

Critical Appraisal : An overview

By

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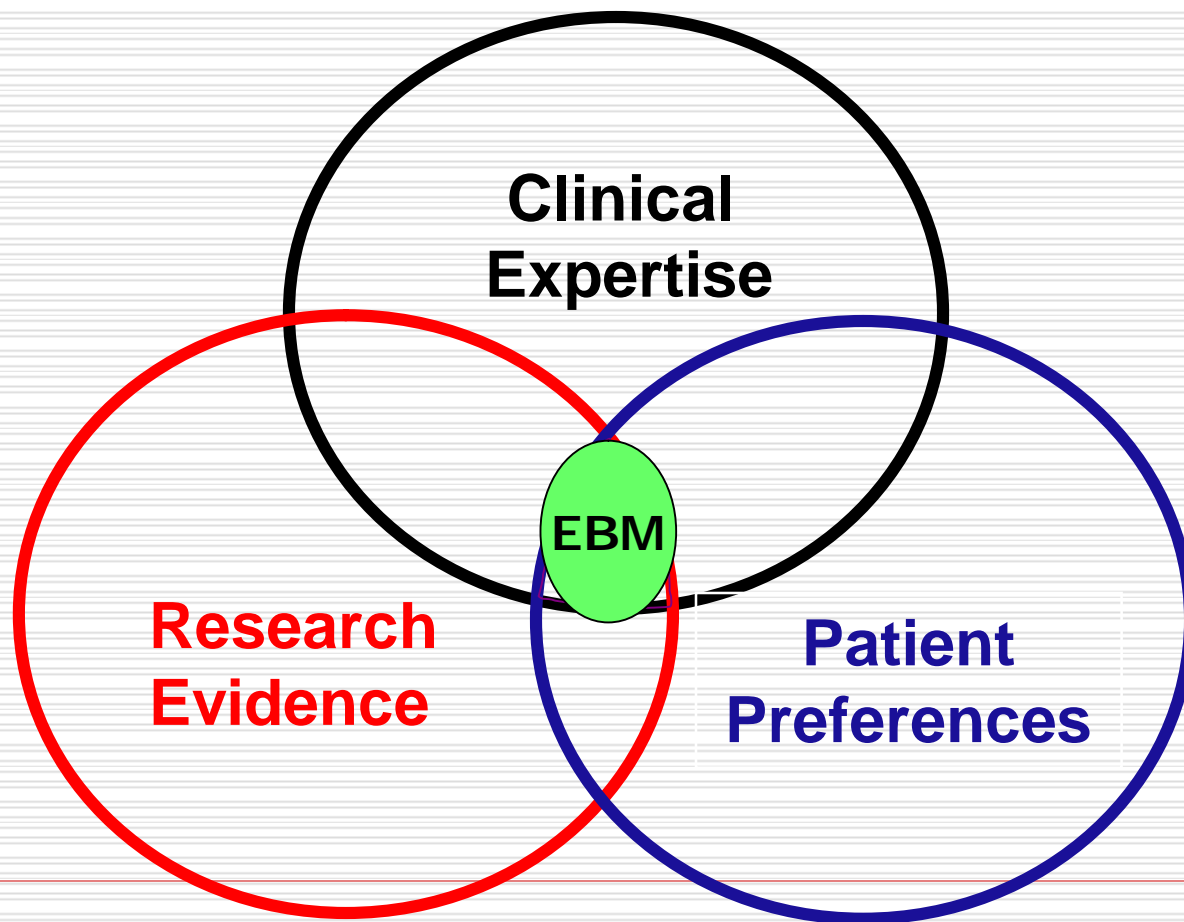
Outline

Importance of Critical Appraisal of
~~Research Articles~~

Users friendly Appraisal tools for different
study designs

Introduction to The “Know how” in Critical
Appraisal

EBM - What is it?



Obstacles to Evidence Based Practice

- q Vast and expanding literature.
- q Limited time to read.
- q Different reasons to read with different strategies.
- n Keeping up to date.
- n Answering specific clinical questions.
- n Pursuing a research interest.



Obstacles to Evidence Based Practice

Published Research
is
“not always”
Valid
or
Relevant

Validity=Truth

- a. External Validity (Generalizability):** Truth beyond a study.

A study is externally valid if the study conclusions represent the truth for the population to which the results will be applied because both the study population and the reader's population are similar enough in important characteristics e.g., age, previous disease history, disease severity, nutritional status, co-morbidity

- b. Internal Validity:** Truth within a study.

A study is internally valid if the study conclusions represent the truth for the individuals studied because the results were not likely due to the effects of chance, bias, or confounding because the study design, execution, and analysis were correct.

Why the need for Critical Appraisal?

- *"Critical Appraisal provides an effective filter for the reliability and validity of health care research that screens out about **98% or more of the medical research literature as not being ready for clinical use.**"*

R Brian Haynes

What kind of evidence is it that Evidence-Based medicine advocates want health care providers and consumers to pay attention to?

BMC Health Serv Res. 2002; 2: 3.

Why the need for critical Appraisal?

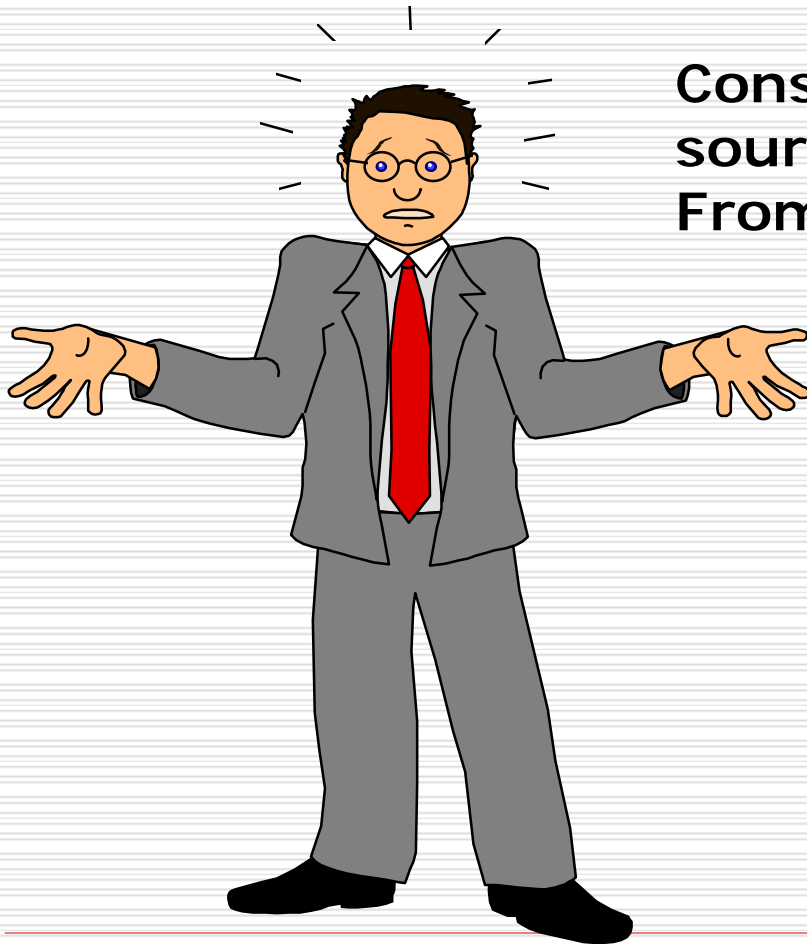
"The study evaluated 60,352 articles from 170 journal titles. The pass criteria of high-quality methods and clinically relevant material were met by 3059 original articles and 1073 review articles."

"Only 6.8% of published research is of high quality and is clinically relevant"

Mc Kibbon et al., 2004 (BMC Medicine 2004, 2:33)

What do evidence-based secondary journals tell us about the publication of clinically important articles in primary healthcare journals?

Dilemma?



**Consult Readily appraised
sources of high level of Evidence
From EBM resources**

&

**Acquire the skills
of Critical Appraisal
of Research articles**

Why is Critical Appraisal Important?

- Critical Appraisal can help us to decide whether we think a reported piece of research is good enough to be used in decision making.



Evidence-based Decision Making

- Patients
- Practitioners
- Health care managers
- Policy makers

Should make use of the best findings from health care research only if the latter is.....

- **Scientifically Valid**
 - **Ready for Clinical Application.**
-

What is Critical Appraisal?

- **Critical appraisal is the process of systematically examining research evidence to assess its validity, results and relevance before using it to inform a decision.**
 - **It is an essential part of evidence-based clinical practice**
 - **Selectivity in choosing good research is the key**
-

Appraisal of Scientific Research

- What is **"valid"** health care research?
 - What are the **"best"** findings from this research?
 - When is health care research **"ready"** for application?
 - **To whom and how** does one apply valid and ready evidence from health care research?
-

Appraisal Tools:

1. CASP (Critical Appraisal Skills Programme)

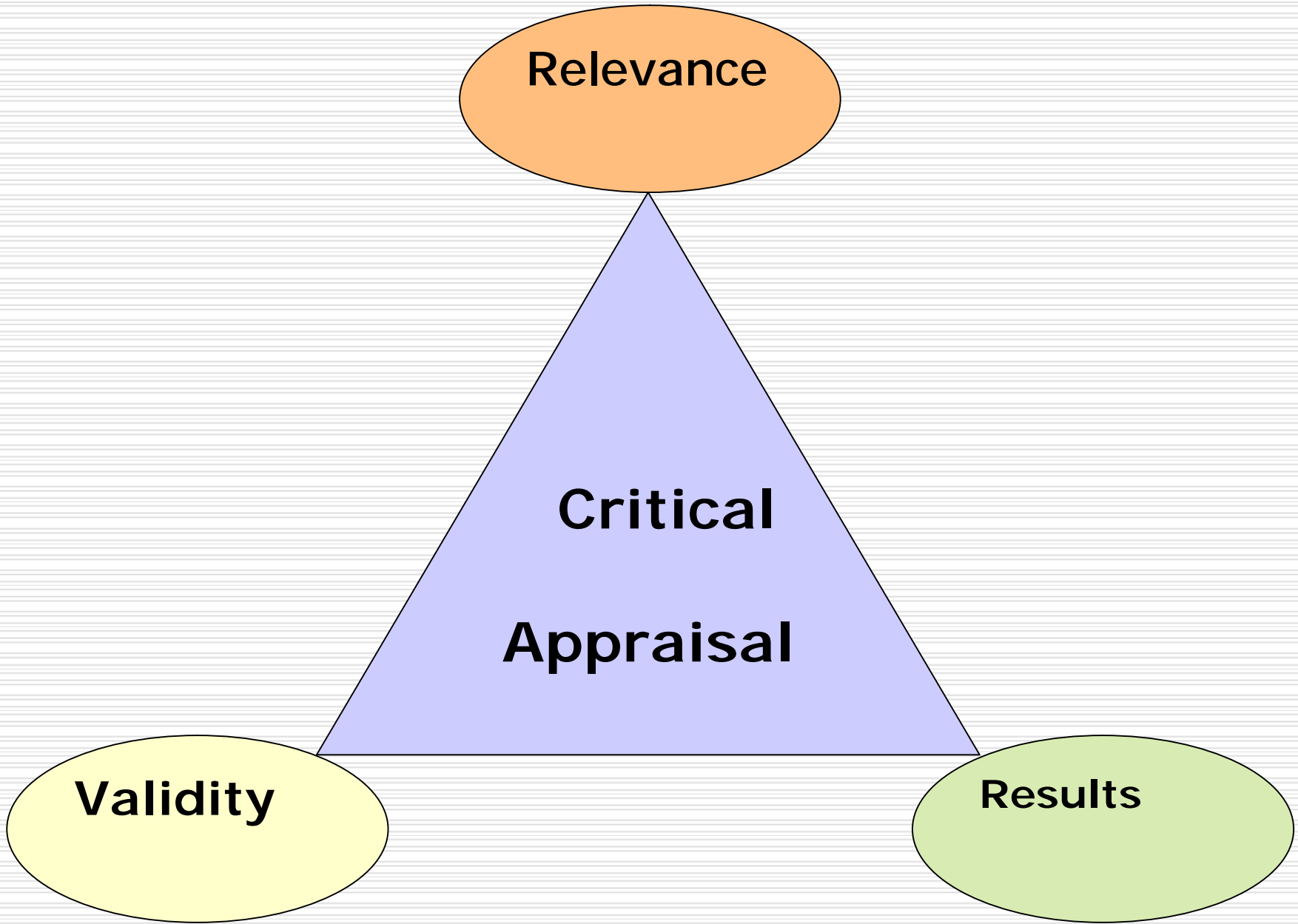
http://www.phru.nhs.uk/casp/critical_appraisal_tools.htm

2. The Centre for Health Evidence: The users' guide to evidence-based practice

<http://www.cche.net/>

3. Centre for Evidence based Medicine (Oxford)

http://www.cebm.net/worksheet_therapy.asp

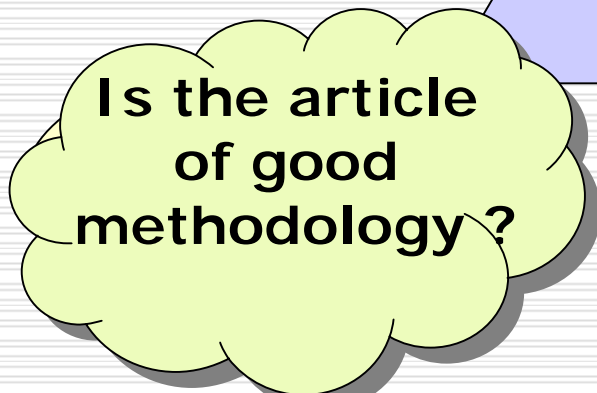


Relevance

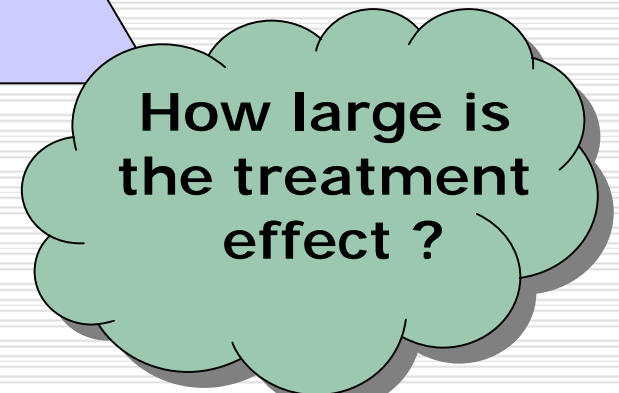


**Critical
Appraisal
of Therapy
Article**

Validity



Results



Relevance

- **Can the results be applied to my patient?**
 - n Similarity between my patient and study cases
 - n Is there any reason not to apply the intervention
 - ∅ Cost
 - ∅ Compliance: patients values
 - ∅ Training needs
 - **Were all clinically important outcomes considered?**
 - n Patient oriented vs disease oriented
 - n Most important outcomes covered
 - n Side effects
 - **Are the likely treatment benefits worth the potential harms and costs?**
-

Validity

- It is the power of study to tell the truth
 - It depends on the quality of study methodology
 - Read Carefully the **Methodology Section**
-

Validity

- **Did the study address a clearly focused question?**
 - n Aim of the work: clear and specific
 - n Clinical question (title, abstract, manuscript): clear and specific
 - **Did the researchers use the right type of study design?**
 - n RCT for therapy
 - n Hierarchy of evidence
-

Validity

Primary criteria

- Was the assignment of Patients to treatment **Randomized**?
 - n Was it proper randomization? (who did and how done)
 - n Was Randomization concealed?
-

Validity

Primary criteria

- Was **follow up complete**?
 - n Dropout bias: minimal
 - Were patients **analyzed** in the groups to which they were randomized?
 - n Intention to treat analysis
-

Validity

Secondary Criteria

- Was the study Blind?
 - n Patients
 - n Investigators
 - Were the groups similar at the start of trial?
 - n Adjustment for significant differences
 - n Baseline characteristics: table 1
 - n Randomization and adequate sample size
 - Were the groups treated equally?
 - n Co-interventions
 - n Follow-up schedule
-

What are the results?

Is it worth to change to the new modality of treatment ?

- q Did the findings answer the research question(s) ?
 - q How significant and precise were the results?
 - § P values and confidence intervals
 - q What is the real clinical value of the treatment ?
 - § Statistical significance \neq clinical significance
-

What are the results?

Is it worth to change to the new modality of treatment ?

- q** How the investigators measured the outcome? (success, failure, side effects)
 - o** How large was the treatment effect?
 - n** Calculate the absolute risk reduction
 - n** Calculate the number needed to treat
 - o** How precise was the treatment effect?
 - n** Look for the confidence interval
-

Appraisal Tools

http://www.phru.nhs.uk/casp/critical_appraisal_tools.htm

- [appraisal tool for systematic reviews](#)
- [appraisal tool for randomized controlled trials](#)
- [appraisal tool for qualitative research studies](#)
- [appraisal tool for economic evaluation studies](#)
- [appraisal tool for cohort studies](#)
- [appraisal tool for case control studies](#)
- [appraisal tool for diagnostic test studies](#)



Articles about Prognosis

- Website: Users' guide for Evidence based Practice

http://www.cche.net/principles/content_prognosis.asp

Articles about harm

- Website: Users' guide for Evidence based Practice

http://www.cche.net/principles/content_harm.asp

Improving the Quality of Reporting of different Studies

- Incomplete and inadequate reporting of research in the medical literature is a widely recognized problem which hampers the critical appraisal and appropriate interpretation of research findings and complicates the practice of evidence-based health care and prevention.
 - If medical journals adopt the checklists and the flow diagrams for every study design, the quality of reporting of studies should improve to the advantage of clinicians, researchers, reviewers, journals, and the public.
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CONSORT Statement

CONsolidated **S**tandards **O**f **R**eporting Clinical **T**rials

- To comprehend the results of a randomized controlled trial (RCT), readers must understand its design, conduct, analysis and interpretation.
 - That goal can only be achieved through complete transparency from authors.
 - Investigators and editors developed the original CONSORT statement to help authors improve reporting by using a [checklist](#) and [flow diagram](#)..
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QUOROM

Quality **O**f **R**eporting of **O**verlapping **M**eta-analysis

- A means to improve the quality of systematic reviews of randomized controlled trials that are published.
 - A checklist of 18 items that need to be addressed by authors, is used during refereeing and will not be part of the final paper (although the prescribed information will be in the published article)
 - A flow diagram to show progress of articles through the review, that will be published as part of the paper.
-

STROBE

STrengthening the **R**eporting of **OB**servational studies in **E**pidemiology

- An appropriate assessment of study quality is of crucial importance for valid systematic reviews and meta-analyses of observational studies:
 - if the “raw material” is flawed, then the conclusions of reviews will be compromised
-

STARD

The **ST**Standards for **R**eporting of **D**iagnostic Accuracy

- To improve the accuracy and completeness of reporting of studies of diagnostic accuracy in order to allow readers to assess the potential for bias in a study and to evaluate the generalisability of its results.
 - Through developing a “checklist” and a “generic flow diagram” for studies of diagnostic accuracy.
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MEDICAL EDUCATION DEVELOPMENT CENTER



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