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Improving Healthcare Quality with Evidence-Based Medicine

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Physicians in recent years felt increasing pressure to work for long hours and to see more patients even though they have few hours in their normal routine hours to dedicate to self and continuing education. Physician usually makes their clinical decisions based on their own practical experience. Although these ways may be time efficient but it might not provide the best care decision when it comes to the patient. In EBM, physicians seeking additional information pose questions that guide research for ideal literature. During a normal single day, a physician can generate as many as 8 clinical questions, finding the most suitable answer which could then alter the physician way of management. Physicians need to practice EBM correctly but lack of time is a major issue as reported in the literature that an average practicing clinician spend less than one hour weekly reading evidence based information. Therefore busy physicians need to learn new technologies that would make practicing EBM more feasible.

The Affordable Care Act is changing the way healthcare is organized and delivered. It is incentivizing providers to improve quality and provide more value to the system, thus, increasing the need for practicing evidence based medicine (EBM). EBM was first defined by Sackett in 1996 as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of the individual patient. It means integrating individual clinical expertise with the best available external clinical evidence from systematic research" [1]. It is "the integration of clinical expertise, patient values, and the best research evidence into the decision making process for patient care" [2]. So contrary to its name, EBM is not just about evidence. It includes three parts: the physician's expertise, the patient's values, and the best research available "the evidence".

The practice of EBM is usually triggered by patient encounters which generate questions about diagnostic tests, treatment, or diseases prognosis [3]. EBM attempts to find the best answers for these questions based on a wide review for a range of literature published on medical journals that apply strict criteria for the validity of research. The evidence, by itself, does not make the decision, but it helps clinicians to take the best decision regarding the patient care process and enhances the opportunity for better clinical outcomes [3]. Now, with the Web and electronic health records, practicing EBM has become easier for clinicians. There are large online databases that clinicians can easily search for evidence [4]. A study by Crowley et al showed that of 520 clinical questions for which answers were sought in the medical literature, in 53% of these cases the literature confirmed the management decision, but in 47% of these cases the literature changed the medication, diagnostic test, or prognostic information given to the patient.

When implemented, EBM helps not only for the best medical care but also at the lowest cost [4]. It is important to cope with the increasing information load and it is the best way to keep updated about the latest in the medical field with the ability to judge the validity of the information e.g. pharmaceutical industry might offer a misleading or biased information, and by EBM many of these claims could be clarified.

Although there appears to be widespread support of evidence-based medicine as a tool for maintaining the quality in medical care and improving outcome, the challenges to it are significant there are literally millions of published articles and studies available. Making the decision of the best resource to search is an important decision [5]. EBM requires new skills of the clinician, including knowledge about literature-searching, and the application of evidence rules in appraising the clinical literature [3]. Translating the results of EBM research into everyday clinical practice is a major challenge especially when big gaps are present between the care the patients receive and the practice the evidence suggests is effective [5]. Other challenges include patient preferences and social circumstances, presence of disease-drug and drug-drug interactions, clinical experience, marketing and promotional activity, and current policies [6].

Lack of time and increased pressure for self-education are two challenges facing healthcare providers. This was evident in the example for favouring β-blockers over calcium channel blocker to manage hypertension. A survey showed that 17% of the patients received β-blockers medication whereas 62% received an alternative medicine which was much more expensive for hypertensive patients. This example indicated the increasing marketing activity of alternative medicine taking the advantage of the lack of time and lack of EBM training among clinicians.

There are five core elements in EBM practice. First is the identification of the reason behind the patient condition and formulating the clinical question. Next is the research of the evidence and finding the right resources to do so. Followed by the critical appraisal and the application phase of the evidence. Finally, evaluating the outcomes of the research [7]. There is a lot of information in the literature and in online resources that can assist clinicians to formulate clinical questions. The more focused is the clinical question on the problem being investigated the better the outcomes of the healthcare decision. Missing the first step of formulating the clinical question can be time consuming and will yield in different results than what was intended [8].

Clinicians and healthcare practitioners use PICO framework to help them formulate a well-constructed clinical question. PICO is an abbreviation for Patient/Problem, Intervention, Comparison, and Outcome respectively. The first component represents a patient or a problem and it gives description of the clinical condition being investigated, in addition to the demographics that relate to it. Intervention is the second component that is related to the clinical action introduced, test, procedure or treatment performed. Comparison

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Patient/Problem	Intervention	Comparison Intervention	Outcome
63 old female with HER2 mutated breast cancer	Herciptin	Conventional chemotherpay	Reduction in tumor size
			Better prognosis

Figure 1: Example of using the PICO method in answering a clinical question.

describes the alternative treatment or the standard therapy compared to the intervention that was administered. Outcome is the results of the study that can be evaluated for its validity and applicability PICOTT framework includes two additional supporting components that provide information about the Type of question and the Type of study design. This method helps clinicians' emphasize and articulate around the aspects related to the clinical question investigated without deviating from their original research question [9]. The most common types of clinical questions are: therapy question, prognosis question, diagnosis question, harm question and cost question [10]. An example of using the PICO method in answering a clinical question is found in Figure 1.

- Therapy Question: select treatment that provides more benefit than harm to the patient and worth all the cost in using them. This is the most common question used in EBM.
- Prognosis Question: evaluate patient clinical course overtime. Then anticipate the complications of the disease.
- Diagnostic questions: how to select and interpret diagnostic tests, goes with prospective, blind comparison to a gold standard or cross-sectional type of studies.
- Harm/Etiology questions: how to identify causes for disease, require cohort, or case control studies.
- Cost Questions: performed using economic analysis.

Once a question is clearly formulated, the clinician should select the appropriate resource(s) and conduct a search. Large databases such as PubMed/MEDLINE will give access to the primary literature. Secondary resources such as ACP Journal Club, Essential Evidence, FPIN Clinical Inquiries, and Clinical Evidence will provide with an assessment of the original study. The Cochrane Library provides access to systematic reviews which help summarize the results from a number of studies. After all relevant information is gathered; one can answer the clinical question (evaluation) and appraise the evidence for its validity and applicability. Validity is the "truthfulness" of the information. Study design and methodology, biases and errors should be applied before an extensive analysis of the study data. If the study is not valid, no need to proceed and the clinician needs to look for another study. Double blinding of both patient and physician increases the validity of the results. Clinical evidence can be obtained from different studies including case reports, cross-sectional studies, case-control studies, cohort studies, systematic reviews and meta-analyses respectively. These sources are listed according to their level of validity. Systematic review and meta-analysis have the highest validity of EBM and also requires the longest time in regards to providing results. Furthermore, clinical evidence is evaluated based on the importance of the results or clinical importance. In medical research where dichotomous categories are being assessed, clinical importance of the outcome is measured to evaluate whether the intervention is useful or not e.g. presence or absence of side-effects. Once validity has been determined, results should be examined for their applicability to the patient" e.g. does my population fall within the study inclusion criteria? Clinicians may have additional concerns with the precision of the study, such as whether the study covered the aspect of the problem that is most important to the patient, or whether the study suggested a clear and useful plan of action. Finally, the clinician should return to the patient and integrate that evidence with clinical expertise and patient preferences. The process should be concluded with self-evaluation by the clinician.

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