulation and its contribution to nursing education [6]. This research documents that simulation promotes student learning and skill development, such as clinical reasoning, decision-making, communication skills, collaboration, and nursing leadership [6]. Furthermore, simulation can bridge the gap between theory and practice since this learning context attempts to represent, as closely as possible, the reality of clinical settings [7]. While some educators see simulation as a complementary educational strategy to clinical placements, others believe it is a substitute for clinical placements [8].

In a context similar to that of Morocco, there is a shortage of health professionals, the unpredictability of control of learning in a clinical setting, difficulty in achieving particular pedagogical objectives, and overcrowding of the training sites [9]. In addition to the adage "never the first time on the patient" [10], nursing students report that their learning in the practicum setting is hindered.

Currently, training in nursing sciences in higher institutes of nursing professions and technical health lasts three years through lecture courses, clinical trainings [11], and facultatively practical training in a simulation laboratory. Under the supervision of a qualified professional as a facilitator, this learning setting is a safe environment that develops the students' expertise [12] increases their knowledge and confidence and prepares them for their first practical experiences [9].

It is interesting for the trainer to foster a supportive academic environment and be aware of the barriers that impede student's learning process in a simulation context [13]. To assist trainers in the simulation process, Jeffries developed a framework to identify the elements necessary to design, implement, and evaluate a simulation activity of which student satisfaction is one [14]. It was pointed out that student satisfaction could further guide learning [15].

According to the literature, several empirical writings in nursing denounce that a large proportion of students have negative experiences during simulation sessions [6]. Specifically, two mixed studies [7, 16] stipulate that some students are dissatisfied with the time allotted to complete the required simulation activities. In addition, there are several factors influencing student satisfaction [17]. In addition to the deficiency of insufficient simulation, limited access to high-quality technology allows the use of low-functional instruments and less interactive teaching and learning methods [18]. Similarly, high levels of anxiety from a lack of experience in a clinical setting have been found to decrease student learning, and the use of simulation in initial nursing education has been shown to reduce anxiety in novice students [19].

In the evaluative approach of an educational training process in the field of health, Kirkpatrick's model with its four levels, including the level of satisfaction, is often used [20]. Therefore, the purpose of this study was to assess student satisfaction with simulation-based learning and associated factors among undergraduate students at our institution. Due to the limited number of studies in this area in general, the results will create new insights for future research.

MATERIALS AND METHODS

Design of the Study

This cross-sectional study was conducted on 26 May 2022, in the simulation laboratory of the Higher Institute of Nursing Professions and Technical Health of the Agadir.

Study Population

A sample size of 68 students of the general nurse option of semester four of the bachelor cycle was chosen. The selection criteria for this sample are based on the exhaustive census, homogeneity, programming, and the successive participation of the students in the four simulation sessions. They excluded the students absent from at least one of the four scheduled simulation sessions.

Data Collection

For this study, we collected quantitative data (questionnaires) to fully understand the students' satisfaction and associated factors following their participation in the four simulation sessions. One of the intended outcomes of Jeffries' simulation theoretical framework is learner satisfaction [14]. Participants completed a questionnaire immediately following the simulation sessions. This questionnaire was chosen as it is used in the literature as a proposal to assess participant

satisfaction with simulation sessions [21]. Its reliability is 0.95, according to Cronbach's test. Participants rated their level of agreement with each item on a four points Likert scale (1=strongly disagree to 4=strongly agree). A structured, pre-tested questionnaire was used for data collection for associated factors. Developed from the literature, it consisted of four parts: learner's psychological safety; teachers' assistance in demonstrating skills; clarity of communication, goals, objectives, and simulation expectations; adequacy of teaching methods to learning styles; the number of sessions per semester; and learner self-preparation [12, 22, 23]. Its Cronbach's index is 0.705, representing a valid internal consistency. The variable response modalities were "yes" or "no". The questionnaires were self-administered.

Data Analysis

After data collection, the questionnaires were checked for completeness, and the data were coded.

Data were entered and analyzed using SPSS version-13. Descriptive analyses were performed, and multivariate

analyses were used to determine the association of independent variables. Variables with a $p < 0.05$ in the multivariate analysis were considered in the multiple linear regression to have statistically significant associations.

RESULTS

All students participated in the study with a 100% response rate. The participants in the study were mainly male (66.20%), with a mean age of 19.93 ± 0.99 years, a minimum age of 19 years, and a maximum age of 23 years. Also, participants reported previous participation in simulation sessions with a percentage of 92.60%.

Student Satisfaction With Simulation-Based Learning

On average, the participants who either "somewhat agree" or "strongly agree" were 90.88% for the organization rubric, 95.81% for the scientific interest, 90.56% for the pedagogical value, 90.72% for the conduct of the sessions, and 96.78% for the general appreciation (**Table 1**).

Table 1. Student satisfaction towards simulation-based learning among nursing students

| Items | STD | SMD | SMA | STA |
|---|----------|-----------|------------|------------|
| Organization | | | | |
| Duration of the session adapted to the content | 2 (2.9%) | 6 (8.8%) | 25 (36.8%) | 35 (51.5%) |
| Distribution of time between the phases of the session is relevant | 1 (1.5%) | 6 (8.8%) | 24 (35.3%) | 37 (54.4%) |
| Teacher availability | 1 (1.5%) | 4 (5.9%) | 22 (32.3%) | 41 (60.3%) |
| Group size is appropriate | | 7 (10.3%) | 29 (42.6%) | 32 (47.1%) |
| The material used was of good quality | | 4 (5.9%) | 21 (30.9%) | 43 (63.2%) |
| Scientific interest | | | | |
| Session themes are relevant | | | 24 (35.3%) | 44 (64.7%) |
| Simulation design was adapted | | 1 (1.5%) | 23 (33.8%) | 44 (64.7%) |
| Choice of speakers in line with the content | 1 (1.5%) | 7 (10.3%) | 33 (48.5%) | 27 (39.7%) |
| Links to prior knowledge | | 2 (2.9%) | 35 (51.5%) | 31 (45.6%) |
| The session allows for effective patient care planning | 1 (1.5%) | 3 (4.4%) | 26 (38.2%) | 38 (55.9%) |
| Usefulness of sessions to assess patients' clinical situations | 1 (1.5%) | 1 (1.5%) | 20 (29.4%) | 46 (67.6%) |
| Pedagogical value | | | | |
| The sessions were interactive | 2 (2.9%) | 4 (5.9%) | 29 (42.6%) | 33 (48.5%) |
| Interaction with simulated experiences | | 5 (7.4%) | 23 (33.8%) | 40 (58.8%) |
| The sessions would improve my communication and teamwork skills | | 7 (10.3%) | 21 (30.9%) | 40 (58.8%) |
| Situations proposed were near to reality | | 5 (7.4%) | 19 (27.9%) | 44 (64.7%) |
| The documents provided were relevant | | 9 (13.2%) | 14 (20.6%) | 45 (66.2%) |
| Conduct of the session | | | | |
| Reception of the students was welcoming | 1 (1.5%) | 3 (4.4%) | 24 (35.3%) | 40 (58.8%) |
| The time of the briefing was adapted | | 8 (11.8%) | 23 (33.8%) | 37 (54.4%) |
| At debriefing, interest of simulation, ethical principles, objectives, & distribution of roles were discussed | | 6 (8.8%) | 27 (39.7%) | 35 (51.5%) |
| Time allocated to the simulation was appropriate | | 8 (11.8%) | 27 (39.7%) | 33 (48.5%) |
| The time given to debriefing was appropriate | 1 (1.5%) | 7 (10.3%) | 26 (38.2%) | 34 (50.0%) |
| The student actors expressed their feelings | | 4 (5.9%) | 24 (35.3%) | 40 (58.8%) |
| The distribution of speaking time was fair | | 7 (10.3%) | 17 (25.0%) | 44 (64.7%) |

Table 1 (Continued). Student satisfaction towards simulation-based learning among nursing students

| Items | STD | SMD | SMA | STA |
|---|----------|------------|------------|------------|
| Reflection and discussion of the performance during the debriefing | | 12 (17.7%) | 27 (39.7%) | 29 (42.6%) |
| The teacher would provide constructive criticism | | 3 (4.4%) | 30 (44.1%) | 35 (51.1%) |
| During the debriefing, the teacher summarized the important questions | | 3 (4.4%) | 23 (33.8%) | 42 (61.8%) |
| The observation grid was used during the debriefing | 1 (1.5%) | 5 (7.4%) | 31 (45.6%) | 31 (45.6%) |
| General appreciation | | | | |
| The overall quality of the sessions was satisfactory | 1 (1.5%) | 2 (2.9%) | 17 (25.0%) | 48 (70.6%) |
| The sessions allowed me to update my knowledge | 1 (1.5%) | | 29 (42.6%) | 38 (55.9%) |
| The sessions helped me to progress in my reasoning | | 3 (4.4%) | 23 (33.8%) | 42 (61.8%) |
| The problems in question are solved | | 2 (2.9%) | 22 (32.4%) | 44 (64.7%) |
| The sessions can improve my future professional practices | 1 (1.5%) | 1 (1.5%) | 22 (32.4%) | 44 (64.7%) |

Note. STD: Strongly disagree; SMD: Somewhat disagree; SMA: Somewhat agree; & STA: Strongly agree

Table 2. Means & medians of factors associated with student satisfaction towards simulation-based learning

| Associated factor | Mean±standard deviation | Median | Interquartile range |
|--|-------------------------|--------|---------------------|
| Psychological safety | 0.81±0.174 | 0.83 | (0.66-1.00) |
| Teacher assistance | 0.77±0.192 | 0.83 | (0.66-1.00) |
| Clarity of goals, objectives, & expectations of simulation | 0.88±0.159 | 1.00 | (0.80-1.00) |
| Adequacy of teaching methods for learning styles | 0.61±0.191 | 0.50 | (0.50-0.75) |
| Number of sessions per semester | 0.74±0.242 | 0.75 | (0.56-1.00) |
| Learner self-preparation | 0.81±0.174 | 0.83 | (0.66-1.00) |

Table 3. Multiple linear regression of factors associated with satisfaction towards simulation-based learning among nursing students

| Model | Coefficients ^a | | | t | p | |
|-------|--|----------------|---------------------------|------|--------|------|
| | Non-standardized coefficients | | Standardized coefficients | | | |
| | B | Standard error | Beta | | | |
| 1 | (Constant) | 3.437 | .251 | | 13.717 | .000 |
| | Psychological safety of the learner | .525 | .174 | .273 | 3.014 | .004 |
| | Adequacy of teaching methods for learning styles | 1.177 | .151 | .672 | 7.781 | .000 |

Note. ^aDependent variable: Student satisfaction

Factors Associated With Student Satisfaction With Simulation-Based Learning

In multiple linear regression analysis with $r^2=0.552$, learner's psychological safety (mean=0.810±0.174) and adequacy of teaching methods to learning styles (mean=0.610±0.191) were statistically significantly associated with students' satisfaction to simulation learning (mean=4.470±0.335), with a $p<0.05$, as shown in **Table 2** and **Table 3**.

Results of study showed that student satisfaction increased when they felt psychologically safe ($t=3.014$; $p=0.004<0.05$). Students who perceived that the methods their instructors taught to demonstrate skills were appropriate for their learning styles had their satisfaction increased towards simulation-based learning ($t=7.781$; $p\leq 0.01$).

DISCUSSION

This study found that the proportion of satisfaction towards simulation-based learning exceeded 80% for all items, which

is consistent with the high level of satisfaction set by Kirkpatrick for effective training [24]. These results are similar to other studies published in the literature regarding simulation based-learning in which student satisfaction rates are reported to be above 90.00% after training [25]. Also, another research showed that students participating in the simulation reported a high level of satisfaction with simulation-based learning with a mean=4.100 and standard deviation (SD)=0.50 [19]. In another study of the implementation and evaluation of simulation-based learning for gynecological examinations, more than 97.00% of students felt that the training answered questions they had and met their expectations [26]. But another study showed a proportion of satisfaction of 78.75% for the quality of organization of the session, 71.67% for the scientific interest, 68.75% for the pedagogical value, and 78.33% for the general appreciation of the teaching module [27]. This difference could be due to differences in methodology, socio-demographic characteristics of participants, and the technology gap between institutions or countries. Indeed, a

positive evaluation of satisfaction in simulation training does not always predict successful learning [21].

Learner psychological safety and the adequacy of teaching methods to students' learning styles were factors statistically associated with satisfaction towards simulation-based learning. The results of this study are consistent with a study conducted at the Department of Allied Health Sciences at the Korea National University of Transportation, which found a significant effect of psychological safety on satisfaction with simulation learning [28]. For some researchers, the potential effect of a simulation scenario to induce stress in students is a good indicator that represents realism, immersion, and degree of involvement [29, 30]. For others, stress can impede cognitive performance and impair learners' concentration and recall [31, 32]. It was explained that some students fear that they will not be able to pass the simulation activities [6]. A sense of humiliation is thus likely to develop in some students, which may affect their skill development [13]. In addition, the results of [16] corroborate those of [33], by raising the fact that a perceived stressful simulation environment proves unfavorable for some students' learning. As a result, many students are likely to be immersed in a difficult learning environment that creates a sense of stress, to the point that they become disengaged from their training and even drop out of their program of study [6].

Similarly, the adequacy of teaching methods to learning styles had a significant effect on student satisfaction, which is similar to the results of a study conducted with midwifery students at Harar Health Sciences College, Haramaya University, and Dire Dawa University in Ethiopia [12]. The study highlights the vital role of teaching styles teaching style to student satisfaction (OR=22.391; $p=0.023$). (OR=22.391; $p=0.023$) [12]. Also, it was found that there is a significant impact of interactivity on student satisfaction [34]. For his part, it was added that to facilitate students' learning in a clinical setting, it is important that the trainer possess the knowledge and clinical experience, be able to ask questions relevant to their training and promote learning opportunities to mobilize their clinical skills [35]. On the other hand, it is essential that the trainer respects his or her students, recognizes their limitations, and is a source of inspiration for their academic progress [35]. The results of another study reported that 51.40% of students said that the way their instructors taught the simulation was appropriate to the way they learned [18]. Indeed, in a study of the effect of simulation on the satisfaction and self-confidence of undergraduate students in a Middle Eastern country, the majority were satisfied with the methods used in the

simulation (mean=4.050; SD=0.88). They reported that the way their trainers taught the simulation was appropriate to the way they learned (mean=3.970; SD=0.74) [36]. According to this study, active learning, collaboration, diverse ways of learning, problem-solving, guided feedback/reflection guided, and fidelity were statistically and positively correlated with students' satisfaction with simulation-based learning ($p<.001$) [36].

The level of satisfaction with simulation-based learning among nursing students at the Higher Institute of Nursing Professions and Technical Health of Agadir is high. Therefore, it is recommended to continue to offer ways to create a climate of confidence to learners through non-judgment, reintroduction of the right to make mistakes, the possibility to question and exit in case of difficulty [37], and coordination teaching methods with learning styles during simulation learning, while taking into consideration differences in learning styles, as they can give learners new opportunities for reflection according to the study in [38]. Therefore, it is advocated to create the means to improve the overall quality of simulation-based learning [39].

CONCLUSIONS

The objectives of this study were to assess student satisfaction and identify factors associated with simulation-based learning offered at the Higher Institute of Nursing Professions and Technical Health. The results of this study showed that participants were satisfied with their learning in the simulation sessions. It may be necessary for teachers to develop strategies and actions to ensure the psychological safety of learners during simulation sessions. In addition, it may be helpful to work more closely with their students and to use scientifically valid theoretical models and guidance documents to enhance pedagogical practices appropriate for simulation-based learning regarding the need for competencies for students in nursing sciences.

The results of this study suggest satisfaction and two associated factors towards simulation-based learning, but it has some limitations. The study was conducted only at the High Institute of Nursing Professions and Technical Health of Agadir. The study was conducted using a quantitative method only. Therefore, it is recommended that further studies are needed using other qualitative or combined methodological approaches.

Despite these limitations, the results of this study will help educators in identifying areas, where student learning needs are not being addressed and, therefore, may help in planning, developing, and evaluating simulation-based

learning in nursing sciences. In addition, the study of satisfaction and its associated factors can form the basis for greater student engagement in the learning process regarding the simulation field.

This study may be that stakeholders can use the results to identify unsatisfied student learning needs. They can plan, develop, and evaluate simulation-based learning in basic education. Thus, this study can provide a foundation for further studies that may focus on analyzing the impact of satisfaction and associated factors on learning effectiveness, which may be important in demystifying the role of simulation in the development of students' practical performance in the clinical setting.

Author contributions: All authors were involved in concept, design, collection of data, interpretation, writing, and critically revising the article. All authors approve final version of the article.

Funding: The authors received no financial support for the research and/or authorship of this article.

Ethical statement: The authors stated that the authorization to collect data was obtained from Higher Institute of Nursing Professions and Technical Health of the Agadir, Agadir, Morocco (Ref. No. 337/ISPITS of the Agadir 15-04-2022). Consent was obtained from the participants.

Declaration of interest: Authors declare no competing interest.

Data sharing statement: Data supporting the findings and conclusions are available upon request from the corresponding author.

REFERENCES

1. Fawaz MA, Hamdan-Mansour AM, Tassi A. Challenges facing nursing education in the advanced healthcare environment. *Int J Africa Nurs Sci.* 2018;9:105-10. (doi:10.1016/j.ijans.2018.10.005).
2. Lavoie P, Clarke SP. Simulation in nursing education. *Nurs Manage.* 2017;48(2):16-7. (doi:10.1097/01.NUMA.0000511924.21011.1b).
3. Fabre M. Jean Houssaye, *La pédagogie traditionnelle. Une histoire de la pédagogie. Suivi de "petite histoire des savoirs sur l'éducation"* [Jean Houssaye, *Traditional pedagogy. A history of pedagogy. Followed by "a brief history of knowledge on education"*]. Paris: Editions Fabert, Collection; 2014. (doi:10.14375/NP.9782849222560).
4. Deane WH, Asselin M. Transitioning to concept based teaching: A discussion of strategies and the use of Bridges change model. *J Nurs Educ Pract.* 2015;5(10):52-9. (doi:10.5430/jnep.v5n10p52).
5. Cantrell ML, Meyer SL, Mosack V. Effects of simulation on nursing student stress: An integrative review. *J Nurs Educ.* 2017;56(3):139-44. (doi:10.3928/01484834-20170222-04).
6. Ben Ahmed HE. La signification de l'expérience vécue d'une relation pédagogique de caring en contexte de simulation clinique haute-fidélité [The meaning of the lived experience of a caring educational relationship in the context of high-fidelity clinical simulation] [PhD thesis]. Montreal: University of Montreal; 2021.
7. Lee SJ, Kim SS, Park Y-M. First experiences of high-fidelity simulation training in junior nursing students in Korea. *Jpn J Nurs Sci.* 2015;12(3):222-31. (doi:10.1111/jjns.12062).
8. CASN. *Domaine de pratique au niveau du baccalauréat en sciences infirmières: Lignes directrices pour les stages cliniques et la simulation* [Area of practice at the baccalaureate nursing level: Guidelines for clinical placements and simulation]. Ottawa: Canadian Association of Schools of Nursing; 2015.
9. Lalonde M, Malouin-Benoit MC, Michon A, Maisonneuve M, Gagnon E, Desroches J. Évaluation de la satisfaction des étudiant(e)s en sciences infirmières suite à leur participation à une simulation interprofessionnelle: Une étude de cas [Evaluation of nursing student satisfaction following their participation in an interprofessional simulation: A case study]. *Rev Francoph Int de Rech Infirm.* 2017;3(4):253-61. (doi:10.1016/j.refiri.2017.07.009).
10. Levraut J, Fournier JP. Jamais la première fois sur le patient [Never the first time on the patient!] *Ann Fr Med Urgence.* 2012;2(6):361-3. (doi:10.1007/s13341-012-0259-9).
11. MHSP. Ministry of Health and Social Protection. Ministry of Health and Social Protection; 2023. Available at: www.sante.gov.ma
12. Jamie AH, Mohammed AA. Satisfaction with simulation-based education among bachelor of midwifery students in public universities and colleges in Harar and Dire Dawa cities, Ethiopia. *Eur J Midwifery.* 2019;3:19. (doi:10.18332/ejm/113132).
13. Fisher R. Designing the simulation learning environment: An active engagement model. *J Nurs Educ Pract.* 2015;6(3):6-14. (doi:10.5430/jnep.v6n3p6).
14. Jeffries PR. A framework for designing, implementing, and evaluating simulations used as teaching strategies in nursing. *Nurs Educ Perspect.* 2005;26(2):96-103.

15. Bryant JL. Assessing expectations and perceptions of the campus experience: The Noel-Levitz student satisfaction inventory. *New Dir Community Coll.* 2006;2006(134):25-35. (doi:10.1002/cc.234).
16. Cato ML. Nursing student anxiety in simulation settings: A mixed methods study [PhD thesis]. Portland (OR): Portland State University; 2013. (doi:10.15760/etd.1035).
17. Aldemir C, Gulcan Y. Satisfaction des étudiants dans l'enseignement supérieur en Turquie [Student satisfaction in higher education in Turkey]. *High Educ Policy Manag.* 2004;16(2):121-35. (doi:10.1787/hempv16-art19-fr).
18. Gudayu TW, Badi MB, Asaye MM. Self-efficacy, learner satisfaction, and associated factors of simulation based education among midwifery students: A cross-sectional study. *Educ Res Int.* 2015;2015: 346182. (doi:10.1155/2015/346182).
19. Lubbers J, Rossman C. Satisfaction and self-confidence with nursing clinical simulation: Novice learners, medium-fidelity, and community settings. *Nurse Educ Today.* 2017;48:140-4. (doi:10.1016/j.nedt.2016.10.010).
20. Kirkpatrick DL, Kirkpatrick JD. Evaluating training programs: The four levels. San Francisco (CA): Berrett-Koehler Publishers; 2006.
21. Ben Thabet J, Ben Amor I, Gargouri J. Proposition de questionnaire de satisfaction pour les séances d'apprentissage par simulation [Proposal for a satisfaction questionnaire for simulation learning sessions]. *Jl M Sfax.* 2019;33:33-8.
22. Ahmed HB, Ouanes I, Allouche E, Chetoui A, Ouechtati W, Bazdeh L. Évaluation du stress généré par un exercice de simulation haute-fidélité chez des étudiants en médecine [Evaluation of stress generated by a high-fidelity simulation exercise in medical students]. *Tunis med.* 2020;98(05):363-9.
23. NLN. Student satisfaction and self-confidence in learning. National League for Nursing; 2005. Available at: <https://www.nln.org/>
24. Boet S, Granry JC, Savoldelli G. La simulation en santé: De la théorie à la pratique [Health simulation: From theory to practice]. Paris: Springer; 2013. (doi:10.1007/978-2-8178-0469-9).
25. Orsi TD, Valadares ALR, Orsi PME, Orsi IME, Moura AS. Simulation-based training for pelvic and breast physical examination: Effect on the anxiety and self-confidence of medical students. *Rev Bras Ginecol Obstet.* 2020;42(11):739-45. (doi:10.1055/s-0040-1718433).
26. Piessen G, Louvet A, Robriquet L, Bailleux E, Jourdain M, Cosson M. Mise en place et évaluation d'un apprentissage par simulation des examens gynécologiques [Implementation and evaluation of simulation-based learning of gynecological examinations]. *Gynecol Obstet Fertil.* 2014;42(9):591-6. (doi:10.1016/j.gyobfe.2014.07.004).
27. Doll A. Place de la simulation médicale haute-fidélité dans la formation médicale continue en médecine générale [Place of high-fidelity medical simulation in continuing medical education in general medicine]. *Life Sci.* 2019;126.
28. Baek ML. Factors affecting the satisfaction of simulation education about emergency delivery for paramedic students. *Fire Sci Eng.* 2014;28(5):98-103. (doi:10.7731/KIFSE.2014.28.5.098).
29. LeBlanc VR. The effects of acute stress on performance implications for health professions education. *Acad Med.* 2009;84(10 Suppl):S25-33. (doi:10.1097/ACM.0b013e3181b37b8f).
30. Piquette D, Tarshis J, Sinuff T, Fowler RA, Pinto R, Leblanc VR. Impact of acute stress on resident performance during simulated resuscitation episodes: A prospective randomized cross-over study. *Teach Learn Med.* 2014;26(1):9-16. (doi:10.1080/10401334.2014.859932).
31. Bryson EO, Levine AI. The simulation theater: A theoretical discussion of concepts and constructs that enhance learning. *J Crit Care.* 2008;23(2):185-7. (doi:10.1016/j.jcrc.2007.12.003).
32. Demaria Jr S, Bryson EO, Mooney TJ, et al. Adding emotional stressors to training in simulated cardiopulmonary arrest enhances participant performance. *Med Educ.* 2010;44(10):1006-15. (doi:10.1111/j.1365-2923.2010.03775.x).
33. Najjar RH, Lyman B, Miehl N. Nursing students' experiences with high-fidelity simulation. *Int J Nurs Educ Scholarsh.* 2015;12:j/ijnes.2015.12.issue-1/ijnes-2015-0010/ijnes-2015-0010.xml. (doi:10.1515/ijnes-2015-0010).

34. Tawfik AK. Service quality as a mediator between interactivity, simulation and students' satisfaction. *Arab Inst Navig J.* 2018;2018(37):44-55.
35. Wafaa Gmeel MA. Caring and effective teaching behavior of clinical nursing instructors in clinical area as perceived by their students. *J Educ Pract.* 2012;3(7):15-26.
36. Al Khasawneh E, Arulappan J, Natarajan JR, Raman S, Isac C. Efficacy of simulation using NLN/Jeffries nursing education simulation framework on satisfaction and self-confidence of undergraduate nursing students in a Middle-Eastern country. *SAGE Open Nurs.* 2021;7:237796082110113. (doi:10.1177/23779608211011316).
37. Spill C, Gatin A. Comment favoriser la sécurité psychologique des étudiants en soins infirmiers lors de l'enseignement des gestes et soins d'urgence par simulation [Comment favoriser la sécurité psychologique des étudiants en soins infirmiers lors de l'enseignement des gestes et soins d'urgence par simulation]? *Nurs Res.* 2019;2(137):62-76. (doi:10.3917/rsi.137.0062).
38. Ewertsson M, Allvin R, Holmström IK, Blomberg K. Walking the bridge: Nursing students' learning in clinical skill laboratories. *Nurse Educ Pract.* 2015;15(4):277-83. (doi:10.1016/j.nepr.2015.03.006).
39. Agha S, Khan MA, Alhamrani AY. Satisfaction of medical students with simulation based learning. *Saudi Med J.* 2015;36(6):731-6. (doi:10.15537/smj.2015.6.11501).

