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Systematic Review

Shared decision-making in medical education – a systematic review

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ABSTRACT

INTRODUCTION. This systematic review examined teaching strategies used to enhance medical students' skills in shared decision-making (SDM) and their impact on students' learning and educational outcomes.

METHODS. Twenty-three studies published between 2014 and 2025 were identified through systematic searches of PubMed, Scopus and Embase. Eligible studies evaluated SDM-focused educational interventions for medical students and reported SDM-related outcomes.

RESULTS. Teaching approaches varied widely, most often involving role-play with SPs or peers, case-based discussions and blended or online modules. Despite heterogeneous outcome measures, experiential methods consistently enhanced students' confidence, communication and attitudes towards SDM. Most studies relied on self-reported data rather than validated, performance-based tools, and few studies included follow-up.

CONCLUSIONS. Although heterogeneity limits firm conclusions, active, experiential approaches appear most promising in developing SDM competencies among medical students. This review synthesises current approaches to SDM training and highlights key research gaps, including the need for validated, performance-based, longitudinal studies to determine which teaching strategies most effectively support long-term competence in SDM.

Shared decision-making (SDM) is a collaborative process in which healthcare professionals and patients cooperate to make informed decisions about care and treatment options. It integrates clinical evidence with the patient's values and preferences [1]. SDM is particularly relevant in preference-sensitive clinical decisions. This applies to situations in which multiple medically appropriate options exist and the optimal choice depends on how patients value the associated risks and benefits [2]. In such contexts, a mutual recognition that more than one acceptable choice exists creates favourable conditions for SDM.

Although often associated with the broader idea of patient-centred care (PCC), SDM refers more specifically to the communicative and cognitive processes through which medical decisions are made collaboratively. Whereas PCC encompasses general attitudes such as empathy, respect and responsiveness, SDM focuses on the interactional practices of deliberation and choice. Making this distinction helps clarify how SDM should be taught and assessed in medical education [3].

Nevertheless, SDM remains difficult to implement. Clinicians may be reluctant to acknowledge uncertainty [4] or revert to directive styles under time pressure [5], whereas patients may feel uneasy in the absence of a single "right" answer or prefer to leave the decision to the physician [6].

SDM has been shown to enhance patient knowledge, increase satisfaction and improve alignment between

treatment and patient values. Teaching future clinicians to engage with SDM is therefore an important aspect of their education. Learning to engage in SDM involves both evidence-based reasoning, such as evaluating risks and benefits, and communication skills, including active listening, open-ended questioning and eliciting patient preferences [7]. Activities such as simulations, role-play and case-based discussions have been used to teach SDM, though evidence of their impact remains mixed [8]. How best to teach and assess SDM competencies in medical education remains a matter of debate.

This review is motivated by the limited evidence on which teaching methods most effectively develop SDM skills in medical students and by the lack of validated assessment strategies. These challenges are further compounded by implementation difficulties and variation in how SDM is integrated across medical curricula worldwide.

This review therefore addresses the following research questions:

- What teaching methods are most effective in helping medical students develop SDM competencies?

- How can assessments reliably measure students' skills in SDM during clinical training?

Addressing these questions is essential for developing evidence-based educational strategies and ensuring that SDM becomes a core competency for all medical graduates.

Methods

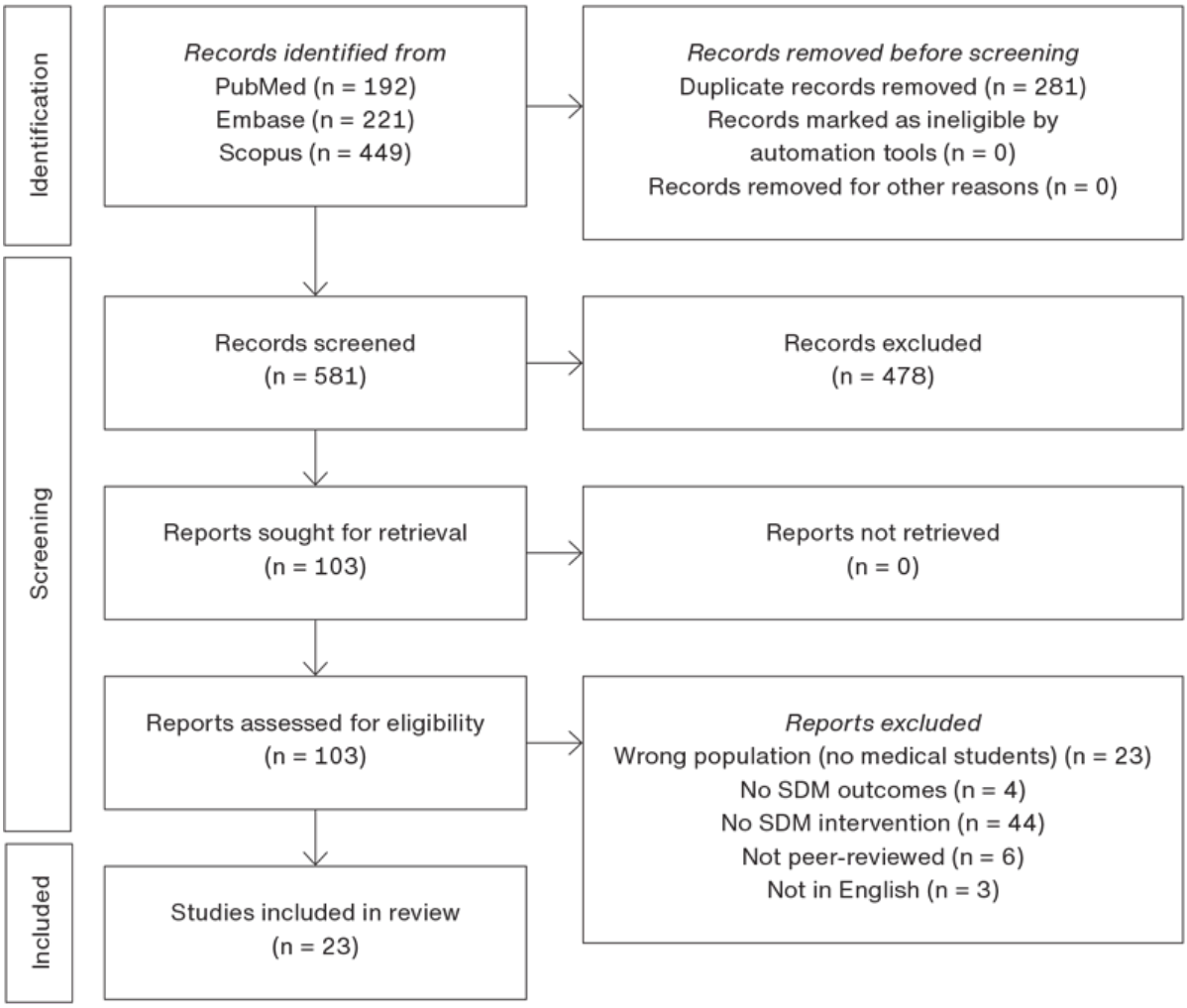
This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [9]. Studies were identified through structured searches in PubMed, Embase and Scopus. The initial search was conducted between 6 and 16 November 2024 and repeated between 31 July and 6 August 2025 to capture newly published material. The search strategy combined the terms "s*hared decision-making"* and *"medical students"* and was limited to publications from 2014 to 2025.

Duplicates were eliminated using EndNote, with further verification by the first author through review of titles and abstracts. Screening was carried out by the first author, who reviewed all titles and abstracts and subsequently assessed the full texts of potentially eligible studies against predefined inclusion and exclusion criteria. For 20 uncertain cases, both authors reviewed the full texts independently and resolved discrepancies by consensus. All potentially eligible full texts were retrieved via the university library. Most exclusions were due to an incorrect study population or a lack of focus on SDM.

Studies were eligible if they described an educational intervention involving SDM, included medical students as the primary study population, and reported outcomes related to SDM competencies. For mixed-learner groups, only studies that reported outcomes separately for medical students were included.

The exclusion criteria were no SDM component, no medical students or no SDM-related outcomes for medical students. Studies with mixed-learner groups (e.g. nursing or allied health) were excluded if medical student outcomes could not be isolated. Non-peer-reviewed publications (e.g., conference abstracts and editorials) and non-English articles were also excluded; no translations were attempted. The overall selection process is shown in the PRISMA flowchart (**Figure 1**).

FIGURE 1 PRISMA 2020 flow diagram showing study selection via databases and registers. Adapted from [9].



SDM = shared decision-making.

The methodological quality of included studies was assessed using an adapted version of the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework, applied at the study level. Articles were rated as of high, moderate, low or very low quality according to five criteria derived from the Cochrane Handbook: risk of bias, inconsistency, indirectness, imprecision and publication bias. No studies were excluded based on quality; rather, these ratings informed the weighting and interpretation of the findings in the synthesis [10].

Results

A total of 23 articles were included to answer the review question (**Table 1**). The included studies represented a variety of designs: eight educational intervention studies [11-18], five randomised controlled trials [19-23], four quasi-experimental studies [24-27], three observational studies [28-30], one descriptive study [31], one qualitative study [32] and one mixed-methods study [33].

TABLE 1 Characteristics of included studies.

Reference	Country	Study design	Study population (n)	Study intervention	Outcomes	Quality assessment	Setting
Eggeling et al., 2021 [19]	Germany	RCT	*Medical students* Mean age 24.5 yrs, SD 3.6 yrs 57% female Most in clinical phase (167)	Hypothetical consultation case Students watched 3-min. video on 2-treatment option *Randomised to* Narrative patient testimonial Fact-based text	*Measured* Perceptions of SDM: survey Control preferences Intended consultation time *Findings* Narrative group rated SDM as significantly more important: p = 0.021, d = 0.37 No change in patient control preferences	*Moderate* RCT with high dropout No pre-post design Possible selection bias	Recruited via mailing list of online learning platform "Sectio Chirurgica"
Geiger et al., 2021 [20]	Germany	RCT	*Medical students* Intervention: mean age 21.9 yrs, Control: mean age 21.7 yrs 120 females (187)	*Online training* Video of suboptimal consultation Questions regarding the skill to be improved Discussion between the physician and an SDM coach Video of optimised consultation	*Measured* SDM knowledge Decision-making ability *Findings* Intervention group showed significantly greater improvement in SDM knowledge: +12%, 95% CI: 7.3-18.5, p < 0.001	*High* Large sample size Randomisation Validated outcomes	University Medical Centre, Kiel
Jacklin et al., 2021 [33]	England	Mixed methods evaluation study: pre-post + interviews	*Medical students* 27% male 73% female (22)	30-min. VP simulating a primary care consultation Interaction via MCQs with feedback at end Pre- and post-questionnaire + quality interviews	*Measured* Self-reported practice intentions Ranking of items *Findings* 59% reported likely change in practice toward more SDM Post-VP simulation increased ranking of "respecting patient choices"	*Moderate* Small sample Self-reported outcomes Possible selection bias No long-term follow-up	Workshop at Manchester Medical Research Student Society's conference
Kaper et al., 2019 [21]	The Netherlands	RCT	*2nd-yr medical students* Mean age 21.2 yrs 75% female 45.9% Dutch nationality (79)	*11-h programme over 5 wks* Health literacy lecture Small-group sessions: info-gathering, SDM, self-management Role plays Peer/moderator feedback Videotaped consultations for reflection	*Measured* Self-reported skills: Survey Observed consultation outcomes *Findings* Intervention group showed a significant increase in SDM skills: B: 1.08; 95% CI: 0.60-1.55 Improvements persisted ≥ 5 wks	*Moderate* Self-reported outcomes Observed outcomes Potential information bias	The Learning Community Global Health, Dutch medical faculty
Leblang et al., 2022 [31]	USA	Descriptive educational intervention	2nd-yr medical students (103)	Didactic training based on AHRQ SHARE Focus on practical SDM skills Role play in small groups with moderator-led feedback	*Measured:* SDM knowledge Perceived skills *Findings:* 96% correctly answered SDM questions 81% agreed that the session improved knowledge and skills	*Moderate* High response rate: 100% No pre-post design No long-term evaluation	University of South Carolina School of Medicine, Greenville
Luttenberger et al., 2014 [24]	Germany	Quasi-experimental	*Preclinical medical students* Mean age 22 yrs 59.9% female (182)	12-h communication course over 6 days (2h/day) in groups of ≈ 15 students Included introduction and practical role play sessions: SPIKES framework	*Measured* Pre-post questionnaires on attitudes Questionnaires on perceived skill gains *Findings* 80.8% preferred interactive learning 77.3% reported skill gains 91.4% valued role play: +10.6% from pre-course	*Moderate* Use of the established SPIKES framework High participation Self-reported No long-term evaluation Limited role-play exposure	University of Erlangen-Nuremberg

To be continued >

TABLE 1 CONTINUED Characteristics of included studies.

Reference	Country	Study design	Study population (n)	Study intervention	Outcomes	Quality assessment	Setting
Schmalz et al., 2023 [11]	Germany	Educational intervention	*Medical students in ≥ 7th semester* 26 women 4 men Some with prior professional training (30)	*1-wk interdisciplinary seminar on* *SDM* Emotional communication Breaking bad news *Included* Lectures Role plays Exercises Discussions	*Measured* Self-reported confidence Self-reported communication skills *Findings* High ratings in both cohorts: 2019: mean 1.08, SD 0.24 2022: mean 1.06, SD 0.24 Scale: 1 = excellent, 5 = poor Reported improvements in empathy and the ability to approach patients	*Moderate* High satisfaction Small sample No long-term follow-up Self-reported outcomes	University of Kiel, elective course
Ship et al., 2024 [12]	USA	Educational intervention study with retrospective pre-post evaluation	*2nd-yr medical students* All with prior clinical rotation (404)	*Curriculum on* Health equity Language justice SDM *Prework 3 h with* Articles Video session guide, followed by small-group discussion: 45 min. Role play *Optional large-group discussion: 45 min.*	*Measured* Self- perceived confidence Course evaluation *Findings* Significant improvement in confidence across all learning objectives: $p < 0.5$, effect size > 0.50 Patient scenario and role play rated highly: median 4/5	*Moderate* Large sample Retrospective pre-post design Self-reported outcomes Response rate 38%	University of Miami
Waschwill et al., 2020 [25]	Germany	Quasi-experimental	≥ 4th-yr medical students (58)	Students translated medical documents into plain language: WHI Control group: no translation: non-WHI Both participated in simulated physician-patient role play explaining findings and SDM options	*Measured* Option scale: transcript of encounters *Findings* The WHI group scored significantly higher in problem definition, explaining legitimate choices and risk communication: OPTION score: WHI group 32.45 ± 5.30 vs 30.23 ± 6.14, $p < 0.001$	*Moderate* Use of validated tools Potential selection bias No long-term follow-up	Online simulated consultation
Mortsiefer et al., 2014 [28]	Germany	Observational: OSCE evaluation	*4th-yr medical students* Across 3 terms (456)	*Mandatory CoMeD-OSCE with 4 stations* Domestic violence Breaking bad news Aggressive patient interactions SDM *Included theoretical preparation and SP sessions*	*Measured* OSCE global rating scores *Findings* Mean total OSCE score 59.40: 74.25% of max SDM station scored highest: 15.78/20	*High* Large sample Standardised OSCE No long-term follow-up	University Hospital of Düsseldorf
Koch et al., 2020 [22]	Germany	RCT	*4th- and 5th-yr medical students at 2 centres* Mean age: 25.7 yrs, SD 3.6 yrs 73% female (63)	*Integrated curriculum on risk communication* Lectures/seminars on SDM principles Interactive video-observed OSCE role plays Feedback Group discussions *Assessed at baseline, 2- and 30-wks post*	*Measured* Risk communication performance: questionnaire *Findings* Intervention group showed significantly higher performance at both post-tests: $d = 2.35$ short-term; $d = 1.83$ at 30 wks, both $p < 0.01$	*Moderate* RCT Long-term follow-up No validated measurement tools	Academic medical centres, Mainz and Heidelberg
Induru et al., 2025 [29]	USA	Observational study	*3rd-yr medical students* Post-clerkship (120)	*Preparation:* *SDM readings on* Choice Option Decision *25-min. SP scenario with 2 treatment options* Antibiotic Symptomatic treatment *Students rated with 9-item assessment rubric: Likert* *Feedback from SP and faculty* Video reviewed by faculty using the same rubric	*Measured* SDM rubric scores: Self SP Faculty *Findings* Students rated themselves lower than SPs: M = 22.6 versus 23.4, $p = 0.027$ No difference between self-ratings and faculty ratings of SDM	*Moderate* Large sample Validated rubric Non-blinded No control group	Vanderbilt Centre Experiential Learning and Assessment

To be continued >

TABLE 1 CONTINUED Characteristics of included studies.

Reference	Country	Study design	Study population (n)	Study intervention	Outcomes	Quality assessment	Setting
Dray et al., 2025 [30]	USA	Observational study: pre-post with follow-up	*Medical students* 17 2nd-yr 9 3rd-yr 11 4th-yr (37)	*Simulation-based communication training, including* Pre-survey SP encounter Individualised feedback 2nd SP encounter Post-survey and 7-mo. follow-up	*Measured* Competence and confidence using the DOC framework SP-rated across 8 domains and self-reported *Findings* Significant improvements in 7/8 domains after 2nd SP encounter Confidence increased in several domains Confidence remained stable at 7-mo. follow-up	*Moderate* Small sample size Pre-pos- test design Long-term follow-up Validated rubric	Large academic medical centre
Leyland et al., 2021 [32]	UK	Qualitative educational intervention	3rd-yr medical students (44)	Small-group discussion on SDM principles and literature Students completed a structured reflection template on the observed consultation: SHARE model Posted reflections online Received peer/ facilitator feedback	*Measured* Thematic analysis of reflections *Findings* Improved understanding of SDM Ability to critically analyse consultations Greater awareness of ethical/ emotional challenges Intention to apply SDM but noted barriers: Power dynamics Time Autonomy	*Low* Voluntary participation Small sample No direct skill assessment	Undergraduate medical school
Lin et al., 2025 [26]	Taiwan	Retrospective quasi-experimental	*4th-yr medical students* Mean age: 23.19 ± 1.77 yrs 60.5% male students (323)	2.5-h SDM workshop: Three Talk Model Delivered face-to-face or online Content identical: Didactics Video examples SP role play	*Measured* Decision-making effectiveness: COMRADE Communication performance: MPI Self-reported confidence *Findings* Both groups improved significantly: $p < 0.001$, $d = 0.50$-0.94 No significant differences between formats: $p > 0.72$	*Moderate* Large sample Retrospective design Self-reported Validated tools Short-term follow-up	Chang Gung University
Marko et al., 2015 [13]	USA	Controlled educational intervention: pre-post	*3rd-yr medical students* At 2 medical schools on OB/GYN Similar demographics and academic profiles (77)	*Structured early pregnancy loss counselling curriculum: 3 h* Lecture: medical aspects, SPIKES, SDM Faculty demonstration Role play with feedback *Control group* Traditional apprenticeship model	*Measured* OSCE checklist Self-reported confidence *Findings* Intervention group had higher OSCE scores: 94.2% versus 69.7%, $p < 0.001$ Greater confidence gains: mean score 1.57 versus 3.62, $p < 0.001$ Scale: 1 = high, 5 = low Higher SP empathy ratings: 1.84 versus 2.62, $p = 0.002$	*Low* Non-randomised Possible confounders Use of validated OSCE and empathy measures	OB/GYN clerkship, Inova Fairfax Women's Hospital, Virginia
Natt et al., 2018 [14]	USA	Educational intervention: cross-sectional formative assessment	*3rd-yr medical students* 78% participation 50 male 43 female (93)	*2 SP scenarios* "Less-is-more" conversation: unnecessary test request SDM conversation: choosing between options *Students received immediate feedback from SP and physician rater*	*Measured* Expert-developed checklist: 10- and 13-item Global ratings Self-reported skills *Findings* Checklists scores: 72-79% Strong correlation with global ratings Students reported improved skills and valued feedback	*Moderate* Single-site Non-comparative Objective scoring with multiple validity sources	Simulation Centre, Mayo Clinic, Rochester

To be continued >

TABLE 1 CONTINUED Characteristics of included studies.

Reference	Country	Study design	Study population (n)	Study intervention	Outcomes	Quality assessment	Setting
Tang & Rupley, 2023 [15]	USA	Educational intervention: pre-post with baseline cohort	*3rd-yr medical students* All in OB/GYN clerkship (56)	*Baseline cohort* 1-h lecture Intervention cohort Lecture and contraceptive counselling pocket guide Online module 30-min. telehealth SP session with feedback	*Measured* Knowledge survey Self-reported confidence Attitudes SP session performance *Findings* Knowledge gain was greater in intervention group but not statistically significant Confidence increased in both groups Strong patient-centred communication in SP sessions	*Low* Non-randomised Small sample Self-reported outcomes	OB/GYN clerkship, Columbia University, New York
Duval et al., 2023 [16]	USA	Educational intervention: pre-post	2nd-yr medical students (28)	*1.5-2 h "Communicating Uncertainty" workshop using ADAPT framework* Assess knowledge Disclose uncertainty Acknowledge emotions Plan next steps Temper expectations *Included* Faculty demo Didactics Small-group SP practice via Zoom Debrief	*Measured* Self-reported confidence: Likert Course feedback *Findings* Confidence improved across domains Exploring emotions improved significantly, p = 0.037 Students rated workshop highly: A/A+	*Moderate* Response rate: 21% Self-reported outcomes No objective assessment	Academic medical centres, USA
Khawand-Azoulai et al., 2024 [17]	USA	Educational intervention: pre-post reflection and evaluation	*4th-yr medical students* In elective transitioning to residency course Participation rate: 19.6% (80)	Virtual, simulation-based "conducting a family meeting" session Flipped classroom with 2-h preparation: Webinar Module Resource guide Pre-session reflection Interprofessional role play Small group Zoom breakout rooms Debrief	*Measured* Pre-session reflections: decision-making balance, challenges Post-session evaluations: Likert *Findings* Pre-session: 85% favoured SDM Anticipated futility/conflict issues Post-session: all learning objectives scored high: 4.7-4.8/5 Qualitative feedback praised realism and value	*Low* Elective Limited participation No objective skill assessment Partial population coverage High response rate for reflections	University of Miami Miller School of Medicine
Kiessling et al., 2016 [23]	Germany	RCT: educational intervention; primary aim, test validation	*2nd-6th-yr medical students* Mean age: 24 yrs 72% female (72)	*5-h SDM training in 3 formats* E-learning Role play Combined	*Measured* CBT-SJT: 22 items SP assessment: OPTION, BGR *Findings* All training groups outperformed controls on CBT: $p < 0.001$, $d = 1.0$-1.7 No difference between formats Low but significant correlation with BGR: $r = 0.24$: none with OPTION Reliability modest: $\alpha = 0.58$ → 0.63 after item removal	*Moderate* Randomised Objective measures Small sample Primary aim was validation	German medical schools, multi-site
Sawatzky & Kline, 2025 [18]	Canada	Case-control educational evaluation	*4th-yr medical students* 16 HMP graduates 87 controls (103)	HMP: 9-16 mos. interprofessional groups paired with a patient mentor in year 1 At graduation, all students completed standardised written care plans	*Measured* Written care plans scored for inclusion of patient/caregiver: Voice Test ordering Referrals *Findings* HMP graduates referenced patient/caregiver voice more often: $p = 0.014$, $d = 0.6$ Ordered fewer diagnostic tests: $p = 0.001$, $d = 3.3$ No difference in referrals	*Low* Small HMP sample Voluntary participation Potential selection bias Long-term follow-up	University of British Columbia, Vancouver

To be continued >

TABLE 1 CONTINUED Characteristics of included studies.

Reference	Country	Study design	Study population (n)	Study intervention	Outcomes	Quality assessment	Setting
Suojanen et al., 2018 [27]	USA	Quasi-experimental: intervention versus control	*3rd-yr medical students* 10 intervention 9 controls (19)	*Communication curriculum* Lecture/discussion "Cheat sheets" 2 videotaped SP encounters with feedback Mid-year live mock interview	*Measured* SP interviews scored by blinded reviewers using 22-item tool *Findings* Intervention group scored significantly higher overall: p = 0.031 Information-giving improved: p = 0.047 Other domains trended positive	*Low* Small sample Potential baseline differences Blinded assessment with objective scoring	Columbia University/ Bassett Medical Center

ADAPT = framework for communicating uncertainty: Assess, Disclose, Acknowledge, Plan, Temper; AHRQ = Agency for Healthcare Research and Quality SDM model; BGR = Berlin Global Rating; CBG = capillary blood gas; CBT = computer-based test; CoMeD-OSCE = Communication in Medical Education objective structured clinical examination; COMRADE = Combined Outcome Measure for Risk Communication and Treatment Decision-Making Effectiveness; d = Cohen's d (effect size); DOC = Development of Communication framework; HMP = Health Mentors Program; MCQ = multiple-choice questionnaire; MPI = Medical Communication Performance Index; OPTION = Observing Patient Involvement; OSCE = objective structured clinical examination; pCO_2 = partial pressure of carbon dioxide; SDM = shared decision-making; SHARE = Seek, Help, Assess, Reach, Evaluate; SJT = Situational Judgment Test; SP = standardized patient; SPIKES = 6-step protocol for delivering bad news: Setting, Perception, Invitation, Knowledge, Emotions, Strategy/Summary; $tcCO_2$ = transcutaneous carbon dioxide; VP = virtual patient; WHI = written health information.

Teaching methods

Studies used a range of approaches to teaching SDM. The most common was role-play, either with standardised patients (SPs) [13, 15, 16, 26-30] or in peer-to-peer settings [11, 12, 14, 20, 21, 24, 31], sometimes supplemented by group discussions or practical exercises [11, 12, 21, 22, 31].

Other formats included virtual patients [17, 33], structured reflections [32] and multimodal designs, such as video-observed objective structured clinical examinations (OSCEs), e-learning modules or blended learning [20, 22, 23]. Online delivery was also trialled, including comparisons of face-to-face versus online role-play [26], preparatory modules followed by group discussions [20] or SP encounters via videoconference [16].

Innovative elements involved translation of medical documents into plain language [25], narrative testimonials versus fact-based texts [19], and direct patient involvement, where students engaged with individuals sharing their lived experiences [18].

Assessment strategies

Most studies relied primarily on self-reported surveys assessing perceived skills, confidence, and attitudes [11, 12, 14-17, 19, 21, 24, 26, 30-33]. These were usually structured questionnaires; some also included qualitative reflections, such as thematic analysis of e-discussions [32].

Performance-based measures were also applied, including SP encounters and structured evaluations of consultations [13, 14, 18, 22, 23, 25-29]. Approaches ranged from OSCEs with communication scenarios [28] and video-observed exams rated by blind reviewers [22] to videotaped consultations evaluated with structured rubrics [13, 26, 27, 29] and written care plans scored for patient involvement [18].

Several studies strengthened methodological rigour by applying validated instruments, including the scale for SDM performance [14, 23, 25], the MAPPIN'SDM observer scale [20], the Jefferson Empathy Scale [13] and the Four Habits coding scheme [21]. Some also combined self-reported and performance-based measures to enhance validity [20-23], for example, by linking survey outcomes to consultation ratings or by integrating knowledge tests, situational judgment tasks and observer assessments.

Outcomes

Outcomes were reported across four main domains: knowledge and attitudes, skills and performance, confidence, and learner satisfaction, with a few studies also examining sustained effects.

Several studies reported significant gains in knowledge and judgment ability [15, 20, 22, 23, 31], with Geiger et al. showing improved concordance with expert ratings [20] and Leblang et al. demonstrating high accuracy on

knowledge items [31]. Attitudinal shifts were also observed as students placed greater decisional weight on patients and viewed SDM as more important after narrative exposure [19] or reported increased intention to apply SDM in future practice [17, 32, 33].

Improvements in performance-based outcomes were frequently documented. Enhanced SDM-related behaviours were seen in OSCE or SP encounters [14, 27, 28], in risk communication [22] and in problem definition and option discussion [25]. Video analysis confirmed stronger empathy and self-management behaviours [21], whereas written care plans revealed greater integration of patient voice [18]. Several studies showed strong performance on SP checklists and rubrics, though occasionally without alignment with faculty ratings [29].

Self-reported confidence and communication skills improved consistently [11, 12, 15, 16, 26, 30], often with students highlighting role-play and SP encounters as impactful. Learner satisfaction was high across most interventions, with sessions rated positively for realism, usefulness and relevance [16, 17, 24, 30]. Finally, a more limited number of studies demonstrated sustained or follow-up effects, including long-term retention of risk communication skills [22] and stable confidence levels months after training [30].

Discussion

Interpretation of findings

Teaching strategies to improve SDM behaviours varied greatly among the included studies.

Role-play with peers or SPs emerged as the predominant strategy across interventions [11-16, 21, 22, 24, 26-31]. Its pedagogical strength lies in an active, experiential learning format that allows students to practice SDM skills and experiment with different approaches in a safe environment. However, whereas role-play enhances self-reported confidence and observed communication skills [21, 24, 28], it remains uncertain to which extent these improvements translate into authentic clinical encounters, where patient complexity and time pressure may challenge transferability, raising questions of external validity.

Digital and online interventions [17, 25, 33] highlight the scalability and efficiency of digital teaching but raise questions about whether conceptual knowledge alone translates into applied SDM skills. Blended approaches [12, 23] have sought to address this by combining digital modules with experiential role-play; however, it remains unclear which component drives the observed improvements. Lin et al.'s comparative study suggests that well-designed online formats can achieve outcomes comparable to face-to-face formats, but its limited external validity and lack of long-term follow-up restrict conclusions about sustained competence [26].

Beyond role-play and digital training, innovative strategies such as narrative exposure [19], structured reflection [32] and patient involvement [18] highlight that SDM competencies extend beyond technical skills to encompass values, empathy and orientation toward patient partnership. Across studies, consistent improvements were observed in knowledge, attitudes, confidence and learner satisfaction, although performance-based outcomes were less consistently demonstrated and not followed in clinical practice. Importantly, findings from Induru et al. [29] revealed discrepancies between students' self-assessments and evaluations by SPs, underscoring the need for multi-source, validated assessment strategies. Whereas most included studies were from Europe and North America, comparable results from Taiwan suggest that these approaches may be transferable cross-culturally, though further work in diverse contexts is needed [26].

The choice of assessment strategy further shaped the strength of findings. Some studies relied primarily on self-reported outcomes [11, 21, 33], which are prone to overestimation and may reflect perceived rather than actual skills. Retrospective pre-post designs [12] have been suggested as a refinement to reduce ceiling effects. By

contrast, studies employing validated, performance-based tools such as the OPTION scale [23, 25], MAPPIN'SDM [20] or COMRADE/MPI [26] provided stronger evidence of genuine SDM competence. These instruments allow for standardised and objective measurement, but were inconsistently applied across studies, complicating comparability. In relation to the research questions, although heterogeneity limits firm conclusions, experiential teaching methods such as role-play, simulation and structured reflection appear most promising for supporting SDM skill development among medical students. Reliable assessment will likely require validated, performance-based tools and multi-source evaluations.

Strengths and limitations

This review provides a comprehensive synthesis of SDM training interventions for medical students, drawing on evidence from varied educational contexts, teaching strategies and assessment methods. By including studies across different stages of medical education, formats (e.g., simulation, didactic teaching, role-play and online learning) and outcome measures, it offers a nuanced picture of the heterogeneity in how SDM is taught.

Several studies were at a high risk of selection bias due to recruitment via websites, conferences or elective courses [11, 17, 19, 27, 30, 33]. Such approaches tend to attract students who are already motivated towards SDM, thereby inflating outcomes and limiting generalisability. In contrast, studies embedded in mandatory courses or integrated curricula [12, 24, 26, 28] reduced the risk by including students with more varied baseline motivation and competence. Still, even compulsory designs were affected by attrition and non-response (e.g., Ship et al., 38% response rate [12]), which may compromise representativeness. In summary, high-risk studies may overestimate effectiveness, whereas lower-risk studies provide stronger evidence for broader applicability.

Another limitation was the lack of long-term follow-up. Most studies assessed outcomes immediately after the intervention, leaving it unclear whether gains in knowledge, skills or attitudes persisted into clinical practice. A few exceptions suggest training effects can endure: Dray et al. reported maintained confidence at seven months [30], Koch et al. demonstrated sustained improvement in risk communication at 30 weeks [22] and Sawatzky & Kline found that students exposed to a patient-led programme in year one continued to prioritise patient perspectives and use diagnostic testing more judiciously three years later [18]. While encouraging, these findings remain constrained by small samples, voluntary participation and indirect outcome measures. More rigorous longitudinal designs are needed to determine whether training translates into lasting competence.

The review itself has limitations. The search was restricted to PubMed, Embase and Scopus, which may have narrowed coverage. Screening was conducted by the first author, using predefined criteria, with uncertain cases (n = 20) discussed and resolved jointly by both authors. Only English-language studies were included, raising the possibility of language bias; however, only three non-English articles were excluded at full-text reading, suggesting minimal impact. Conference abstracts and non-peer-reviewed publications were excluded, reducing comprehensiveness but ensuring sufficient methodological detail and quality. Finally, mixed-population studies were included only when medical student outcomes were reported separately, ensuring that the findings specifically reflect this target group.

Further directions

Future studies should employ more rigorous designs to address current limitations in SDM training research. Larger, multi-centre randomised trials with standardised interventions are needed to clarify which teaching strategies yield lasting gains. Longitudinal designs are particularly important to determine whether improvements in knowledge, confidence and communication skills persist in clinical practice.

One study highlights the value of structured, standardised approaches to SDM training for healthcare professionals and underscores the need for collaboration across countries and disciplines to support broader

adoption [34]. To strengthen comparability, researchers should use validated, performance-based assessment tools, ideally alongside self-report and multi-source evaluations from SPs and faculty. Developing a core outcome set for SDM training in medical education could further improve consistency across studies.

For educators, current evidence supports active learning strategies such as role-play with peers or SPs, combined with reflective exercises and structured feedback, which consistently enhance confidence and skills. Online and blended formats show promise for scalability but should be paired with experiential practice to ensure applied competence. Future curricula should also address known barriers, such as time constraints and managing uncertainty, by embedding SDM practice into realistic, challenging scenarios.

In clinical practice, studies using the OPTION scale have consistently shown that the extent of SDM remains limited [35]. This highlights the importance of integrating SDM-focused communication training into medical education to better prepare future doctors for PCC.

Conclusions

This systematic review demonstrates that a wide range of strategies have been employed to teach SDM in undergraduate medical education, with role-play and simulation emerging as the most consistently effective methods for building skills and confidence. Innovative formats, such as narrative exposure and reflective exercises, may offer additional value in shaping attitudes and empathy, though evidence remains limited.

Across studies, the validity of findings was limited by reliance on self-reported outcomes and inconsistent use of validated instruments. Performance-based assessments, particularly when combined with multi-source evaluations, provide stronger evidence of competence but were applied inconsistently. Long-term effects were rarely measured, and it remains unclear whether training translated into sustained practice.

In conclusion, the evidence highlights the promise of experiential and patient-centred approaches, while underscoring the need for more rigorous, standardised and longitudinal research to establish effective and reliable strategies for embedding SDM as a core competency in medical education.

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KEY POINTS

- Medical students' shared decision-making (SDM) skills can be strengthened through varied teaching strategies.
- Role play, simulations and online modules were the most common interventions.
- Interventions improved confidence, communication skills and SDM-related attitudes.
- Few studies used validated tools or long-term follow-up, limiting evidence on lasting impact.

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