SHORT COMMUNICATION

Translating discoveries of research into general practice: Need of the hour

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ABSTRACT

We live in an era of information, innovation and change. There are a wide range of differences between what is known and what is practiced. Variation occurs due to gap between the time that basic and clinical research knowledge takes for transforming into reality of practice. As a result, there is delay between adopting new and useful information and discarding ineffective and harmful ones. The way to fill this gap is performing evaluations of findings available and by making them accessible to the clinician. It is of paramount importance that clinical decision regarding patient health care should incorporate the best available scientific evidence. Clinical decision making based on good quality evidence will lead to more effective and efficient treatments. Evidence alone is never sufficient to make a clinical decision. For effective care, the practitioner needs a more efficient and effective way to search for information as wells as skills to rapidly evaluate and sort out what is useful and relevant.

Key words
Evidence, problem-based learning, research

INTRODUCTION

In medicine and dentistry, there are well-established causes of disease, diagnostic and investigation methods and treatments that lead to good practice. There is also bad practice: there may be tests and treatments that are effective but not commonly used and, possibly worse, tests and treatments that despite being ineffective are used. How can we reach at a conclusion as to what is a cause of disease and what is not, and what is an effective treatment and what is ineffective? Which method to adopt and what to discard? Evidence-based medicine/dentistry provides a remedy for this.

Evidence-based dentistry (EBD) is the integration and interpretation of the available current research evidence, combined with personal experience. It allows dentists as well as academic researchers to keep abreast of new developments and to make decisions that should improve their clinical practice. A useful introduction to the methods employed is in the textbook by Sackett *et al.*: Clinical epidemiology; A basic science for clinical medicine.[1]

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Evidence-based Health Care is the conscientious, explicit, and judicious use of best evidence in making decisions about care of individual patients.[2]

WHAT IS EVIDENCE-BASED DENTISTRY?

"It is an approach to oral health care that requires the judicious integration of systematic assessment of clinical relevant scientific evidence, relating to patient's oral and medical condition and history; with the dentist's clinical expertise and the patient's treatment needs and preferences".[3]

Practicising evidence-based medicine is exerting a profound effect on quality of patient care, but dentistry is lagging behind in adopting the concept; however, now, the scenario is changing as the American Dental Association has held two conferences targeting and promoting this concept.

Evidence-based health care consists of five concepts.[4] It can be remembered as 5 A's [Table 1]:

1. Asking answerable questions (Asking)
2. Searching for the best evidence (Acquiring)

3. Critically appraising the evidence (Appraising)
4. Applying the evidence (Applying)
5. Evaluating the outcome (Assessing)

The effective practice of evidence-based medicine involves converting the need for information (about diagnosis, prognosis, therapy, prevention, etc.) into an answerable question (step one), tracking down the best evidence with which to answer that question (step two), critically appraising that evidence for its validity (closeness to the truth), impact (size of the effect) and clinical relevance (step three), integrating the critical appraisal with our clinical expertise and with our patient's needs (step four) and evaluating our effectiveness and efficiency in executing steps one to four and seeking ways to improve them both for the next time (step five).[5]

ASKING ANSWERABLE QUESTIONS

A prudent question is one half of wisdom – Francis Bacon

Turning the clinical problems into a well-built clinical question is a key skill of evidence-based practice. In practice, it is a rare day when you are not faced with a need to know some new information about the prognosis, treatment or management of a condition. Turning these clinical problems into a well-built (answerable) clinical question is a key skill of evidence-based practice. There are essentially two types of questions:

Background questions: These ask for general knowledge about a disorder and have two main components. A question root (who, what, how, when or why) A disorder or specific aspect of a disorder (e.g., what causes dental caries? Or, what are the complications of root canal treatment.

Foreground questions: These ask for specific knowledge about how to manage patients with a disorder, and a good or well-constructed foreground question usually has four main elements [Table 2].

Scenario: let us consider a case of a mother from a fluoridated water community with a child who has caries, asking you whether they should be using fluoridated toothpaste?

P: Children from fluoridated communities with caries. (Problem/Population)
I: Would use fluoridated toothpaste (Intervention)
C: Comparing with placebo (Comparison)
O: Reducing the incidence of caries (Outcome).

FINDING EVIDENCE

After formulating a clinically relevant question, try to get all relevant information answering that question. Evidence can be viewed in terms of synthesizing all valid and relevant research that answers a specific question rather than considering a single research study.[6]

Table 1: Steps of evidence-based health care

How to practice?
↓
Identify the clinical problem
↓
Formulate clear and relevant question
↓
Search for relevant evidence
↓
Critically evaluate the evidence
↓
Ignore irrelevant information; interpret the relevant evidence
↓
Decide in appropriate action
↓
Evaluate the outcome in terms of clinical expertise and patient outcome

Table 2: PICO process

P:	Patient, population (Problem)
I:	Intervention (Cause, Prognosis)
C:	Comparison (Control)
O:	Outcome

Commonly referred to as *PICO*

There can be traditional and modern (electronic database) methods of collecting information.

The most widely available database is Medline, which can be accessed via the PubMed interface.

SOURCES OF EVIDENCE

There are two types of sources for finding evidence: primary and secondary.

Primary source: Original research publications that have not been filtered or synthesized.

Secondary source: Are synthesized publications of the primary literature. These include systematic reviews, meta analysis, evidence-based articles reviews and clinical practice guidelines and protocols.

Evidence-based practice aims for the ideal that healthcare professionals should make "conscientious, explicit and judicious use of current best evidence" in their everyday practice.[7]

EBD categorizes different types of clinical evidence and ranks them according to the strength of their freedom from the various biases that beset medical research [Figure 1].

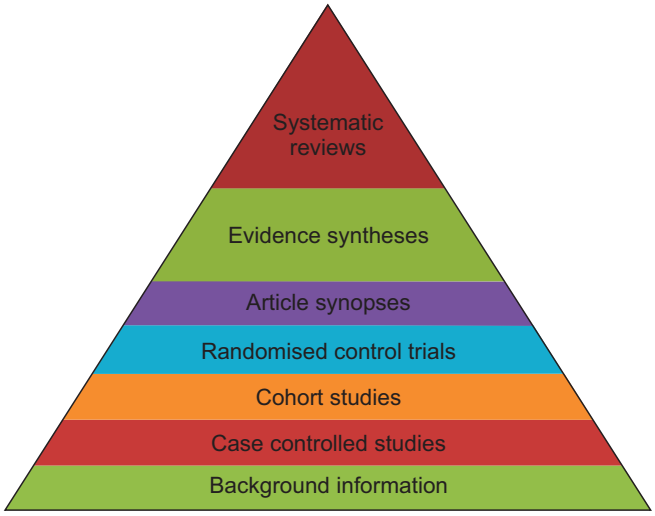

Figure 1: Hierarchy of information

For example, the strongest evidence for therapeutic interventions is provided by systematic review of randomized, double-blind placebo-controlled trials involving a homogeneous patient population and medical condition. In contrast, patient testimonials, case reports and even expert opinion have little value as proof because of the placebo effect, the biases inherent in observation and reporting of cases, difficulties in ascertaining who is an expert and more.[8]

APPRAISING THE EVIDENCE

Even accurate data collection can mislead if interpretation is based on wrong assumptions. Almost all scientific studies are flawed. Critical appraisal is a way of rapidly assessing published papers in order to sort out the relevant or valid papers from the poor quality or irrelevant ones. Critical appraisal is best carried out in a structured/ standardized way using explicit criteria. Appraisal can help the clinician to assess:

Validity: is the degree to which the results of the study are likely to be true, believable and free from bias. Internal validity focuses on the methodology of research. External validity focus on whether the finding can be generalized outside the study. As the population differs, study outcomes can have different outcomes on different populations. It might be affected by the way treatment was performed. For instance, if the time spent on treatment was extensive, it might not be practical to provide this therapy outside of a research study.

Impact: impact of study can be evaluated by the size of treatment effect for therapeutic interventions. We can evaluate relative risk reduction, relative benefit ratio and measuring impact of the diagnostic test by sensitivity, reliability, sensitivity. For example, in the above scenario, whether the toothpaste application will be useful in reducing the incidence of caries

Clinical relevance: main target of our action is treatment; therefore, we should evaluate the evidence for clinical relevance.

ACTING ON THE EVIDENCE

"Remember, people will judge you by your actions, not your intentions." There are a number of well-documented delays between clinical practice and the available research evidence. As the researches are going on, more and more treatment options and strategies are coming on way. We have to be updated to provide best care to the patient and to stay up to date. There can be many challenges in implementing an evidence-based approach. Political, economic, social, technological, legal and ethical (PESTLE)[9] considerations have to be taken into account while acting on evidence.

ASSESSING YOUR PERFORMANCE

The last step in this process is evaluating the outcome, whether the whole process was correctly applied or not. For example, in the above scenario, whether fluoride toothpaste application will be helpful in reducing the incidence of caries or whether it is of no use? As dentistry is a treatment-oriented profession, the moral duty of the dentist is to relate the outcome of the process in terms of clinical relevance as well as preference of the patient as the goal of medicine is to, first, do no harm. But, there are no interventions that are free of risk. In most treatment strategies, there is risk involvement. It is the dentist's duty to adopt the procedures with minimal risk and inform the patient about the negative consequence of therapy that can happen so that the patient can make his own decision about his own care.

BENEFITS OF EVIDENCE-BASED APPROACH

The benefits of an evidence-based approach are as follows:[10]

- Is objective
- Is scientifically sound
- Is patient focused
- Incorporates clinical experience
- Stresses good judgment
- Is thorough and comprehensive
- Uses transparent methodology.

GOAL OF EVIDENCE-BASED MEDICINE

The practice of EBM means "integrating individual clinical expertise with the best available external clinical evidence." The goal was to improve the quality of patient care through the identification and promotion of practices that work and the elimination of ineffective or harmful ones. This requires clinicians to be open-minded and to try new methods that are scientifically proven to be effective, and to discard old methods that are not.[11]

LIMITATIONS OF EBM

Evidence based medicine is associated with various limitations[12]

1. Universal to the practice of medicine
2. Shortage of coherent, consistent scientific evidence
3. Difficulties in applying evidence to the care of individual patients
4. Barriers to the practice of high-quality medicine
5. The need to develop new skills
6. Limited time and resources.

CONCLUSION

In developing useful and reliable treatment plans, one should be careful about the patient's treatment needs and preferences with the best available scientific evidence, in conjunction with the dentist's clinical expertise. It needs a skilful and systematic approach to summarize the large volume of literature that health care providers need to assimilate into their practices. As it is almost impossible to read each article published every year, the evidence-based medicine process uses a systematic approach to review and publish the evidence relevant to specific clinical situations. Through the dissemination of such evidence, the EBD process is designed to help practitioners provide the best care to patients. But, EBD faces challenges as there is natural resistance to change, lack of skills to critical evaluating the things and inability to collect relevant information. EBD provides an approach to oral health care that follows a process of systematically collecting and analyzing scientific evidence. If we work together as a profession, we can refine the concept of EBD to improve in new ways the oral health of our patients.

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