



Medical and Health Professional Education
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BEME Spotlight 31

Effectiveness of Teaching Evidence-Based Medicine to Undergraduate Medical Students: A BEME Systematic Review

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Review citation

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Keywords

Teaching, Evidence-Based Medicine, Undergraduate Medical Education, Outcome Measure, Systematic Review.

Headline conclusions

1. In general, teaching EBM has the potential to improve knowledge, attitudes and skills in undergraduate medical students. However, evidence supporting the effect of EBM teaching on students' behaviours is currently insufficient.
2. Evidence supporting the use of clinically integrated methods (i.e. educational activities integrated into clinical practice) and stand-alone short instructions (i.e. brief educational activities conducted in no real clinical practice context) are currently insufficient.
3. High quality evidence has supported that computer-assisted instructions are as effective as traditional educational strategies in improving EBM knowledge and attitudes. Nevertheless, their effects on the students' skills and behaviours are unclear.
4. We have also drawn no net conclusion about the effectiveness of problem-based learning of EBM since only one high-quality study examined it.
5. We suggest future studies to focus on assessing long-term higher-order mastery of EBM and use robust methods and high-quality assessment tools.

Background and context

The Teaching of evidence-based medicine (EBM) has become increasingly popular in both undergraduate and postgraduate medical education programs worldwide (Crilly et al., 2009). EBM is now a component of the foundation years training program in the UK, (Colleges., 2007) the focus of graduate assessment in the USA (Stewart, 2001) and a requirement of practicing physicians in Canada (Frank et al., 2005). However, the most effective methods for teaching EBM to undergraduate medical students have remained unclear.

Review objectives

We aimed to evaluate the effect of various EBM teaching strategies on medical students' knowledge, attitudes, skills, and behaviors. In addition, the teaching of EBM is reported to be improved by breaking it into the steps of asking, acquiring (or accessing), appraising, applying, plus an evaluating (or assessing) step (Del Mar et al., 2004). Therefore, we also examined whether the educational interventions could improve the above EBM steps.

Review methodology

Search Strategy: We searched MEDLINE, SCOPUS, ISI Web of Science, Educational Resource Information Center (ERIC), Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Current Controlled Trials up to May 2011. In addition, we screened the references of our included studies and the studies that have cited our included studies as their references (backward and forward reference checking).

Inclusion and Exclusion Criteria: We included the comparative studies i.e. randomized controlled trials, non-randomized controlled trials, and self-controlled trials that: A) had recruited undergraduate medical students (defined as medical school students who have not yet enrolled in the residency programs), B) had carried out at least one educational intervention (defined as coordinated educational activity, of any medium, duration or format) to teach EBM, and C) had objectively assessed the impact of the intervention(s) on students' knowledge, attitudes, skills, or behaviors using tests, questionnaires, clinical performance, etc.

Data Extraction: Two investigators (SFA and EA) independently summarized the study characteristics, key results, and quality indicators using an electronic data abstraction form. Disagreements between the two investigators were resolved by third reviewer negotiation.

Data Synthesis: We synthesized the results qualitatively by tabulating the characteristics of the included studies and whether they fulfill the quality criteria. We also classified the studies based on their interventions, and discussed the effects of the interventions on the knowledge, attitudes, skills, and behaviors of asking, acquiring, appraising, and applying.

Implications for practice

Teaching EBM has the potential to improve knowledge, attitudes and skills in undergraduate medical students. However, there is still insufficient evidence to support the statement that EBM teaching either improves students' behaviors or yields a long-term mastery of EBM.

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