Key concepts for teaching critical appraisal and critical thinking

Evidence Live 2018
Workshop
20 June
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The plan

• Introduction (15 minutes)
• Are these concepts sensible and useful? (30 minutes)
• Ways in which the Key Concepts are being used (15 minutes)
  • Critical thinking and Appraisal resource Library (CARL)
  • Students for Best Evidence
• To what extent are the concepts applicable to other types of interventions (15 minutes)
• How do these key concepts fit with other domains of critical appraisal and critical thinking, and how can we promote learning of these concepts? (10 minutes)
  • Core Competencies for Evidence-Based Practice
• Wrap-up (5 minutes)
The Informed Health Choices (IHC)
Key Concepts

• People need to be able to assess the trustworthiness of claims about the effects of treatments (interventions)
• Acquiring the skills to assess the trustworthiness of claims about the effects of treatments depends on being familiar with, and correctly applying, some key concepts
• The IHC Key Concepts provide a framework for
  • Developing and evaluating resources to help people learn to think critically about treatment claims
  • Organising, coding, and retrieving other teaching and learning materials
  • A database of multiple-choice questions that can be used for assessing people’s ability to apply the IHC Key Concepts
“Treatment”

• A treatment is any intervention (action) intended to improve health, including preventive, therapeutic and rehabilitative interventions, and public health or health system interventions.

• Although we have developed and framed the Key Concepts to address treatment claims, people in other fields have also found them relevant; for example, for assessing claims about the effects of educational interventions or environmental measures.
What we mean by “concepts”

The Key Concepts are criteria (standards for judgment)

• They are issues worthy of attention or consideration in assessing treatment claims and making choices based on claims.

• They encourage a person to learn, to recognise and assess treatment claims, and to make informed choices.

They are based on evidence and logic.
Personal experiences or anecdotes (stories) are an unreliable basis for assessing the effects of most treatments

**Anecdotes are unreliable evidence**

<table>
<thead>
<tr>
<th>Explanation</th>
<th>Implication</th>
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<tr>
<td>People often believe that improvements in a health problem (e.g. recovery from a disease) was due to having received a treatment. Similarly, they might believe that an undesirable health outcome was due to having received a treatment. However, the fact that an individual got better after receiving a treatment does not mean that the treatment caused the improvement, or that others receiving the same treatment will also improve. The improvement (or undesirable health outcome) might have occurred even without treatment.</td>
<td>If an individual got better after receiving a treatment it does not necessarily mean that the treatment caused the improvement, or that others receiving the same treatment will also improve.</td>
</tr>
</tbody>
</table>
Recognising an unreliable basis for treatment claims

1.1 Treatments can harm
1.2 Anecdotes are unreliable evidence
1.3 Association is not the same as causation
1.4 Common practice is not always evidence-based
1.5 Newer is not necessarily better
1.6 Expert opinion is not always right
1.7 Beware of conflicting interests
1.8 More is not necessarily better
1.9 Earlier is not necessarily better
1.10 Hope may lead to unrealistic expectations
1.11 Explanations about how treatments work can be wrong
1.12 Dramatic treatment effects are rare
Understanding whether comparisons are fair and reliable

2.1 Clear answers require clear questions
2.2 Comparisons are needed to identify treatment effects
2.3 Comparison groups should be similar
2.4 Peoples’ outcomes should be analysed in their original groups
2.5 Comparison groups should be treated equally
2.6 People should not know which treatment they get
2.7 Peoples’ outcomes should be assessed similarly
2.8 Peoples’ outcomes should be assessed reliably
2.9 All participants should be followed up
2.10 Consider all the relevant fair comparisons
2.11 Reviews of fair comparisons should be systematic
2.12 Be cautious of indirect comparisons
2.13 Treatment comparisons based on assumptions may not be reliable
2.14 Peer-review and publication does not guarantee reliable information
2.15 All fair comparisons and outcomes should be reported
2.16 Subgroup analyses may be misleading
2.17 Relative measures of effects can be misleading
2.18 Average measures of effects can be misleading
2.19 Fair comparisons with few people or outcome events can be misleading
2.20 Confidence intervals should be reported
2.21 Don’t confuse “statistical significance” with “importance”
2.22 Don’t confuse “no evidence of a difference” with “evidence of no difference”
Making informed **choices** about treatments

3.1 Are the right problems and the right options being considered?
3.2 Do the outcomes measured matter to you?
3.3 Are you very different from the people studied?
3.4 Are the treatments practical in your setting?
3.5 Do treatment comparisons reflect your circumstances?
3.6 How certain is the evidence?
3.7 Do the advantages outweigh the disadvantages?
3.8 If the treatment was recommended, was the recommendation made by a group with appropriate skills and perspectives?
Background

• Why we developed the IHC Key Concepts
• How we developed the IHC Key Concepts
• How we have used the Key Concepts in the IHC project
• How others have used the Key Concepts
Testing Treatments interactive
Promoting critical thinking about treatment claims
A network for students interested in evidence-based health care
Students 4 Best Evidence (S4BE)

A growing network of students interested in learning more about evidence-based health care

The S4BE website features blogs written by, and for, students:

- Explanatory blogs / tutorials
- Blogs about the latest health research
- Informal reviews of learning resources
A series of 36 blogs written by 19 students, each explaining 1 of the ‘Key Concepts’

Some examples:

- ‘Treatments can harm’
- ‘Don’t confuse statistical significance with importance’
- ‘Do the outcomes measured matter to you’
3.1 Do the outcomes measured matter to you?

This is the title for the section of the course on kindergarten that has been taught by our colleague, John Calabro.

This is the body of the section that explains the importance of outcomes measured in kindergarten. It discusses the implications for future education and the need for accurate measurement.

Associação não é o mesmo que causalidade

This is the title for the section of the course on kindergarten that explains the difference between association and causality. It discusses the importance of understanding the distinction between the two concepts in order to make informed decisions.

1.3 Associação não é o mesmo que Association is not the same as causation

This is the body of the section that explains the difference between association and causality. It discusses the importance of understanding the distinction between the two concepts in order to make informed decisions.
Thank you

www.students4bestevidence.net

Twitter: @Students4BE

facebook.com/Students4BE

general@students4bestevidence.net

www.testingtreatments.org/
New concepts under consideration

2.1 Clear answers about the effects of treatments require clear questions

2.8 Outcomes should be measured reliably in treatment comparisons

2.12 Treatment comparisons that are made between studies can be misleading

2.13 Treatment comparisons may be sensitive to assumptions that are made

3.1 The problem and the treatment options being considered may not be the right ones

3.8 Treatment recommendations often depend on different skills and perspectives
Questions or comments?
Are these concepts sensible and useful?

1. Are concepts included that should not be?
2. Are there important concepts that are missing?
3. Are the concepts organised in a logical way?
Reflect and discuss with your neighbours
How do these key concepts fit with other domains of critical appraisal and critical thinking, and how can we promote learning of these concepts?
Abstract

IMPORTANCE Evidence-based practice (EBP) is necessary for improving the quality of health care as well as patient outcomes. Evidence-based practice is commonly integrated into the curricula of undergraduate, postgraduate, and continuing professional development health programs. There is, however, inconsistency in the curriculum content of EBP teaching and learning programs. A standardized set of minimum core competencies in EBP that health professionals should meet has the potential to standardize and improve education in EBP.

OBJECTIVE To develop a consensus set of core competencies in EBP.
EBP core competencies list
Loai Albarqouni et al.

• Six groups: Introductory, Ask, Acquire, Appraise and Interpret, Apply, and Reflect
• Different types of clinical questions, such as questions about diagnosis, prognosis, and aetiology
American Philosophical Association report of critical thinking skills and dispositions

Cognitive skills and subskills

- **Interpretation**: Categorization, Decoding Significance, Clarifying Meaning
- **Analysis**: Examining Ideas, Identifying Arguments, Analyzing Arguments
- **Evaluation**: Assessing Claims, Assessing Arguments
- **Inference**: Querying Evidence, Conjecturing Alternatives, Drawing Conclusions
- **Explanation**: Stating Results, Justifying Procedures, Presenting Arguments
- **Self-Regulation**: Self-examination, Self-Correction
American Philosophical Association report of critical thinking skills and dispositions

Approaches to specific issues, questions, or problems

• Clarity in stating the question or concern
• Orderliness in working with complexity
• Diligence in seeking relevant information
• Reasonableness in selecting and applying criteria
• Care in focusing attention on the concern at hand
• Persistence though difficulties are encountered
• Precision to the degree permitted by the subject and the circumstance
American Philosophical Association report of critical thinking skills and dispositions

Approaches to life and living in general

• Inquisitiveness with regard to a wide range of issues
• Concern to become and remain generally well-informed
• Alertness to opportunities to use critical thinking
• Trust in the processes of reasoned inquiry
• Self-confidence in one’s own ability to reason
• Open-mindedness regarding alternatives and opinions
• Understanding of the opinions of other people
• Fair-mindedness in appraising reasoning
• Honesty in facing one’s own divergent world views
• Flexibility in considering biases, prejudices, stereotypes, egocentric or sociocentric tendencies
• Prudence in suspending, making or altering judgments
• Willingness to reconsider and revise views where honest reflection suggests that change is warranted
Informed Healthcare Choices

Angela Morelli & Tom Gabriel Johansen
InfoDesignLab.com

BULLSHIT DETECTOR
A toolkit for students and teachers in how to debunk false claims about your health

Back to all the other concepts

Informed healthcare choices are made when a patient is provided with information about the available treatment options, their potential benefits and risks, and the best course of action based on individual circumstances. However, when comparing treatments, apparent differences may exist in outcomes, which can be attributable to differences other than actual characteristics of the people in the comparison groups. Differences in characteristics might result in estimates of treatment effects that are either larger or smaller than they actually are. A method such as allocating people to different treatments by assigning them random numbers (the equivalent of flipping a coin) is the best way to ensure that the groups being compared are similar in terms of both measured and unmeasured characteristics.

Implication: Be cautious about relying on the results of observational studies.
thou shalt not commit logical fallacies

appeal to nature

Making the argument that because something is 'natural' it is therefore valid, justified, inevitable, good, or ideal.

A logical fallacy is a flaw in reasoning. Logical fallacies are like tricks or illusions of thought, and they're often very sneakily used by politicians and the media to fool people. Don't be fooled! This website has been designed to help you identify and call out dodgy logic wherever it may raise its ugly, incoherent head.
That's a claim!
A toolkit for students and teachers to think critically about health claims

[Diagram showing various health claim analysis tools and strategies]

- Be fair
- Beware
- Truth check

Strategies:
- Make claims believable
- Check for evidence
- Examine sources
- Use critical thinking

Tools:
- Checkliste
- Expert opinion
- Scientific evidence
- Critical thinking

Tips:
- Look for red flags
- Question everything
- Don't assume
- Verify

Remember:
- Claims are not necessarily true just because they sound good.
- Don't accept claims at face value.
- Always look for evidence to support claims.
- Be skeptical.

Health claim evaluation:
- Think critically
- Question
- Verify
- Evaluate

Health claims can be misleading.
Always verify before相信ing.

Further resources:
- Science.gov
- CDC
- NHS

This is just a guide, always do your own research.
That’s a claim!
A toolkit for students and teachers to think critically about health claims
Hooey!
A guide for figuring out which health claims are nonsense and which make sense
Beware, be fair, take care!

A toolkit for students and teachers to think critically about health claims
Nonsense and Sense about Health
A toolkit for deciding which health claims are nonsense and which make sense

BE FAIR

BE EVEN when considering the evidence used to support a treatment claim
When considering the evidence used to support a treatment claim, be fair. Check if the evidence is clear and if the study has been well-designed. Check if the results are consistent with other studies.

BE FAIR when deciding what to do
When deciding what to do, take care to consider the consequences of taking a treatment. Check the potential benefits and risks. Check if the treatment is appropriate for you. Ask for a second opinion.

TAKE CARE

TAKE CARE when deciding whether a treatment is safe and effective
When deciding whether a treatment is safe and effective, take care to check the evidence. Check if the treatment has been properly tested. Check if the treatment is safe for you. Ask for a second opinion.

BEWARE

BEWARE of faulty reasons used to support treatment claims
When someone presents bad or misleading information about the benefits of a treatment, be wary. Check the evidence. Check if the claim is supported by a clear and well-designed study. Check if the study has been peer-reviewed.

BEWARE when deciding whether a treatment is safe and effective
When deciding whether a treatment is safe and effective, be wary. Check the evidence. Check if the treatment has been properly tested. Check if the treatment is safe for you. Ask for a second opinion.

BEWARE when you use the Widely used
Do not assume that something is safe or effective just because it is widely used. Check the evidence. Check if the treatment has been properly tested. Check if the treatment is safe for you. Ask for a second opinion.

BEWARE when you use the Associated with
Do not assume that something is safe or effective just because it is associated with something else. Check the evidence. Check if the treatment has been properly tested. Check if the treatment is safe for you. Ask for a second opinion.
How to be a health detective
Question the claim, check the science, and consider your choices

Beware

Widely used: Do not assume that treatments are beneficial or safe simply because they are widely used or have been used for a long time.

Beware of faulty reasons used to support treatment claims: When you hear someone use one of these reasons to support a claim about the effects of a treatment, BEWARE! These are not good reasons to believe a claim.

Be fair when considering the evidence used to support a treatment claim: Trustworthy claims about the effects of treatments require fair comparisons of treatments. Watch out for unfair treatment comparisons and results that are reported in misleading ways.

Take care when deciding what to do: When deciding what to do, TAKE CARE to consider the relevance of the evidence, how important the good and bad outcomes are to you, and how sure you can be about the treatment effects.

Beware

Associated with: Do not assume that an outcome was caused by a treatment unless other reasons for an association have been ruled out by a fair comparison.
Being a healthy BS detective
A toolkit to help students and teachers spot unreliable health claims
Spot and Stop health bullshit

A toolkit for students and teachers to think critically about health claims

- BE FAIR
  - Beware of faulty reasons used to support treatment claims. Be fair when considering the evidence used to support a treatment claim. Be true to the evidence about the effects of treatments. Watch out for unfair treatment comparisons and results that are reported in misleading ways.

- BEWARE
  - Beware when deciding what to do. Take care when deciding what to do. Take care to consider the relevance of the evidence, how important the good and bad outcomes are to you, and how sure you can be about the treatment effects.

- TAKE CARE
  - Beware of evidence that is not widely used or has been used for a long time. Beware when deciding what to do. Take care when deciding what to do. Take care to consider the relevance of the evidence, how important the good and bad outcomes are to you, and how sure you can be about the treatment effects.
The Health Bullshit detector
A toolkit for students and teachers to think critically about health claims

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BE
Beware when you see this:

It is 100% safe!

People often exaggerate the benefits of treatments and ignore or downplay potential harms. However, few effective treatments are 100% safe.
Beware of untrustworthy claims

We hear claims about the effects of treatments all the time. Many of these are not trustworthy. These Key Concepts can help you spot untrustworthy claims. When you hear someone use one of these reasons to support a claim about the effects of a treatment, you should raise a red flag – BEWARE – and ask where the evidence is.

1.1 100% safe! 1.7 As advertised!
1.2 It worked for me! 1.8 More is better!
1.3 Associated with! 1.9 Earlier is better!
1.4 Widely used! 1.10 I hope it works!
1.5 New and better! 1.11 It works like this!
1.6 Recommended by experts! 1.12 100% effective!
MAKE SURE to look for:

**Dissimilar comparison groups**

If people in the treatment comparison groups differ in ways other than the treatments being compared, the apparent effects of the treatments might reflect those differences rather than actual treatment effects. Differences in the characteristics of the people in the comparison groups might result in estimates of treatment effects that appear either larger or smaller than they actually are. A method such as allocating people to different treatments by assigning them random numbers (the equivalent of flipping a coin) is the best way to ensure that the groups being compared are similar in terms of both measured and unmeasured characteristics.

**Implication:**
Be cautious about relying on the results of studies that do not use random allocation.