

How to teach evidence-based medicine to urologists

Sakineh Hajebrahimi, Ali Mostafaie¹

Department of Urology, Iranian Center for Evidence Based Medicine, Tabriz University of Medical Sciences, ¹Department of Ophthalmology, Tabriz University of Medical Sciences, Tabriz, Iran

ABSTRACT

The goal of this article is to help develop, disseminate, and evaluate resources that can be used to practice and teach EBM for urology residents and continuing education of urologists to reduce the gap between research and clinical practice. Urology departments should build capacity for residents to shape the future of quality and safety in healthcare through translating evidence into practice. Cutting edge approaches require knowing how to teach Evidence-based urology, to make Bio-statistics easy to understanding and how to lead improvement at every level. The authors shared their experience about 'what works' in a surgical department to building an Evidence-based environment and high quality of cares.

Key words: Evidence-based urology, teaching methods, evidence based recourses

INTRODUCTION

Evidence-based medicine (EBM) has been defined as the evolution of medical sciences using special skills in order to integrate best available evidence and clinical expertise for caring individual patients.^[1] In the recent years, EBM teachers have focused on reducing the gap between research and practice by enabling good readers to good users of research results. There is an increasing emphasis among surgical specialists including urologists toward evidence-based urology (EBU).^[2,3] This development is taking place both in continued medical education for practicing urologists as well as urology residency training programs, in which the reported average of number of EBU teaching hours is 10 hours per academic year.^[4] While this appears low, in training programs where no formal EBU curriculum exists, the time spent is likely to be even less. Integration of EBM principles is essential in clinical decision making, teaching residents and in

a larger role, for opinion leaders or policy makers – each of which has a significant impact on the practice of urology. The objective of this article is to introduce urologists to the methods on promoting and teaching EBM and to enlist useful resources.

TEACHING EVIDENCE-BASED MEDICINE IN UROLOGY RESIDENCY

To make EBM effective and transformative in daily practice, incorporating various formats of teaching is essential. Since newer and innovative teaching methods are being introduced, incorporating them as and when they are identified to be effective in teaching EBM will make learning innovative and easy.

Large group teaching

Didactic lectures have been a time-tested method of teaching, being in vogue for several centuries. Distinct advantages include the ability to deliver a large amount of content to a large group of individuals. Teaching EBU needs to be learner- and patient-centered. From that aspect, though large group teaching is not the most effective method, it can be used to teach EBU core concepts. Concepts of hierarchy and levels of evidence, relevance of biostatistics, and the role of various indices in diagnosis and treatment may be taught in these lectures. The concepts taught in a large group setting may be utilized to incorporate the principles in applied exercises, to synthesize available evidence before arriving at a clinical judgment.^[5]

Evidence-based medicine log book

Motivating the residents to maintain an EBU log book

For correspondence:

Dr. Ali Mostafaie, Iranian Center for Evidence Based Medicine, Tabriz University of Medical Sciences, Tabriz, Iran
E-mail: alimostafaie@yahoo.com

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to document clinical problems in an answerable Patient, Intervention or test, Comparison, Outcome (PICO) format will enable addressing the issue at focus precisely with the available evidence [Table 1]. The teacher's role is to guide the resident to frame questions that will require review of literature to arrive at the best possible evidence. Faculty should be adept at literature search and guiding the trainees to find best possible literature evidence by defining the search limits, which enables them to learn the application of EBM. Occasionally, pre-appraised articles may be available but performing one's own literature review and summarizing the findings provides material for the next evidence-based journal club discussion.

In order to achieve better results, materials to help critical appraisal, Evidence-based Journal club, Evidence-based morbidity Conference should be made available in the urology resident work-room. A number of materials pertinent to urology, including the EBM chapter in the American Urological Association Core Curriculum (<http://www.auanet.org/eforms/elearning/core/>) as well as the Journal of Urology Users' Guide to the Urological Literature series [Table 2] and the BJU International Evidence-Based Urology in Practice series [Table 3] have recently become available.

Evidence-based medicine courses

Although a short course on evidence based approach may not change a seasoned clinician's approach,^[29] incorporating such a short course early in the medical curriculum will be beneficial. First year of medical school is an acceptable time for teaching the fundamentals of EBM and clinical epidemiology.^[30] In residency program, basic and advance search strategy workshops could be held in the first academic year of urology training. This type of learning can be enhanced by a 2-3 day EBM local workshop.

Competency of residents for developing answerable question from clinical scenario and performing an appropriate search should be assessed before and after the workshops. Trainers' workshops for the faculty will enable the faculty to skillfully guide the residents to integrate evidence-based principles in their learning. The international workshops that are held annually worldwide [Table 4], are suitable for faculty development as well as chief or senior residents who wish to enhance their teaching skills. Similar programs may be organized along with the annual conferences at national or zonal level.

Evidence-based journal club

Evidence-based journal club is a very effective environment to improve critical appraisal skills and thereby learn the application of what was learnt in a lecture or a workshop. Clinical questions to be answered can be identified from the residents' logbooks. Ideally, the plan for teaching should be driven by the motivation of the residents to solve specific clinical problems they have encountered in their day-to-day practice. In order to evaluate the impact of evidence-based

Table 1: PICO format to maintain logbook for trainees

Element of the clinical question				
	Patient	Intervention (or cause, prognosis)	Comparison (optional)	Outcome
	Describe as accurately as possible the patient or group of patients of interest	What is the main intervention or therapy you wish to consider? Including an exposure to disease, a diagnostic test, a prognostic factor, a treatment, a patient perception, a risk factor, etc.	Is there an alternative treatment to compare? Including no disease, placebo, a different prognostic factor, absence of risk factor, etc.	What is the clinical outcome, including a time horizon if relevant?
Example 1	In patients with vesicoureteral reflux	Do antibiotic prophylaxis	Compared to no antibiotic	Reduce the number of pyelonephritis episodes?
Example 2	In men with early prostate cancer	Does radical prostatectomy	Compared to IMRT	Have better cure rates with lesser adverse effects?
Example 3	In young men with pelvic fracture urethral distraction defect	Having bilateral pubic rami fracture	Compared to unilateral fracture	Does it have higher risk of erectile dysfunction?

Table 2: Topics in the Users' Guide to the Urological Literature series, Journal of Urology

Topic	References
Evidence-based clinical practice: A primer for urologists	Scales <i>et al.</i> ^[6]
How to perform a literature search	Krupski <i>et al.</i> ^[7]
How to use an article about a diagnostic test	Scales <i>et al.</i> ^[8]
How to use a systematic literature review and meta-analysis	Tseng <i>et al.</i> ^[9]
How to use an article about therapy	Bajammal <i>et al.</i> ^[10]
How to use a clinical practice guideline	Dahm <i>et al.</i> ^[11]
Understanding results	Breau <i>et al.</i> ^[12]
How to use an article about prognosis	Dahm <i>et al.</i> ^[13]

journal club on routine practice one can randomly check residents' inpatient and outpatient medical documentation. It is more rewarding when this assessment is done by an expert teacher who has a good idea of the EBM framework, familiar with strengths and weaknesses of EBM. EBM courses improve knowledge and skills of students but there is a lack of evidence on its role in changing the routine

Table 3: Topics in the evidence-based urology in practice series, *BJU International*

Topic	References
Number needed to treat	Breau <i>et al.</i> ^[14]
How to use pubmed effectively	Krupski <i>et al.</i> ^[15]
What are levels of evidence?	Singh <i>et al.</i> ^[16]
P values vs. Confidence intervals	MacDonald <i>et al.</i> ^[17]
Composite endpoints	Lavallee <i>et al.</i> ^[18]
Publication bias	Tseng <i>et al.</i> ^[19]
Loss to follow-up	Karl <i>et al.</i> ^[20]
Kaplan-meier analysis	Sur <i>et al.</i> ^[21]
Heterogeneity in a systematic review meta-analysis	Imamura <i>et al.</i> ^[22]
When to believe a subgroup analysis?	Wang <i>et al.</i> ^[23]
Incorporating patient values in evidence-based clinical decision making	Canfield <i>et al.</i> ^[24]
Likelihood ratios	Scales <i>et al.</i> ^[25]
The cochrane library	Hajebrahimi <i>et al.</i> ^[26]
Intention to treat analysis	Mazel <i>et al.</i> ^[27]
Randomized trials stopped early for benefit	Canfield <i>et al.</i> ^[28]

Table 4: Workshops in evidence-based practice skills and faculty development

Evidence-Based Decision Making in Urology, AUA Meeting Course http://www.aula2011.org
Teaching and Leading EBM, Duke University http://www.mclibrary.duke.edu/training/courses/ebmworkshop/
How to Teach Evidence-Based Clinical Practice, McMaster University http://ebm.mcmaster.ca/index.html
How to Practice Evidence-Based Healthcare, University of Oxford http://www.cebm.net/
Teaching Evidence-Based Practice, University of Oxford http://www.cebm.net/
Rocky Mountain Workshop on How to Practice Evidence-Based Healthcare http://ebhc.ucdenver.edu/

behaviors.^[31] Evaluating the investigative algorithm and prescribing pattern of residents regularly will give an idea of the effectiveness of EBM teaching. Examples of compliance with current best evidence-based practice include: The guideline-concordant use of deep vein thrombosis prophylaxis, appropriate antibiotic prophylaxis, imaging and screening algorithms.

Evidence-based clinical conference

Traditionally, morning reports and mortality morbidity are two ideal teaching environments in routine clinical practice. In these meetings, one can incorporate teaching and role modeling into the residents' daily practice. The following outlines a framework how these conferences may be used for EBM teaching:

1. The on-call resident presents a clinical scenario and

will have some recommendation for diagnosis or treatment of the patient based on what he/she searched last night.

2. Faculty will facilitate implementing the best available evidence in clinical decision making.
3. A clinical librarian will attend the meeting and guide the participants in procuring relevant literature, to address controversies.
4. The residents enlist the questions that arise from the discussion and engage in further literature search.
5. Findings of this literature search are discussed in the next meeting or bedside rounds.

A significant amount of teaching in surgical specialties takes place in Mortality Morbidity Conference (MandM) conferences, which are defined as "golden hour of surgeons".^[32] Patient safety and equity are the most crucial parts of the health care quality improvement. Monthly MandM conference in most of the surgical departments includes a surgical complication or death presentation, followed by discussion among attending and surgical house staff. Evidence-based approach may be incorporated by substantiating the discussions with highest level of available evidence. Furthermore, the discussion should be directed to type of errors, patient safety and equity issues without any blame or derision. This enables the urologist in training to be familiar with the most accurate diagnostic methods and most effective treatments to lower mortality and morbidity rates. In the MandM meeting, another possibility is to identify areas where utilizing evidence based principles could potentially have altered the clinical course of a patient.

Bed side and operating room

Some of the principles discussed above may be incorporated in decision making while in the operating room as well as at the bedside. Encouraging the trainees to make decisions and to spell it out enabling them to evaluate, if it is in line with available evidence, will promote active learning. This may involve operative steps or other decisions to be taken for admitted patients. Several teaching methods recommended for bedside teaching may be modified appropriately for teaching in the operating room.^[33]

Assessments

For EBM to have an impact on practice, the competency and skills of the trainee to incorporate evidence-based practice needs to be evaluated. Studies have shown that the trainers also need to have adequate skills to teach, which should be assessed using a standard tool. A recent systematic review shows that there is no specific tool for assessment of teaching these principles.^[14] Some mock exams have been designed to evaluate students' skills but still none of those have been standardized. On the other hand, summative assessments like multiple choice questions mostly assess knowledge of the residents. But by evidence-based modified workplace

assessment using Direct Observation of Procedural skills (DOPS), Mini-Cex (mini clinical exam), Case-Based Discussion (CBD), and Procedural-Based Assessment (PBA), one may assess evidence-based practice of the residents in workplace. This will help measuring the interventions through an evidence-based urology curriculum.

CONCLUSION

There is growing interest in several specialties to incorporate evidence-based teaching. Incorporation of evidence-based teaching in the medical school will enable urologists to further hone their skills during residency and later in their practice. Ample opportunities are available while treating patients, in the clinic, operating room, and by the bedside. Faculty who are well trained to apply EBM principles have a crucial role to play in promoting evidence-based teaching in urology.

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