What is the Best Evidence Medical Education?

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A B S T R A C T

Best Evidence Medical Education (BEME) is defined as: "The implementation by teachers and educational bodies in their practice, of methods and approaches to education based on the best evidence available." Five steps have been recognized in the practice of BEME. These are: framing the question, developing a search strategy, evaluating the evidence, implementing change and evaluating that change. In this paper, I described the concept of BEME, its steps, and challenges.

Introduction

Evidence based practice (EBP) is increasingly being considered in most professions, rising from the evidence-based medicine paradigm (EBM).[1] In medical education, however "there is a move to make it more evidence-based".[2] At the Association for Medical Education in Europe (AMEE) conference in 1998, the thought of Best Evidence Medical Education (BEME) was stimulated.[3] And later, it was more considered by medical educators and researchers. In this short paper, I describe the concept of BEME, its steps, and challenges.

What is BEME?

BEME is defined as: "The implementation by teachers and educational bodies in their practice, of methods and approaches to education based on the best evidence available".[4] In fact, BEME can be considered as a spectrum ranging from 100% opinion-based education where there is no useful evidence, to 100% evidence-based education where there is adequate evidence.[5]

What are the steps in BEME?

Hart and Harden, based on the EBM approach, recommended five steps in gathering and using evidence in medical education.[6] These are:

1. Framing the question;
2. Developing a search strategy;
3. Evaluating the evidence;
4. Implementing change;
5. Evaluating that change;

Framing the question

First, you should exactly formulate and define your search query. In EBM, the PICO (Population, Intervention, Comparison, and Outcome) model is used to formulate a search question. But in medical education these components are participants, educational aspects, and outcomes.[7] For example, the medical education query, "Are journal clubs effective in supporting evidence-based decision making?"[8] can be defined according to the three question components (Table 1).

Table 1. Three question components

Question components	Topics: Journal clubs in evidence-based decision making
Participants	Undergraduate, postgraduate, and practice settings
Educational aspects	Whether the journal club is an effective intervention in supporting decision making?
Outcomes	Are the journal club change learner reaction, attitudes, skills and behaviors or patients outcomes?

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Developing a search strategy

In this stage, you must identify appropriate keywords, select relevant databases, and define inclusion and exclusion criteria. There are some challenges in searching the medical education evidence:

1. Medical education has not its own thesaurus or taxonomy. "Large databases, such as Medline, do not describe their educational content well enough for reliable retrieval".[9] The main interest of MeSH (Medical Subject Headings) is biomedical literature and "ERIC Thesaurus" dedicated to education. So, the lack of the medical education thesaurus is still being felt.

2. There is no comprehensive bibliographic database dedicated to the medical education.[10] "Core bibliographic databases such as MEDLINE, EMBASE, and CINAHL as biomedical databases, ERIC and BEI as educational databases, and PsycINFO as a psychology database, have covered medical education evidences only to some extent".[11]

3. The articles of medical education are publishing in many different journals.

Where to find evidence in medical education?

As mentioned above, because of the lack of comprehensive database in medical education, we should use different sources and databases to find evidence. These sources typically are: core bibliographic databases (MEDLINE, EMBASE, CINAHL, ERIC, BEI, Education Research Complete, and PsycINFO), keyword databases (Research and Development Resource Base [RDRB]) and (Medical Education Citation Database),[10] citation databases (Thomson Reuters' Web of Science, Scopus, and Google Scholar), hand searching (especially these journals: Medical Teacher, Medical Education, Academic Medicine, BMC Medical Education, The Clinical Teacher, Advances in Health Sciences Educa-tion, Journal of Graduate Medical Education, Teaching and Learning in Medicine), web searching (use general search engines such as Google, Yahoo! and Bing, specific search engines including Scirus and Scientific WebPlus, and web/subject directories such as DMOZ, INFOMINE, and Medirectory.

Evaluating the evidence

In this step, you should evaluate the quality of documents using confident criteria. Harden recommends the QUESTS criteria for this purpose.[5]

Quality: the type of evidence or research method and the rigor of the study;
1. evidence based on professional judgment, the beliefs and values of experienced teachers;
2. evidence based on educational principles;
3. evidence based on professional experience
4. evidence based on case studies;
5. evidence based on cohort studies and related methods;
6. evidence based on randomized controlled trials.

Utility: the extent to which the approach described would need to be adapted for use in the teacher's practice;

Extent: the number of studies described and the size of the studies;

Strength: the clarity and lack of ambiguity of the conclusions;

Target: the extent to which the expectations of the researcher and the teacher are similar;

In medical education a modified version of "Kirkpatrick's Four Level Evaluation Model" (learner reaction, learning, behavior, and result)[2] is used for this purpose called Kirkpatrick hierarchy (Table 2).

Setting: the similarity of the setting or context.

Table 2. Kirkpatrick hierarchy[12]

Level 1	Participation	Covers learner's views on the learning experience, its organization, presentation, content, teaching methods and aspects of the instructional organization, materials, quality of instruction.
Level 2a	Modification of attitudes/perceptions	Outcomes here relate to changes in the reciprocal attitudes or perceptions between participant groups toward intervention/simulation.
Level 2b	Modification of knowledge/skills	For knowledge, this relates to the acquisition of concepts, procedures and principles; for skills this relates to the acquisition of thinking/problem-solving, psychomotor and social skills.
Level 3	Behavioral change	Documents the transfer of learning to the workplace or willingness of learners to apply new knowledge and skills.
Level 4a	Change in organizational practice	Wider changes in the organizational/delivery of care, attributable to an educational program.
Level 4b	Benefits to patient/clients	Any improvement in the health and well being of patients/clients as a direct result of an educational program.

Implementing and evaluating the change

After implementation of educational interventions, you should assess the successes and failure of them.[6] If BEME guidelines be followed properly, maybe some of the results of such assessments worth publishing in one of journals and provide evidence for decision makers.

What is the BEME Collaboration?

BEME Collaboration is an international organization that "committed to moving the medical profession from opinion-based education to evidence based education".[13] This organization provides supports and training for the production of systematic reviews in medical education.[3] The BEME collaboration has published 23 systematic reviews and there are others in progress. The published review listed in Table 3.

What is the Campbell Collaboration?

The Campbell Collaboration is an international organization that committed to conducting and supporting the accessibility of systematic reviews in the areas of education as well as criminal justice, social policy and social care.[14] These systematic reviews are freely available in "the Campbell library" (http://www.campbellcollaboration.org/library.php).

Conclusion

The concept of BEME has quickly come forwarded over the last decade. BEME has clear steps that must be considered in applying and using it. The BEME Collaboration, as an international organization, plays a critical role in fostering and supporting BEME by preparing systematic reviews in health care science education. Following its guidelines could help production of applicable evidences for policy makers in Medical Education.

Competing interests

None to be declared.

Table 3. BEME collaboration systematic reviews

1.	Best Evidence Medical Education
2.	Teaching and learning communication skills in medicine-a review with quality grading of article
3.	Systematic searching for evidence in medical education (Part 1: Sources of information and Part 2: Constructing searches)
4.	Features and uses of high-fidelity medical simulations that lead to effective learning
5.	Predictive values of assessment measurements obtained in medical schools and future performance in medical practice
6.	How can experience in clinical and community settings contribute to early medical education?
7.	Systematic review of the literature on assessment, feedback and physicians' clinical performance
8.	A systematic review of faculty development initiatives designed to improve teaching effectiveness in medical education
9.	A Best Evidence Systematic Review of Interprofessional Education
10.	The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice
11.	A systematic review of the literature on the effects of portfolios on student learning in undergraduate medical education
12.	A systematic review of the efficacy of portfolios for post-graduate assessment and education
13.	Conducting a best evidence systematic review. Part 1: From idea to data coding.
14.	Educational games for students of health care professions
15.	A systematic review of effective features of educational interventions to improve compliance in aseptic central venous catheter use in acute care
16.	Is the journal club an effective intervention in supporting evidence-based decision making in health care professionals?
17.	What impact do structured educational sessions to increase emotional intelligence have on medical students?
18.	Teaching musculoskeletal clinical skills to medical trainees and physicians: A Best Evidence in Medical Education systematic review of strategies and their effectiveness
19.	Faculty development initiatives designed to promote leadership in medical education
20.	What is the impact of structured resuscitation training on healthcare practitioners, their clients and the wider service?
21.	The effects of audience response systems on learning outcomes in health professions education.
22.	Features of educational interventions that lead to compliance with hand hygiene in healthcare professionals within a hospital care setting
23.	The effectiveness of case-based learning in health professional education

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