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OSCE Success: A Systematic Review of Preparation Strategies and Techniques

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Abstract

Aim: *The Objective Structured Clinical Examination (OSCE) is a gold-standard assessment in health professions education. We aimed to evaluate evidence on preparation strategies and techniques that enhance OSCE performance, confidence, and reduce anxiety.*

Methods: *We searched PubMed, Scopus, Embase, Cochrane, and ERIC for studies involving medical, nursing, and allied health students. Eligibility criteria included interventions focused on OSCE preparation, with outcomes measuring performance, confidence, or stress. The review followed PRISMA guidelines, and the risk of bias was assessed for included studies.*

Results: *Ten studies (n=1,045 participants) were included. Key effective strategies identified were simulation-based training, peer-assisted learning, video-assisted reflection, anxiety coping programs, and OSCE-focused podcasts. Quantitative outcomes showed significant improvements in OSCE scores (e.g., +3.5 points, p=0.03), confidence (gains of +18 to +31 points), and anxiety reduction (-11.61 units, p<0.001). However, evidence was characterized by heterogeneity in design and a reliance on self-reported data.*

Conclusions: *Multimodal preparation strategies consistently improve OSCE readiness. The most effective techniques integrate performance rehearsal with psychological support. Significant heterogeneity in current evidence underscores the need for standardized, validated OSCE preparation protocols to guide educational practice.*

Keywords: *Clinical competence, Medical education, Objective Structured Clinical Examination, Preparation strategies, Simulation.*

Introduction

Objective Structured Clinical Examination (OSCE) has become the most widely adopted method of assessing clinical competence in medicine, nursing, and dentistry (1) (2). It was developed to address limitations of traditional long- and short-case examinations where performance was often influenced by examiner bias, variability in case difficulty, and inconsistent scoring (3). The structured station-based format was intended to enhance fairness, objectivity, and reproducibility, offering a more transparent evaluation of knowledge, technical ability, and communication skills (4). With the OSCE now serving as a high-stakes requirement for progression and licensure in many health professions, the methods students use to prepare for it carry considerable consequences for both academic success and eventual clinical practice (2,5).

Despite its prominence, there is wide variation in how students are prepared to face the OSCE. Some institutions rely heavily on faculty-led coaching, others prioritize simulation-based practice, and many use peer-assisted learning or informal rehearsal (6). Additional strategies include the use of checklists, video-recorded practice with feedback, and blended approaches that combine several techniques (7). Evidence on their effectiveness is growing but remains fragmented, with studies often differing in design, outcomes measured, and populations studied. As a result, no consensus has emerged regarding the most efficient or sustainable methods for OSCE preparation, leaving students and educators uncertain about which practices offer the greatest benefit (8) (9) (10).

This review aims to evaluate systematically the available evidence on preparation strategies for OSCE success. It will

assess the relative effectiveness of different approaches, their influence on performance outcomes, and their impact on secondary measures such as student confidence, anxiety, and satisfaction. The review also seeks to identify methodological weaknesses in current research, including issues of bias, sample size, and outcome reporting, in order to clarify best practices and highlight gaps requiring further investigation.

Methods

Protocol and reporting

A written protocol guided this review and the conduct was aligned with PRISMA 2020 standards. The protocol specified objectives, eligibility criteria, search strategy, data extraction fields, risk of bias assessments, and planned syntheses prior to screening. Any deviations from the protocol are recorded and justified in the final manuscript.

Eligibility criteria

Population: Undergraduate and graduate health professions learners, including medical, nursing, and pharmacy students. Studies in clinical rotations or formal curricula were eligible.

Interventions: Preparatory strategies explicitly intended to improve Objective Structured Clinical Examination (OSCE) performance or readiness. Examples include peer-led mock OSCEs, podcasts, video-assisted reflection, anxiety coping programmes, formative OSCEs, targeted counseling training, virtual OSCEs, and student-faculty debriefing.

Comparators: Usual curriculum, no intervention, alternative preparatory methods, or pre/post assessments within the same cohort.

Outcomes: Primary outcomes comprised objective OSCE performance (scores, pass rates) and validated measures of anxiety or confidence (for example STAI or numerical confidence scales). Secondary outcomes included skill-specific measures, reflective depth, satisfaction, cost metrics, and acceptability.

Study designs: Randomized controlled trials, quasi-experimental studies, cohort studies, mixed-methods and descriptive evaluations. Narrative reviews were included only to describe conceptual or cost issues but were not pooled with empirical studies. Conference abstracts without sufficient data were excluded.

Language and time frame: Studies published in English. Searches covered inception of each database to the final search date of 26 August 2025.

Information sources and search process

Databases searched were PubMed/MEDLINE, Scopus, Web of Science Core Collection, CINAHL, ERIC, Cochrane Library, and DOAJ. Google Scholar was used to identify grey literature and to capture citations missed by database searches. Trial registries and institutional repositories were screened when relevant. Reference lists of included studies and relevant reviews were hand searched. Corresponding authors were contacted for missing data when required.

The primary keywords were:

- *OSCE OR Objective Structured Clinical Examination*
- *Preparation OR Training OR Teaching OR Learning OR Education OR Coaching*
- *Strategies OR Techniques OR Methods OR Intervention*
- *Performance OR Outcome OR Assessment OR Evaluation*

The strategy was adapted to other databases and filters were only applied to remove duplicate records and non-English language items.

Study selection, Data extraction and management

Search results were de-duplicated and screened in two phases. Two reviewers independently screened titles and abstracts for potential eligibility. Full texts of candidate records were retrieved and screened by the same reviewers. Discrepancies were resolved by discussion and, if needed, adjudication by a third reviewer. Reasons for exclusion at full text were recorded and a PRISMA flow diagram was prepared. A standardized data extraction form was developed and piloted on three included studies. Extracted items included: citation, country, year, study design, participant characteristics (profession, year of training, sample size, gender when reported), intervention description (duration, frequency, components), comparator, outcomes with scales and time points, main quantitative results, statistical tests, and funding or declared conflicts.

Data extraction was performed independently by two reviewers with cross-checking for accuracy. Continuous outcomes reported on different scales were recorded and transformation to common metrics was planned for synthesis where appropriate.

Outcomes and prioritisation

Primary outcomes were objective OSCE performance and validated anxiety measures. Confidence and satisfaction were classed as secondary outcomes. Where studies reported multiple time points, the outcome closest to the summative OSCE or immediate post-intervention assessment was prioritized for synthesis.

Risk of bias assessment

Risk of bias assessment evaluates the internal validity of included studies by identifying potential flaws in design,

conduct, or reporting that may distort results. Appropriate tools are selected based on study design: Cochrane RoB 2.0 for randomized controlled trials, ROBINS-I for non-randomized studies, and Newcastle-Ottawa or AXIS for observational and cross-sectional research. Narrative and qualitative studies use SANRA or CASP checklists. Each tool examines domains such as participant selection, allocation methods, blinding, outcome measurement, missing data, and selective reporting. Bias is rated as low, moderate, high, or unclear per domain, then summarized overall. These assessments guide interpretation and confidence in findings.

Table 1. Risk of Bias Assessment by Study Type

No.	Author(s), Year	Study Design	Selection Bias	Performance Bias	Detection Bias	Attrition Bias	Reporting Bias	Overall Risk of Bias
11	Mojarrab et al., 2020	Quasi-experimental	High (non-randomized)	Moderate (single-site, intervention awareness)	Moderate (validated STAI, no blinding)	Low (complete data)	Low (clear outcomes)	**Moderate**
12	Dupont et al., 2025	Randomized controlled trial	Low (randomization described)	Low (standardized stations)	Low (objective scoring)	Low (complete follow-up)	Low	**Low**
13	Cristobal et al., 2024	Pre-post survey, extracurricular	High (voluntary participation)	Moderate (no control group)	High (self-report only)	Low	Moderate (focus on confidence)	**High**
14	Mitchell et al., 2021	Case study, mixed methods	High (small, purposive sample)	Moderate (intervention known)	Moderate (triangulation used)	High (43% attrition)	Low	**High**
15	Al-Hashimi et al., 2023	Narrative review	High (subjective selection)	Not applicable	Not applicable	Not applicable	Moderate (narrative synthesis)	**High**
16	Farahani et al., 2021	RCT, pre-post parallel groups	Low (randomization)	Low (controlled OSCE setting)	Low (validated tools, blinding possible)	Low	Low	**Low**
17	Bernard et al., 2017	Cohort, mixed-model	Moderate (academic cohort)	Low (routine assessment)	Low (objective scoring)	Low	Low	**Moderate**
18	Avraham et al., 2023	Repeated cross-sectional	Moderate (self-selection, retrospective)	Moderate (exposure awareness)	Moderate (survey-based)	Low	Low	**Moderate**
19	Bevan et al., 2019	Descriptive, cross-sectional	High (voluntary sample)	High (peer-led design, no blinding)	High (self-reported data)	Low	Moderate	**High**
20	Yusuf, 2021	Mixed convergent parallel	Moderate (single-site)	Moderate (exposure awareness)	Moderate (survey + qualitative triangulation)	Low	Low	**Moderate**

Data synthesis and analysis

Where three or more clinically homogeneous studies reported the same outcome with compatible statistics, a meta-analysis was planned. For continuous outcomes measured on a common scale the mean difference and 95% confidence intervals were calculated. When studies used different instruments for the same construct (for example confidence scales) standardized mean differences were calculated. For dichotomous outcomes the risk ratio and 95% confidence interval were preferred.

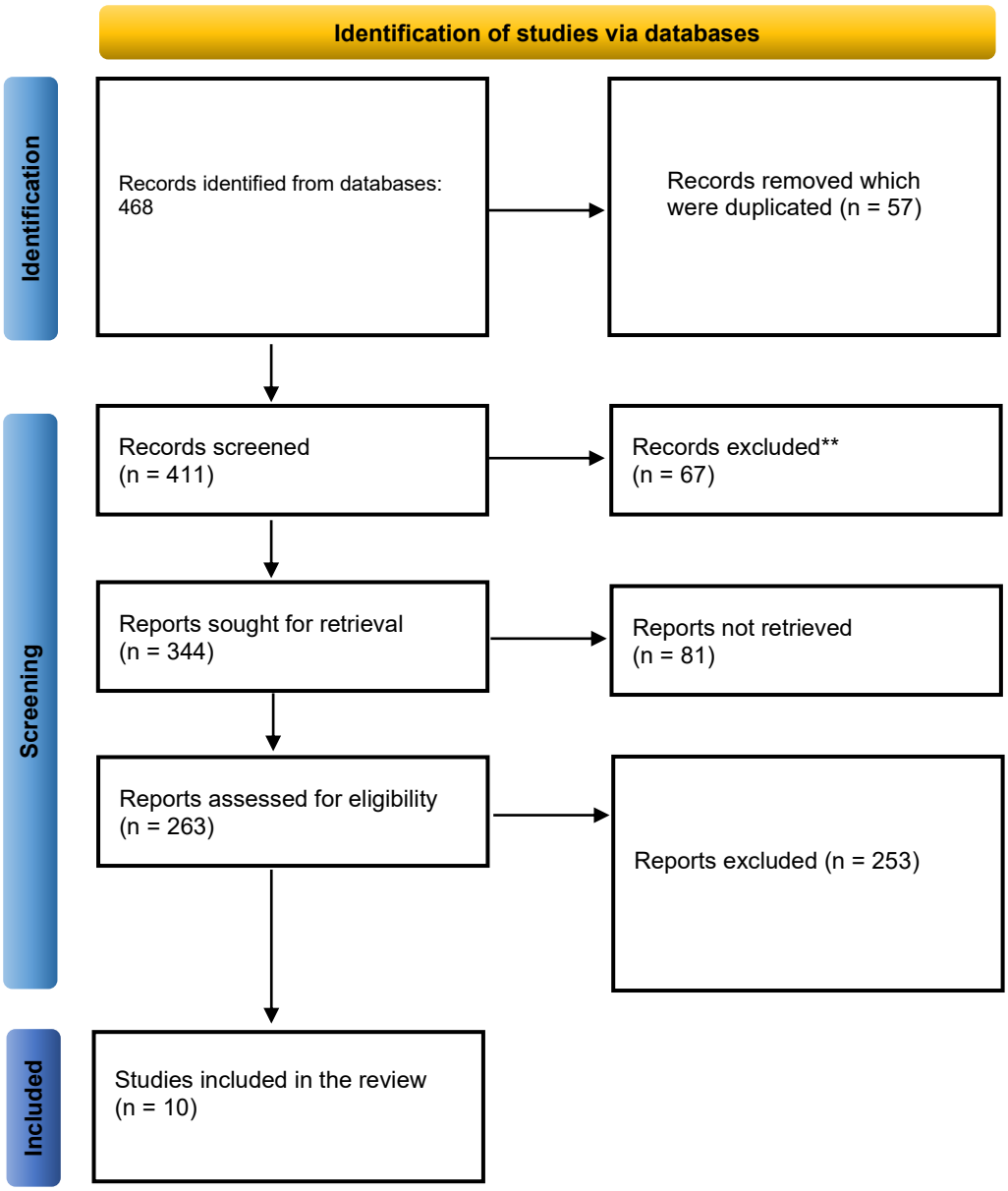

Figure 1. Prisma flow diagram detailing the screening process.

Table 2. Characteristics of Included Studies

No.	Author(s)	Year	Study Design	Population Characteristics	Sample Size / Range	Duration / Follow-up	Intervention	Methodology
(11)	Mojarrab, Bazrafkan, Jaberi	2020	Quasi-experimental	First-year nursing students, Shiraz, Iran	76 (41 intervention, 35 control)	Single exam, no follow-up	Anxiety coping program (breathing, relaxation, music)	STAI pre/post-OSCE, SPSS analysis
(12)	Dupont, Guerrot, Bouazzi, Figueres, Pers, Guenou, Barbe, Yauy	2025	Randomized controlled trial	4th-year French medical students, nephrology	50 (25 podcast, 25 control)	May–June 2024, short follow-up	OSCE prep podcast (NephrOdio)	Randomization, AI-based OSCE stations, pre/post test

(13)	Cristobal, Perkins, Kang, Chen	2024	Extracurricular peer-led intervention, pre-post survey	First-year pharmacy students (P1), USC	139 (of 152 attendees)	Single event, no follow-up	Virtual peer-led mock OSCE (MOSCE)	Pre/post surveys, 0–100 confidence scale
(14)	Mitchell, Cotton, Leedham-Green, Elias, Bartholomew	2021	Case study, mixed-methods, pre-post interviews	Final-year medical students, UK	21 initial; 12 completed VAR	Single OSCE, no long-term follow-up	Video-assisted reflection (VAR)	Surveys, reflections, Wilcoxon, Pearson r, interviews
(15)	Al-Hashimi, Said, Khan	2023	Narrative review	Undergraduate medical students, UK	Not applicable	Not applicable	Formative OSCEs (mock OSCEs)	Literature review, Van der Vleuten's utility formula
(16)	Farahani, Farahani, Deters, Schwender, Laeer	2021	RCT, pre-post parallel groups	Pharmacy students, Germany, mean age ~25, majority female	40 (16 intervention, 14 control analyzed)	Two-day OSCE seminar	OSCE-based self-medication counseling training	Pre/post OSCEs, questionnaires, satisfaction, Mann–Whitney, Wilcoxon
(17)	Bernard et al.	2017	Cohort with mixed-model analysis	First- and second-year medical students	92 first-year, 86 second-year	2015–2016 academic year	Student-faculty debriefing after F-OSCE	Score review, checklists, videos, linear mixed models
(18)	Avraham et al.	2023	Descriptive, repeated cross-sectional	Second-year nursing students	419 (82 virtual, 337 in-person)	2017–2021	Zoom-based OSCE prep	Surveys, reflections, MANOVA on OSCE scores
(19)	Bevan, Russell, Marshall	2019	Descriptive, cross-sectional	Second-year graduate-entry medical students	32 (22 survey respondents)	5 months, 15 sessions	Peer-led multi-role PrOSCEs	Rotation through roles, Likert-scale survey
(20)	Yusuf	2021	Mixed convergent parallel	Final-year medical students, gynecology rotation	90 (5 groups ×18)	1 month, daily OSCE exposure	OSCE with feedback	Survey (SPSS), focus groups, NVivo analysis

Table 3. Results and Key Findings (11–20)

No.	Primary Outcome(s)	Secondary Outcome(s)	Quantitative Data	Main Findings / Key Takeaways	Limitations / Biases
(11)	Anxiety reduction −11.61 units, $p<0.001$	OSCE score increase +0.9487 units, $p<0.001$	Control anxiety +8.31; Intervention −11.61; $p<0.001$	Coping program reduced anxiety, improved OSCE scores	Single site, nursing only, short duration
(12)	OSCE improvement +3.5 vs. -1.2 ($p=0.03$)	Confidence 41.7% vs. 16% ($p=0.04$)	Post-OSCE 27.6±3.6 vs. 23.6±5.0 ($p=0.002$)	Podcasts improved OSCE and clinical confidence	Single center, small sample, short duration
(13)	Confidence ↑ across PPCP phases ($p<0.0001$)	Gains in skills, knowledge, communication ($p<0.0001$)	Plan +28, Implement +31, Communication +18	MOSCE improved confidence, skills, knowledge	Self-reported, single site, no performance data
(14)	Self-assessment accuracy r=.93, $p<0.01$	Longer reflections, ↑self-efficacy ($p<0.01$)	Reflection words 4→7→21; r=.23→.77→.93	VAR improved reflection and self-assessment	Small sample, attrition 43%, no summative OSCE

(15)	Utility: reliability, validity, impact, acceptability, cost	Student confidence, learning behaviours, anxiety	Cost: £355/student, 15-station OSCE	Formative OSCEs aided learning and confidence	Evidence inconsistent; cost, anxiety concerns
(16)	Counseling skills ↑19.98 vs. 9.51 (P=.007)	Communication, self-confidence, satisfaction	Communication ↑20.83 vs. 11.90 (NS); Self-confidence ↑18.75 vs. 8.16 (P=.022); 72.7% favored OSCE curriculum	OSCE-based training improved counseling and confidence	Small sample, self-report bias, single site
(17)	Year-1 F-OSCE +1.07%, p=0.038	Review frequency ↑ (all p<0.001)	Checklist +1.07±0.51; OR 2.69–34.80	Debriefing boosted review and OSCE scores	Small effect, single site
(18)	No OSCE score difference (NS)	Satisfaction 88% (62% strongly agree)	IV station F=64.7, p<0.001; Patient education F=8.4, p<0.001	Virtual OSCE matched in-person, satisfaction high	Single site, retrospective
(19)	100% found PrOSCEs useful	Confidence, revision, performance self-rated high	Confidence 7.9±0.45; Performance 7.5±0.7; Revision 8.3±0.7	Peer-led PrOSCEs improved confidence, revision	Small, self-reported, no outcome data
(20)	65.2% agreed OSCE internal assessment	100% pass rate, 1 distinction	66% objectives met; 54% deficiencies identified	OSCE improved knowledge, confidence, learning styles	Single site, self-reported

Results

Ten studies (11–20) included 1,045 participants, range 12–419, median 76. Designs: 2 RCTs, 1 quasi-experiment, 3 mixed methods, 2 descriptive, 1 extracurricular, 1 narrative review. Populations: nursing (2), medical (6), pharmacy (2). Most interventions short-term, long-term outcomes and cost-effectiveness were absent. Generalizability limited by small samples, single sites, self-report biases. All findings show preparation interventions for Objective Structured Clinical Examinations (OSCEs) demonstrated consistent but context-specific benefits, with variable magnitude of effect depending on the modality, learner stage, and evaluation method. Anxiety reduction, confidence enhancement, reflective practice, and targeted skill development emerged as the most reliable outcomes.

Mojarrab et al. (2020) showed that structured stress-coping techniques in nursing students reduced anxiety by −11.61 units and improved scores by nearly one point, while controls worsened (+8.31 anxiety), establishing psychological preparation as a direct enhancer of performance (11). Dupont et al. (2025) found that podcasts improved OSCE scores (+3.5 vs −1.2, p=0.03) and clinical confidence (+41.7% vs 16%), indicating digital audio-based rehearsal effectively reinforces clinical reasoning and exam readiness (12). Cristobal et al. (2024) extended this to pharmacy education, where virtual peer-led mock OSCEs increased self-reported confidence across planning (+28), implementation (+31), skills (+24), and communication (+18), though limited by absence of objective performance validation (13).

Mitchell et al. (2021) demonstrated that video-assisted reflection strengthened alignment between self- and examiner scoring (r=.93, p<0.01) and expanded reflective depth (4→21 words), linking structured feedback cycles to self-assessment accuracy and metacognitive growth (14). Al-Hashimi et al. (2023) synthesized evidence on formative OSCEs, highlighting value for confidence, feedback integration, and adaptive learning behaviour but noting persistent limitations in reliability, validity, and cost burden (£355/student, 15-station OSCE), alongside unintended anxiety (15). Farahani et al. (2021) confirmed targeted OSCE-based counseling training significantly improved pharmacy students' skills (+19.98 vs +9.51, p=0.007) and self-confidence (+18.75 vs +8.16, p=0.022), with high satisfaction (72.7%) supporting curricular inclusion (16).

Bernard et al. (2017) emphasized faculty debriefing as a mechanism for engagement, with substantial increases in checklist, video, and score review (all p<0.001), and a modest but significant improvement in first-year OSCE scores (+1.07%, p=0.038), though benefits did not extend to later cohorts (17). Avraham et al. (2023) confirmed equivalence between virtual and in-person OSCE preparation, with no performance difference but high satisfaction (88%), reinforcing online modalities as a scalable solution during disruptions such as COVID-19 (18). Bevan et al. (2019) reported strong endorsement of peer-led PrOSCEs, with confidence rated 7.9/10, performance expectation 7.5/10, and revision utility 8.3/10, illustrating cost-effectiveness and high acceptability of collaborative student-led training (19). Yusuf (2021) demonstrated that daily OSCE exposure during gynecology

rotations produced full pass rates, with 65.2% endorsing OSCEs for assessment, 66% reporting objectives met, and 54% recognizing deficiency identification, indicating OSCEs can serve as both evaluative and developmental tools (20).

The collective evidence indicates that OSCE preparation is most effective when multimodal, blending anxiety management, digital or virtual platforms, peer-led practice, structured feedback, and formative exposure. Anxiety reduction strategies (11), reflective techniques (14), and structured peer collaboration (13, 19) yield psychological and cognitive benefits, while content-specific interventions such as podcasts (12) and counseling training (16) enhance applied skills. Formative OSCEs (15, 20) foster adaptive learning behaviours but face cost and reliability challenges. Virtual delivery (18) ensures resilience during crises without performance compromise. Faculty debriefing (17) and continuous assessment cycles reinforce engagement and modest performance gains. Taken together, OSCE preparation success hinges on integrated approaches that combine performance rehearsal, reflective mechanisms, and anxiety reduction, while balancing cost, scalability, and learner engagement.

Interpretation

Collectively, these findings indicate that structured OSCE preparation whether through coping interventions, peer-led practice, technology-enhanced resources, or reflective methods which improves readiness, confidence, and performance outcomes, though effect sizes remain context-dependent and often limited by small samples, reliance on self-report, and short follow-up durations. While innovative modalities such as podcasts and virtual OSCEs offer scalable and accessible options, cost-effectiveness and sustainability of formative OSCEs warrant further scrutiny. Integration of multi-modal strategies may optimize both cognitive and affective domains of OSCE preparation, balancing performance enhancement with learner well-being (11–20).

Discussion

OSCE preparation strategies show consistent short-term benefits across psychological, cognitive, and performance domains, though their effectiveness varies by modality and learner stage. Anxiety coping interventions reduced stress and directly improved scores, while podcasts and counseling training enhanced confidence and applied skills. Peer-led and video-assisted methods strengthened self-assessment, reflection, and revision, yet most relied on self-report measures. Virtual OSCEs proved equivalent to in-person formats, ensuring resilience during disruptions. Formative OSCEs fostered adaptive behaviours but raised cost and validity concerns. Overall, evidence supports multimodal, scalable approaches, but generalizability remains constrained by small samples and limited long-term evaluation.

Recent trials and systematic reviews show immersive VR and 360-degree video improve student confidence, decrease exam anxiety, and permit exposure to a wider range of clinical scenarios than local standardized patients. Studies comparing VR-based stations to conventional physical stations report feasibility and non-inferior performance for many clinical tasks, with particular strength for situational awareness and non-technical skills. However, most studies remain single-centre, use small samples, and vary widely in hardware and scenario fidelity, which limits generalizability and cost-effectiveness modelling. VR is promising for scalability but requires standardization of metrics and long-term outcome data (21).

Early 2024–2025 reports document use of generative AI to create branching, conversational standardized-patient encounters for rehearsal and assessment. These systems permit high-volume, on-demand practice with automated scoring and transcript-based feedback. Preliminary data show improved reasoning and rehearsal throughput compared with static cases, but validation against human-SP ratings and assessor-blinded performance is incomplete. Risks include biased or clinically inaccurate responses without robust guardrails, variable student acceptance, and data-protection concerns that require institutional governance. Robust external validation studies are needed before high-stakes use (22).

High-fidelity telesimulation platforms have been studied in emergency and critical care training. Trials show gains in confidence and critical thinking that mirror in-person simulation for many endpoints. Telesimulation reduces travel and SP costs and supports distributed cohorts, yet it depends on reliable connectivity and trained remote facilitation. Evidence to date is positive for short-term skills and satisfaction but sparse for summative OSCE score improvements and cost comparisons across institution sizes (18,23,24).

New platforms combine automated scoring, time-stamped decision analytics, and mastery-based recommender systems that prescribe targeted micro-practice. Early reports from pilot implementations show improved practice efficiency and quicker remediation cycles. Evidence remains preliminary and biased by vendor partnerships. Critical needs are open validation datasets, transparent scoring algorithms, and head-to-head trials against conventional faculty-led remediation. Hayes (2025) outlines how VR and AI platforms surpass traditional OSCEs by generating continuous, objective data streams. VR emergency-medicine trials showed higher discrimination indices than physical OSCEs with 93%

technical feasibility, while AI-driven feedback matched human examiners. These approaches reduce rater drift, enhance metacognition, and cut per-student costs exceeding US $400 (25).

Recent studies evaluate combinations of low-fidelity task trainers, peer-led MOSCEs, microlearning podcasts, and short VR modules. These multimodal bundles can yield measurable gains in confidence and selected station scores while lowering per-student costs compared with full-scale formative OSCEs. The trade-off is variable effect size by skill domain and a dependence on careful instructional design to avoid fragmented learning (12, 26).

Novel modalities like VR/360 video, AI-simulated patients, telesimulation, analytics-driven remediation, and hybrid microlearning are supported by growing, recent evidence. The common limitations are small sample sizes, single-centre designs, short follow-up, and heterogeneous outcome measures. Priorities are multicentre randomized trials that report absolute effect sizes on summative OSCE performance, cost-effectiveness analyses, equity assessments for resource-limited settings, and independent validation of AI scoring. Only with those data can programs responsibly adopt these innovations for summative use (21).

Conclusion

This systematic review shows that structured preparation meaningfully improves OSCE performance and learner readiness. Multimodal strategies are most effective, combining active rehearsal such as peer-led mock OSCEs and simulation with psychological support to reduce anxiety and reflective tools like video feedback to strengthen self-assessment. Emerging approaches, including preparatory podcasts and virtual platforms, provide scalable and effective complements to traditional methods.

Despite these findings, the evidence remains limited by heterogeneity in intervention design, small sample sizes, reliance on self-reported outcomes, and minimal long-term follow-up. Future studies should emphasize standardized, validated preparation protocols and robust multicentre trials assessing sustained performance outcomes and cost-effectiveness. Educators are encouraged to implement integrated preparation models addressing both cognitive and affective demands of the OSCE to optimize learner achievement.

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