Evidence-based medicine for better healthcare

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ABSTRACT

Clinicians in developing countries frequently come across a situation where existing guidelines are not enough for decision making. Very often, patients' values and circumstances restrict clinicians from following guidelines word to word in all cases and they have to select one most economical, appropriate and effective treatment or diagnostic test in minimal time from data available from different populations.

Evidence based medicine is claimed to have an answer to these problems. Although accepted by many, questions continue to be raised about its time consuming process, feasibility and generalisability. Developments like modes of practising EBM, development of CATs and Best Practices have made access to already appraised evidence possible, providing answer for time constraints. Tools of EBM like NNT, likelihood ratio have made it generalisable and applicable to individual patient. This article is written to see the advantages of EBM which have made it more meaningful for developing countries with limited resources for research.

Key-words: Evidence based medicine, NNT, systematic reviews, modes, levels of evidence.

Key message: Evidence based medicine has attained a great momentum world over in last decade. EBM has come a long way since its inception, so much so that ways to reduce the time and skill for practising it have also been discovered making it more and more doable. In India, views are still more against than in favour. The need is to understand the principle of EBM, unfold the myths and use the tools of EBM more efficiently to aid decision making for better health care.

INTRODUCTION

Clinicians frequently come across a situation where existing guidelines and information available in textbooks are not enough for decision making. Quite often there is no relevant evidence from either basic or applied research.[1] Even when evidence exists, difficulties arise when it is inconclusive, inconsistent with previous studies, irrelevant to clinical realities or of poor quality.[2] Few research studies report results in the context of the totality of available evidence.[3] More often than not, in developing countries like India, clinicians have to select the one most economical, appropriate and effective treatment in

minimal time. Sometimes, patient is not willing to stay in hospital while the guidelines recommend otherwise.

Challenges for clinicians:
Many challenges are being faced by clinicians in day to day practice:
1. Daily need for valid, reliable and applicable information about a clinical querry.
2. A gradual decline in the up-to-date knowledge[4] and clinical performance[5] with time, widening the gap between diagnostic skills and clinical judgement.

3. Sources available to answer clinical querries have been textbooks[6] (which rapidly become outdated due to the kind of information explosion seen now a days or do not provide a satisfactory answer to all querries), continuing medical education (often ineffective) or medical journal (too voluminous and too variable in their validity for practical clinical use).

4. Patients' values and other factors restrict clinicians from following guidelines word to word in all cases.

Evidence Based Medicine (EBM) is claimed to be a method to provide a solution to most (if not all) of these limitations. These ideas have been around for a long time. These were used in post-revolutionary Paris (when clinicians like Pierre Louis sought the truth in systematic observation of patients), but are reported to have originated in ancient Chinese medicine. They were named EBM in 1992 by a group led by Gordon Guyatt at McMaster University in Canada[7]. Since then, the number of articles about evidence-based practice has grown exponentially.

What is EBM?

The most recent definition of EBM is "the explicit, judicious, and conscientious use of current best evidence from health care research in decisions about the care of individuals and populations."[8] It is 'the integration of best research evidence with clinical expertise and patient values'. EBM integrates these three elements to optimize clinical outcomes and quality of life. To make this integration possible, five steps are identified for completing the task:

1. Asking an answerable question.
2. Searching and identifying the best evidence to answer that question.
3. Critical appraisal of the evidence for its validity, impact, and applicability to the individual patient.
4. Integrating the critical appraisal with clinical expertise and with the patient's unique biology, values and circumstances.
5. Evaluating our effectiveness and efficiency in executing the steps and finding out ways to improve them both for the next time.

However, most busy clinicians lack skills of searching, appraising and applying. Those who are skilled, have hardly a few hours per week for general reading and a few minutes per patient for finding and assimilating evidence. In a survey of UK General practitioners (GPs), 33% of GPs reported having used the Cochrane Library at least once and 67% had not previously used the library. GPs that reported to have used the Cochrane Library used it only occasionally and found the library to be user friendly as well as being a useful source of information. However, 52% of GPs had never heard or used the Cochrane Library, and most reported poor publicity, awareness and time constraints as the major reasons for their lack of use.[9] Despite acceptance all over the world, critics of EBM stick to the point that its practice requires time and skills unavailable to the busy clinician.[10]

Tools of EBM:

Evidence-based medicine attempts to use mathematical methods to derive clinical benefits of tests and treatments. Tools used by practitioners of evidence-based medicine include:

1. Levels of evidences: EBM classifies evidences available in research articles as 'levels of evidences' based on their utility in decision making. RCTs are at a high level as it eliminates most of the biases, but even above RCTs are systematic review and meta-analysis. A systematic review is an overview of various studies using explicit and reproducible methods. A meta-analysis is synthesis of results of two or more primary studies that addressed the same hypothesis in the same way.

A systematic review limits bias in identifying and rejecting studies and makes conclusions more reliable and accurate, large amounts of information can be assimilated quickly and results of different studies can be formally compared to establish generalisability. Quantitative systematic reviews (meta-analyses) increase the precision of the overall result.

2. Likelihood ratio: When appraising therapeutic article for application, once all the best evidence is assessed, treatment is categorised as "likely to be beneficial", "likely to be harmful", or "evidence did

not support either benefit or harm". These are easier to understand and more meaningful as the therapy which is more likely to harm than benefit is less likely to be used.

3. Number needed to treat / harm (NNT/NNH): In considering the risks and benefits of an intervention to an individual, patients and clinicians find absolute measures (e.g., risk difference) easier to understand. NNT/NNH express the effectiveness and safety of an intervention in a clinically meaningful way and provide an absolute magnitude of a treatment effect. An NNT of 1 means each patient treated responds. An NNT of 20 indicates that on treating 20 patients, one extra patient will respond.

It is easy to understand that a therapy with NNT 5 (which is needed to be given to 5 patients to get one extra response) will be more effective and beneficial than another with NNT 50 (which should be given to 50 to get one extra response). A vaccine with NNT 10 (provides protection to one extra person when given to 10) will be more beneficial than another vaccine with NNT 1000 (needs to be given to 1000 persons to get protection in one extra person). Thus, EBM tools give more meaningful figures to aid in making clinical decisions at individual as well as community levels.

4. Critical appraisal: This is designed to objectively assess the clinical research in terms of validity (both internal and external), generalizability and applicability to an individual patient in question (by calculating the NNT for the population in question from the NNT of the study population using baseline risk). It takes into account trial design considerations, risk of bias, follow up, and power. High-quality studies have clearly defined eligibility criteria, and have minimal missing data.

5. Integration of patient values in decision making: EBM experts also guide to sought for patient's opinion in making decision by informing him about the pros and cons of the decision and grade them, thus making the decision acceptable to the patient.

Evidence: made accessible
Following all steps from formulating a question to searching, appraising and applying is a time consuming process. Hence, different modes of practising EBM have been identified.[11]

1. 'Appraising mode': For the conditions encountered every day e.g., unstable angina, both searching critically appraising are carried out.

2. 'Searching mode': For the conditions encountered less often (e.g., aspirin poisoning) critical appraisals already performed by others are searched for, skipping the step of critically appraising. As the validity has been checked by others, the only task left is to assess for applicability and apply.

3. Replicating mode: For the problems likely to be encountered very infrequently, "blindly" seek, accept and apply the recommendations received from authorities in the relevant branch of medicine regardless of whether the advice received from the experts is evidence-based, merely opinion-based.
Some other important developments in EBM have also made it possible to overcome the time and skill constraints. These include the systematic reviews generated by Cochrane Collaboration, the growing numbers of evidence-based journals (such as ACP Journal Club) containing abstracts of quality- and relevance-filtered studies, and the creation of "best evidence" sections in a number of established journals. CAT maker is a software tool, provided by the Centre for Evidence-Based Medicine in Oxford, which helps to create critically appraised topics (CATs), for the key articles about Therapy, Diagnosis, Prognosis, Aetiology/Harm and Systematic Reviews of Therapy. The generation of databases of these critically appraised topics (one-page summaries of evidence relevant to common clinical questions) which can be quickly accessed at the point of care,[12] represent another time- and energy-saving solution for busy clinicians.

When a busy (180+ admissions per month) in-patient medical service brought electronic summaries of evidence previously appraised either by team members ("CATs") or by the summary journals to working rounds, it was documented that, on average, the former could be accessed in 10 seconds and the latter in 25 seconds. Moreover, when assessed from the viewpoint of the most junior members of the

team caring for the patient, this evidence changed 25% of their diagnostic and treatment suggestions and added to a further 23% of them. Hence if electronic searching is made available at the point of care, it can cut time of access to the evidence to a few seconds.[13]

CONCLUSION

The modes of practising EBM, CATs, best practices and other like developments have made EBM much less time consuming. The tools of EBM like number needed to treat (NNT), absolute risk reduction (ARR), Likelihood to benefit/harm (LHH), make the outcomes easier to understand, more meaningful and generalizable. In developing countries where it is difficult to find a study done on similar population, more often than not, clinicians have to depend on the evidences produced by studies done on a different population. EBM aids to make these results generalizable and applicable to the local population. Now that the time and skill constraints have been taken care of, with all its characteristics, if warmly accepted, understood and applied, EBM can be utilised to provide better healthcare, more acceptable to the individual patients.

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