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EVIDENCE BASED DENTISTRY

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ABSTRACT

The practice of dentistry presents many challenges on a daily basis keeping abreast with advances in dentistry. The dentists strive to meet to highest degree, to provide the quality oral health care in skilled, compassionate and in effective manner. The dentistry as a profession has developed a specialized knowledge for professional decision making through 3 phases. Those phases are age of expertise, age of professionalization, age of evidence. Evidence based dentistry which is distinct from dentistry based on evidence has permeated dental research and dental practice only in the last few decades, as an offspring, as it were, of evidence based health care in general and evidence based medicine in particular. Evidence based approach is ideal in today's situation and it is important that these clinical decisions making incorporate the best available scientific evidence in order to maximize the potential for successful patient care outcome. Hence it is decided to review the available literature and analyze it.

KEYWORDS: Evidence; Systematic reviews; Meta-analysis; Clinical research; Dentistry

INTRODUCTION

"Education never ends; it's a series of lessons with the greatest for the last", said Watson. In our day to day life as a consumer we take many decisions, not all these decisions we take are based on information from consumer reports, authorized publications and experimental results. Even dentistry is no exception to this either in usage of dental materials, treatment modalities, teaching and research etc.[1,2] Each day consciously or unconsciously we make decisions regarding our patients care, to make clinical decisions almost instinctively. We draw on a wealth of resources including our own clinical experiences and discussions with colleagues. We rely on text books, journal articles, seminars, continuing education programs and previous educational experiences etc. Good and sound dental practice relies not upon bits and pieces of selected evidence but rather upon the collection of best available research evidence. Research evidence is the fundamental for dentistry in 21st century. It follows the models of evidence based medicine, which focuses on answering clinical questions using a critical appraisal of research, assessing the dental literature, finding the relevant and valid scientific studies and applying such results of such investigations to improve clinical care.[3] Evidence based approach is ideal in today's situation and it is important that these clinical decisions making incorporate the best available scientific evidence in order to maximize the potential for successful patient care outcome.[4] Each of us has a role in assessing this information because still there is a lacuna in this regard in the dentistry. Hence it is decided to review the available literature and analyze it.

HISTORY

Dentistry has come to this field later than medicine and has for the most part adopted the same language and conversations. So the definition just given for evidence based medicine is applied to evidence based dentistry.[5-7] David socket originally defined evidence based dentistry as," the conscientious, explicit, and judicious use of best evidence in making decisions about care

of individual patients".[5,8] The subsequent rapid spread of Evidence based dentistry has arisen from 4 realizations.[9] The realizations, attested to by ever-increasing numbers of clinicians, are:

1. Our daily need for valid information about diagnosis, prognosis, therapy and prevention.
2. The inadequacy of traditional sources.
3. The disparity between our diagnostic skills and clinical judgment, which -increase with experience, and our up-to-date knowledge and clinical performance, which decline.
4. Our inability to afford more than a few seconds per patient for finding and assimilating this evidence.

The establishment of journal on evidence based dentistry 1st appeared as a supplement to the BDJ in 1998 and later it became a stand-alone journal in 2000.[8] The 1st center for evidence based dentistry established in the year 2000 in Davangere (India**)**. In the year 2001 the journal of evidence based dental practice was first established in United States.[1,8] The DSM-Forsyth center for evidence based dental research was established in Boston in 2003.[9]

GOALS OF EVIDENCE BASED DENTISTRY

Evidence-based dentistry has two main goals:

1. Best evidence/research and
2. The transfer of this in practical use.

This involves four basic phases:

- Asking evidence-based questions (framing an answerable question from a clinical problem);
- Searching for the best evidence;
- Reviewing and critically appraising the evidence;
- Applying this information in a way to help the clinical practice.

Carr and McGivney[5] have suggested an additional phase that is the

- Evaluation of performance of the techniques, procedures or materials.[10,11]

STAGES IN THE PROCESS OF EVIDENCE BASED DENTISTRY

The Evidence based dental process is based on the abilities and skills of the clinician. This process includes the following steps (Fig. 1).[12]

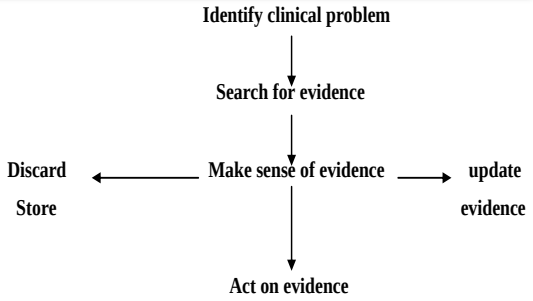

Fig. 1: STEPS OF EVIDENCE BASED[4]

IDENTIFY CLINICAL PROBLEM/CONVERTING INFORMATION INTO A QUESTION

The first step in evidence based dentistry is asking a clear question about a clinical problem. The question must be relevant to the patient's problem and phrased in such a way that it will point you towards relevant and accurate answers.[13]

QUESTIONS

The questions are often related to therapy, diagnosis, prognosis or causation. Most often the original question is too broad, so narrowing it down involves using a PICO format.[1]

THE BASICS OF A WELL BUILT QUESTION

P - Patient or problem . . . . . starting with your patient asks, how would I describe a group of patients similar to mine? Be precise yet brief.

I - intervention (treatment tasks, cause, prognostic factor)….ask, which main intervention am I considering? Be specific.

C - Comparison…..asks, what is the main alternative to compare the intervention? Be specific.

O - Out come……ask, what can I hope to accomplish?

E.g:

P - Patients with Osseo integrated implant

I - Who smoke,

C - Compared to patients who don't smoke

O - What is the proportion of implants lost at 10 years?[1]

SEARCH FOR EVIDENCE

After establishing question the next stage is to search for evidence. Evidence can be derived from a number of sources. Richards and Lawrence 1995 suggest that there are four basic routes to finding the evidence.

1) **Ask an expert:** Asking a consultant or a colleague is an efficient way of getting an answer to a problem, but drawback of this approach is they may not be completely aware of all the up to date evidence, often hold quite subjective opinions about particular issues.
2) **Read a text book:** It is a good idea, but there is evidence that they rapidly go out of date, even when new.
3) **Find the relevant article:** But you may not have a relevant reprint and even if you do you never get around to reading it properly.
4) **Search a database such as Medline/ Such as Cochrane:** It would appear to be the best way to gather the evidence, as it will be the most up to date and quite comprehensive. Access to the literature via the internet is a simple procedure, but there is a danger of becoming swamped with articles that are not necessarily relevant or scientifically sound.[4]

The UK Cochrane center was established in 1992 in oxford, its specific role is to collaborate with others to build, maintain and disseminate a database of systemic, up to date reviews of randomized controlled trials of health care. In 1993, the Cochrane collaboration was founded. This is an international organization that aims to help people make well informed decisions about health care by preparing, maintaining and disseminating systematic reviews of health care effects. There are 2 web sites which are very useful for dentists to check to see if a review has been under taken in which they are interested;

- The Cochrane collaboration (www.cochrane.org) where the reviews are usually limited to RCTs.
- The NHS center for reviews and dissemination.(www.york.ac.uk/inst/crd)[13]

TWELVE TOOLS FOR ASSESSING EVIDENCE

- Be skeptical.
- Don't trust biologic plausibility.
- What level of controlled Evidence is Available?
- Did the cause precede the Effect?
- No betting on the Horse after the Race is over.
- What is a 'Clinically Relevant pretrial' Hypothesis?
- Size Does Matter.
- Is there 'Even one different explanation that works as well or better'?
- Was the study properly randomized?
- When to rely on Nonrandomized Evidence?
- Placebo effects, real or Sham?
- Was there protection against Conflict of Interest?

The hierarchy of evidence is as follows[12]

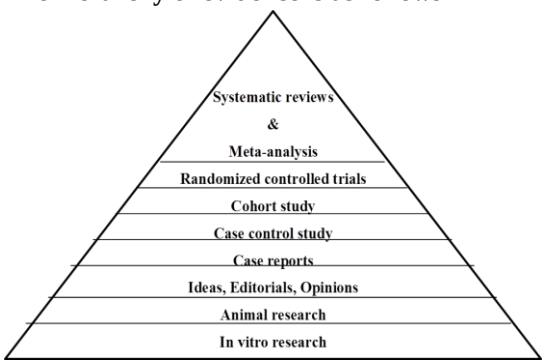

Fig. 2: Modified from Greenhalgh in 1997

MAKING SENSE OF EVIDENCE

Once you have gathered your material, the next stage is to appraise it and see if it makes a contribution to good evidence about your problem. After you have appraised the material, you decide to discard it, or keep it.[12]

Critically appraising the evidence

The evidence has to be critically appraised for its validity, impact and applicability. This involves ensuring that the sources of potential bias have been eliminated and appropriate statistical methods have been used. The outcomes are appropriately summarized so that a decision can be made based on their clinical importance.[1]

APPLYING EVIDENCE BASED DENTISTRY TO PATIENTS

One of the ways that validity of information is assessed is the extent to which it can be applied to patient care. However certain specific points must be considered while applying certain types of information to patient care. These are considered below.

1. **Diagnostic tests**: practitioners must be assured that the tests are available, accurate, affordable and precise in their settings. Clearly the patient must be a willing participant in the diagnostic procedure with the exception of obtaining valuable new information that will influence the outcome to

justify the additional cost or discomfort.

2. **Prognosis**: whether the information in the article about the prognosis of the condition should be applied by answering questions like.
3. **Therapy**: certain questions specific to articles about therapy will help determine when to apply improvements to patients and when not.[1,14]

EVALUATING THE OUTCOMES

This is the final step in the process of evidence based dentistry. This is to evaluate the effectiveness of the intervention and clinical outcomes and to determine how effectively the evidence based decision making process was applied.[12]

ADVANTAGES OF EVIDENCE - BASED DENTISTRY

It improves the effective use of research evidence in clinical practice - The clinical problem solving approached to dentistry favours the early uptake of new and better treatments, or results in the early rejecting of ineffective treatments. It relies on evidence rather than authority for clinical decision making - Regular reviewing of the current available evidence should develop as practitioners so that we have the skills to evaluate evidence for ourselves based on our own clinical practice and assessment of the evidence rather than textbooks or authorities may not be up to date. It enables practitioner to monitor and develop clinical performance those of the skills out lined should enable us to monitor and develop our clinical performance.[4]

TRADITION BASED DENTAL CARE VERSUS EVIDENCE BASED DENTAL CARE

Tradition-based dental care and evidence-based dental care offer complementary paradigms for clinical decision-making. Tradition-based care emphasizes the primacy of knowledge, experience, and intuition in the exercise of good clinical judgment. Evidence based care emphasizes the integration of good judgment with the best available evidence and the patient's values in the making of clinical decisions.[15]

A PARADIGM SHIFT

The former paradigm - The former paradigm was based on the following assumptions about the knowledge required to guide clinical practice: Unsystematic observations from clinical experience, understanding of basic mechanisms of disease and pathophysiologic principles, thorough traditional dental training is a sufficient base from which to generate valid guidelines for clinical practice and maintaining one's knowledge about patient prognosis, the value of diagnostic tests, & the efficacy of treatment.

THE NEW PARADIGM

The assumptions of the new paradigm are as follows:

1) Clinical experience, and the development of clinical instincts (particularly with respect to diagnosis), are crucial and necessary parts of becoming a competent physician. At the same throe, systematic attempts to record observations in a reproducible and unbiased fashion markedly increase the confidence one can have in knowledge about patient prognosis, the value of diagnostic test, and the efficacy of treatment. In the absence of systematic observation one must be cautious in the interpretation of information derived from clinical experience and intuition, for it may at times be misleading
2) The study and understanding of basic mechanisms of disease and pathophysiologic principles are necessary but insufficient and incorrect. It leads to inaccurate predictions about the performance of diagnostic tests and the efficacy of treatments.
3) Understanding certain rules of evidence is necessary to correctly interpret literature on causation, prognosis, diagnostic tests, and treatment strategy. It follows that clinicians should regularly consult the original literature (and read and he able to critically appraise the "Methods" and "Results" sections) in solving clinical problems and providing optimal patient care.[16]

Evidence-based care is a global movement in all the health science disciplines. It represents a philosophical shift in the approach to practice a shift that emphasizes evidence over opinion and, at the same time, judgment over blind adherence to rules. This approach provides a bridge between research and everyday patient care.[17]

THE PROBLEMS / BARRIERS OF INTRODUCING EVIDENCE BASED DENTISTRY

Richards and Lawrence (1998) note four problems of introducing evidence-based dentistry: They are:

Amount of evidence

- Quality of evidence
- Dissemination of evidence
- Practice based on authority rather than evidence.

Amount of Evidence

Currently over 2 million biomedical articles are published annually in some 20,000 journals. There are about 500 journals related to dentistry. Clearly not all of these articles are relevant to all areas of dental practice, nor can one hope to read any more than a small minority.

Quality of Evidence

A number of publications that are widely read in dentistry are not subject to peer review and even when they are there is the tendency for publication bias. This bias may not be explicit but there is a tendency both by the researchers and editors to publish positive reviews. Negative trials can be equally valuable, and concerns have been raised that increasing sponsorship of medical trials by commercial concerns could result in non-publication of negative findings.

Dissemination of Evidence

Unless good methods of dissemination are available even where there is good evidence it can take many years for a particular treatment to become the norm.

Practice Based On Authority Rather Than Evidence

The use of techniques or therapies based on the views of authority rather than evidence may lead to the wrong treatment being performed.[4]

THE IMPACT OF EVIDENCE BASED DENTISTRY ON THE DENTAL RESEARCH COMMUNITY

EBD opens a new era in dental research. This movement can bring together traditional basic science researchers with clinical researchers, clinicians and educators. The current barriers that exist between the dental research community and the practicing community can diminish as evidence based team start to work on finding, appraising, summarizing and analyzing evidence to answer clinically relevant questions. Dental research results are raw; EBD represents a potential strengthening of the complex process of science transfer of translating research into practice. Failure or success EBD will affect dental researchers implied contract to improve the oral health of the public.[18]

CONCLUSION

The concept of evidence based dentistry with a view to keep abreast with advances in dentistry. The importance of evidence for every branch of dentistry in teaching in order to orient the practitioners among the great amount of most actual scientific information's, and to support clinical decisions, is well established in dentistry. The practice of evidence-based dentistry is a process of lifelong, self-directed, problem-based learning which leads to the need for clinically important information about diagnosis, prognosis, therapy and other clinical and health care issues. The need for reliable information and the electronic revolution have come together to allow the "paradigm shift" towards evidence-based health care. The ultimate beneficiaries of evidence based dentistry are members of the public, who will reap the rewards of better care. The ability to deliver evidence-based practice promotes individualization of care and assures the quality of health care for patients today as well as those of tomorrow. All health care professionals need to understand the principles of EBP, recognize EBP in action, implement evidence-based policies, and have a critical attitude to their own practice and to evidence. Without these skills, professionals and organizations will find it difficult to provide 'best practice'. Evidence Based Dentistry is a way of thinking, a philosophy, a paradigm, and it is a practice of dentistry for the millennium.

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