



EVIDENCE-BASED PRACTICE

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ABSTRACT

Evidence-based practice (EBP) involves complex and conscientious decision-making which is based not only on the available evidence but also on patient characteristics, situations, and preferences. It recognizes that care is individualized and ever changing and involves uncertainties and probabilities. Research evidence does not fall simply into "evidence-based" and "non-evidence-based" classes, but can be anywhere on a continuum from one to the other, depending on factors such as the way the study was designed and carried out. The existence of this continuum makes it necessary to think in terms of "levels of evidence", or categories of stronger or weaker evidence that a treatment is effective. Evaluation of research quality can be a difficult task requiring meticulous reading of research reports and background information. It may not be appropriate simply to accept the conclusion reported by the researchers. A number of protocols for the evaluation of research reports have been suggested and will be summarized here. Some of these divide research evidence dichotomously into EBP and non-EBP categories, while others employ multiple levels of evidence.

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INTRODUCTION

EBP is the integration of clinical expertise, patient values, and the best research evidence into the decision making process for patient care. Clinical expertise refers to the clinician's cumulated experience, education and clinical skills. The patient brings to the encounter his or her own personal preferences and unique concerns, expectations, and values. The best research evidence is usually found in clinically relevant research that has been conducted using sound methodology. Evidence-based behavioural practice (EBBP) "entails making decisions about how to promote health or provide care by integrating the best available evidence with practitioner expertise and other resources, and with the characteristics, state, needs, values and preferences of those who will be affected. This is done in a manner that is compatible with the environmental and organizational context. Evidence is research findings derived from the systematic collection of data through observation and experiment and the formulation of questions and testing of hypotheses" [5]. EBP is a problem-solving approach to clinical decision-making within a health care organization. It integrates the best available scientific evidence with the best available experiential (patient and practitioner) evidence. EBP considers internal and external influences on practice and encourages critical thinking in the

judicious application of such evidence to the care of individual patients, a patient population, or a system^[1]

Definition

EBP 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^[4]." Figure 1 explains the practice of EBP.

Dr. David Sackett.



Figure 1 Practice of EBP

Steps in EBP Process

The Steps in the EBP Process includes six process, they are assessing the patient, asking questions to the patient, acquiring the evidence for practice, appraising, apply the care with the patient integrate with the evidence of practice and self

evaluation of the performance. Table 1 explains the steps in EBP^[4]:

Table 1 Steps in EBP^[4]

| | |
|------------------------------|---|
| ASSESS the patient | 1. Start with the patient -- a clinical problem or question arises from the care of the patient |
| ASK the question | 2. Construct a well built clinical question derived from the case |
| ACQUIRE the evidence | 3. Select the appropriate resource(s) and conduct a search |
| APPRAISE the evidence | 4. Appraise that evidence for its validity (closeness to the truth) and applicability (usefulness in clinical practice) |
| APPLY: talk with the patient | 5. Return to the patient -- integrate that evidence with clinical expertise, patient preferences and apply it to practice |
| Self-evaluation | 6. Evaluate your performance with this patient |

The next step in this process is to take the identified concern or problem and construct a question that is relevant to the case and is phrased in such a way as to facilitate finding an answer. Table 2 explains about asking questions to the patient.^[4]

Anatomy of a good clinical question: PICO

PICO is a mnemonic that helps one remember the key components of a well focused question. The question needs to identify the key problem of the patient, what treatment or tests you are considering for the patient, what alternative treatment or tests are being considered (if any) and what is the desired outcome to promote or avoid.

P= Patient Problem

How would you describe a group of patients similar to yours? What are the most important characteristics of the patient? This may include the primary problem, disease, or co-existing conditions. Sometimes the gender, age or race of a patient might be relevant to the diagnosis or treatment of a disease.

I= Intervention, prognostic factor or exposure

Which main intervention, prognostic factor, or exposure are you considering? What do you want to do for the patient? Prescribe a drug? Order a test? Order surgery? Or what factor may influence the prognosis of the patient - age, co-existing problems, or previous exposure?

C= Comparison

What is the main alternative to compare with the intervention? Are you trying to decide between two drugs, a drug and no medication or placebo, or two diagnostic tests? Your clinical question may not always have a specific comparison.

O= Outcome

What can you hope to accomplish, measure, improve or affect? What are you trying to do for the patient? Relieve or eliminate the symptoms? Reduce the number of adverse events? Improve function or test scores?

Table 2 Asking the Well Built Clinical Question^[4]

| | |
|--------------------|---|
| ASSESS the patient | 1. Start with the patient -- a clinical problem or question arises from the care of the patient |
| ASK the question | 2. Construct a well built clinical question derived from the case |

Type of Question

Different types of clinical questions are best answered by different types of research studies. This table 3 suggests study designs best suited to answer different types of clinical question^[1].

Table 3 clinical question and study design^[1]

| Clinical Question | Suggested Research Design(s) |
|------------------------|--|
| All Clinical Questions | Systematic review, meta-analysis |
| Therapy | Randomized controlled trial (RCT), meta-analysis Also: cohort study, case-control study, case series |
| Etiology | Randomized controlled trial (RCT), meta-analysis, cohort study Also: case-control study, case series |
| Diagnosis | Randomized controlled trial (RCT) Also: cohort study |
| Prevention | Randomized controlled trial (RCT), meta-analysis Also: prospective study, cohort study, case-control study, case series |
| Prognosis | Cohort study Also: case-control study, case series |
| Meaning Quality | Qualitative study |
| Improvement | Randomized controlled trial (RCT) |
| Cost | Also: qualitative study Economic evaluation |

Level of Evidence^[3]



Figure 2 Level of evidence/ Evidence hierarchy^[3]

Johns Hopkins Model of Evidence

In 2015, OHSU Healthcare adopted the Johns Hopkins Model for Evidence Based Practice to frame clinical inquiry initiatives.^[1]

Phases of EBP



Figure 3 John Hopkins Model for evidence based practice^[6]

The three Phases of EBP^[6]

The JH Evidence-based Practice Model consists of three phases:

Practice-Develop and refine your question and your team
Evidence-Search, appraise, summarize and synthesize internal and external sources of evidence.

Translation - Create and implement an action plan, evaluate outcomes, disseminate findings. Figure 3 explains the phases of EBP.

Other Theoretical Models^[1, 3]

- The Iowa Model of Evidence-Based Practice to Improve Quality Care.

- Stetler Model of Research Utilization
- ACE Star Model of Knowledge Transformation

Johns Hopkins Nursing EBP: Levels of Evidence

Level I

Experimental study, randomized controlled trial (RCT)
Systematic review of RCTs, with or without meta-analysis

Level II

Quasi-experimental Study

Systematic review of a combination of RCTs and quasi-experimental or quasi-experimental studies only, with or without meta-analysis.

Level III

Non-experimental study
Systematic review of a combination of RCTs, quasi-experimental and non-experimental, or non-experimental studies only, with or without meta-analysis.
Qualitative study or systematic review, with or without meta-analysis

Level IV

Opinion of respected authorities and/or nationally recognized expert committees/consensus panels based on scientific evidence.

Includes

- Clinical practice guidelines
- Consensus panels

Level V

Based on experiential and non-research evidence.

Includes

- Literature reviews
- Quality improvement, program or financial evaluation
- Case reports
- Opinion of nationally recognized expert(s) based on experiential evidence

EBP Resources¹⁴

- ACP Journal Club Part of Annals of Internal Medicine, ACPJC offers critical appraisals of important articles from over 100 different journals.
- Clinical Evidence clinical Evidence describes the best available evidence from systematic reviews, RCTs, and observational studies when appropriate for assessing the benefits and harms of treatments.
- Dynamed: Dynamed is a point-of-care reference resource designed to provide clinicians with current, evidence-based information to support clinical decision-making.
- Essential Evidence Essential Evidence is a one-stop reference that includes evidence-based answers to clinical questions concerning symptoms, diseases, and treatment.
- FPIN Clinical Inquiries Clinical Inquiries provides answers to clinical questions by using a structured search, critical appraisal, clinical perspective, and rigorous peer review. FPIN Clinical Inquiries deliver evidence for point of care use.

- Up-to-date: Up-to-date is an evidence-based, peer reviewed information resource available via the Web, desktop/laptop computer, and PDA/mobile device.

Article Databases

Pub Med (MEDLINE)

Pub Med comprises more than 22 million citations for biomedical articles from MEDLINE and life science journals. Access to titles / abstracts is free. Citations may include links to full-text articles from Pub Med Central or publisher web sites.

Cochrane Library

The Cochrane Library contains high-quality, independent evidence to inform healthcare decision-making. It includes reliable evidence from Cochrane systematic reviews and a registry of published clinical trials. The methodology used to create the Cochrane reviews is recognized as the gold standard for developing systematic reviews.

Center for Reviews and Dissemination (DARE)

The databases DARE, NHS, EED and HTA assist decision-makers by identifying and describing systematic reviews and economic evaluations, appraising their quality, and highlighting their relative strengths and weaknesses.

E-Books and Libraries

Access Medicine

Numerous e-books available to subscribers.

Clinical Key

Online search tool for e-books, journals, Procedures Consult, First Consult, surgical Vitals and other clinical information. To access PDF files for E-books, you must register for and login to a personal account. If you get a session time out message while searching Clinical Key, please close or refresh your browser and try your search again.

Scientific American Surgery

Scientific American Surgery, formerly ACS Surgery, contains authoritative recommendations on current surgical care from master surgeons. Includes drawings, graphs, photos, and decision-making algorithms

Stat!Ref

An online collection of electronic books. Additional resources are also available from the "Tools & Features" menu including *Stedman's Medical Dictionary*, MedCalc 3000, and nursing podcasts (NCLEX-RN exam)

Meta / Cross Search Engines

TRIP (Turning Research into Practice)

The TRIP Database searches across multiple internet sites for evidence-based content. It covers key medical journals, Cochrane Systematic reviews, clinical guidelines, and other highly relevant websites to help health professionals find high quality clinical evidence for clinical practice.

The next step is to read the study and determine if the methodology is sound so that we can consider the results.

Appraisal Criteria

When appraising research, keep the following three criteria in mind:

Quality

Trials that are randomised and double blind, to avoid selection and observer bias, and where we know what happened to most of the subjects in the trial.

Validity

Trials that mimic clinical practice, or could be used in clinical practice, and with outcomes that make sense. For instance, in chronic disorders we want long-term, not short-term trials. We are [also] ... interested in outcomes that are large, useful, and statistically very significant ($p < 0.01$, a 1 in 100 chance of being wrong).

Size

Trials (or collections of trials) that have large numbers of patients, to avoid being wrong because of the random play of chance. For instance, to be sure that a number needed to treat (NNT) of 2.5 is really between 2 and 3, we need results from about 500 patients. If that NNT is above 5, we need data from thousands of patients.

Evidence Appraisal Tool¹²

OHSU Performance Excellence System (OPEX) Tools on O2

Problem Solving Methodology Tools

A standardized 9 step plan to solve problems of any scale.

Change Acceleration Process (CAP) Tools

Focusing on the “adoption” side of implementing successful change, the CAP tools and framework are an important component of the OPEX system and toolset.

Standards for Quality Improvement Reporting Excellence (SQUIRE) Guidelines

SQUIRE 2.0 Guidelines

The SQUIRE guidelines provide a framework for reporting new knowledge about how to improve healthcare. They are intended for reports that describe system level work to improve the quality, safety, and value of healthcare, and used methods to establish that observed outcomes were due to the intervention(s).

Self Evaluation

Sensitivity and specificity are characteristics of the test but do not provide enough information for the clinician to act on the test results. Likelihood ratios can be used to help adapt the results of a study to specific patients. They help determine the probability of disease in a patient. Table 4 explains the evaluation the performance with the patient

Table 4 Evaluate the performance with the patient^[4]

| Reference Standard Disease Positive | Reference Standard Disease Negative |
|--|--|
| Study Test Positive | True Positive |
| Study Test Negative | False negative |

Sensitivity: = true positive / all disease positives

Specificity: Specificity = true negative / all disease negatives

Table 4 Likelihood ratios (LR)

| LRs greater than 10 or less than 0.1 | cause large changes |
|--------------------------------------|------------------------|
| LRs 5 – 10 or 0.1 – 0.2 | cause moderate changes |
| LRs 2 – 5 or 0.2 – 0.5 | cause small changes |
| LRs less than 2 or greater than 0.5 | cause tiny changes |
| LRs = 1.0 | cause no change at all |

LR + = positive test in patients with disease / positive test in patients without disease

LR - = negative test in patients with disease / negative test in patients without disease

Likelihood ratios indicate the likelihood that given tests result would be expected in a patient with the target disorder compared to the likelihood that the same result would be expected in a patient without that disorder.

Likelihood ratio of a positive test result (LR+) increases the odds of having the disease after a positive test result.

Likelihood ratio of a negative test result (LR-) decreases the odds of having the disease after a negative test result. Table 4 explains the likelihood ratios.

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