Introduction of Competency-Based Education Focusing on Evidence-Based Medicine (EBM): Teaching EBM as a Practical Skill

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Introduction

Competency-based medical education (CBME) is a specific form of competency-based education which focuses on clinical performance and skills combined with readiness for independent practice in contrast to the more academically oriented, intended learning outcome (ILO)-based structure of Danish university education (Alharbi, 2024). CBME can help young physicians become ready for real-world clinical tasks and responsibilities, provided that the competencies are aligned with the realities and demands of subsequent clinical practice (Alharbi, 2024; Imanipour et al., 2022). In the CBME framework, progression is tied to demonstrating that specific and clearly defined competencies have been achieved. Timelines can vary according to prior experience and rate of development. This model accommodates existing skills, uses repeated, *actionable* feedback, and encourages learners to take active responsibility for their own development. This makes it well suited to teaching the practical skills required for safe, effective patient care (Alharbi, 2024).

Junior doctors under training to become specialists come from highly diverse backgrounds. Some are new to the specialty and others have years of experience. This wide range of prior knowledge and skills means that a uniform, one-size-fits-all approach to teaching EBM is ineffective. Teaching therefore needs to be individually adapted. Another important factor is that junior doctors are often busy with clinical duties, so a crucial aspect of any educational activity is to ensure that it is both flexible and efficient. This is necessary to allow all interested doctors to

participate at their convenience. This project entailed designing and implementation of an EBM course for early-career physicians grounded in principles of CBME and using a mini clinical evaluation exercise (mini-CEX) for the assessment.

Rationale for Designing an EBM Course

One of the key foundations of safe and effective patient care is EBM which may be defined as *"the conscientious, explicit, and judicious use of the current best evidence"* in making decisions about the care of individual patients (Djulbegovic & Guyatt, 2017). EBM ensures that clinical decisions include the most up-to-date and reliable scientific evidence and helps promote and facilitate "Lifelong Learning". Traditionally, junior medical doctors will be used to asking senior colleagues for advice but by feeling competent in the use of EBM early-career medical doctors may be able to find their own answer regarding clinical questions. Although junior doctors are given courses about EBM, they are not taught how to implement EBM into their own clinical practice (as a practical skill). The present project was a practical EBM course which included learning how to approach clinical questions using central EBM methodology.

Methods

Early-career doctors in postgraduate training posts within the department of medical gastroenterology at Hvidovre Hospital were invited to take part in the course (Appendix Figure 1). All consented to participate and received written information via e-mail outlining the aims and structure of the course, together with preparatory learning materials on EBM and core frameworks for appraising interventions and diagnostic tests.

Each participant was then scheduled for an individual teaching session lasting approximately 20 to 30 minutes. Initially, the perceived relevance of EBM to their day-to-day clinical practice was discussed, in order to identify where, and to what extent, they considered EBM applicable and useful to their own work. This discussion informed a brief learning needs assessment and agreement of individual learning priorities.

The written material was reviewed during the session and follow-up tutorials of around 20 minutes were arranged after approximately 2 to 4 weeks and again at 8 weeks. Between sessions, participants were encouraged to apply the EBM framework in their clinical practice whenever they judged it appropriate and feasible. They were offered the opportunity to revisit and clarify any EBM concepts or principles in additional short, one-to-one sessions, as often as required.

A mini-CEX was used to evaluate the course in order to capture participants' performance in routine clinical practice. The mini-CEX is a validated method for workplace-based assessment, in which supervisors directly observe trainees during patient encounters and provide structured feedback across several domains (Lörwald et al., 2018). This format aligns closely with CBME because it assesses real-world performance rather than just theoretical knowledge, which encourages ongoing development through repeated interactions and tailored feedback. In this study, the assessment format was chosen because it aligns with the principles of CBME, where the emphasis is on demonstrated performance ("*does*") rather than solely on knowledge ("*knows*"). The mini-CEX was adapted to focus on the application of EBM in clinical encounters, with additional items addressing the formulation of clinical questions, identification and interpretation of relevant evidence, and integration of that evidence into clinical decision-making. This adaptation enabled evaluation of whether participants were able to apply EBM principles at the bedside following completion of the course.

Assessing Level of Competence

Before the course, participants completed a brief self-assessment of their EBM competence, rating their confidence in skills such as formulating clinical questions, searching for evidence, critically appraising studies, and applying evidence in patient care on a 5-point scale (Table 1). The same instrument was administered after the course to capture perceived changes in competence, with participants using the following anchors for self-rating.

Table 1. Description of 5-point scale used to evaluate competency.

1 = requires complete, direct supervision
2 = requires direct supervision with some guidance
3 = indirect supervision, supervisor immediately available
4 = unsupervised practice for routine cases
5 = trusted to supervise others

Results

The study was initially conceived as a pilot to explore the suitability of the teaching methods and the feasibility of the assessment approach, with a full implementation planned for two junior doctors. As further colleagues in the gastroenterology departments volunteered to participate, the course was extended to include six doctors: one completed only the baseline session, three completed the first two teaching sessions, and two completed the entire course. All participants reported having some or extensive prior knowledge of EBM (with the level ranging from 3 to 5 points) and expressed that the topic was both relevant and meaningful to their clinical work. On self-assessment, all participants reported greater familiarity with the interventions than diagnostic tests, and none indicated that they had previously used EBM in their routine clinical decision-making. The duration of the initial teaching session ranged from 15 to 30 minutes. Three participants requested a brief recap of key concepts between sessions to consolidate their learning. The full planned evaluation, including completion of all teaching sessions and mini-CEX assessments, was achieved for the two junior doctors who had been originally selected for in-depth assessment. Both doctors who completed the full course initially self-rated their EBM competence between levels 3 and 4, varying with the specific clinical question. By the end of the course, one reported progression to levels 4–5, and the other to level 5.

An additional plan to obtain external ratings from senior colleagues was not realised, as no senior clinicians felt they had sufficient direct clinical contact with the participants across the study period to provide a robust judgement. Although several colleagues perceived a general improvement in the participants' clinical performance during the

eight weeks, they were unable to attribute this specifically to EBM use rather than to increasing clinical experience.

For the remaining participants, informal follow-up indicated that all felt able to conduct an EBM-based evaluation with more confidence. All participants reported that the structured EBM format was helpful and that it supported them in independently identifying and appraising relevant evidence, rather than relying exclusively on senior colleagues' opinions.

Discussion

The present study suggested that despite the limited duration of the teaching sessions, participants demonstrated a clear improvement in their self-assessed competency in the practical application of EBM. This indicates that short, focused, and (easily) repeatable lessons may be valuable for developing practical skills.

Clinical practice evolves quickly, and without EBM training doctors may default to tradition or local custom rather than the latest evidence. EBM teaching can help junior doctors evaluate new research, adopt best practices, and keep care current, and in this project integrating EBM into everyday clinical work appeared both feasible and highly relevant from the learners' perspective. Discussions with my supervisors suggested that while theoretical EBM content is usually covered, trainees' confidence in applying these skills is often neglected, even though self-efficacy beliefs, i.e., judgements about one's ability to perform required tasks, are closely tied to motivation, persistence, and performance in demanding clinical environments (Klassen & Klassen, 2018). To support self-efficacy repeated practice and structured feedback was used including the mini-CEX format that proved a useful framework. The learning experience was perceived as positive by both participants and me, and the emphasis on practice-oriented benefits appeared to enhance motivation. Learner feedback also facilitated adaptation of the format beyond ward rounds, as originally planned, extending its use to on-call settings and to the presentation of complex clinical questions and cases in departmental meetings.

Conclusion

This pilot suggests that applying a CBME framework to EBM teaching is a promising strategy for early-career doctors. Although the sample was small, participant evaluations were favourable, and it seems plausible that structured EBM training of this kind can strengthen practical skills and, in turn, support better patient care over time. Despite the limitations, the findings justify continuing the course, with a follow-up evaluation planned to inform ongoing refinement of the teaching as well as the assessments.

References

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Appendix

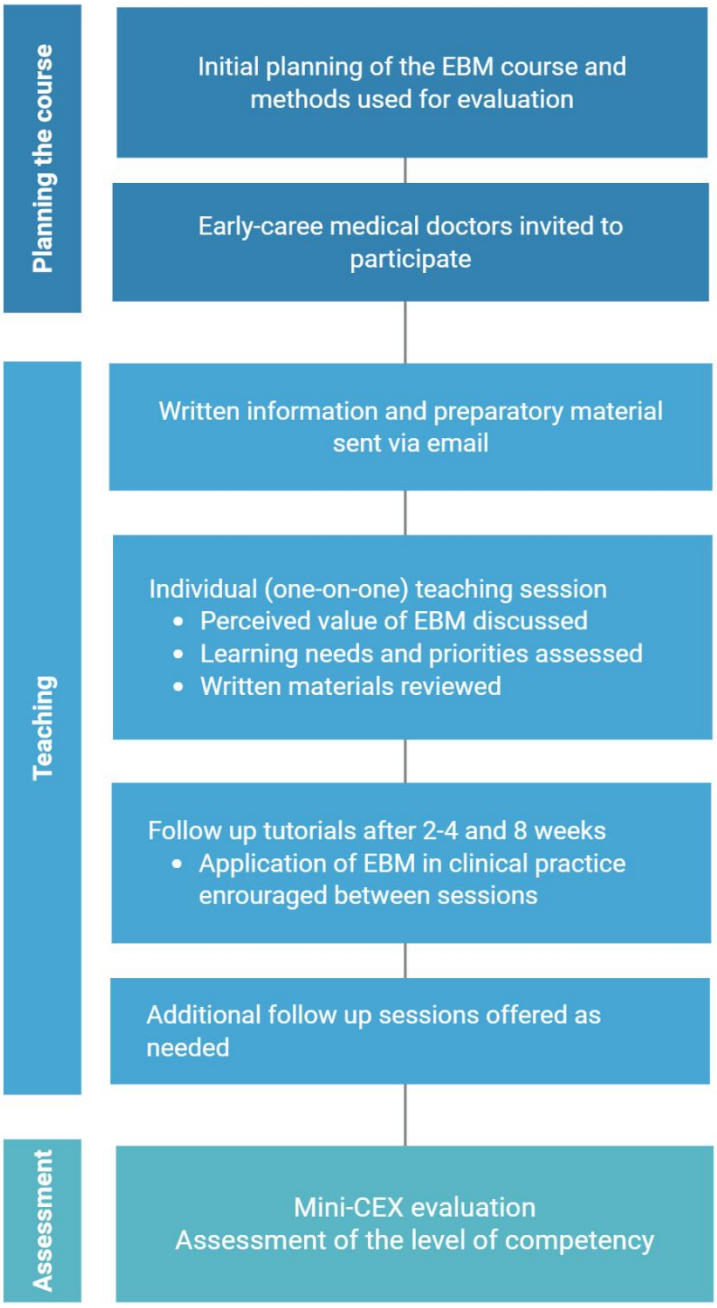

Figure 1. The figure gives an overview of the planning stage, the lessons and follow up tutorials in the course and assessment.