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Evidence based Research in Dentistry: An Insight

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Evidence based Research in Dentistry: An Insight

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Abstract- Dentists need to make clinical decisions based on limited scientific evidence. The goal of evidence-based dentistry is to help practitioners provide their patients with optimal care. This is achieved by integrating sound research evidence with personal clinical expertise and patient values to determine the best course of treatment. The basis of evidence-based dentistry and its application in research work.

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I. Evidence Based Research in Oral Health

Evidence-based medicine is 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" (Sackett, 1996)[1].

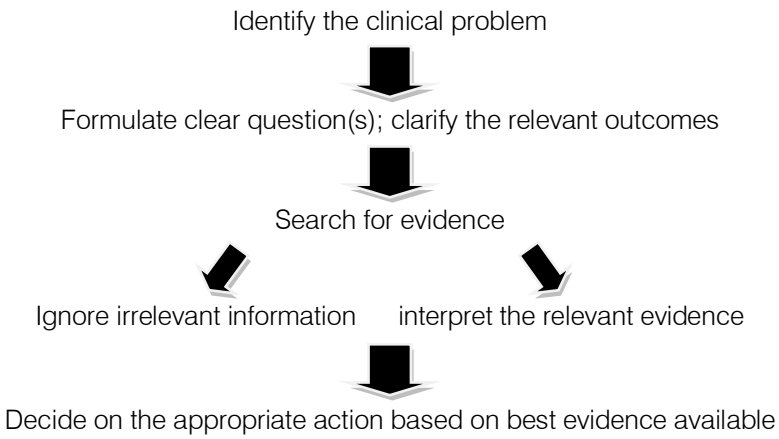


Figure 1: Main steps in practicing evidence based dentistry

Evidence-based health care (EMHC) has a wider definition as decisions that affect the care of patients are not only taken by clinicians, but managers and health policy makers may also be involved. The medical or dental journals publish an overwhelming number of randomized controlled trials (RCT) annually that usually form the evidence base for determining the relative effectiveness of different therapies including drugs, procedures, and treatments for the management of different diseases or conditions. Depending on the volume of literature for a particular topic, it is often not sensible for the health care professionals to undertake this searching and appraising of the evidence and researchers have developed a methodology for summarizing the evidence in the form of systematic reviews.

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There has been some confusion about the terms "systematic review" and "meta analysis." Some researchers have used the two terms synonymously but perhaps the more widely accepted definition is that a systematic review is the whole process of locating the studies to be included, appraising their quality, and summarizing the results, including a summary of the data from different studies if appropriate. The specific statistical pooling of the data is known as meta-analysis. Meta analysis is the application of statistical procedures to examine tests of common hypothesis from more than one study.

Systematic reviews differ from traditional reviews of the literature in several ways. They are based on a focused question and are undertaken in a systematic manner according to predetermined criteria, specifying which databases are searched, what the inclusion criteria are, and how the study quality will be assessed and the data will be synthesized.

Traditional reviews of literature were frequently undertaken in a haphazard manner and tended to be prone to bias often reflecting the views of the authors. Systematic reviews are important as they reduce large

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amounts of information into manageable portions. They are used to formulate guidelines and policy and are therefore an efficient use of resources.

Systematic reviews may increase the power or precision of the effect estimate of the relative effectiveness between the interventions being assessed and if well conducted should be used to limit bias and improve accuracy.

Systematic reviews, such as primary research studies, may be well or poorly conducted and there are guidelines for assessing the quality of systematic reviews.

PRISMA provides a checklist and flowchart for the reporting of systematic reviews that include randomized controlled trials (http://www.equator-network.org).

MOOSE is a similar checklist and flowchart, also available through this website, for assessing reviews of observational studies.

II. The Cochrane Collaboration

The Cochrane Collaboration was established in Oxford in 1993 led by Sir Iain Chalmers. The ideas behind the initial aims of the Cochrane Collaboration collecting together and summarizing data from randomized controlled trials were put forward by Archie Cochrane in his book "Effectiveness and Efficiency" (Cochrane, 1972) that was the original textbook on evidence-based medicine. In 1979, Archie Cochrane had issued a call to assemble "a critical summary, adapted periodically, of allrelevant randomized controlled trials" (Cochrane, 1979).

The Cochrane Collaboration website (http://www.cochrane.org/index.htm)[5] is very helpful and summarizes its function as follows:

The Cochrane Collaboration is an international not-for-profit and independent organization, dedicated to making up-to-date, accurate information about the effects of healthcare readily available worldwide. It produces and disseminates systematic reviews of healthcare interventions and promotes the search for evidence in the form of clinical trials and other studies of interventions(Padiyar et al, 2011)[6.]

The major product of the collaboration is the Cochrane Database of Systematic Reviews (CDSR) that is published quarterly as part of The Cochrane Library, a regularly updated collection of evidence-based health care databases available on CD-ROM and on the internet. Additional databases in The Cochrane Library include the following:

The Database of Abstracts of Reviews of Effects (structured abstracts of 11,000 non-Cochrane systematic reviews from around the world. The reviews have been appraised by reviewers at the Centre for Reviews and Dissemination in the United Kingdom).

The Cochrane Central Register of Controlled Trials (CENTRAL) (the Cochrane Collaboration's register of controlled trials, providing bibliographic information on over 600,000 reports of trials identified by contributors to the Cochrane Collaboration).

Databases of methodological issues relating to systematic reviews, economic evaluations and health technology assessments are also available.

III. The Cochrane Oral Health Group (COHG)[7]

(http://www.ohg.cochrane.org/)

The Cochrane Oral Health Review Group comprises an international network of health care professionals, researchers, and consumers preparing, maintaining, and disseminating systematic reviews of randomized controlled trials in oral health. Oral health is broadly conceived to include the prevention, treatment, and rehabilitation of oral, dental and craniofacial diseases and disorders. The COHG was registered with the Cochrane Collaboration in June 1994. The editorial base was initially set up in the United States under the coordinating editorship of Alexia Antczak Bouckoms. In August 1996, the editorial base was transferred to Manchester within the University's School of Dentistry, with Bill Shaw and Helen Worthington as coordinating editors. The COHG aims to produce systematic reviews that primarily include all RCT of oral health.

The Group also maintains a Trials Register that is submitted every quarter for publication in the CENTRAL on The Cochrane Library. There is a process within Cochrane where the new trials in CENTRAL are fed back to MEDLINE to ensure that trials have been correctly indexed in MEDLINE. The work of the COHG is carried out by over 624 members from 40 different countries around the world.

Members contribute to the Group in many different ways:

- Preparing systematic reviews, peer reviewing
- Manually searching journals
- Translating articles
- Offering consumer input.

The activities of the COHG are coordinated and supported by the editorial team located at the editorial base at the School of Dentistry, The University of Manchester, United Kingdom.

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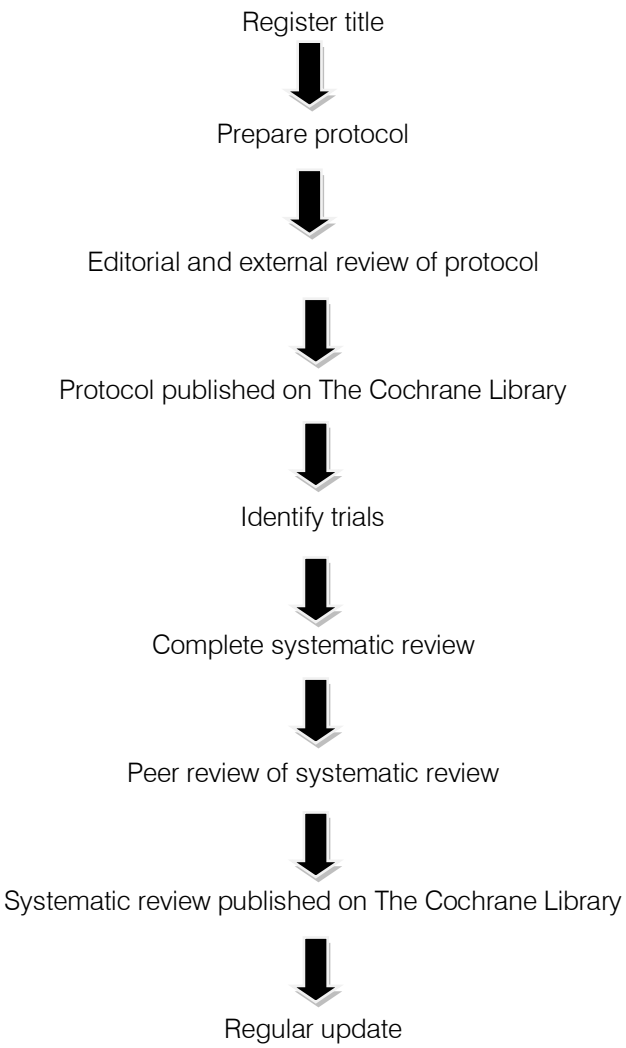


Figure 2: The COHG has an editorial process as outlined below

Randomized controlled trials, which satisfy the inclusion criteria, are usually included in Cochrane reviews of interventions. Some reviews will also include quasi-randomized trials when methods such as alternate allocation have been used to allocate patients to groups.

The inclusion criteria for trials relate to the objectives of the review and use a PICO format which includes specific criteria defining

- P (patient problem)
- I (intervention)
- C (comparison)
- (outcomes)

Randomized trials may therefore be excluded if they include a patient group different to the one specified, different interventions, or do not include any of the outcomes of interest. One of the key dimensions in considering whether a study is valid relates to whether it answers its research question "correctly," that is, in a manner free from bias. This is often described as "internal validity" or "quality." Therefore, it is appropriate to consider risk of bias when assessing studies. This is done by addressing six specific domains: sequence generation, allocation concealment, blinding, incomplete outcome data, selective outcome reporting, and other sources of bias.

IV. Levels of Evidence (Figure 3)

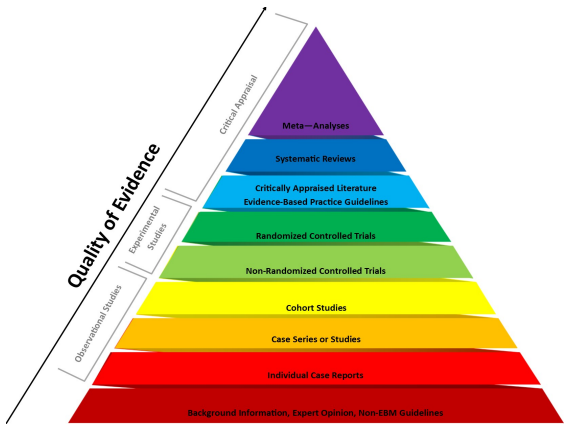


Figure 3: Hierarchy levels of evidence (in descending order of evidence strength)

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The highest level of evidence or the "Gold standard" is the systematic review and meta analysis using two or more randomized controlled trials of human subjects.

Systematic reviews and meta analysis are considered the gold standard for evidence because of their strict protocols to reduce bias. These 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 RCT's and other well controlled methods.

The hierarchy of evidence is based on the concept of causation and the need to control bias. Although each level may contribute to the total body of knowledge, "not all levels are equally useful for making patient care decisions". In progressing up the pyramid, the number of studies and correspondingly the amount of available literature decreases, while at the same time their relevance to answering clinical questions increases.

V. Conclusion

In order to undertake a study, a proper methodology which is systematic and incorporates theoretical analysis of the methods applied to the field of research is mandatory. In today's arena of healthcare learning, incorporating evidence based research into everyday practice is one of the most important skills to the learnt and hence appropriate knowledge this field is of prime importance.

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