



Evidence based Dentistry – Simplified

KEYWORDS

Evidence based Dentistry, Cochrane database, meta- analysis, cohort studies

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ABSTRACT

The principles of evidence based methodologies provide a systematic frame work for relying on scientific evidence in conjunction with clinical experience and judgment to answer questions and stay in touch with innovations in dentistry. This article in short provides the clinicians an approach to use evidence based methodology in their clinical practice.

Summary: Current concepts of evaluating health care require a scientific basis for treatment. This approach applies to all the spheres of health care, be it medical, dental, pharmacological and so on. This article summarizes the guidelines to determine validity of study results whether they can be applied to clinical practice. Evidence Based Dentistry supplies guidelines to help the clinician make an intelligent decision. A stepwise approach supplied by evidence based methodology is described in this article. The examples cited are relevant to dentistry, helping the clinician understand it better. By integrating good science with clinical judgment and patient preferences, the clinicians can enhance their decision making ability and maximize the potential for successful patient care outcomes.

Current concepts of evaluating health care require a scientific basis for treatment. This approach applies to all the spheres of health care, be it medical, dental, pharmacological and so on.

Let us have a bite into the history of evidence based therapy or medicine. Archibald L. (Archie) Cochrane was born in 1909 into a wealthy Scottish family, from which he inherited the advantage of a private income and the disadvantage of porphyria. Though a brilliant student, his medical training was interrupted by a lengthy psychoanalysis in Europe, and by service in a field ambulance unit in the Spanish Civil War. Eventually Cochrane qualified in medicine in 1938 and joined the R.A.M.C. in 1939. He was taken prisoner in Crete in 1941 and served the rest of the war as medical officer in various POW camps. Cochrane's post-war career with the Medical Research Council as a field epidemiologist in South Wales earned him the respect and admiration of a generation of British epidemiologists. However, Cochrane's international reputation is not based on his achievements as an epidemiologist, but on his 1971 monograph "Effectiveness and Efficiency. Random Reflections on Health Services," a biting scientific critique of medical practice. Cochrane died in 1988, but his name lives on in the Cochrane Collaboration, a network of researchers devoted to clinical trials, and the torch which he lit had been carried forward by the groups promoting evidence-based medicine.¹

Cochrane Collaboration was developed in 1993 in response to Archie Cochrane's call for up-to-date, systematic reviews of all relevant randomized controlled trials of health care. Cochrane's suggestion that the methods used to prepare and maintain reviews of controlled trials in pregnancy and childbirth should be applied more widely was taken up by the Research and Development Programme, initiated to support the United Kingdom's National Health Service. Motto of Cochrane Collaboration is "Working together to provide best evidence for health care."

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Hence a question arises as to what is evidence based dentistry? Evidence based dentistry (EBD) is based on concepts developed at MacMaster University Guidelines to determine validity of study results whether they can be applied to clinical practice EBD supplies guidelines to help the clinician make an intelligent decision.² How can this evidence based approach be utilized in dentistry? Let us take an example of product testing in dentistry. It is carried out in laboratories and not in operatory. Majority of the studies conducted

are univariate analysis, which means, one variable is tested. On the contrary clinic, where the real dentistry is practiced is a multivariate environment.³

Another example is of an in vitro study where dental cement is studied for its retentive property by studying retention of casting on extracted teeth. In reality the Clinician choses a cement not just based on its retentive property but postoperative sensitivity, film thickness, setting time, working time, longevity, ability to clean up, setting expansion and so forth.

To fill this gap there is a need to conduct controlled, long term clinical trials which can help clinicians to make decisions. But it has disadvantages of being expensive and time consuming process.

Evidence based medicine is defined as the integration of the best research with clinical expertise and patient values.

ADA has defined evidence based dentistry as an approach to oral health care that requires the judicious integration of systematic assessments of clinically relevant scientific evidences, relating to the patients oral and medical condition and history, with the dentist's clinical expertise and the patients treatment needs and preferences.

Evidence based decision making is the kind of approach based on scientific evidence, patient preferences or values, clinical patient circumstances and experience and judgment of the clinician.

The evidence based dentistry is needed to improve quality of health care and to demonstrate the best use of limited resources. Two forces that hinder its complete benefit are firstly, the variation in practice pattern; it differs from person to person. Secondly, the difficulty that clinicians face in assimilating scientific evidence in to their practice. This requires clinicians to do extensive reading, attend courses, use internet, database like (Pubmed, Cochrane library).

Following are the advantages of using evidence based approach compared with other assessment methods. The evidence based approach is objective, scientifically sound, patient focused, incorporates clinical experience, stresses on good judgment, thorough and comprehensive and uses transparent methodology.⁴

The skills and abilities needed to apply evidence based decision making process are the following⁵

1. Concert information needs and problems into clinical questions so that they can be answered.
2. Conduct a computerized search with maximum efficiency for finding the best external evidence with which to answer the question.

3. Critically appraise the evidence for its validity and usefulness (clinical applicability).
4. Apply the results of the appraisal, or evidence, in clinical practice.
5. Evaluate the process and your performance.

Considering the first skill and ability, it is necessary to ask a good question. The PICO process is utilized to frame a good question. A well built question should have 4 parts, P – patient problem or population, I – intervention, C – comparison, O – outcomes. Let us take an example of a good question “For a patient at risk for infective endocarditis and penicillin allergy, does clindamycin as compared to erythromycin provide more effective antibiotic prophylaxis in terms of safety, better absorption, and more sustained serum levels?”

This particular question is equipped with all the 4 parts needed to call it a well built question. Infective endocarditis, penicillin allergy, clindamycin, erythromycin and antibiotic prophylaxis form the key words that can be used to conduct a computerized search in various databases, e.g. Pubmed, Chochrane database. To sharpen and focus the search key terms can be combined using Boolean operators like “OR” and “AND”. Various filters can also be used.

The synthesis of all valid research that answers a specific question, which distinguishes it from a single research study is called the evidence.⁶

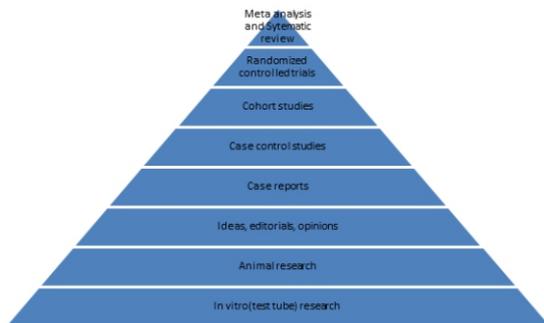


Figure 1: Levels of evidence

The above pyramid depicts level of evidences based on the ability to control for bias and to demonstrate cause and effect. The Meta-analysis and systematic review form the gold standards. Systematic reviews provide a summary of multiple research studies that have investigated the same specific question. Systematic reviews use explicit criteria for retrieval, assessment, and synthesis of evidence from individual RCTs (Randomized Control Trials) and other well controlled methods. Meta-analysis is a statistical process often used with systematic reviews. It combines the statistical analyses of several individual studies into one analysis. As the pooled data-sample size increases the power increases.⁷

Source of evidence can either be primary or secondary. Primary sources are the original research publications that have not been filtered or synthesized. Examples are Pub Med (MEDLINE), National library of medicine's premier bibliographic database, EMBASE, HealthSTAR, CINALH and Cochrane collaboration library. Secondary source are the synthesized publication of primary literature. Which include Systematic reviews and meta analyses, evidence based article reviews, and clinical practice guidelines and protocols, summaries of systematic reviews and research articles, Evidence based journals e.g. The Journal Of Evidence Based Dental Practice and Evidence Based Dentistry.

The next step is appraising the evidence generated. The clinician should understand the evidence found. Review the evidence whether it is a systematic review or an original study, if methods were conducted rigorously and appropriately. The evidence should be critically analyzed.

Critical analysis guides are CONSORT (Consolidated standards of reporting trials) statements, QUOROM (Quality of reporting of Meta-analyses) and CASP (Critical appraisal skills program). The purpose of CONSORT is to improve the review and reporting of Randomized Control Trials. QUOROM improves the review and reporting of systematic reviews. The CASP is conducted to review systematic reviews, Randomized control Trials and several other types of studies.⁵

Once the above mentioned procedures are done, apply the results of the appraisal or evidence, in clinical practice. The final step is to evaluate the effectiveness of the intervention and clinical outcomes and to determine how effectively the Evidence Based Decision Making process was applied.

References

1. Hill GB. Archie Cochrane and his legacy. An internal challenge to physicians' autonomy? *J Clin Epidemiol.* 2000 Dec;53(12):1189-92.
2. Guyatt GH, Sackett DL, Cook DJ. Users' guides to the medical literature. II. How to use an article about therapy or prevention. A. Are the results of the study valid? Evidence-Based Medicine Working Group. *JAMA.* 1993 Dec 1;270(21):2598-601.
3. Goldstein GR. What is evidence based dentistry? *Dent Clin North Am.* 2002 Jan;46(1):1-9.
4. Newman M, Caton J, Gunsolly J. *Ann Periodontol* 8:1,2003
5. Newman M G, Takei H H, Klokkevold P R. *Clinical Periodontology*, 10th edn, Saunders.
6. Greenhalgh T. "Is my practice evidence-based?". *BMJ.* 1996 Oct 19;313(7063):957-8.
7. Mulrow CD. Rationale for systematic reviews. *BMJ.* 1994 Sep 3;309(6954):597-9.