



Review Article

Standardized Patient Simulation in Healthcare Education

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Abstract

Introduction: Simulation training is a key part of healthcare and medical education, but the use of standardized patients in simulation training is not yet systematic at least in Finland. The purpose of this literature review was to determine the benefits and challenges of using standardized patients in simulation training. **Methods:** The information search was conducted in the international Cinahl and Pubmed databases. The search terms used were “Simulation”, “Simulation-based education”, “Simulated patient”, “Standardized patient” and “Standardized patient”. The inclusion criteria were 1) peer-reviewed original research 2) published in Finnish or English 3) published in the last 10 years. Additionally, the research had to be conducted in Europe, the United States, Canada, or Australia. 40 studies fulfill the criteria. The data was analyzed with inductive content analysis. **Results:** The use of a standardized patient in simulation training improves student learning outcomes, as well as develops interaction and work-life skills. For the standardized patient, participating in simulation training can increase acting experience and bring content to everyday life. However, it can also be physically and mentally taxing. It’s important that the teacher enables good preparation for the role. Challenges experienced by students are related to stress created by the standardized patient and unexpected situations in the simulation of standardized patients. **Discussion:** The results show that the utilization of standardized patients in simulation requires planning and adequate resources, but it also brings various benefits, especially for the development of students’ skills.

Keywords: Simulation; Learning; Literature reviews

Introduction

In healthcare education, simulation is a common teaching method [1]. In simulation training, it is possible to practice skills required in the field, such as communication and leadership, in safe conditions. These skills are essential to improve patient safety [2].

Simulation training combines several different learning theories, such as cognitive, social, and experiential learning [3].

Kolb (1984) presents experiential learning as a cycle in which knowledge and skills are shaped during the learning process from experience through reflection [4]. Thus, simulation learning is one of the active learning methods where the student is seen as an active participant. The student constructs and deepens their knowledge based on what they have previously learned [5]. Simulation training can be carried out using different models and methods [6]. However, the teaching always includes the preparation of the simulation situation, the description of learning objectives, the simulation situation itself, and the learning discussion [7].

Simulated patients (SP) have been represented by mannequins and actors since the 1960s [6]. In simulation, it is possible to use a standardized patient. SP can be a healthy individual who has been trained to represent a patient or an actual patient who presents their own illness in a standardized manner [8,9]. People of different ages, from children to the elderly, can act as standardized patients [10]. They can be divided into three groups: a volunteer or paid actor, a trainer or teacher, and another student in the field [11]. Smithson and his research colleagues [11] note that, regardless of the group, each patient brings a unique combination of benefits and limitations. For example, paid actors can further enhance the realism of the simulation situation [12].

Standardized patients are already widely used in healthcare education [13]. Standardized patients bring humanity and interactivity to simulations; the exercises can emphasize the patient-centered perspective [14]. Practicing with them simultaneously challenges the trainees' nursing skills and both verbal and non-verbal skills [15].

Methods

The purpose of the literature review was to determine what benefits and challenges the use of standardized patients in simulation training brings to the situation. The research question of the literature review was: "What issues are associated with the preparation and utilization of standardized patient cases in simulation training from the perspective of the teacher, student, and patient?"

The literature review's data search was conducted in the international Cinahl and Pubmed databases. The data searches were performed in March-April 2022, and they were executed using a free word search. The search terms used were "Simulation", "Simulation-based education", "Simulated patient", "Standardized patient", and "Standardized patient". In addition to the systematic search, data search was also conducted manually. In total, there were 2,044 search results before database restrictions, and 1,618 after them. Database restrictions and the progress of the search process are shown in Figure 1.

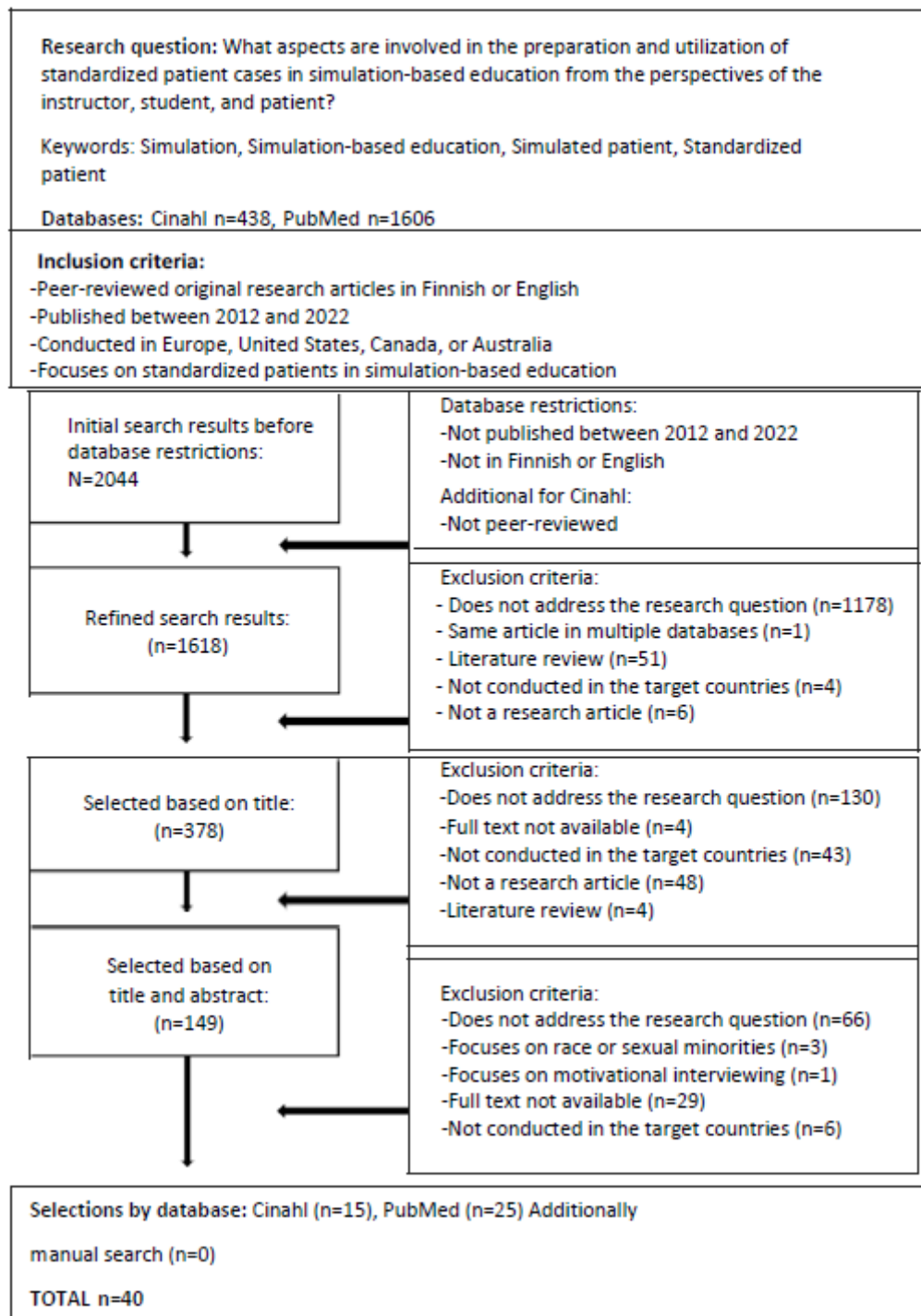


Figure 1: Information retrieval strategy.

The search process was guided by the research question, based on which the inclusion and exclusion criteria for the material were also set. The inclusion criteria for the material were peer-reviewed original research, published in Finnish or English within the last 10 years. The applicability of the research results to European society and health care education was considered during the data search phase, excluding certain countries from the review. The review selected only studies conducted in Europe, the United States, Canada, or Australia. The reliability of qualitative research, especially content analysis, can be assessed from perspectives such as credibility, confirmability, and transferability [16,17]. In this review, credibility and confirmability were supported by discussion among researchers about methods and analysis during the research process.

The research material consisted of 40 scientific articles. Of these, 12 were conducted with qualitative research methods, 18 with quantitative research methods, and 10 as mixed-methods

research. Most of the studies were conducted either in the United States (n=18) or in Europe (n=16). In addition, there were studies conducted in Canada (n=2) and Australia (n=4).

The analysis of the material was carried out with inductive or data-driven content analysis. Initial responses to the research question were first picked from the material, and information was gradually derived into a more conceptual form [18]. A total of 262 original expressions corresponding to the research question were found from the material, from which 649 abstractions were obtained. The original expressions were translated into Finnish during the reduction phase. The reductions resulted in 87 subcategories, which further led to 21 upper categories and finally 4 main categories.

In each stage of the review, good scientific practice has been followed, paying attention to honesty, carefulness, and appropriate references when handling the works of other researchers [19].

Results

Benefits and challenges of standardized patient simulation

The participation of standardized patients in simulation education benefited the students, for example, when considering learning outcomes or the development of communication skills. On the other hand, it must also be noted that a standardized patient is not a mannequin but a person whose needs must be considered throughout the simulation process (Figure 2).

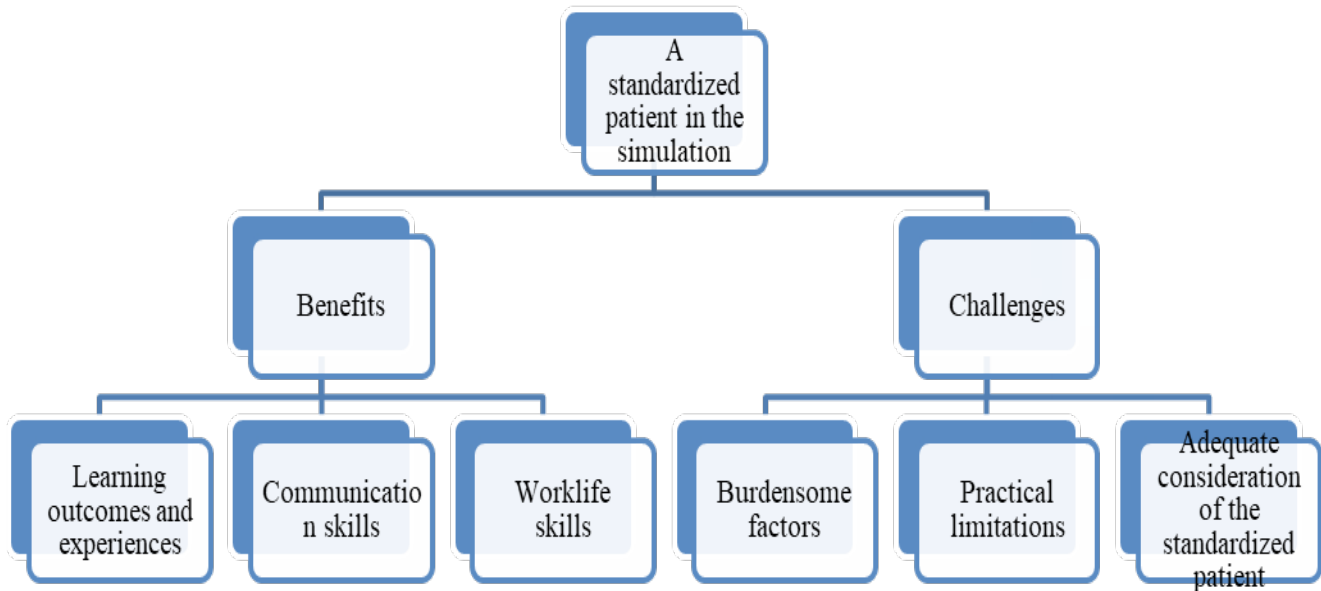


Figure 2: Standardized patient as part of simulation teaching.

Benefits

Standardized patients were found to be an effective and learning outcome-enhancing teaching method (10; 25; 28; 36). Students particularly appreciated the realism of the situation when performing clinical nursing work and encountering the patient compared to a patient simulator or peer-assisted learning (2; 8; 9; 16; 20; 21; 25; 27; 32; 33; 34; 39). Interaction with the standardized patient helped students to implement more patient-centered nursing (17; 20; 23; 31; 38). It also concretized their responsibility for patient care and gave the opportunity to change negative preconceptions like assumptions mental illness (5; 6; 23; 24; 33).??? during the nurse-patient meeting.

Especially older standardized patients appreciated filling the gap left by the working life and the transformation of their own personal challenges into a growing experience (30). Through simulation, they also got the opportunity to develop their own communication in health care (15). In addition, simulation offered opportunities for accumulating acting experience and reflection (15; 19).

Standardized patient simulation developed students' communication skills (7; 10; 12; 19; 23; 36; 39). The possibility for reciprocal communication improved students' ability to

make decisions about patient care (20). It also gave students the opportunity to learn to tolerate silence in the presence of the patient, which is an important part of interaction and the building of a good care relationship (23).

It was important for students to act in a professional role in standardized patient simulations. They felt that it facilitated encounters with patients and clinical situations in working life and combined theory and practice (8; 10; 16; 20; 28; 35; 36). Simulations increased students' self-confidence, and they felt more confident in recognizing, for example, domestic violence (4; 20; 28; 29; 40)."

Challenges

Too long simulation days or excessive requirements, for example regarding scripted lines, can burden standardized patients. This can cause fatigue and decrease their activity in their role (14; 30). Strain can also be increased by difficulty in detaching from the role, breach of personal boundaries, and hurtful speech by students (14; 15; 22).

Students experienced stress when working with a standardized patient (1). The situation's evaluation by the teacher and peers and the patient's questions caused stress (22; 23; 35).

Also, unexpected situations during the simulation, such as the death of a patient, could create negative emotions for the student, thereby causing mental strain (8; 13; 23). Students' perceived stress decreased as they got used to the simulation situation (28; 36)."

Standardized patients could be recruited from schools, theaters, and the close circle of teaching staff. In recruitment the timing of the simulation, accessibility, teaching schedule, and the opportunity for reflection had to be considered. For example, the willingness of young patients to participate decreased if the simulation teaching was placed during leisure time or if transport connections were difficult to arrange. It was important for patients that there were enough breaks during the day for meals, discussions, and relaxation after the situation. Especially young patients appreciated the opportunity to discuss their roles, performances, and uncertainties (14).

Standardized patients wished for empathy, clarity, and respect from teachers (30). In simulation teaching, they should be encountered as individuals to utilize personal strengths (22; 30). For example, previous experience of acting as a standardized patient could increase the reality of the situation or facilitate communication (8; 22). The standardized patient had the ability to adapt to changing situations and respond to unexpected questions (37). They were also able to reduce the student's anxiety with their own actions, for example, through humor, and guide the situation according to the student's needs (8; 15; 22).

For the success of the simulation, it was important to ensure patients' opportunity to prepare carefully before the simulation (14; 26). Practice improved the quality of performance, and scenarios repeated several times increased the confidence of especially young patients (3; 14; 22). Instead of memorizing lines, patients hoped for easily memorable keywords (30)."

The importance of feedback in simulation

Feedback played a crucial role for students participating in standardized patient simulation, as it helped them evaluate and develop their own competence and provide constructive feedback on the implementation of the simulation. The importance of feedback was especially emphasized in learning discussions held at the end of the simulations, which reinforced students' learning and increased their knowledge of the topics discussed (25; 28; 29; 35). Reflection in learning discussions was considered beneficial, as it enabled students to recognize their own strengths and weaknesses, develop their own actions, and improve their confidence (3; 25; 35; 39)."

Feedback from standardized patients was considered particularly useful (19; 21; 25). It enhanced students' ability to put themselves in the patient's position and increased situation awareness (17; 37). Standardized patients wished for the

opportunity to give feedback to students (8; 15; 18; 22) and to receive it on their own performance to develop (15; 30). All parties participating in the simulation provided ideas for developing simulation teaching. The development suggestions of the students about standardized patient simulation were related to the structure and schedule of the simulation. For example, they hoped for more and more diverse simulation teaching, starting earlier in the education (25; 28; 39; 40). More simulations related to interaction were hoped for (17; 19; 25). In addition, they emphasized better utilization of feedback from teachers and peer observers (25; 35). Teachers wished for longer learning discussions and the opportunity to support standardized patients in giving feedback to students (11; 37). Standardized patients, on the other hand, wished for clear instructions on how to act in roles and opportunities to change their roles to better match their abilities (14; 30).

Conclusion & discussion

The purpose of this literature review was to determine the benefits and challenges of using standardized patients in simulation teaching from the perspectives of the teacher, student, and patient. The use of standardized patients in simulation improved student learning, including interaction and working life skills [20-30]. Indeed, students felt better prepared to face the challenges and responsibilities of their future working life [31,23,32,25,26,33]. Interaction with a standardized patient facilitates the implementation of patient-centered care by the student, as the patient's feelings as well as verbal and non-verbal communication must be considered [15].

When dealing with a real person instead of a patient simulator, it's important to adapt teaching and consider the unique features of the situation. Standardized patients often do this voluntarily, wishing to assist in the education of health professionals [10]. Extended simulation days or excessive demands, such as in terms of spoken lines, can strain standardized patients [34-36]. Difficulty detaching from the role, the breach of personal boundaries, and hurtful comments from students can also increase strain [34,35,37, 40-50]. It's crucial to offer those acting as patients the opportunity for sufficient debriefing.

Simulation scenarios are always somewhat straining for students. In Finland, the use of standardized patients in simulation teaching is not yet routine. The new situation and the more active and realistic participation of a standardized patient compared to a patient simulator can initially cause strain for students [38,37,24, 25,33,27]. This must be considered when increasing the use of standardized patients in simulation teaching. The situation is also new for teachers, and they need training on how to prepare standardized patients for simulations and provide them with feedback [39].

In places where the pool of trained standardized patients is

currently limited, it would be crucial to consider various recruitment and training strategies. Collaboration with schools, theaters, and possibly patient organizations, as well as utilizing the social circles of the teaching staff, could be beneficial for recruitment. The better trained the standardized patients are, the more likely the simulations will run smoothly, and students will benefit from them. Familiarizing ourselves with the literature further reinforced our belief that standardized patients bring added authenticity to simulations and enhance learning, despite the laborious, multi-stage, and resource-intensive preparation process [40,50-60].

References

1. Gaba D (2004) The future vision of simulation in health care. *Quality and Safety of Health Care* 13: i2-i10.
2. Naik VN, Brien SE (2013) Review article: simulation: a means to address and improve patient safety. *Can J Anaesth* 60: 192-200.
3. McGaghie WC, Harris IB (2018) Learning Theory Foundations of Simulation-Based Mastery Learning. *Simul Healthc* 13: S15-S20.
4. Kolb DA (1984) *Experiential Learning: Experience as the Source of Learning and Development*. Prentice Hall, New Jersey.
5. Freeman S, Eddy SL, McDonough M, Wenderoth MP, Smith MK (2014) Active learning increases student performance in science, engineering, and mathematics. *PNAS* 111: 8410-8415.
6. Singh H, Kalani M, Acosta-Torres S, El Ahmadieh TY, Loya J (2013) History of simulation in medicine: from Resusci Annie to the Ann Myers Medical Center. *Neurosurgery* 73: 9-14.
7. Blomgren K (2015) Simulaatiot-melkein leikkiä, melkein totta. *Lääketieteellinen Aikakauskirja Duodecim* 131: 2239-2244.
8. Barrows HS (1993) An overview of the uses of standardized patients for teaching and evaluating clinical skills. *Acad Med* 68: 443-451.
9. Beullens J, Rethans J, Goedhuys J, Buntinx F (1997) The use of standardized patients in research in general practice. *Fam Pract* 14: 58-62.
10. Plaksin J, Nicholson J, Kundrod S, Zabar S, Kalet A (2016) The Benefits and Risks of Being a Standardized Patient: A Narrative Review of the Literature. *Patient* 9: 15-25.
11. Smithson J, Belligan M, Glass B, Mills J (2015) Standardized patients in pharmacy education: an integrative literature review. *Currents in Pharmacy Teaching and Learning* 7: 851-863.
12. Silén-Lipponen M, Korvenoja M, Välimäki T, Aura S, Mönkkönen K, et al. (2021) Sosiaali- ja terveysalan suursimulaatio -kokemuksia moniammatillisen yhteistyön oppimisesta. *Tutkiva Hoitotyö*, 19: 20-27.
13. Rutherford-Hemming T, Alfes CM, Breymier T (2019) A systematic review of the use of standardized patients as a simulation modality in nursing education. *Nursing Education Perspectives* 40: 84-90.
14. Ha EH (2018) Experience of nursing students with standardized patients in simulation-based learning: Q-methodology study. *Nurse Educ Today* 66: 123-129.
15. Mårtensson S, Knutsson S, Hodges EA, Sherwood G, Broström A, et al. (2022) Undergraduate nursing students' experiences of practicing caring behaviours with standardised patients. *Scand J Caring Sci* 37: 271-281.
16. Elo S, Kääriäinen M, Kanste O, Pölkki T, Utriainen K, et al. (2014) Qualitative Content Analysis: A Focus on Trustworthiness. *SAGE Open* 4.
17. Kyngäs H, Kääriäinen M, Elo S (2020) The Trustworthiness of Content Analysis.
18. Teoksessa Kyngäs H, Mikkonen K, Kääriäinen M (2000) The Application of Content Analysis in Nursing Science Research 41-48.
19. Elo S, Kyngäs H (2008) The qualitative content analysis process. *J Adv Nurs* 62: 107-115.
20. TENK (2012) Hyvä tieteellinen käytäntö ja sen loukkausepäilyjen käsitteleminen Suomessa. Tutkimuseettisen neuvottelukunnan ohje 2012.
21. Donovan LM, Mullen LK (2019) Expanding nursing simulation programs with a standardized patient protocol on therapeutic communication. *Nurse Education in Practice* 38: 126-131.
22. Escribano S, Cabañero-Martínez MJ, Fernández-Alcántara M, García-Sanjuán S, Montoya-Juárez R, et al. (2021) Efficacy of a Standardised Patient Simulation Programme for Chronicity and End-of-Life Care Training in Undergraduate Nursing Students. *Int J Environ Res Public Health* 8: 11673.
23. Hemond JA, Franchek-Roa KM, Caplin DA, Hobson WL (2021) Teen Actors Teaching Communication Skills. *Cureus* 13: e19515.
24. Herron EK, Nemeth J, Powers KA (2017) Clinical Simulation in Nursing 13: 331-337.
25. Knutson Å, Øgård-Repål A, Fossum M (2021) Simulations with Standardized Patients for Nursing Students in Preparation for Clinical Placements in Mental Health Care. *Nurse Educ Today* 54: 70-76.
26. Reeves NE, Waite MC, Tuttle N, Bialocerkowski A (2019) Simulated patient contributions to enhancing exercise physiology student clinical assessment skills. *Adv Simul* 4: 15.
27. Ross M, Bryan J, Thomas K, Asghar-Ali A, Pickens S (2020) Elder Abuse Education Using Standardized Patient Simulation in an Undergraduate Nursing Program. *J Nurs Educ* 59: 331-335.
28. Tuzer H, Dinc L, Elcin M (2016) The effects of using high-fidelity simulators and standardized patients on the thorax, lung, and cardiac examination skills of undergraduate nursing students. *Nurse Educ Today* 45: 120-125.
29. Webster KEF, Carlson E (2020) Building therapeutic connections with the acutely ill through standardised patient simulation in nurse education an evaluation study. *Nurse Educ Today* 84: 104261.
30. Witt MA, Mc Gaughan K, Smaldone A (2018) Standardized Patient Simulation Experiences Improves Mental Health Assessment and Communication. *Clinical simulation in nursing* 23: 16-20.
31. Woroch R, Mc Namara M (2021) Intimate Partner Violence Standardized Patient Simulation for Nurse Practitioner Students. *J Am Psychiatr Nurses Assoc* 29: 338-343.
32. Bodys-Cupak I, Łatka J, Ziarko E, Majda A, et al. (2020) Medical simulation with simulated patients in the education of polish nursing students – pilot study. *Pielęgniarsstwo Polskie* 77: 166-173.
33. Kol E, Ince S, Işık RD, İlaslan E, Mamakli S (2021) The effect of using standardized patients in the Simulated Hospital Environment on first-

- year nursing students psychomotor skills learning. *Nurse Educ Today* 107: 105147.
34. Turesson C, Lindh Falk A (2021) Learning occupational therapy practice using standardised patients in a practical examination - experiences of students and teachers. *Scand J Occup Ther* 12: 1-10.
 35. Gamble AS, Nestel D, Bearman M (2020) Listening to young voices: The lived experiences of adolescent simulated patients in health professional education. *Nurse Educ Today* 91: 104476.
 36. Schelgel C, Smith CM (2019) "Please let me know when I do not realize it myself": a qualitative analysis of senior simulated patients' experiences. *Advances in Simulation* 4: 18.
 37. Gamble AS, Nestel D, Bearman M (2020) Power and adolescent simulated patients: A qualitative exploration. *Nurse Educ Pract* 48: 102871.
 38. Kearney GP, Gormley GJ, Wilson D, Johnston JL (2018) Blurred boundaries: sexuality and power in standardised patients' negotiations of the physical examination. *Advances in Simulation* 3: 11.
 39. Allen ML (2018) Examining Nursing Students' in an End-of-Life Care Simulation. *Clinical Simulation in Nursing* 14: 21-28.
 40. Yilmaz DU, Last N, Harvey J, Norman L, Monteiro S, et al. (2022) Quality in Standardized Patient Training and Delivery: Retrospective Documentary Analysis of Trainer and Instructor Feedback. *Cureus* 14: 1-8.
 41. Kühne F, Ay DS, Otterbeck MJ, Weck F (2018) Standardized Patients in Clinical Psychology and Psychotherapy: a Scoping Review of Barriers and Facilitators for Implementation. *Acad Psychiatry* 42: 773-781.
 42. Solorzano Martinez AJ (2017) Implementing a Workplace Violence Simulation for Undergraduate Nursing Students. A Pilot Study. *J Psychosoc Nurs Ment Health Serv* 55: 39-44.
 43. Sterz J, Gutenberger N, Stefanescu MC, Zinßer U, Bepler L, et al. (2021) Manikins versus simulated patients in emergency medicine training: a comparative analysis. *Eur J Trauma Emerg Surg* 48: 3793-3801.
 44. Takeuchi LY, Bonvin R, Ambresin AE (2021) 'Demystifying' the encounter with adolescent patients: a qualitative study on medical students' experiences and perspectives during training with adolescent simulated patients. *Medical Education Online* 26: 1979445.
 45. Tengiz FI, Sezer H, Başer A, Şahin H (2022) Can patient-physician interview skills be implemented with peer simulated patients? *Med Educ Online* 27: 2045670.
 46. Phillips AC, Mackintosh SF, Bell A, Johnston KN (2017) Developing physiotherapy student safety skills in readiness for clinical placement using standardised patients compared with peer-role play: a pilot non-randomised controlled trial. *BMC Med Educ* 17: 133.
 47. Martin CT, Chanda N (2016) Mental Health Clinical Simulation: Therapeutic Communication. *Clinical Simulation in Nursing* 12: 209-214.
 48. Meerdink M, Khan J (2021) Comparison of the use of manikins and simulated patients in a multidisciplinary in situ medical simulation program for healthcare professionals in the United Kingdom. *J Educ Eval Health Prof* 18: 8.
 49. Johnson KV, Scott AL, Franks L (2020) Impact of Standardized Patients on First Semester Nursing Students Self-Confidence, Satisfaction, and Communication in a Simulated Clinical Case. *SAGE Open Nursing* 6: 1-7.
 50. Gardner D, Wettstein R, Hart M, Bhasin P, Tran K, et al. (2018) Using Standardized Patients as Part of a Preclinical Simulation. *Respiratory Care Education Annual* 27: 43-55.
 51. Gurley L, Roberson J, Burnham York A, Childress J (2020) Interprofessional Team Approach Using Standardized Patient Simulation to Facilitate Person-Centered Quality Healthcare in Home Hospice Care Setting. *J Hosp Palliat Nurs* 23: 69-77.
 52. Hadley D, Packer L, Kim H, Darrah N, LaMarra D, et al. (2018) Faculty facilitators' and standardized family members (SFMs) perceptions of student teamwork during an interprofessional education simulation workshop. *J Interprof Care* 32: 786-789.
 53. Fraser K, Huffman J, Ma I, Sobczak M, McIlwrick J, et al. (2014) The emotional and cognitive impact of unexpected simulated patient death: a randomized controlled trial. *Chest* 145: 958-963.
 54. Eichorn N, Zarn M, Moncrieff D, Spoto C, Lee S, et al. (2021) Original Interprofessional Simulations to Train Students in CSD and Related Health Professions in Team-Based Health Care. *Communication Disorders Quarterly* 43: 23-31.
 55. Brayden K, Fradkin D, Lee H (2020) Effect of Standardized Patient Simulation on Nursing Students' Attitudes Toward Psychiatric Nursing and Patients With Mental Health Problems. *J Psychosoc Nurs Ment Health Serv* 59: 15-21.
 56. Brennan LF, McBride A, Akinola M, Ogle S, Goforth J, et al. (2021) Improving Health Professions Students' Understanding of Interprofessional Roles Through Participation in a Patient Stabilization Simulation. *American Journal of Pharmaceutical Education* 85: 173-178.
 57. Cortés-Rodríguez AE, Roman P, López-Rodríguez MM, Fernández-Medina IM, Fernández-Sola C, et al. (2021) Role-Play versus Standardised Patient Simulation for Teaching Interprofessional Communication in Care of the Elderly for Nursing Students. *Healthcare* 10: 46.
 58. Dawson RM, Lawrence K, Gibbs S, Davis V, Mele C, et al. (2021) "I Felt The Connection": A Qualitative Exploration of Standardized Patients' Experiences in a Delivering Bad News Scenario. *Clinical Simulation in Nursing* 55: 52-58.
 59. Denizon Arranz S, Blanco Canseco JM, Pouplana Malagarriga MM, Holgado Catalán MS, Gámez Cabero MI, et al. (2021) Multi-source evaluation of an educational program aimed at medical students for interviewing taking the clinical history using standardized patients. *GMS Journal for Medical Education* 38.
 60. Alsaad AA, Davuluri S, Bhide VY, Lannen AM, Maniaci MJ (2017) Assessing the performance and satisfaction of medical residents utilizing standardized patient versus mannequin-simulated training. *Adv Med Educ Pract* 8: 481-486.
 61. Alvarez S, Schultz JH (2017) Medical educators' perception of communication training with simulated patients: an explorative study approach. *BMC Research Notes* 10: 650.