Evidence-based Health Promotion

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Evidence-based Medicine

• “… the integration of best research evidence with clinical expertise and patient values”
  - David L. Sackett, 2000

• NOT ONLY recommendations from experts (or myself)
• NOT ONLY imagination, experience, or logic
• NOT ONLY what we (the project team) want to do
Evidence-based Health Promotion

• It is all about making choices…

• Project team – what programme / activities should I plan and implement?

• Heads of Agency / Department Heads – which programme from which team should I approve and support?

• Funding agency – which programme should I fund?
Evidence-based Health Promotion

• With limited resources, the HCPS may support…

  • promotion programmes or interventions more possible to be effective (evidence-based/ theory-driven)
  or

  • promotion programmes or interventions designed to prove its own effectiveness (evidence-generating)
Practical Steps in Evidence-based Health Promotion

1. Formulate an answerable question
2. Track down the best evidence of outcomes
3. Critically appraise the evidence (to find out how good it is and what it means)
4. Apply the evidence
1. Formulate an answerable question

- What specific health needs of specific local community / target group have I identified?
- Does that fit into the HCPS thematic priorities?
- → What should I do about this condition or problem?
  - Specific Aim(s)
  - Specific Objectives
2017 HCPS Thematic Priorities

- Tobacco Control
- Lifestyle, nutrition and physical activity
- Mental well-being
- Injury prevention
- Reducing alcohol-related problems
- Promoting family doctor model of care

- Management of chronic disease
- Cancer prevention
- Breastfeeding
- Healthy use of Internet and electronic screen products
- Organ donation
1. Formulate an answerable question

• P – who are the relevant people in relation to the problem I have in mind
• I – what management strategy (intervention) I want to find out in relation to the problem
• C – what other strategies for comparison with the one I am interested in
• O – what outcomes am I most concerned about, and what the participants are most concerned about
1. Formulate an answerable question

• Whether a management strategy (intervention / promotion programme) actually benefits the population concerned?

• E.g. Among community-dwelling elderly, does yoga, compared with their daily activities such as Tai-chi, better achieve fall prevention?

• E.g. Does a newly developed mobile app, compared with existing educational pamphlets, better assist parents to make healthy diet choices for their toddlers?
2. Track down the best evidence of outcomes

- With my answerable question in mind…

- What have others (local or overseas) done to address similar health needs of similar population – to achieve similar aim(s)?

- If I already have a strategy / programme in mind, what have others (local or overseas) done to prove its effectiveness?
2. Track down the best evidence of outcomes – search strategies

Traditional database – online journals

- Medline 2000+ via ProQuest
- PubMed
- ScienceDirect
- Embase (Excerpta Medica database)
- CINAHL (Cumulative Index to Nursing and Allied Health Literature)
- Journals @Ovid
- Scopus
- Google Scholar
2. Track down the best evidence of outcomes

• Other useful internet resources on community and public health
  • https://www.nice.org.uk/guidance
  • https://www.thecommunityguide.org/
  • https://phpartners.org/hp2020/index.html
  • http://ph.cochrane.org/cph-reviews-and-topics
2. Track down the best evidence of outcomes

Grey literatures

- produced by organizations outside of the traditional commercial or academic publishing and distribution channels. Types include:
  - reports (annual, research, technical, project, etc.)
  - working papers, monograph, government documents, white papers and evaluations.
  - unpublished theses, conference papers or abstracts

Consult some guidelines for “good practices” if there is no published study with the same programme content
2. Track down the best evidence of outcomes

- Information of highest quality – participants randomly allocated to intervention (my strategy in mind) or control (comparison) groups, and outcomes compared

- Randomised Controlled Trial (RCT)

Image credit: https://thelogicofscience.com/2016/01/12/the-hierarchy-of-evidence-is-the-studys-design-robust/
2. Track down the best evidence of outcomes

• Among the strategies and programmes proposed by others, which ones are the best in achieving the aim(s) similar to my plan? How can I bring the same effect to my local context?

• Why other strategies and programmes do not work / are not working as good?
2. Track down the best evidence of outcomes

- Scientific information – whether an intervention / strategy works (based on a carefully controlled trial / in ideal environment) – **efficacy**

- Social science evidence – the degree of beneficial effect under “real world” circumstances with variations in length and intensity of programme, characteristics of participants, support from others… – **effectiveness**
2. Track down the best evidence of outcomes

- Not every strategies can be tested with “randomised controlled trial”
  - e.g. Wear or not wear motorcycle helmets?
  - e.g. Raise or not raise tobacco tax?

- → Find evidence on “good practices” if there is no published study with the same programme content
2. Track down the best evidence of outcomes

- Rule out strategies that are unlikely to be useful

- Beware of commercial websites / personal or company blogs – information given may be biased
3. Critically appraise the evidence – to find out how good it is and what it means

• After identifying the evidence, i.e. a few studies that seems applicable…

• What are the PICO (people, intervention, comparison, outcomes) of the studies, and are they close enough to my plan?
3. Critically appraise the evidence

• How well were the studies done?
  • Are the results biased?
  • Are there confounding factors (e.g. participants different in nature between different groups) to make the comparison results invalid?
• What do the results mean, and could they have been due to chance?
3. Critically appraise the evidence
3. Critically appraise the evidence

• Has my answerable question been answered?
  • Does the strategy / programme I have in mind seems to be effective in addressing the specific health needs of my specific local community / target group?
  • → Does this strategy / programme seems to be effective in achieving my…
    • Specific Aim(s)
    • Specific Objectives
3. Critically appraise the evidence

Special tools in assessing eligible clinical trials and methodological quality

- Risk of bias table (Higgin & Green, 2011)
- The PEDro scale (The Physiotherapy Evidence Database)
- The Jadad Scale (Oxford quality scoring system)
- The QUADAS Scale

Assessment of data analysis

- Review Manager 5.4 (meta-analysis results)
<table>
<thead>
<tr>
<th>Bias domain</th>
<th>Source of bias</th>
<th>Support for judgment</th>
<th>Review authors’ judgment (assess as low, unclear or high risk of bias)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection bias</td>
<td>Random sequence generation</td>
<td>Describe the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups</td>
<td>Selection bias (biased allocation to interventions) due to inadequate generation of a randomised sequence</td>
</tr>
<tr>
<td></td>
<td>Allocation concealment</td>
<td>Describe the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen before or during enrolment</td>
<td>Selection bias (biased allocation to interventions) due to inadequate concealment of allocations before assignment</td>
</tr>
<tr>
<td>Performance bias</td>
<td>Binding of participants and personnel*</td>
<td>Describe all measures used, if any, to blind trial participants and researchers from knowledge of which intervention a participant received. Provide any information relating to whether the intended binding was effective</td>
<td>Performance bias due to knowledge of the allocated interventions by participants and personnel during the study</td>
</tr>
<tr>
<td>Detection bias</td>
<td>Binding of outcome assessment*</td>
<td>Describe all measures used, if any, to blind outcome assessment from knowledge of which intervention a participant received. Provide any information relating to whether the intended binding was effective</td>
<td>Detection bias due to knowledge of the allocated interventions by outcome assessment</td>
</tr>
<tr>
<td>Attrition bias</td>
<td>Incomplete outcome data*</td>
<td>Describe the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. State whether attrition and exclusions were reported, the numbers in each intervention group (compared with total randomised participants), reasons for attrition or exclusions where reported, and any reinclusions in analyses for the review</td>
<td>Attrition bias due to amount, nature, or handling of incomplete outcome data</td>
</tr>
<tr>
<td>Reporting bias</td>
<td>Selective reporting</td>
<td>State how selective outcome reporting was examined and what was found</td>
<td>Reporting bias due to selective reporting</td>
</tr>
<tr>
<td>Other bias</td>
<td>Anything else, ideally specified</td>
<td>State any important concerns about bias not covered in the other domains in the tool</td>
<td>Bias due to protocoled biases</td>
</tr>
</tbody>
</table>

*Assessments should be made for each main outcome or class of outcomes.

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**Fig 1** Example presentation of risk of bias assessments
PEDro scale

The PEDro scale was last amended on 21 June 1999.

This briefly explains why each item has been included in the PEDro scale. More detail on each item is provided in the PEDro scale training program.

1. eligibility criteria were specified

Note on administration: This criterion is satisfied if the report describes the source of subjects and a list of criteria used to determine who was eligible to participate in the study.

Explanation: This criterion influences external validity, but not the internal or statistical validity of the trial. It has been included in the PEDro scale so that all items of the Delphi scale are represented on the PEDro scale. This item is not used to calculate the PEDro score.

2. subjects were randomly allocated to groups (in a crossover study, subjects were randomly allocated an order in which treatments were received)

Note on administration: A study is considered to have used random allocation if the report states that allocation was random. The precise method of randomisation need not be specified. Procedures such as coin-tossing and dice-rolling should be considered random. Quasi-randomised allocation procedures such as allocation by hospital record number or birth date, or alternation, do not satisfy this criterion.

Explanation: Random allocation ensures that (within the constraints provided by chance) treatment and control groups are comparable.

3. allocation was concealed

Note on administration: Concealed allocation means that the person who determined if a subject was eligible for inclusion in the trial was unaware, when this decision was made, of which group the subject would be allocated to. A point is awarded for this criteria, even if it is not stated that allocation was concealed, when the report states that allocation was by sealed opaque envelopes or that allocation involved contacting the holder of the allocation schedule who was “off-site”.

Explanation: “Concealment” refers to whether the person who determined if subjects were eligible for inclusion in the trial was aware, at the time he or she made this decision, which group the next subject would be allocated to. Potentially, if allocation is not concealed, the decision about whether or not to include a person in a trial could be influenced by knowledge of whether the subject was to receive treatment or not. This could produce systematic biases in otherwise random allocation. There is empirical evidence that concealment predicts effect size (concealment is associated with a finding of more modest treatment effects; see Schuiz et al (1985) JAMA 253:408.

4. the groups were similar at baseline regarding the most important prognostic indicators

Note on administration: At a minimum, in studies of therapeutic interventions, the report must describe at least one measure of the
### Oxford Quality Scoring System

1. Was the study described as random?  
   - Yes  
   - No

2. Was the randomization scheme described and appropriate?  
   - Yes  
   - No

3. Was the study described as double-blind?  
   - Yes  
   - No

4. Was the method of double blinding appropriate?  
   - Yes  
   - No

5. Was there a description of dropouts and withdrawals?  
   - Yes  
   - No

The following table summarises QUADAS-2 and lists all signalling, risk of bias and applicability rating questions.

<table>
<thead>
<tr>
<th>DOMAIN</th>
<th>PATIENT SELECTION</th>
<th>INDEX TEST</th>
<th>REFERENCE STANDARD</th>
<th>FLOW AND TIMING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Describe methods of patient selection: Describe included patients (prior testing, presentation, intended use of index test and setting):</td>
<td>Describe the index test and how it was conducted and interpreted:</td>
<td>Describe the reference standard and how it was conducted and interpreted:</td>
<td>Describe any patients who did not receive the index test(s) and/or reference standard or who were excluded from the 2x2 table (refer to flow diagram). Describe the timeline and any interventions between index test(s) and reference standard:</td>
</tr>
<tr>
<td>Signalling questions (yes/no/unclear)</td>
<td>Was a consecutive or random sample of patients enrolled?</td>
<td>Were the index test results interpreted without knowledge of the results of the reference standard?</td>
<td>Is the reference standard likely to correctly classify the target condition?</td>
<td>Was there an appropriate interval between index test(s) and reference standard?</td>
</tr>
<tr>
<td>Risk of bias: High/low/unclear</td>
<td>Could the selection of patients have introduced bias?</td>
<td>Could the conduct or interpretation of the index test have introduced bias?</td>
<td>Could the reference standard, its conduct, or its interpretation have introduced bias?</td>
<td>Could the patient flow have introduced bias?</td>
</tr>
<tr>
<td>Concerns regarding applicability: High/low/unclear</td>
<td>Are there concerns that the included patients do not match the review question?</td>
<td>Are there concerns that the index test, its conduct, or its interpretation differ from the review question?</td>
<td>Are there concerns that the target condition as defined by the reference standard does not match the review question?</td>
<td></td>
</tr>
</tbody>
</table>
4. Apply the evidence

- Is this strategy / programme feasible in my setting?
- Do I need to contact authors (of the published strategy or programme / the studies) to get more implementation details about the programme?
- Can I do the necessary follow-up and evaluation in my setting?
- Will my target participants be willing and able to comply with the programme plan?
4. Apply the evidence

• Is this really the best strategy / programme I want to implement?
  • Would “doing nothing” be even better for the participants?

• Is my target participant group sufficiently similar to those in the published studies?

• What would the target participants think about this programme?
An evidence-based health promotion plan...

... can be designed through the above practical steps
References

• Secretary’s Advisory Committee on National Health Promotion and Disease Prevention Objectives for 2020. Evidence-Based Clinical and Public Health: Generating and Applying the Evidence. USA: Department of Health and Human Services; 2010.