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Links between evidence-based medicine and shared decision-making in courses for doctors in training: a scoping review

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ABSTRACT

Objectives This scoping review aims to synthesise the current evidence on the inclusion and effectiveness of integrating evidence-based medicine (EBM) and shared decision-making (SDM) into training courses for doctors in training to enhance patient care. Both EBM and SDM appear to be taught separately and their combined role in providing high-quality patient care has not yet been explored.

Design Scoping review of literature from January 2017 to June 2021.

Setting Any setting where doctors in training could undertake EBM and/or SDM courses (hospitals, universities, clinics and online).

Participants Doctors in training (also known as junior doctors, residents, registrars, trainees, fellows) defined as medical graduates undertaking further training to establish a career pathway.

Methods Searches were conducted in the databases Medline, Embase, Scopus and Cochrane Library. Bibliographies of included articles and their cited references were hand searched and assessed for inclusion. Included studies described training and outcomes of either EBM, SDM or both. Reported outcomes included EBM knowledge and skill tests, attitude surveys, SDM checklists and surveys and patient and doctor experience data obtained from surveys, focus groups and interviews.

Results Of the 26 included studies, 15 described EBM training courses, 10 described SDM training courses and 1 course combined both EBM and SDM. Courses were heterogeneous in their content and outcomes, making comparisons difficult. EBM courses prioritised quantitative outcome assessments and linked knowledge and skills, such as critical appraisal, but overlooked other key elements of patient-centred care including SDM.

Conclusions SDM and EBM are taught separately in most training courses. The inclusion of SDM, evaluated by qualitative assessments, is currently omitted, yet could provide a more person-centred care focus in EBM courses and should be investigated to increase our knowledge of the effectiveness of such courses and their role in improving doctors' skills and patient care.

Protocol A protocol for this review has been published and contains further details of the methodology.

Strengths and limitations of this study

- ► The potential benefits of integrated evidence-based medicine (EBM) and shared decision-making (SDM) training for doctors in training are yet to be explored.
- ► This is the first scoping review that investigates incidence, benefits and barriers of integrated EBM–SDM training.
- ► Qualitative as well as quantitative studies are included, in order to increase understanding of EBM–SDM training outcomes.
- ► An innovative focus of this review is the influence of EBM–SDM training on patient-centred care.
- ► This scoping review is limited to studies published between January 2017 and June 2021.

INTRODUCTION

Rationale for the scoping review

Evidence-based medicine (EBM) and shared decision-making (SDM) have been reported as interrelated aspects of patient-centred care,[1–3] but they appear to be taught and reported separately in the international literature on postgraduate training of recently qualified doctors (which we describe as 'doctors in training' in this paper).

EBM requires the clinician to use their clinical experience and expertise, the best current research evidence and patient preferences regarding treatment and care, to make well-informed, optimal healthcare decisions.[4] This practice has been expanded to encompass other healthcare professions where terminology such as evidence-based practice (EBP), evidence-based healthcare and evidence-based surgery has emerged. SDM involves the patient and clinician in making healthcare decisions together, underpinned by medical evidence, clinical expertise and patient preference and circumstance.[5] Patient preference regarding treatment and care and their personal circumstances are, ideally, incorporated into the decision-making process while clinicians and patients discuss options, benefits and risks of healthcare decisions. In so doing, SDM has the potential to support the practice of EBM at the decision-making stage.[6]

The practice of SDM is said to be most valuable when there are uncertainties as to the best option for treatment, tests or surveillance, or if there is more than one viable option.[2] The optional use of decision aids, information available to patients that helps them to make informed, personalised choices about their healthcare with their doctor,[7] can facilitate the SDM process by providing visual representations of the evidence and associated options and risks.[8 9]

The roles of EBM and SDM in supporting patient care are increasingly recognised in the published literature, but within separate domains.[3] EBM is frequently taught within epidemiology programmes,[10] while SDM is often taught within communication courses.[11] As such, they are seldom taught together despite sharing patient-centred principles such as the patient's individual preferences and opportunities to increase patient autonomy during their care. With the growing recognition of the patient's role in clinical care decisions,[12] there is a need to incorporate meaningful outcomes associated with SDM into the assessment of EBM training.

This scoping review explores whether recent training courses address all EBM steps (ask, acquire, appraise, apply, assess)[13] and the degree to which SDM is currently included in the decision-making and evidence application steps of EBM. The literature already alludes to gaps in EBM and SDM practice and teaching alongside the need for increased patient empowerment,[14] where patients are regarded as equal partners in their own healthcare. Educational gaps in EBM training include inconsistent content, poor reporting of training interventions and inadequate evaluation of outcomes.[8 15] Furthermore, the lack of a universal definition of SDM impedes a standardised way of evaluating training outcomes across SDM training courses.[16] However, up to this point, the extent to which these gaps occur has been unclear. Consequently, this may be an opportune time for both EBM and SDM to evolve in a way that is more closely aligned.

A scoping review was chosen as an appropriate method to examine the under-researched question of whether published EBM training courses include or omit to include SDM training, and why, the results of which may indicate the need for broadening the curriculum. This scoping review aimed to synthesise current information, identify gaps and priorities and develop recommendations to enhance SDM and EBM research and training.

Objectives

This scoping literature review was designed to answer one primary and two secondary research questions.

Primary research question

- To what extent does the current literature report on the inclusion and effectiveness of SDM embedded in EBM training courses for doctors in training?

Secondary questions

- How are EBM and SDM skills taught to doctors in training?
- To what extent can SDM outcomes be an indicator of patient-centred care and optimal clinician experience and outcomes following SDM embedded in EBM training?

Exploratory framework

These research questions were explored using the framework 'Population, Concepts, Context', referred to by the Preferred Reporting Items for Systematic Review and Meta-Analysis extension for scoping reviews (PRISMA-ScR) Explanation Document[17] and the Joanna Briggs Institute Reviewer's Manual.[18]

Population, concepts, context

The population of interest was doctors in training (also known as junior doctors, residents, registrars, trainees, fellows) defined as medical graduates undertaking further training to establish a career pathway. The concepts of interest were EBM and SDM training, how they were currently taught to doctors in training, whether they were taught together or separately and the outcomes. The outcomes were reported from training assessments in the included EBM and SDM studies, including EBM knowledge scores, EBM attitude survey results and patient and doctor experience and outcome data obtained from surveys, observations, focus groups and interviews. The context was any setting where doctors in training could undertake EBM and/or SDM courses (hospitals, universities, clinics and online). All types of peer-reviewed evidence sources were included, for example, randomised and non-randomised controlled trials (RCTs), observational studies, before-after studies, quantitative, qualitative and mixed-methods studies.

METHODS

The scoping review methods were guided by the PRISMA-ScR Checklist and Statement,[17] and the framework created by Arksey and O'Malley,[19] which has widespread use among scoping review guidelines and has been extended by Levac and colleagues.[20]

Eligibility criteria

Inclusion and exclusion criteria are summarised in table 1.

A change from the protocol is the date range included in all searches. This has been narrowed to January 2017 to June 2021, resulting from the authors' decision to limit reporting to the most current literature from the array of EBM and SDM literature dating back to the early 1990s.

Information sources

Bibliographic databases were searched using subject headings and keywords for the following search terms: doctors in training, EBM, SDM, educational interventions. The databases searched (in June 2021) were Ovid

Table 1 Eligibility criteria for the scoping review

Criterion	Inclusion criteria	Exclusion criteria
Population	Doctors in training: junior doctors who are training for a career pathway such as surgeon or physician.	Medical or healthcare students Other healthcare professionals, for example, nurses, allied healthcare professionals
Concept	Courses (educational interventions with outcome measures) that link EBM and SDM; courses in EBM, courses in SDM. Outcome measures include knowledge tests, surveys observation checklists, interviews and focus groups.	No educational intervention or no outcome measures
Context	Any educational setting in postgraduate medicine (hospitals, clinics, online).	
Date	January 2017 to June 2021	Studies published before 2017.
Language	English or with English translation provided	Studies written in another language that cannot be translated

EBM, evidence-based medicine; SDM, shared decision-making.

Medline, Embase, Scopus and Cochrane Library. The bibliographies of articles selected for inclusion and their cited references were hand-searched for inclusion of additional relevant studies.

Search

Search strategies and documentation followed those set out in the protocol.[1] However, since publication of the protocol, a new Medical Subject Heading (MeSH) term for 'shared decision-making' was released for Medline. The new term was included in an updated search on 4 June 2021 (see online supplemental material 1 (Search Strategy) for the Ovid Medline search strategy).

Selection of sources of evidence

Two researchers (MS, JC) conducted the searches and independently screened the results according to eligibility criteria at the title and abstract stage. Cohen's Kappa was calculated (0.861, p<0.001) and showed substantial agreement between the two researchers on a selection of articles for full-text inclusion in the review. Selected articles then underwent full-text review to confirm eligibility criteria. A third researcher (YZ or FR) arbitrated in the event of any disagreement between MS and JC to ensure that a consensus was reached.

Data charting process

A data extraction form was developed, and data charting was undertaken by two researchers (MS and JC) and verified by the other researchers (YZ, MSt and FR).

Data items

Data were sought and documented for the following variables and summarised in tables 2–4: First Author; Year; Country; Cohort; Design; Setting; Programme; Intervention; Outcome Measures and Outcomes, including New World Kirkpatrick Model (NWKM) Levels or NWKM.[21]

RESULTS

Selection of sources of evidence

After duplicates were removed, 3035 citations were identified from searches of electronic databases. Based on the title and the abstract, 2389 were excluded as they did not meet the eligibility criteria, leaving 646 full-text articles retrieved and assessed for inclusion. Of these, 620 were excluded for the following reasons: (a) medical students or other excluded groups who made up a substantial proportion of study participants, (b) studies conducted outside the specified date range, (c) studies that did not include an educational intervention. An additional study[22] was identified since the protocol was published and included in the final set of studies. A total of 26 full-text studies were selected for inclusion in this scoping review. A PRISMA flow diagram depicts the study selection process in figure 1.

Characteristics of sources of evidence

Studies were grouped according to the focus of their educational intervention (SDM, EBM, SDM–EBM). Relevant data relating to outcomes are presented in tables 2–4.

NWKM[21] is adapted from the traditional Kirkpatrick model, to provide increased flexibility when evaluating curricular activity. It has been used for this scoping review due to its relevance to outcomes in medical education. Level 1 outcomes depict satisfaction, engagement or relevance related to an educational outcome; level 2 outcomes include change (or commitment to change) in knowledge, skills and attitudes. Level 3 outcomes include application of learning or behaviour changes. Level 4 includes results, including how new behaviours of the participants contribute to organisational goals.[21] According to Li *et al*,[21] level 4 also includes changes in patients' health outcomes, resulting from doctors' post-training behaviours and is deemed applicable to this review. Specific EBM and SDM outcomes represented by these NWKM levels include EBM knowledge

Table 2 Study interventions and outcomes of included EBM courses

Study	Intervention	Outcomes (quantitative)	Outcomes (qualitative)	KWKM level
Goodarzi *et al*[22]	Before-after EBM course comparison cohorts: 12 hours over 6 months for active group (N=39); integrated 1 year for passive group (N=30)	Knowledge tests and attitude, decision and behaviour questionnaire showed significant improvement in active group compared with passive group.		2
Pammi *et al*[23]	Before-after seven 1 hour EBM sessions (N=19)	Knowledge test showed significant improvement postcourse.		2
Nelson *et al*[24]	Before-after EBM course clinically integrated over 1 year (N=60)	Knowledge test scores showed statistically significant improvement		2
Tavarez *et al*[25]	Before-after EBM course clinically integrated over 2 years (N=22)	Knowledge test scores showed significant increase in knowledge and skills		2
Korownyk *et al*[26]	Review of 2 year courses over 15 years	In-house rating scales determined attitudes, comfort and self-reported behaviour change. Not comparable across years		3
Mlika *et al*[27]	Before-after EBM 1 day workshop (N=20)	Non-significant difference in knowledge scores preworkshop and postworkshop. Positive feedback.		1
Bentley [28] *et al*	Before-after EBM 1 year course (N=53)	Knowledge test showed statistically significant postcourse improvement		2
Bastaninejad *et al*[29]	Before-after EBM 6 hour workshop (N=41)	Knowledge test showed statistically significant postworkshop improvement		2
Nandiwada *et al*[30]	Intervention study of integrated EBM course over 5 months. (N=19)	Postcourse survey (attitudes and self-reported behaviours) showed improvement	Debriefing session. Increased communication and understanding post-course.	3
Muzyk *et al*[31]	Intervention study of EBM course integrated into 4 year programme. (N=51)	Weekly and yearly attitude surveys showed increased confidence and communication skills		3
Ramaswamy *et al*[32]	Before-after EBM course clinically integrated over 1 year (N=17)	Before-after surveys showed significant increase in self-assessed confidence		3
Oller[33]	Intervention study of integrated EBM course over 3 months. (n=24)	Learning activities in clinics, engagement survey. Both showed improvement		1
Cartledge *et al*[34]	Before-after online EBM module (N=29)	Knowledge test showed non-significant improvement	Positive postcourse feedback	1
Aneese *et al*[35]	Before-after 1 year EBM course (N=60)	Knowledge test showed statistically significant postcourse improvement	Focus group improvement in confidence and skills	2
Mousavi *et al*[36]	Before-after team-based learning EBM sessions (N=86)	Individual and group scores showed team improvement after session. Satisfaction survey showed improvement		2

EBM, evidence-based medicine; NWKM, New World Kirkpatrick Model.

scores, EBM attitude surveys, self-reported outcomes, patient-reported SDM outcomes, observer-rated SDM outcomes.

Results of individual sources of evidence

The final set of studies included 15 studies reporting EBM courses, 10 studies reporting SDM courses and one study that described a combined EBM–SDM course for the doctors meeting the eligibility criteria.

Review of the included EBM courses

Raw data from the 15 studies included that met the eligibility criteria are presented in online supplemental table 1. A summary of study interventions and outcomes of EBM courses included is presented in table 2.

Course design and content

Of the 15 EBM courses described in studies included in this review, 9 were developed and delivered in the USA, three in Iran, and one in each of: Canada, Tunisia and a study where collaboration took place between the UK and Rwanda. The number of participants ranged from 17 to 86 across studies. Doctors in training were working in discipline-specific training programmes including neonatal-perinatal medicine,[23] paediatrics,[24 25] family medicine,[26 27] emergency medicine,[28] otolaryngology,[29] cardiology,[30] psychiatry[31] and geriatric-palliative care.[32] The length of EBM courses ranged from 1 day[27 29] to 4 years.[31] The predominant study designs were before–after studies. A variety of learning activities were undertaken, including some didactic teaching/learning

Table 3 Interventions and qualitative and quantitative outcomes of included studies describing SDM courses

Study	Intervention	Outcomes (quantitative)	Outcomes (qualitative)	NWKM level
Bentley *et al*[37]	Needs assessment and intervention (N=28)	Post workshop survey showed increased engagement and commitment to using SDM.	Focus group interviews used for needs assessment; uncovered SDM barriers and facilitators	2
Chesney and Devon[38]	Before-after 2 hour-session using best case/worst case scenarios. (N=18)	Questionnaires on attitudes and confidence not changed; action scores higher after session.		3
Harman *et al*[39]	Before-after 8 week SDM course. (N≈ 180 residents and interns)	Observer checklist showed improvement in all SDM behaviours during ward rounds.		3
Huffman *et al*[40]	Quasi-RCT before-after online modules comparing EBP and SDM interventions for SDM training. (N=93)	Preserveys and postsurveys showed self-reported improvements in SDM attitudes and knowledge of both study arms.		3
Abbasgholizadeh *et al*[41]	Before-after half-day session (N=41)	Prequestionnaires and postquestionnaires found increased beliefs that practising EBM would be beneficial. Increased intention to practice SDM		**2**
Kanzaria and Chen[42]	Needs analysis intervention 1 hour session (N=28)	Checklist used with simulated patients showed improvement in SDM skills		3
Ritter *et al*[43]	Before-after 2 hour workshop (N=27)	Observer performance rating, self-reported questionnaire, standardised patient feedback showed improvement in SDM comfort and practice		3–4
Ajayi *et al*[44]	Before-after Goals of Care (GoC) 90 min session (N=30)	Presurveys and postsurveys demonstrated increased understanding and confidence in GoC conversations.		**2**
Rusiecki *et al*[45]	Before-after 4 week course (N=36)	Preknowledge and postknowledge/attitude surveys showed improvement; observer ratings of recordings with real patients showed improvement		3
Worthington *et al*[46]	Before-after 1 hour session (N=54)	Presurveys and postsurveys showed improvement in knowledge and comfort with counselling		3

EBM, evidence-based medicine; NWKM, New World Kirkpatrick Model; RCT, randomised controlled trial; SDM, shared decision-making.

course components,[24 26–28 32 33] online or blended learning[25 26 30 34] and EBM learning integrated with clinical activities.[22 26 30 32 33 35] EBM learning was integrated with clinical activities that included outpatient clinics, inpatient hospital rounds and morning reports. There was an emphasis on doctors' acquisition of EBM knowledge and skills, including critical appraisal skills, which was often practised in journal clubs.[22 24–26 28 29 32 35]

Outcome measures and methods

All studies used quantitative methods to evaluate EBM skills and knowledge. Several studies used validated

Table 4 Summary of a study describing an EBM-SDM integrated course and outcomes

Study	Intervention	Outcome (quantitative)	Outcomes (qualitative)	NWKM level
Hinneburg *et al*[50]	Before-after 4 day EBM-SDM pilot course (N=20)	Critical Health Competence test showed significant improvement after course.	Focus group interviews revealed problems with statistical understanding and SDM role plays	3

EBM, evidence-based medicine; NWKM, New World Kirkpatrick Model; SDM, shared decision-making.

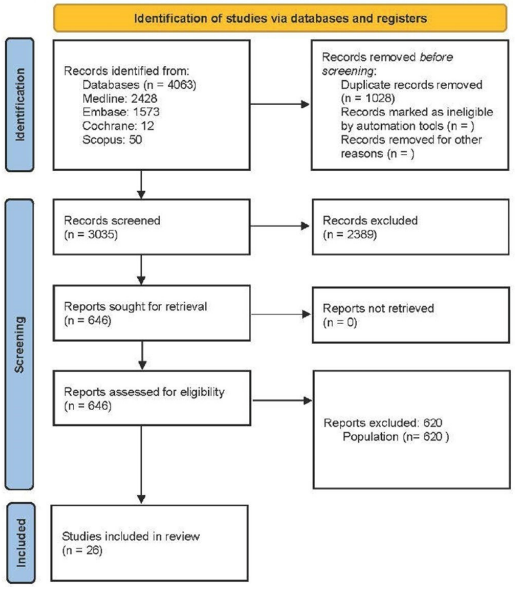

Figure 1 PRISMA flow diagram. PRISMA, Preferred Reporting Items for Systematic Review and Meta-Analysis.

knowledge tests to compare preintervention and postintervention EBM knowledge,[22 24 25 28 34 35] while still others used a modified version of a standardised test.[23 29] Knowledge tests administered before and after EBM interventions included the Berlin test,[28] modified Berlin,[35] modified Fresno test,[23 29] assessing competency in EBM test,[22] In Training Examination[25] and Columbia EBM Instrument.[34] One study used a survey of attitudes and behaviour (Practice-Based Learning and Improvement competency rating.[34] Author-devised surveys were also implemented.[26 30 31 33] Three studies used qualitative methods (focus group, feedback, debriefing) in addition to quantitative methods to evaluate the EBM curriculum.[30 34 35]

The learning outcomes mostly focused on knowledge acquisition. Seven studies reported a statistically significant increase in short-term knowledge using standardised tests assessed at 0 to 6 months, following an EBM course.[22–25 28 29 35] One study reported a non-significant improvement using a non-standardised knowledge test.[27] Only two studies examined long-term learning outcomes, assessed at 6 months or longer, following the EBM course.[24 29] A number of studies reported improvements in self-reported behaviours and attitudes.[26 27 30 31 33 35 36] There was little evidence of training in the fourth step of EBM, 'apply the evidence', where patients were also involved, although Muzyk *et al*[31] reported psychiatry trainees felt more confident and skilled in communicating evidence to patients after the training. Using NWKM scores,[21] table 2 indicates three studies, reported level 1 outcomes, eight studies were predominately level 2 outcomes related to changes in knowledge, four studies reported level 3 outcomes related to changes in behaviour, including self-reports. None of the studies reported level 4 patient outcomes or experiences.

Summary of SDM courses

Raw data from included studies describing SDM courses are presented in online supplemental table 2. A summary of interventions and outcomes of included studies describing SDM courses is presented in table 3.

Content and delivery

The 10 SDM courses were conducted in a range of countries: seven were from the USA, one from Iran, one from Switzerland and one from Canada. The settings were varied and included specific trainee cohorts such as psychiatry residents,[37] surgical residents,[38] paediatric inpatient trainees[39] and paediatric trainees caring for children with autism and their parents.[40] Nine studies[37–39 41–46] used a before–after study design. One study[40] was a quasi-RCT that compared two groups and two interventions, one focussing on SDM and the other on EBP. Most SDM courses (7 out of 10) were delivered within one session. The time span of each single session course ranged from 1 hour to 1 day. Only two courses[39 45] ran for more than one session. In one 8-week course reported by Harman *et al*[39] participants attended two workshops (total time 135 min), engaged in role play scenarios and discussions and practised their SDM skills on ward rounds while receiving feedback and coaching from trained observers. A 4-week course reported by Rusiecki *et al*[45] included meetings, practice with a patient actor and observer assessment of participants' recordings of SDM conversations with their outpatients. Another course reported by Huffman *et al*[40] was conducted online.

Outcome measures and results

A range of standardised and non-standardised outcome measures were used including standardised scales or surveys such as the Rochester Participatory Decision-Making Scale,[47] Ottawa Decision Support Framework Acceptability questionnaire[48] and a modified Observing Patient Involvement in Decision-Making scale.[49] Eight studies reported the use of self-made surveys. Tavarez *et al*[37] used qualitative evaluation methods, a preintervention focus group to explore psychiatry trainees' views of professional identity and its relevance to the doctor–patient relationship and a post-SDM training intervention survey that included open-ended questions on the value of SDM to their practice. Studies had a range of objectives that included straightforward skill acquisition,[43] to improving awareness and attitudes towards practising EBM[37 38 41 45 46] and assessing increased use of SDM following training.[38–40 42–45]

Survey or interview feedback was predominantly positive, where participants either intended to practice SDM following training,[37 41] or behaviour changes were measured after training using self-reporting techniques[38 40 46] and by observers using observation scales to evaluate doctors' interactions with real or patient actors.[38 39 42 43 45] In all studies, an improvement in doctors' SDM behaviour was noted. Using the NWKM, most studies[38–40 42 43 45 46] were categorised as level 3 outcomes,

indicating a change in behaviour following training where participants' application of SDM knowledge and skills was documented. The remaining three studies were rated according to the NWKM as level 1[41] or level 2.[37 44] None of the studies included level 4 patient outcomes or experiences as an aim or outcome.

Summary of EBM–SDM courses

Only one study reported by Hinneburg *et al*[50] from Germany integrated SDM training into an EBM course. See online supplemental table 3 for details of this course. Table 4 summarises the EBM–SDM study intervention and outcomes.

Content and delivery

This was a mixed methods pilot study consisting of 20 doctors (including residents, researchers and clinicians) and nine interprofessional participants. A blended learning approach was used, with web-based learning (3 hours over 2 weeks) and two face-to-face learning blocks (18 hours over 4 days each). Problem-based learning methods were used. The curriculum consisted of six modules, each covering an aspect of EBM. Evidence-based decision-making and SDM were included in module 6.

Outcome measures and outcomes

Post-training focus group interviews explored feasibility, acceptability and attitudes of participants towards evidence-based decision-making. Participants were observed throughout the course by an independent observer, and they undertook the Critical Health Competence test (CHC test),[51] which assessed critical health competencies among patients but was not previously tested with clinicians.[50]

Result

The participants rated the comprehensibility of the learning modules as high. Critical health competencies increased significantly after the training, however, practical exercises revealed that statistical concepts were insufficiently understood by participants (eg, the difference between the benefits and harms of diagnostic tests). Thus, they could not accurately communicate this information to patients. In addition, during role play on evidence-based decision-making (module 6), some participants did not focus on the concept of SDM.

Synthesis of results

Synthesis of results took place according to methodologies used, curriculum content, delivery, outcome measures, outcomes and patient involvement and outcomes. This synthesised information was used to answer the scoping review questions.

How are EBM and SDM taught to doctors in training?

Most of the EBM and SDM interventions used a variety of teaching and learning modes within a course, including didactic teaching, interactive discussions, role play, online learning components and team-based learning to promote individualised, active learning experiences. SDM training consisted of more face-to-face sessions, than EBM (100% vs 86%) due to the relevance of role-play as an important SDM learning activity. SDM training focused on using patient substitutes, such as patient actors or role-playing, and less frequently using real patients. In contrast, the focus of EBM training was more on knowledge acquisition or changes in behaviour, such as improving critical appraisal and doctors' decision-making skills, rather than involving patients in decision-making. There was little involvement of patients throughout or after the EBM courses. These contrasts are borne out in the NWKM levels where EBM training mostly consisted of level 2 outcomes assigned to eight studies, indicating an improvement in learning and knowledge acquisition. Only four studies reported changes in doctors' behavioural outcomes (NWKM level 3) that were mainly associated with communicating evidence to colleagues and increased confidence. In contrast, the SDM training documented seven NWKM level 3 studies where outcomes were associated with improved SDM attitudes, confidence and practice.

To what extent can SDM outcomes be an indicator of patient and clinician experiences or outcomes following EBM training that incorporates SDM?

Only one pilot study, by Hinneburg *et al*,[50] incorporated SDM into EBM training for participants. This study[50] used mixed methods methodology (unlike most of the quantitative studies included in this review) using interviews and observations alongside a CHC test, to evaluate the feasibility and acceptability of the pilot course. The course delineated clear EBM steps, so the role of SDM could be understood within step 4 of the EBM process. In contrast, most of the other EBM studies in this review did not include all the EBM steps (Ask, Acquire, Appraise, Apply, Assess) and were strongly focused on critical appraisal of evidence (step 3: Appraise) and its role in improving doctors' decision-making.

The extent to which SDM could be an indicator of patient or clinician experiences or outcomes was unclear due to barriers encountered by participants. Despite the positive feedback received for this innovative EBM–SDM course, many doctors struggled with statistical understanding of evidence, which impeded their ability to discuss risks and options with patients.[50] In addition, some doctors were unable to focus on SDM during the role-play session.[50] These issues were acknowledged by the authors, and a larger cluster RCT is planned to address these challenges. There was no indication during this pilot of SDM being linked to NWKM level 4 patient experiences or outcomes.

DISCUSSION

The principal findings from this scoping review confirm that EBM training and SDM training are not seen to as support one another in the majority of the literature that

was examined, but appear to be developed, delivered and evaluated along parallel educational pathways. Where patient-centred care is concerned, only SDM training appears to incorporate patient perspectives, although the literature reviewed indicated that this occurs most frequently through doctors' self-reporting techniques and observations, rather than through patients' experiences and reports. Thus, no level 4 NWKM level outcomes were reported for any of the included studies.

The EBM studies included in the review indicated that the goals, interventions and outcomes of current courses published during the past 5 years, have not encompassed patient involvement, experiences or SDM, despite the growing importance of patient-centred care in the recent published literature.[52] While two studies describing EBM courses,[26 31] referred to the value of patient-centred care and SDM training, neither study incorporated these important components into an EBM course. Yet one of the original EBM proponents, David Sackett,[53] stated in 1997 'The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence'[53] (,p3). Most importantly, he went onto include the patient's role in EBM practice, as: '…the thoughtful identification and compassionate use of individual patients' predicaments, rights, and preferences in making clinical decisions about their care' [53](p3). It is clear from this scoping review that the role of the patient continues to be frequently overlooked in EBM training, as demonstrated by the included studies. This indicates a major research gap in our knowledge of the impact of EBM training and practice on patient experiences and outcomes. Future research is needed into EBM–SDM training programmes for doctors that incorporate and evaluate patient involvement in their care, using SDM as part of a patient-centred care approach.

The focus of EBM training still rests on doctors' knowledge and skill acquisition, particularly critical appraisal of the literature. Patient involvement, experiences, outcome measures and feedback could be integrated through the inclusion of SDM training into EBM courses, to fully realise the original EBM definition that Sackett described. However, it will be difficult to incorporate SDM while EBM outcomes remain focused on skills acquisition alone, and assessment relies on quantitative tests and surveys. Furthermore, the included SDM courses omitted the important role of patient feedback to doctors and instead focused on outcome measures regarding doctors' SDM skills, using observational tools or self-reporting techniques.

Strengths and weaknesses

A major strength of this scoping review is that it demonstrated current oversights and research gaps regarding the potential of EBM and SDM being taught and practised together, so that important patient-centred outcomes, such as the patient experience of decision-making and its impacts on patient care, can be assessed and understood. A related research gap, the omission of qualitative methods to understand patients' experiences and outcomes following doctors' EBM-SDM training and practice, needs to be explored further which can be undertaken using interviews and focus groups or other similar individual or group discussion method that encourages deep reflection and personal opinion. However, this scoping review also identified potential opportunities for change through observations made by at least three of the included authors. Korownyk *et al*[26] stated the importance of SDM as a patient outcome in EBM training; Harman *et al*[39] sought, but did not report, patient feedback of their experience following SDM encounters with their doctors; and Ajayi *et al*[44] attempted unsuccessfully to collect patient-reported outcomes following SDM conversations. While Hinneburg *et al*[50] demonstrated the possibilities of SDM supporting EBM training, some issues associated with implementing such an integrated approach have already been identified. This scoping review indicates the possibility of future innovative studies taking place, where explorations of integrated EBM-SDM training, with the addition of qualitative outcome evaluations, that may increase our understanding of the role of patient experiences and outcomes in EBM.

This scoping review has some limitations. The NWKM Levels were used to assess the quality of educational interventions of the included studies and their relevance to the research question. Tables 2–4 included NWKM levels that demonstrated the omission of patient experiences (level 4) as an outcome of each intervention.

In addition, the studies in this scoping review included a diverse range of methodologies that lacked transparency regarding the reporting of assessment approaches, making it more challenging to compare outcomes across studies. This also suggests that the transfer of findings to other studies may be problematic. The large proportion of studies from the USA (61%) indicates the possible presence of publication bias, where studies in languages other than English, or from smaller institutions in other countries, have not been published.

Conclusions and implications for future research

SDM and EBM are taught separately in most training courses. The combination of EBM and SDM training, as demonstrated by Hinneburg *et al*,[50] provides the opportunity to include the patient voice and shift the focus of EBM training towards patient-centred care. This scoping review supports the claim by Hinneburg *et al* that '… shared decision-making has often not been part of EBP curricula in the past' (50,p110). Their innovative course sought common and complementary ground between EBM and SDM through a single pilot study, but more research needs to be undertaken across a wider group of studies to examine this further. As Hinneburg *et al* stated, 'The goal of module 6 is for the participants to be able to supply the individual patient with evidence and to perform shared decision-making in their daily practice' (50,p110). The addition of qualitative methods, encompassing the patient voice, may give a valuable dimension

to EBM–SDM training outcomes and support greater linkage between them. It could facilitate increased understanding of the third component of EBM, patient preferences and circumstances. For example, patient interviews following EBM–SDM training could provide important feedback on whether patient preferences are adequately included and how they could be improved in future training. Future research should explore such methods to assess the best way of raising the profile of patient-centred care in EBM training, thereby including all steps of the EBM process. The inclusion of SDM, evaluated by qualitative outcome assessments, could provide a more person-centred care focus in EBM courses and should be investigated to increase our knowledge of the effectiveness of such courses and their role in improving patient care. The time has never been better to move the field forward in this way.

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