



# Bringing Evidence-based Medicine to the Bedside

Sumedh S Hoskote\*, Shashank R Joshi\*\*, AK Ghosh\*\*\*

**E**vidence-based medicine (EBM), the philosophical origins of which extend back to the mid-19<sup>th</sup> century and earlier, remains a contemporary topic for clinicians.<sup>1</sup> Despite its ancient origins, EBM remains a young discipline and its positive impacts are just beginning to be validated, and it continues to evolve.<sup>1</sup>

Evidence-based medicine is defined as “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.”<sup>1</sup> A less descriptive and more specific definition states EBM to be “the enhancement of a clinician’s traditional skills in diagnosis, treatment, prevention and related areas through the systematic framing of relevant and answerable questions and the use of mathematical estimates of probability and risk.”<sup>2</sup> EBM is extremely relevant today because provision of evidence-based health care is the most ethical way to practice, as it integrates up-to-date, patient-oriented research into the clinical decision making process, thus improving patients’ outcomes.<sup>3</sup> EBM should be used to guide, and not replace, clinical decision-making. Whether a particular piece of evidence applies to a given clinical scenario or not can only be determined by one’s own clinical expertise.<sup>1</sup> Criticism has ranged from EBM being old hat to it being a dangerous innovation, perpetrated by the arrogant to serve cost cutters and suppress clinical freedom.<sup>1</sup> As EBM continues to impact clinical practice in ever-greater measures, it is imperative to keep pace with its evolution.

Evidence-based medicine is not cookbook medicine but an art of integration scientific published data in a valid form to informed clinical decisions on a given patient.<sup>1</sup> It is a modern way of giving the best practice algorithm which integrates clinical expertise with patient’s choice as well as what is available and affordable for that individual patient. Clinical decision-making is a complex art that is learnt in medical college and undergoes constant fine-tuning all the way till the end of one’s medical career. Experience and knowledge are both key factors in efficient and accurate clinical decision-making. However, personal experience cannot outweigh the collective experience of thousands of clinicians and researchers spread over several decades. An evidence-based approach maximizes patient benefit

by adopting only the most rigorously proven methods to guide therapy. Also, in today’s society, which tends to initiate litigation with ever-increasing frequency, EBM comes forth as the safest method of decision-making.

Clinical decisions can be made in several ways that may not always correlate with the evidence-based methods. Decision-making by anecdotal evidence refers to a clinician calling upon personal experiences of patients that he/she has encountered during the course of medical practice to guide decisions pertaining to the patient at hand. Decision-making by expert opinion refers to the use of sponsored literature that aims to provide information about management of a particular ailment. Such information, disseminated routinely by drug manufacturers, should be rigorously validated for its scientific accuracy before modifying one’s management protocols. Even though valid, published articles may be cited by these sources, the onus lies on the practitioner to ensure that the data presented is uniformly shown by most studies; and that the study presented is not an exception. The data presented should be viewed keeping in mind the hierarchy of evidence and the study design used (Tables 1 and 2). In India, due to the lack of health insurance coverage of the general population, it becomes necessary to, sometimes, make decisions solely on the basis of the perceived cost-benefit ratio. While this sort of decision-making – by cost minimization – is a practically relevant solution to a specific case, it remains a non-evidence-based approach to decision-making. Placing absolute faith in summarized forms of EBM (meta-analyses, systematic reviews) is also not the ideal way to base clinical decisions. It is more prudent to first ensure whether these studies had any errors in design and to search literature oneself to reach one’s own informed conclusions. Other means of decision-making can include use of data appearing in the lay press, as well as relying on opinions of peers or seniors.

Over the years, though EBM has steadily increased its [Table 1 : Hierarchy of evidence<sup>4</sup>](#)

---

Systematic reviews and meta-analyses  
 RCTs with definitive results  
 RCTs with non-definitive results  
 Cohort studies  
 Case-control studies  
 Cross-sectional surveys  
 Case reports

---

Legend: RCT, randomized controlled trial. Data sources are listed as most reliable to least reliable.

\*Research Associate, Joshi Clinic, Mumbai. \*\*Consultant Endocrinologist, Lilavati Hospital, Bhatia Hospital and Joshi Clinic, Mumbai. \*\*\*Associate Professor of Medicine, Mayo Clinic, Rochester, Minnesota, USA.

Table 2 : Preferred study designs<sup>5</sup>

Broad topic	Example(s) of clinical data studied	Preferred study design
Therapy	Efficacy of drugs or a surgical procedure, or methods of service delivery	Randomized controlled trial
Diagnosis	Validity (can it be trusted?) or reliability (are the results consistent?) of a diagnostic test	Cross-sectional survey comparing the test against the gold standard test
Screening	Value of a test in detecting sub-clinical disease in a large population	Cross-sectional survey
Prognosis	Course of a patient who was diagnosed at an early stage of disease	Cohort study
Causation	Whether a putative risk factor is responsible for causing a particular disease or not	Cohort study or case-control study (depending on rarity of the disease)

influence on clinical practice, a recent pilot study found that a majority of clinicians use non-evidence-based methods in making decisions.<sup>6</sup> Another study that examined self-assessed competence in EBM literature appraisal found that the vast majority of respondents (83.3%) felt that their knowledge of biostatistics was inadequate and 76.7% could not identify if the correct statistical methods had been used in a study. The majority of respondents also agreed that biostatistics and EBM are important in clinical practice.<sup>7</sup> One study conducted on resident physicians found that clinical decisions were made by consulting attending physicians, books or hand-held computers, rather than on evidence-based means.<sup>8</sup>

It is fairly clear that EBM has not achieved the optimal effect at the patient's bedside. Increased utilization is needed at all levels of medicine – in medical college, during residency and in practice. A longitudinal study in medical students showed that incorporation of EBM in second and third years of medical education provided students with a sustained increase of EBM knowledge at the end of their third year.<sup>9</sup> Residency training is the most crucial period when EBM needs to be incorporated, because this is the steepest portion of the medical learning curve, when decision-making habits are consolidated. Large teaching hospitals can provide conducive environments for practising physicians and faculty to be abreast of the latest medical knowledge due to their teaching. However, academic activities may be limited for independent practitioners. An innovative approach to this problem could be to have EBM journal clubs organized locally amongst practitioners.<sup>10</sup> Other roadblocks to practice of EBM include lack of peer support, time constraints and limited accessibility to quality resources.<sup>11</sup> However, studies have shown that busy clinicians who devote their scarce reading time to selective, efficient, patient driven searching, appraisal, and incorporation of the best available evidence can practice EBM.<sup>1</sup>

One possible hurdle to the practise of EBM is the false perception that it is already being incorporated adequately in clinical practice. However, this argument falls before evidence of striking variations in both the integration of patient values into clinical behaviour and in the rates with which clinicians provide interventions to their patients.<sup>1</sup> Another problem is the lack of relevance of data that may be studied predominantly in a Western population, the

results from which may not be suitable or accurate for the population being treated. A method known as evidence farming, which aims at systematically collecting locally relevant data for use by practitioners, can prove useful in this scenario.<sup>6</sup> Admittedly, a working knowledge of biostatistics, research methods and study design is required for accurate appraisal of medical literature.

Good clinical practice depends on the integration of one's expertise with the best available evidence. Without clinical expertise, practice risks becoming tyrannised by evidence, for even excellent external evidence may be inapplicable to or inappropriate for an individual patient. Additionally, without current best evidence, practice risks becoming rapidly out of date, to the detriment of patients.<sup>1</sup> This helps clarify the scope of EBM and its integral dependence on clinical expertise.

It must be emphasized that true knowledge comes from being involved. EBM can achieve its potential and reach the bedside only when more and more clinicians actively pursue research and become well-acquainted with even finer nuances of utilizing accurate evidence in their practice.

## REFERENCES

1. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *BMJ* 1996;312:71-2.
2. Donald A, Greenhalgh T. *A hands-on guide to evidence based health care: practice and implementation*. Oxford: Blackwell Science, 2000.
3. Das K, Malick S, Khan KS. Tips for teaching evidence-based medicine in a clinical setting: lessons from adult learning theory. Part one. *J R Soc Med* 2008;101:493-500.
4. Guyatt GH, Sackett DL, Sinclair JC, Hayward R, Cook DJ, Cook RJ. *Users' guides to the medical literature*. IX. A method for grading health care recommendations. *JAMA* 1995;274:1800-4.
5. Greenhalgh T. *How to read a paper: the basics of evidence based medicine*. 2nd ed. London: BMJ Publishing Group; 2001. p.45.
6. Hay MC, Weisner TS, Subramanian S, Duan N, Niedzinski EJ, Kravitz RL. Harnessing experience: exploring the gap between evidence-based medicine and clinical practice. *J Eval Clin Pract* 2008;14:707-13.
7. West CP, Ficalora RD. Clinician attitudes toward biostatistics. *Mayo Clin Proc* 2007;82:939-43.
8. McCord G, Smucker WD, Selius BA, Hannan S, Davidson E, Schrop SL, et al. Answering questions at the point of care: do residents practice EBM or manage information sources? *Acad Med* 2007;82:298-303.
9. West CP, McDonald FS. Evaluation of a longitudinal medical school evidence-based medicine curriculum: a pilot study. *J Gen Intern Med* 2008;23:1057-9.

10. Doust J, Del Mar CB, Montgomery BD, Heal C, Bidgood R, Jeacocke D, et al. EBM journal clubs in general practice. Aust Fam Physician 2008;37:54-6.
11. Ghosh AK. Clinical applications and update on evidence-based medicine. J Assoc Physicians India 2007;55:787-94.



## Announcement

### JAPI Judges for Best Paper Award

I am extremely grateful to the Judges: Dr. AL Kakrani (Pune), Dr. DK Kochar (Bikaner), Dr. TK Suma (Alappuzha), Dr. Ajay Kumar (Patna), and Lt Col (Dr.) Rajat Kumar (New Delhi) for their painstaking efforts put by them while evaluating all articles published during the year 2008.

Dr. Shashank R Joshi,  
Hon. Editor, JAPI.