Evidence- Based Medicine for Medical Students
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Today, scientific knowledge is progressing fast and medicine, with its all important impact on patients' lives, is no exception. Everyday new medications and therapeutic procedures are being adopted or withdrawn following research findings proving them remarkable or worthless respectively. Protocols of treatment procedures are constantly under revision as a result of new evidence. What was new yesterday is old today and may become obsolete tomorrow. In this age of information technology, such is the pace of change and patient awareness that any physician who does not follow the latest recommendations may be awarded a professional death sentence. To date, several clinicians may actually be practicing age old remedies and treatments quite profitably, the authors are of the opinion that the scenario is likely to change quite soon. With rapid advancement in medical sciences, the ability of doctors to gather more and more information and remain up to date becomes difficult; if not impossible. At the same time, patients are armed to the tooth with latest information about their respective conditions. Even before the doctors tell them about their condition, the patients sometimes already know the differential diagnosis with the available treatment options. In this age of information technology, it is not just useful but also mandatory for the clinicians to stay abreast of developments and choose the best treatment option for their patient.

There is an evident time lag between discovery of new facts and evidence their inclusion in medical texts to be transmitted to the readers. Medical textbooks are often out of date by the time they are published. Moreover, they are often not based on best and latest available evidence and research findings.(1) Hence one may argue that textbooks alone aren't sufficient to ensure optimum, appropriate and up-to-date clinical decision making for the doctors. For example one can find almost nothing in the latest version of Harrisons' Principles of Internal Medicine 17th Edition (2008) about the recent Influenza H1N1 Pandemic.(2) So what does one do? How does a doctor provide up-to-date care? Through the implementation of Evidence-Based Medicine (EBM). It’s probably the best way of decision making in the clinical environment.(3) EBM refers to the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.(4, 5)

EBM includes the following five steps:

1. Question your practice.
2. Find the evidence.
3. Appraise the evidence.
5. Check you are acting on the evidence.(6)

It is acknowledged that many aspects of medical care are abstract, and hence cannot be quantified, or depend on individual factors, such as quality-of-life, which are only partially subject to scientific methods. Therefore EBM is applied to those areas that are subject to scientific scrutiny. It aims to apply these methods to ensure that the best prediction of outcomes in medical treatment. As discussed by Rosenberg et al. (1995), there is strong academic consensus that scientific evidence should be the platform that supports medical decisions; and it is precisely in this scenario where EBM is considered a new paradigm for medical practice.(7)

Commonly, clinicians take decisions based on their experience and guided by indirect evidence provided by relevant biological disciplines such as physiology, biochemistry and microbiology, which do not interact with medical practice in a direct way. For example (a) using an evidence based approach, a physician can evaluate and communicate the value of prostate cancer screening by finding the latest data on the number needed to screen to prevent one death(8). (b)
understanding how theory relates to real life and actual practice (9).

The use of direct evidence to take clinical decisions has boosted clinical studies, moving one step forward towards the genesis of a new “medical science” known as clinical epidemiology (10). This is a discipline that uses the scientific method to solve relevant medical issues, becoming the main source of evidence that nourishes the EBM. The scientific basis of clinical epidemiology, and by consequence of EBM, is to explain the causes of observed phenomenon through universal laws and to represent these laws in mathematical terms. Sacket et al. (1996) clearly stated that one of the main advantages of EBM’s paradigm when taking medical decisions is the introduction of mathematical terms to predict an important clinical outcome. (4) Thus decisions regarding the advantage of a particular method or technique over another have a quantifiable evidence base. Although EBM attempts to express clinical information using mathematical models, statistical data alone are not sufficient to direct clinical practice due to the plethora of individual patient specific variables. Thus EBM does require pragmatic interpretation and careful application of absolute data values. However, in summary, the application and advantages of clinicians actively engaging in EBM include:

1. The number of published books and journals are very low in comparison with the pace of progress in sciences
2. Rapid progress in sciences results in even the annually updated textbooks and monthly published journals to include outdated information.(11)
3. EBM can be helpful to prevent inappropriate variations in clinical practice.(12)

Why medical students need to apply it

Nowadays patients have access to large volume of medical information online. A quick internet search can yield a ream of information about any condition. Therefore patients may well approach medical students for further information or discussion of the information they have found. Thus it is important for a medical student to understand and evaluate evidence and information to establish that which is reliable and that which is not and to be able to communicate this to patients. (13) Honing such skills while a student will ensure that such practices are second nature after graduation.

Medical students’ knowledge about EBM is currently low as it is not always routinely taught in medical schools, nor is a part of formal training. However, short term course and workshops are frequently available and can increase students’ knowledge and improve their attitudes towards EBM. (14-21) The result is improved proficiency in forming medical questions, identifying the best clinical evidence(15) and literature searching skills(15, 19). Workshops and courses can also improve students’ familiarity, receptivity,(20) and their attitudes towards EBM as well as their self perception of EBM skills. (15, 21)

Time constraints within the curriculum and limited faculty support may represent some barriers for teaching EBM to medical students. (18) Some medical students have disproportionate ‘fear of numbers’ and find it difficult to adopt methods which involve mathematical calculations or statistics.(22) Orsat et al have observed that training systems in some countries are not adequately developed to incorporate teaching of EBM(23)

Medical students need the opportunities to put EBM into practice in real cases while maintaining patients’ safety. (24)

Recently some teaching models for applying EBM for medical students in clinical practice have been developed. PEARLS (Presentation of Abstracted from Research Literature to solve real people’s problem) is one example. (25) This model attempts to guide medical students to follow the EBM steps to answer a focused clinical question raised by their contact with a real patient. Most of students are able to find useful information about a clinical question suggested by resident or attending physician. (26) But PEARLS also has a special focus on students’ ability to pick a good and well-framed question. (25) this can improve their knowledge, confidence, and patient care skills. (27) Also Schwartz etal described a 10 step guideline for improving residents’ critical appraisal skills.(28)

Suggestions for improving medical students’ knowledge and their use of EBM are:

Group working: this allows medical students to share their ideas and their knowledge, to evaluate each others’ outcome and may stimulate motivation to learn and use EBM.

Active participation: For critical appraisal of medical literature a medical student needs to actively participate in research projects to encounter the limitations and try different ways to solve them. Without this, a medical student may not be able to comprehensively critique research methodology.

Real patients: Medical students need to utilise their experience and knowledge of EBM on the real patients at their bedsides. Indeed medical student should take advantage of such opportunities to test his/her experience because any fault after graduation while practising unsupervised medicine may prove disastrous for their patients.
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CONFLICTS OF INTEREST
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