

A Systematic Review of Emotional, Cognitive, and Logistical Factors Influencing Simulated Patient Performance in Simulation-Based Education

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Purpose: Simulated patients (SPs) are critical to simulation-based education (SBE) in developing learners' clinical, communication, and professional skills. However, limited research has examined the factors influencing SP performance and consequent learning outcomes.

Patients and Methods: We conducted a systematic review (2013–2025) using six databases, focusing on human SPs in healthcare education. Nineteen studies met the inclusion criteria and were analyzed using inductive thematic analysis. Study quality was assessed using the QATSDD tool.

Results: Inductive thematic analysis identified three key domains influencing SP performance: emotional (anxiety, fulfillment), cognitive (task complexity, improvisation), and logistical (training, scheduling). SP involvement enhanced educational outcomes (empathy, communication, clinical reasoning) but was sometimes limited by SP fatigue, stress, or cognitive overload. Among the reviewed studies, 7 were high and 12 were of medium quality (no low-quality studies).

Conclusion: Authentic SP portrayals enhance student learning, but factors such as emotional strain and cognitive load can limit effectiveness. We recommend structured SP training, robust feedback mechanisms, and attention to SP cognitive and cultural challenges. Future research should prioritize long-term SP outcomes, measurement of SP cognitive load, and exploration of ethical and cultural dimensions of SP engagement.

Keywords: simulated patients, medical education, learning outcomes, cognitive load, feedback

Introduction

Simulation-Based Education (SBE) is integral to clinical training, enhancing skills through immersive scenarios.¹ At the core of SBE's success are simulated patients (SPs), also known as standardised patients, who play diverse roles in the education and assessment of trainees.² SPs significantly enrich learning by fostering safe, patient-centered environments that enhance communication and technical skills.^{3–8} A key feature of SP programs is the provision of feedback from a patient's perspective, which has been highly valued for bridging theoretical knowledge and practical application.^{9–13} Such feedback not only facilitates immediate corrective action but also promotes self-reflection and continuous improvement.^{14,15}

Participation as an SP also benefits the individuals themselves, increasing their health knowledge, empathy, and understanding of clinical contexts.⁵ Nonetheless, SPs face challenges: they often come from varied backgrounds and must simultaneously portray roles, observe learners, provide feedback, and sometimes assess performance.^{16,17} Cultural context critically shapes feedback dynamics¹⁸ in SP programs. Dimensions such as power distance, individualism–collectivism, and communication style influence how SPs deliver feedback and how students perceive it. For instance, in hierarchical cultures SP feedback may be undervalued compared to faculty, whereas in egalitarian settings

it is received more collaboratively.^{18–20} Similarly, learners in collectivist contexts may prefer group-oriented comments, while those in individualist cultures expect personalized critique. These cultural differences highlight the need for training SPs to adapt their feedback style to diverse educational settings, ensuring that feedback remains authentic, actionable, and equitable.^{19–22} High-stakes assessments such as OSCEs impose further demands, requiring SPs to perform complex scenarios under observation, which can be emotionally and physically draining.^{5,23} This imposes cognitive load,²⁴ as SPs must quickly internalise character details and medical information,²⁵ potentially compounded by factors like age.^{26,27} Although cognitive load effects on students are well documented,^{28–32} SP-specific challenges warrant further study.

Given SPs' growing role, understanding how multitasking and environmental demands affect their performance is imperative. Most existing research focuses on learner outcomes, with limited insight into SP experiences.^{33,34} A previous narrative review by Plaksin et al¹⁶ identified benefits and risks for SPs but did not focus on contextual factors. Importantly, theoretical frameworks such as cognitive load theory are seldom applied to SP performance, leaving synthesis of factors somewhat unstructured. To address these gaps, we ground our analysis in Sweller's cognitive load theory and propose a conceptual framework integrating emotional, cognitive, and logistical domains to organize factors influencing SP performance. Sweller's CLT highlights human limits on working memory when managing complex tasks. In the SP context, playing a patient and observing learners is a dual task that overloads memory, causing cognitive strain and performance errors.³⁵ This systematic review aims to synthesize recent literature on SP performance factors, their implications for learners, and directions for future research.

Materials and Methods

Search Strategy: This review followed PRISMA guidelines.³⁶ Six databases (Ovid Medline, PubMed, Web of Science, CINAHL, Scopus, Embase) were searched (April 2024; updated January 2025) for peer-reviewed articles on human SPs in undergraduate medical education (see [Appendix A](#)). Search results from each electronic database were imported into Covidence© 2021 (systematic review software, Veritas Health Innovation, Melbourne, Australia (available at www.covidence.org)) which facilitated de-duplication, screening, and data extraction. In addition, the reference lists of the included articles were hand-searched to identify additional relevant studies. Search concepts included SP performance, SP roles, and simulation-based education.

Eligibility Criteria: Studies were selected for inclusion based on the following criteria: 1) peer-reviewed journal articles published in English, within the last 10 years; 2) studies focused on the role of human SPs in simulation-based education for undergraduate medical students; 3) articles that evaluated factors affecting SP performance, including training, coaching, and skills development. Articles were excluded if they did not meet these characteristics or were literature reviews, editorials, commentaries, or conference abstracts. This timeframe was chosen because previous reviews covering literature up to 2014 have already explored earlier developments in simulation practices involving SPs.¹⁶ The decision to focus on more recent articles is based on significant advancements in simulation methodologies and their integration into medical education over the past decade.

Data Extraction and Synthesis: Two reviewers (EFF, BSMA) independently screened titles/abstracts and full texts. An 87% agreement (Cohen's $\kappa=0.80$) was achieved in eligibility decisions. Discrepancies were resolved by consensus and discussion with additional reviewers (UHM, EA). Data extraction used a Covidence template, collecting study details (authors, year, aims, design, participants) and results related to SP performance factors and student learning. We performed an inductive thematic analysis: relevant findings from each study's results and discussion were coded line-by-line without using a pre-existing framework, allowing themes to emerge organically. Codes were iteratively refined and grouped into themes and overarching domains (emotional, cognitive, logistical).

Risk of Bias Assessment: Two reviewers (EFF, BSMA) independently assessed study quality using the QATSDD tool,³⁷ which scores each of 16 criteria from 0 to 3. Total scores were converted to percentages (<50% low quality, 50–80% medium, >80% high). Disagreements were resolved by discussion; no disagreements affected overall category of assignments.

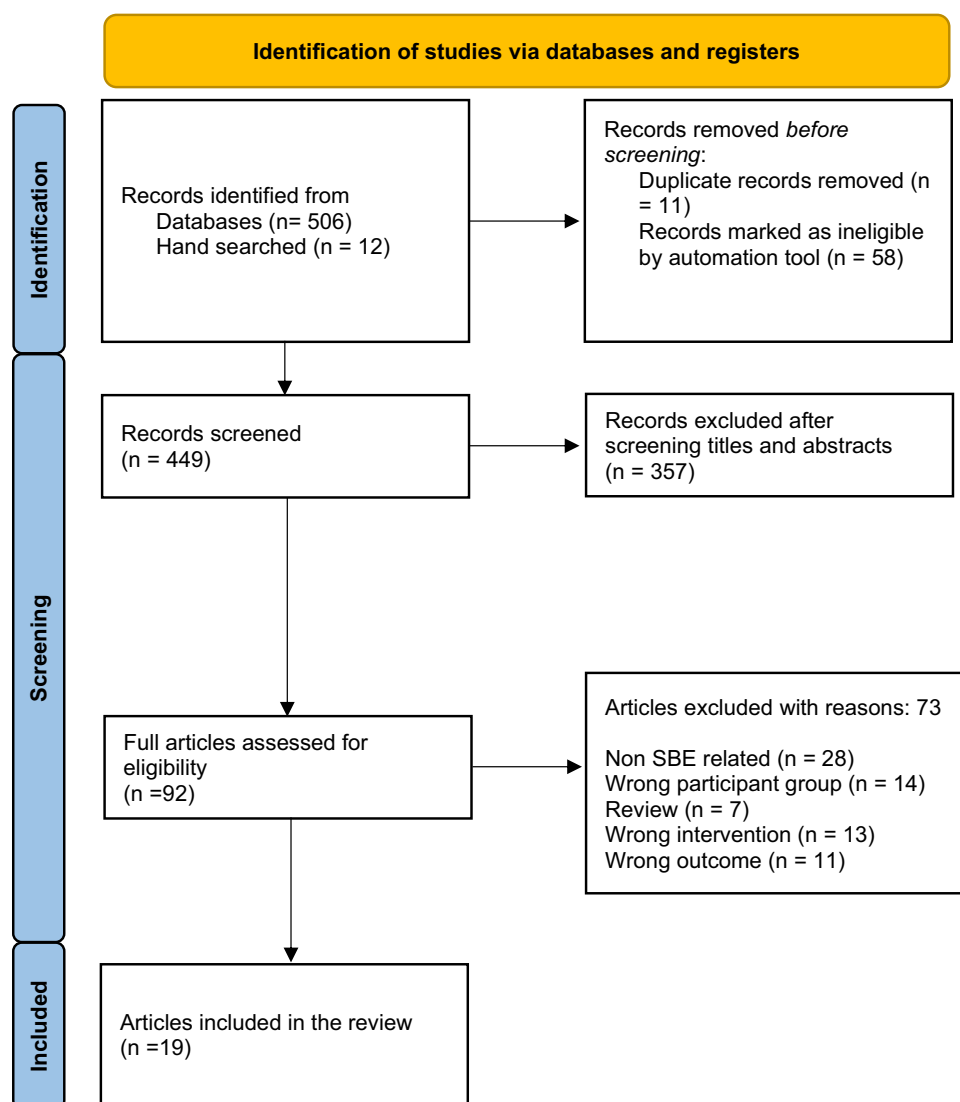


Figure 1 Prisma flow chart.

Results

The search yielded 518 records (506 database results, 12 from hand-searching). After removing 11 duplicates and screening titles/abstracts (92 full texts reviewed), 19 studies^{24,38–55} met inclusion criteria (see PRISMA Figure 1).

Characteristics of the Included Articles

Table 1 presents the summary characteristics of the 19 included studies. Studies spanned nine countries: USA (6), Australia (3), UK (3), Netherlands (2), and one each from France, Germany, Switzerland, Sweden, UAE. There were 607 total participants. Fifteen studies were qualitative, two mixed methods, and two quantitative. Fifteen studies included only SPs: four included SPs plus faculty or students. Only one study quantitatively measured SP cognitive load; the others used surveys or interviews.

Enablers and Barriers to SP Performance

Analysis revealed three domains affecting SP performance (Table 2).

Table 1 Characteristics of the Reviewed Articles

Authors	Title	Study Design	Overall Study Findings
Newlin-Canzone ET, Scerbo MW, Gliva-McConvey G, Wallace AM. 2013. ²⁴	The Cognitive Demands of Standardized Patients: Understanding Limitations in Attention and Working Memory with the Decoding of Nonverbal Behaviour During Improvisations	Quantitative – NASA TLX	Simultaneous portrayal of a character and assessment of a learner, especially during required improvisations, may significantly impair SPs' observational abilities and increase mental workload. This underscores the need for specific training to handle these cognitive demands.
Simmenroth-Nayda A, Marx G, Lorkowski T, Himmel W. 2016. ³⁸	Working as a simulated patient has effects on real patient life – Preliminary insights from a qualitative study	Qualitative – individual interviews	SPs experienced changes in behaviour as real patients: being more attentive, understanding the doctor's work conditions better, and acting more self-confidently. These changes could potentially empower patients, suggesting that SP training may be a model for empowering real patients.
Schlegel C, Bonvin R, Rethans J, Van der Vleuten C. 2016. ³⁹	Standardized Patients' Perspectives on Workplace Satisfaction and Work-Related Relationships – A Multicenter Study	Qualitative - individual interviews	SPs are motivated and satisfied with their roles as long as the social environment is supportive, and they receive adequate feedback and recognition. The study highlights the importance of understanding SPs' perspectives to enhance their well-being and effectiveness in SP programs.
Thompson J, Tiplady S, Hutchinson A, Cook G, Harrington B. 2017. ⁴⁰	Older people's views and experiences of engagement in standardised patient simulation	Qualitative – focus groups	Involvement in SPS can be beneficial for the well-being of older participants, providing them a sense of purpose, belonging, and being valued, while also enhancing students' learning by adding realism to the simulation. It's suggested that nurse educators consider developing SPS programs that involve older people.
Block L, Brenner J, Conigliaro J, Pekmezaris R, DeVoe B, Kozikowski A. 2018. ⁴¹	Perceptions of a longitudinal standardized patient experience by standardized patients, medical students, and faculty	Qualitative – focus groups	Lack of continuity pairings among students, SPs, and faculty was identified as a barrier, limiting the effectiveness of relationship-building and feedback. Continuity pairings of students, faculty, and SPs were recommended to strengthen the LSP experience. Recommendations also included the use of individualized door charts to prompt case recall by students, and the importance of individualizing feedback by SPs.
Pritchard SA, Denning T, Keating JL, Blackstock FC, Nestel D. 2020. ⁴²	"It's Not an Acting Job ... Don't Underestimate What a Simulated Patient Does": A Qualitative Study Exploring the Perspectives of Simulated Patients in Health Professions Education	Qualitative - focus groups	SPs identify as educated specialists with a professional role in health professional education, committed to authenticity and supporting learners. They face challenges in preparation and performance due to insufficient information or training, and experience negative physical and mental health impacts. SPs' practice aligns with a community of practice, characterised by mutual engagement, joint enterprise, and a shared repertoire.
Gamble A, Bearman M, Nestel D. 2021. ⁴³	Engaging young people as simulated patients: a qualitative description of health professional educators' perspectives	Qualitative - individual interviews	Engagement of CASPs in health professions education is seen as divisive. While CASPs can meaningfully contribute to education, their engagement raises ethical, practical, logistical, and financial challenges.
McKinley M, Arnold A, Burns I, Geddes H, McDonald L, O'Carroll V. 2022. ⁴⁴	Simulated patients' experiences and perspectives of an interprofessional ward simulation: An exploratory qualitative analysis	Qualitative - individual interviews	SPs play a crucial role in IPSE and value their contribution to healthcare education. They highlighted the need for better preparation, clearer understanding of their role, and more active participation in the simulation process. The study also points out public unawareness about the changing scope of professional practice in healthcare.
Dickinson KJ, Hill T, Johnson S, Orfanos M, Casavechia J, Glasgow M, Neill KK. 2022. ⁴⁵	Simulated patient perceptions of telesimulation education	Qualitative - individual interviews	SPs appreciated telesimulation for its educational modality and potential in telehealth education but were concerned about learner participation and professionalism. SPs saw psychological safety as equivalent between in-person and virtual simulations and appreciated the health safety the virtual platform provided. Incorporating SP feedback into telesimulation education is important for ensuring high-quality education.

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Table 1 (Continued).

Authors	Title	Study Design	Overall Study Findings
Lovink A, Groenier M, van der Niet A, Miedema H, Rethans J. 2024. ⁴⁶	How simulated patients contribute to student learning authentically: an interview study	Qualitative- individual interviews	SPs contribute to meaningful student learning by providing variation and authenticity in SP-student encounters. The study highlights the importance of allowing SPs to act and react from different positions to optimize learning experiences
Hamad NB & Folorunsho EF, 2023. ⁴⁷	Simulated Participants' Experiences and Challenges with Online and Face-to-Face Interactions During COVID-19: A Case Study in UAEU	Qualitative - individual interviews	By utilizing simultaneous online and in-person techniques, it may be possible to more successfully incorporate SPs in simulation-based learning.
George, R. E., Wells, H., and Cushing, A. 2022. ⁴⁸	Experiences of simulated patients in providing feedback in communication skills teaching for undergraduate medical students	Qualitative - focus groups	Feedback from SPs is shaped by their experiences over time as well as the intricate interpersonal and social connections that exist between them, facilitators, and students.
McLean, M., Johnson, P, Sargeant, S., Green, P. 2015. ⁴⁹	Simulated patients' perspectives of and perceived role in medical students' professional identity development.	Qualitative - individual interviews	The study highlighted the significant role of SPs in shaping medical students' professional identities through their feedback and interactions.
Ceccolini G, Kanevsky M, Feinn R, Philibert I, Netter F H. 2024. ⁵⁰	Adapting standardized patient training to improve patients' understanding and preparedness for health care encounters	Mixed Methods - surveys and focus groups	More than 55% of SP respondents agreed that their preparedness for medical encounters increased since becoming an SP
Van Hooser J, Harden R M, Vail M, Friedrichsen S, Lieberz D, Mattson S, Onello E. 2024. ⁵¹	The Interprofessional Standardized Patient Experience: An Effective Interprofessional Education Activity for Prelicensure Health Professional Students	Quantitative - Quasi- Experimental	The ISPE improved understanding of roles and responsibilities among different health professions and emphasized the importance of interprofessional teams in patient care.
Codron P, Autret E, Fisbach M, O'sullivan K, Riveau H, Annweiler C, Lerolle N, Biere L. 2024. ⁵²	English Workshops with Simulated Patients and Peers Reduce Medical Students' Apprehension About Speaking in English.	Quantitative - surveys	The workshops led to reduced anxiety, high satisfaction, perceived improvement in English proficiency, and increased confidence in patient interactions
Erici S, Lindqvist D, Lindström M B, Gummesson C. 2023. ⁵³	Three perspectives on learning in a simulated patient scenario: a qualitative interview study with student, simulated patient, and teacher	Qualitative - individual interviews	The paper indicates that the simulated patient scenario placed a high cognitive and emotional load on the student participants, as it required them to navigate between their personal and professional identities, adapt their communication strategies in real time, and engage in the process of professional identity development. The study identified three key themes: identity formation, collaborative learning, and learning intentions, highlighting the emotional impact of the simulation on students' professional identity development
Starr SA; Plack MM, Lewis KL, Blatt, B 2021. ⁵⁴	How Do Standardized Patients Form Their Complex Identities? The Impact of Interactions with Medical Students. Simulation in Healthcare:	Qualitative – Focus groups	SPs experienced a transformation into a complex identity composed of multiple roles. Within this identity, they found purpose, fulfillment, and self-actualization through fostering students', as well as their own, personal, and professional growth and through developing a higher sense of social responsibility. Within this identity, they also encountered the challenges of navigating between judging and supporting medical students, and toggling between their real and simulated selves
Lovink A, Groenier M, Niet A V D, Miedema H, Jan-Joost Rethans, J.-J Rethans. 2021. ⁵⁵	The contribution of simulated patients to meaningful student learning.	Qualitative - individual interviews	Interactions with SPs offer more than just communication skill enhancement; they also play a significant role in the professional and personal development of students. The authentic responses from SPs during encounters were particularly valuable, suggesting that over-standardization of SPs might limit opportunities for meaningful learning.

Emotional Influences

SPs often draw on personal experience, enhancing authenticity and emotional realism in scenarios.^{46,49} Many SPs felt fulfilled by contributing to student learning, which was motivating.^{39,41} Feedback methods such as “sandwich-style” and out-of-role discussions helped SPs process their feelings.^{47,55} However, intense or repeated scenarios led to SP fatigue and exhaustion, compromising performance.^{40,42} Sustaining continuity over long-term simulations was difficult, affecting

Table 2 Enablers and Barriers Affecting SPs' Performance and Student Learning

Authors	Title	Enablers of SP performance	Barriers to SP performance	Impact on Student Learning
Newlin-Canzone ET, Scerbo MW, Gliva-McConvey G, Wallace AM. 2013 ²⁴	The Cognitive Demands of Standardized Patients: Understanding Limitations in Attention and Working Memory with the Decoding of Nonverbal Behavior During Improvisations	SPs benefited from personal growth through their participation	The need for improvisation, active observation, and maintaining the integrity of the simulation placed significant cognitive demands on SPs and led to stress. There were instances where the SP role did not offer significant development opportunities, leading to dissatisfaction or disengagement	Reduced effectiveness of SP performance limited the educational value. If simulated patients (SPs) do not perform accurately or realistically, it detracts from the learning experience by compromising the authenticity of the training. This diminishes the educational value as learners are not presented with the realistic challenges necessary to practice clinical skills and decision-making effectively.
Simmenroth-Nayda A, Marx G, Lorkowski T, Himmel W. 2016 ³⁸	Working as a simulated patient has effects on real patient life – Preliminary insights from a qualitative study	Increased attentiveness, better understanding of doctors' work conditions, and more self-confidence in interacting with doctors.	Not mentioned;	Positive impacts on SPs' real-life patient experiences enhances empathy and engagement. When SPs have experiences as actual patients, it enriches their comprehension of patient emotions and behaviors. This enhanced understanding allows SPs to more authentically portray their roles, thereby increasing their empathy and engagement. Consequently, this authenticity provides students with a more immersive and realistic learning environment, which enhances their clinical skills and emotional insight.
Schlegel C, Bonvin R, Rethans J, Van der Vleuten C 2016 ³⁹	Standardized Patients' Perspectives on Workplace Satisfaction and Work-Related Relationships – A Multicenter Study	Feeling motivated, engaged, willing to invest effort in their task, appreciating supportive social environment, importance of SP trainer role, use of feedback.	Challenges with increasing demands, difficulties when students do not take learning opportunities seriously, some SPs feel not adequately informed or supported in certain tasks.	SPs perceive their role as crucial for the professional development of healthcare students, contributing significantly to healthcare education and patient-student communication.

Thompson J, Tiplady S, Hutchinson A, Cook G, Harrington B 2017 ⁴⁰	Older people's views and experiences of engagement in standardized patient simulation	Using personal experiences to improve care, having a sense of purpose, feeling appreciated. A sense of purpose, mental stimulation, and personal fulfillment from being involved in the teaching sessions	Participants reported potential fatigue or exhaustion, and anxiety about simulation performance. Feeling drained, upset, or emotionally invested when immersed in the simulation and reflecting on their own healthcare experiences.	Involving older people in standardized patient simulations (SPS) adds realism by reflecting the unique health challenges of elderly patients, such as chronic illnesses or cognitive decline. This enhances the value of training by giving students exposure to these specific issues, allowing them to develop crucial caring skills like empathy, active listening, and effective communication. Interacting with older patients helps students refine both their clinical and compassionate care abilities, preparing them to offer better patient-centered care for older adults.
Block L, Brenner J, Conigliaro J, Pekmezaris R, DeVoe B, Kozikowski A. 2018 ⁴¹	Perceptions of a longitudinal standardized patient experience by standardized patients, medical students, and faculty	Fulfilling role in medical student education, instilling empathy in students, and contributing to a safe learning environment for real-time feedback.	Limitations to continuity, integrity, and fidelity of the cases, with some students confusing SPs with characters from other cases.	The LSP experience was seen as a way to enhance the understanding of continuity in clinical skills, with feedback from SPs and faculty contributing significantly to student growth over time. Students feeling empathy and emotional reactions towards the female LSP character, Linda Paulson, particularly during difficult encounters. Students developing an emotional connection and relationship with the female LSP character over multiple encounters.

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Table 2 (Continued).

Authors	Title	Enablers of SP performance	Barriers to SP performance	Impact on Student Learning
Pritchard SA, Denning T, Keating JL, Blackstock FC, Nestel D 2020 ⁴²	"It's Not an Acting Job ... Don't Underestimate What a Simulated Patient Does": A Qualitative Study Exploring the Perspectives of Simulated Patients in Health Professions Education	Increased confidence in healthcare settings for themselves, enjoyment and personal development from the work, sense of fulfillment and contribution to society.	Physical and mental health impacts like musculoskeletal discomfort and anxiety from portraying emotionally demanding roles.	SPs see their dual identity of representing patients and assessing student competency as essential to student learning and assessment. SPs play a dual role in medical education by both simulating patients and assessing students' competency. As patients, they help students practice clinical skills in a realistic setting, while also providing feedback on students' performance. This dual identity is crucial for student learning, as it allows for hands-on practice and offers valuable insights into strengths and areas for improvement, enhancing both skills and assessment accuracy.
Gamble A, Bearman M, Nestel D 2021 ⁴³	Engaging young people as simulated patients: a qualitative description of health professional educators' perspectives	Supports the development of communication skills, provides a realistic option for learning without harming real patients, beneficial for both teaching and assessment.	Ethical concerns, potential harm, logistical and financial challenges, and difficulty in maintaining consistency in performance. Worry and concern about the potential for CASPs to be negatively impacted or traumatized by the roles they are asked to play. Ethical concerns about involving CASPs who may not fully understand or consent to their role. Distress experienced by CASPs	These practical learning methods enhance students' knowledge by helping them apply theoretical concepts in real-world scenarios, which deepens their understanding. It also boosts learners' confidence by providing a safe space to practice and make mistakes without consequences. This allows students to refine their skills and gain experience, ensuring they are better prepared for real-world challenges.

McKinley M, Arnold A, Burns I, Geddes H, McDonald L, O'Carroll V 2022 ⁴⁴	Simulated patients' experiences and perspectives of an interprofessional ward simulation: An exploratory qualitative analysis	Value in contributing to healthcare education, importance of being prepared and informed about their role, desire for more active involvement in debrief and feedback to students.	Variability in interprofessional collaboration among student teams, stereotypical views on roles and responsibilities of different healthcare professions, and a perceived need to create chaos or challenges for students.	SPs recognize the importance of understanding roles and responsibilities in effective IPC. They suggested that better preparation and involvement in feedback could enhance student learning. Desire to provide more immediate and direct feedback to the students, rather than just written feedback. The SPs felt they had more to contribute in the moment, but did not have the opportunity to do so. Willingness to provide constructive feedback to the students, but with a sense of caution about providing feedback to individual students in a way that could be perceived as overly critical.
Dickinson KJ, Hill T, Johnson S, Orfanos M, Casavechia J, Glasgow M, Neill KK.2022 ⁴⁵	Simulated patient perceptions of telesimulation education	Appreciation of telesimulation for education and potential benefit in telehealth education, psychological safety equivalent to in-person simulations, protection of personal safety.	Concerns about learner participation and professionalism, challenges in portraying certain emotions and physical signs virtually, increased cognitive load, difficulty in connecting with learners.	Concerns about adequacy of preparation for clinical practice, perceived learner distraction and lack of professionalism in the virtual environment highlight concerns about virtual medical training, including whether it adequately prepares students for real-world clinical practice, the potential for learner distractions in an online environment, and challenges in maintaining professionalism. Virtual training may lack the hands-on experience of in-person settings, leading to concerns about student focus and engagement. Additionally, the less structured nature of virtual environments can make it harder to enforce professional behaviors, affecting the quality and seriousness of the learning experience.

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Table 2 (Continued).

Authors	Title	Enablers of SP performance	Barriers to SP performance	Impact on Student Learning
Lovink A, Groenier M, van der Niet A, Miedema H, Rethans J. 2024 ⁴⁶	How simulated patients contribute to student learning in an authentic way, an interview study	Value of variation among SPs, acting from multiple positions (patient from the role description, as a teaching aid, and as an individual person), authentic interactions.	The need to balance between acting according to the role description and incorporating their own personality or beliefs into the portrayal.	Variation in SP portrayals and the diversity of SP-student encounters contribute to meaningful learning, with SPs' authentic reactions during encounters providing valuable feedback-in-action. Personal beliefs, motivations, and family circumstances influence SPs' attitudes and reactions during the encounters.
Hamad Nabtta Bashir, Folorunsho Evelyn Funke 2023 ⁴⁷	Simulated Participants' Experiences and Challenges with Online and Face-to-Face Interactions During COVID-19: A Case Study in UAEU	SPs acknowledged the benefits of online such as convenience, continued work opportunity, and personal protection during the pandemic.	With one exception: most SPs preferred face-to-face delivery over online interactions. - SPs experienced communication failures, technical issues, and a lack of reality in their online interactions.	Not explicitly mentioned; focus was on impacts on SPs' experiences with role play online with the medical students.
George RE, Wells H, Cushing A. 2023 ⁴⁸	Experiences of simulated patients in providing feedback in communication skills teaching for undergraduate medical students	SPs feedback in a "sandwich style" and "out-of-role" manner help in prioritize their discussion from emotional experiences throughout the session	Despite the positive impact on students learning process the SPs faced challenges in the feedback process. They had difficulties with sensitivity to group dynamics, unspoken facilitators expectations, and differences in perspectives on student performance.	Simulated patients provide valuable feedback to medical students on communication skills. Prioritizing and emphasizing the emotions and feelings experienced during the simulated patient encounter. Conveying the interpersonal emotional connection felt between the simulated patient and the student

McLean M, Johnson P, Sargeant S, Green P. 2015 ⁴⁹	Simulated patients' perspectives of and perceived role in medical students' professional identity development.	SPs creating a supportive learning environment contributed to students' professional identity development, offering a safe and welcoming atmosphere for students to practice and improve their abilities. SPs offering authentic portrayal of patient character and offering constructive feedback from a patient's perspective, allowed students to reflect and improve their clinical and communication skills.	SPs observed that students with pre-existing identity could impede the development of a new professional identity as a physician. Some students might not fully immerse themselves in the scenarios, limiting the effectiveness of the learning experience.	Students' interactions with SPs promote self-awareness and ongoing clinical practice development by encouraging student to consider their performance Increased emotional maturity and empathy in older, more experienced students. Emotional challenges for some students in transitioning from a prior healthcare identity (eg nursing) to a medical student identity. Emotional development of professionalism as students gain more clinical experience and internalize their future responsibilities as doctors
Ceccolini G, Kanevsky M, Feinn R, Philibert I, Netter F H 2024 ⁵⁰	Adapting standardized patient training to improve patients' understanding and preparedness for health care encounters.	SPs reported that their training improved their comprehension of the structure and flow of medical visits, enabling them to navigate real-life healthcare interactions more effectively. SPs felt less anxious and more in control of their healthcare encounters, perceiving a greater sense of equality and reduced power differential with medical professionals	The study did not explicitly identify specific barriers affecting SPs within the context of their training and subsequent real-life applications.	Adopting SP training techniques can increase engagement more effectively during medical encounters, providing clearer information and feedback. As a result, medical students have access to more thorough and precise patient encounters for learning.
Van Hooser J, Harden R M, Vail M, Friedrichsen S, Lieberz D, Mattson S, Onello E 2024 ⁵¹	The Interprofessional Standardized Patient Experience: An Effective Interprofessional Education Activity for Prelicensure Health Professional Students.	Structured faculty-guided debriefing sessions following the simulated patient interviews provided SPs with clear guidelines and feedback mechanisms, ensuring consistency and realism in their portrayals.	Implementing interprofessional activities may present challenges, including coordinating schedules across multiple disciplines and ensuring SPs are adequately trained to handle diverse scenarios presented by students from different professional backgrounds.	ISPE had a significant positive impact on student learning. Students reported an increased respect and understanding of the functions and roles of various healthcare team members, fostering a more collaborative approach to patient care.

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Table 2 (Continued).

Authors	Title	Enablers of SP performance	Barriers to SP performance	Impact on Student Learning
Codron P, Autret E, Fisbach M, O'sullivan K, Riveau H, Annweiler C, Lerolle N, Biere L. 2024 ⁵²	English Workshops with Simulated Patients and Peers Reduce Medical Students' Apprehension About Speaking in English.	Interdisciplinary approach will ensure simulated patients (SPs) are well-prepared to portray authentic clinical situations, thereby enhancing the educational experience for students.	Challenges may include the need for SPs to accurately represent diverse medical conditions and the necessity for continuous training to maintain consistency and realism in their portrayals.	Post-workshop assessments showed a significant decrease in students' anxiety related to listening to English medical content and speaking with patients in English, substantial proportion of students reported feeling more confident about conducting interviews in English with non-French-speaking patients in the future.
Erici S, Lindqvist D, Lindström M B, Gummesson C 2023 ⁵³	Three perspectives on learning in a simulated patient scenario: a qualitative interview study with student, simulated patient, and teacher).	SPs were well-prepared and understood their responsibilities, therefore, they were better able to depict patient scenarios.	It was emotionally draining for SPs to depict patients with mental illnesses, and difficult to maintain consistency in role portrayal during highly emotional/ emotionally loaded scenarios. Tension between personal and professional identities	Interacting with SPs provided students with opportunities to practice and refine their communication skills, particularly in handling sensitive or complex patient interactions. Collaborative creation of the emotionally charged scenario was a significant learning experience
Starr SA; Plack MM, Lewis KL, Blatt, B 2021 ⁵⁴	How Do Standardized Patients Form Their Complex Identities? The Impact of Interactions with Medical Students. Simulation in Healthcare:	SPs brought humanism to a rigorous medical curriculum. They experienced a transformation of perspective and purpose leading to a new professional identity.	SPs were challenged with how to strike the best balance between standardization and providing students with the authenticity of the SP's real voice. Sometimes, their simulation performance evoked critical self-judgments	SPs developed a new sense of social responsibility, recognizing the direct impact they could potentially have on the development of future physicians. They understand that by portraying patients authentically, they directly impact the development of essential skills, attitudes, and empathy in medical students, which will ultimately improve the quality-of-care future doctors provide.

Lovink A, Groenier M, Niet A V D, Miedema H, Jan-Joost Rethans, J.-J Rethans. 2021 ⁵⁵	The contribution of simulated patients to meaningful student learning.	SPs providing genuine, unscripted responses during interactions allowed students to experience realistic patient behaviours, enhancing the authenticity of the learning experience.	Portraying varied patient scenarios, especially those involving distressing conditions were emotionally draining for SPs, affecting their performance and well-being. Maintaining consistency in replies across multiple sessions was difficult for SPs, which impacted the standardization of the learning experience for students.	Engagements with SPs allowed students to practice and enhance their communication strategies in a safe setting, resulting in better patient contact skills. Feeling the SP's real emotions during the interaction evoked emotions in the students as well. The experience allowed students gain confidence in their performance and had the ability to change their behavior during the interaction based on the SP's feedback - experiencing a process of reflection-in-action, where they reflected on their own interventions and adapted their behavior in the moment.
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character consistency.⁴¹ Some SPs reported limited personal development from their roles, leading to disengagement.²⁴ Additionally, SPs sometimes struggled with balancing strict standardization and authenticity, critically self-assessing their performances.⁵⁴

Cognitive Influences

Acting as an SP developed individuals' communication skills and clinical understanding, which benefited them personally.⁴² Thorough mental preparation for their role made SPs more attentive during simulations.³⁸ Adequate feedback and recognition from instructors and peers increased SP satisfaction.³⁹ However, cognitive demand could be overwhelming. According to cognitive load theory, tasks like improvisation and maintaining simulation integrity impose high intrinsic and extraneous load.⁵⁴ For example, SPs required to improvise and observe students simultaneously missed over 75% of learners' nonverbal cues.⁵⁶ When SPs had to portray a patient while evaluating the learner, their observational accuracy declined.²⁴ SPs also reported stress from fear of making errors or role overload.⁴⁷ Ethical dilemmas in simulating sensitive conditions added to their mental load.⁴³

Logistical Influences

A supportive environment and effective training were crucial for SP motivation. Well-designed preparation programs improved SP confidence and performance.⁴³ During the pandemic, online role-play increased SP comfort and safety.⁴⁸ Conversely, logistical challenges hindered SP performance. Scheduling conflicts, inadequate compensation, and interruptions to continuity in extended simulations undermined SPs' ability to stay in role.^{39,43} Weak mentoring and unclear instructor expectations also reduced consistency. In virtual simulations, technical problems and communication issues further impair realism.⁴⁸ Unspoken group dynamics and mismatched faculty expectations similarly had negative effects.⁴⁷

Impact of SP Performance on Student Learning

Two main themes emerged regarding SPs' impact on learners: educational enhancements and learning challenges.

Enhancement of Educational Outcomes

SPs significantly improve simulation realism, which enhances learner outcomes. Particularly, older SPs deepen student empathy for older patients.^{40,47} Authentic interactions with SPs foster student emotional and professional growth.⁴¹ Longitudinal encounters with the same SP let students build clinical continuity and relationships.⁴¹ SPs trained in clear, engaging communication increase students' preparedness for varied patient encounters.⁵⁰ SPs also serve as both patient and assessor, providing immediate, actionable feedback that strengthens student knowledge and clinical practice.^{42,53,55} This real-time reflection enhances learning during simulations and equips students to adapt in clinical environments.

Challenges in Learning Outcomes

Variability in SP portrayal sometimes causes learner confusion. If SPs were overwhelmed by emotional or cognitive demands, they could not fully engage students, diminishing their learning experience.⁴¹ Ethical tensions and the emotional toll of difficult roles could complicate scenarios, affecting both SPs and learners, and potentially undermining educational safety and effectiveness.⁴³

Risk of Bias Assessment

QATSDD scores ranged from 62% to 95%. Twelve studies (63%) were medium quality (50–80%) and seven (37%) were high quality (>80%). No study was rated below 50%. Common weaknesses were lack of explicit theoretical grounding and limited user involvement in study design ([Appendix B](#)).

Across the 19 studies, QATSDD scoring indicated a generally moderate quality evidence base ([Appendix B](#)). The predominance of qualitative studies and lack of experimental designs limit the strength of conclusions. We note again that one included study was co-authored by a review author (EFF), though its quality score was determined independently to avoid bias.

Discussion

This systematic review builds on the work of Plaksin et al¹⁶ by incorporating new literature and explicitly applying theory to interpret findings. We used cognitive load theory as a guiding framework, which helps explain how multi-tasking and mental demands affect SP performance. Our conceptual model (emotional, cognitive, logistical domains) provides a unifying lens for diverse findings, strengthening explanatory coherence.

Our synthesis highlights SPs' pivotal role in medical education: by bringing realistic patient portrayals, they enhance learner empathy, communication, and clinical skills.^{43,56–60} Older SPs, in particular, enrich sessions by sharing life experience, which has been shown to increase students' empathy toward aging patients.⁴⁷ The value of SP feedback is evident; structured feedback methods help SPs process their experiences and deepen learning.^{47,61,62} These outcomes align with adult learning theory and experiential learning principles, emphasizing the importance of authenticity.^{57,63}

However, SP performance can be compromised by various factors. Fatigue and emotional strain^{23,33,43,48} can reduce the fidelity of SP portrayals, thereby limiting educational value. Inconsistencies in portrayal (due to overload or insufficient training) may confuse students. The cognitive challenges of improvisation and dual roles (acting and observing) are consistent with cognitive load theory: when working memory is taxed, performance suffers.^{54,56} For example, SPs missing critical cues while multitasking⁵⁶ underscores how high intrinsic and extraneous load hamper effectiveness. This finding suggests that SP roles should be designed to manage cognitive load (eg, by limiting multi-tasking demands).

Our findings also reveal gaps in the literature. Most evidence comes from qualitative reports; few studies quantified SP workload or learning outcomes. This limits our ability to compare across contexts or to synthesize effect magnitudes. Only one study measured SP cognitive load quantitatively,⁵⁶ despite its thematic prominence. Future research should use methods to integrate SP perceptions with objective measures, including physiological mixed workload indices and learner performance scores. This would clarify how SP cognitive and emotional states directly affect learner outcomes.

Notably, cultural factors emerged as important but underexplored. SP programs reported benefits from diversity,⁴⁰ yet no study empirically assessed cultural context. Drawing on Hofstede's theories,⁶⁴ one might hypothesize, for instance, that SP feedback may be received differently in high versus low power-distance cultures. Similarly, uncertainty-avoidance could influence SP improvisation preference.⁶⁵ These are promising avenues to ensure SP programs are culturally sensitive.

Contradictory findings are acknowledged: SPs both benefiting from and being burdened by their roles, and we analyse them in context. For example, whether SP experiences are positive or negative may depend on support structures. Some studies reported that well-supported SPs experienced personal growth,^{42,66} while others noted neglect of SP welfare.^{24,47} This contrast suggests actionable improvements, emphasising that robust SP support and feedback might tip the balance toward positive outcomes.

Implications for Practice

The findings highlight several actionable strategies for strengthening SP programs. Program designers should implement structured training and routine debriefing to reduce cognitive load and emotional strain while also training faculty to collaborate effectively with SPs by setting clear expectations and supporting their roles. Curriculum developers can enhance authenticity by embedding SP feedback into learning objectives and acknowledging SPs' cognitive limits—adopting a “good enough” fidelity approach that balances realism with local resources to avoid overburdening SPs. To ensure sustainability, programs should assess the cost-effectiveness of different training models (in-person, online, hybrid) and pursue scalable approaches such as peer mentoring, modular training packages, and e-learning platforms. Finally, integration strategies, including role-specific preparation and systematic support mechanisms, can be embedded within existing curricula with minimal additional resource demands, ensuring SP programs remain both effective and feasible.

Future Research

This review highlights several critical gaps in the literature that must be addressed to enhance the effectiveness of SP roles and improve associated educational outcomes. We propose five priority areas for future research, organized by urgency and potential impact:

First, current evidence is largely qualitative, with only one study directly measuring workload. Newlin-Canzone et al⁵⁶ found that SPs missed over 75% of non-verbal cues when required to improvise while observing, underscoring the intensity of their cognitive load. Further quantitative research is essential to validate these findings and guide targeted support strategies to reduce stress and improve simulation fidelity. Second, longitudinal studies on SP well-being: Most research addresses immediate or short-term effects of SP participation. Longitudinal work is needed to explore the cumulative emotional and psychological impact of repeated exposure to high-stakes or emotionally demanding scenarios on SPs' resilience, mental health, and retention. Third, evaluation of SP training and support frameworks: While effective preparation and feedback are widely acknowledged as important, rigorous evaluations of training strategies remain scarce. Studies such as Schlegel et al³⁹ highlight their potential value, but further evidence is needed on best practices, cost-effectiveness, and scalability to ensure SPs are consistently supported across programs. Fourth, cultural and ethical dimensions of SP roles: Cultural context critically shapes SP performance and feedback delivery. Hofstede's cultural dimensions⁶⁴ provide a lens for understanding differences in power distance, collectivism, and uncertainty avoidance, all of which influence how feedback is given and received.^{18,19,21,22,62,65,67} Yet, no studies directly examined these influences in SP feedback. Research in this area is needed to design culturally sensitive and ethically sustainable SP programs, ensuring authentic representation of diverse populations and safeguarding SP well-being in emotionally demanding roles.^{22,66,68} Fifth, virtual and technology-mediated SPs: Emerging innovations in digital and virtual SPs^{69–71} offer opportunities for scalability, accessibility, and new pedagogical approaches. Future studies should compare traditional and virtual SPs to assess their impact on learner engagement, SP workload, and authenticity of interaction, thereby guiding effective integration of technology into SBE.

Strengths and Limitations of the Study

A strength of this review is its comprehensive scope, covering emotional, cognitive, and logistical factors across international studies. Our theoretical framing (cognitive load theory) provides coherence to a complex topic. We also transparently reported our methods and appraisal outcomes. This thorough approach provided a detailed exploration of how SPs enhance learning environments, which is crucial for a holistic understanding of their roles. Additionally, recommendations for future research are clearly articulated, offering actionable insights to optimise simulation programs and ensure the well-being of SPs.

Despite its comprehensive scope, the review has several limitations that affect its generalisability and applicability. Variability in the design, methodology, and demographics of the reviewed studies, which, while broadening the review's scope, also complicates the direct comparison of SP programs. There is significant heterogeneity among the included studies poses challenges for effective synthesis and comparison, thereby limiting both the depth of interpretation and the broader relevance of the conclusions. The predominance of qualitative over quantitative research further constrains the scope and diminishes the overall strength of the evidence base. Additionally, the review's limitation to English-language publications introduces language and publication biases, potentially excluding significant international research and skewing the global understanding of SP practices. A further limitation of this review is that 63% of the included studies were rated as medium quality, reflecting variability in study rigour, methodology, and reporting standards. This uneven evidence base limits the strength and generalisability of the findings, as methodological weaknesses such as inconsistent application of theory, limited use of mixed methods, and small sample sizes reduce the robustness of conclusions. While our synthesis offers useful insights, these quality constraints mean the results should be interpreted with caution and underscore the need for more rigorously designed, high-quality studies in this field. Selection biases may also exist due to the subjective nature of study inclusion and the focus on literature from only the past decade, potentially overlooking foundational studies and historical perspectives critical to the topic of SBE involving SPs.

Conclusion

Simulated patients are essential contributors to high-quality medical education, benefiting both students and SPs. This review shows that SP authenticity enhances learning, but highlights that emotional strain, cognitive load, and practical constraints can limit SP effectiveness. To optimize SP use, educators should focus on structured training, supportive feedback systems, and attention to SP cognitive and cultural needs. Research must address key gaps, especially the measurement of SP cognitive demands and long-term effects to inform these efforts. By integrating insights on SP experiences, programs can design more realistic and sustainable simulations. This, in turn, supports curriculum and faculty development initiatives that prepare both students and SPs for collaborative, effective learning in healthcare.

Abbreviations

SBE, Simulation-Based Education; SP, Simulated Patient; QATSDD, Quality Assessment Tool for Studies with Diverse Designs; OSCE, Objective Structured Clinical Examination.

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