Overview, structure, and methodologies of a systematic review & Utility of SRs

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August 11, 2017
Organizations producing and/or using systematic reviews (SRs)
0 Cochrane library [http://www.cochranelibrary.com](http://www.cochranelibrary.com)
  0 Wide ranges of (mostly) medical topics; some public health related topics

0 Campbell library
  [https://www.campbellcollaboration.org/library.html](https://www.campbellcollaboration.org/library.html)
  0 Crime and Justice; Disability; Education; International Development; Knowledge Translation and Implementation; Nutrition; Social Welfare

0 USDA’s Nutrition Evidence Library
  [https://www.cnpp.usda.gov/nutritionevidencelibrary](https://www.cnpp.usda.gov/nutritionevidencelibrary)
  0 Food and nutrition related topics; nutrition education
Utility of SRs

0 Planning and design a new trial/intervention
0 Identify research gaps
0 Support or inform policy or practice guideline development
0 Health claim petition (U.S. FDA https://www.fda.gov/RegulatoryInformation/Guidances/ucm053843.htm)
0 Support or inform insurance coverage decisions
0 … and others
75 Trials & 11 Systematic Reviews a Day: How Will We Ever Keep Up?

Growth in published trials

Growth in published systematic reviews


Types of Reviews

Evidence mapping
Horizon scanning

No formal quality assessment

Figure source: HLWIKI International
http://hlwiki.slais.ubc.ca/index.php/Scoping_reviews
A SR ≠ a meta-analysis ≠ a (narrative) review with or without a systematic literature search

0 Systematic review
   0 a comprehensive summary and synthesis of all available evidence that meets predefined eligibility criteria to address a specific research question or range of questions

0 Meta-analysis
   0 commonly included in systematic reviews, a statistical method that quantitatively combines the results from different studies
Qualitative vs. Quantitative Synthesis

Qualitative synthesis
0 Required for all systematic reviews
0 Content expertise is needed
0 Subjectivity cannot be totally avoided so transparency of the process is the key to minimize biases
0 GADE is the most commonly used approach (http://www.gradeworkinggroup.org/)

Quantitative synthesis (e.g., meta-analysis)
0 Empirical and objective
0 Content expertise is not needed for pooling (but would help interpret results)
0 Optional for all systematic review but .. Justifications are needed for when meta-analysis CANNOT or IS NOT APPROPRIATE to be performed
What authors DO

1. Identify the issue and determine the question
2. Write a plan for the review (protocol)
3. Search for studies
4. Sift and select studies
5. Extract data from the studies
6. Assess the quality of the studies
7. Combine the data (synthesis or meta-analysis)
8. Discuss and conclude overall findings

What is in a systematic review

- TITLE
- ABSTRACT
- PLAIN LANGUAGE SUMMARY
- BACKGROUND
- OBJECTIVES
- METHODS
  - Selection criteria (types of studies, participants, interventions, outcomes)
  - Search strategy
  - Data collection and analysis
  - Quality, risk of bias
- RESULTS
  - Description of studies
  - Risk of bias
  - Effects of interventions
- DISCUSSION
  - Summary of main results
  - Quality of evidence
  - Potential biases in the review
- AUTHORS’ CONCLUSIONS
  - Implications for practice
  - Implications for research
- FIGURES
- TABLES

Source: Figures from the Centre for Health Communication and Participation
Standards for Conducting a SR

0 Institute of Medicine (IOM) Standards for Systematic Reviews
https://www.ncbi.nlm.nih.gov/books/NBK209518/
  0 IOM standards are for SRs of comparative effectiveness research of therapeutic medical or surgical interventions

0 Cochrane Handbook for Systematic Reviews of Intervention
http://handbook.cochrane.org/
  0 Official document that describes in detail the process of preparing and maintaining Cochrane SRs on the effects of healthcare interventions

0 Guidelines for Systematic Reviews of Health Promotion and Public Health Interventions
  0 For the purpose of advising and supporting systematic reviews of health promotion and public health interventions within the Cochrane Collaboration
Many Online Lectures or Tutorials Regarding How to Conduct a SR

0 National Library of Medicine - The Pieces of Systematic Review with Margaret Foster Webinar Series
https://nnlm.gov/scr/professional-development/systematic-review-series

0 Campbell Collaboration Online Training
https://www.campbellcollaboration.org/research-resources/online-training.html

NEVER perform a systematic review alone!!
Execution of a SR may vary → affect risk of bias of a SR
Some clinical journals provide specific guidance to the authors regarding SR manuscripts but many don’t

0 Reporting of a SR greatly affects its usefulness
0 To maximize transparency and reproducibility, all data should be made available
  0 SRDR https://srdr.ahrq.gov
  0 Cochrane library
  0 Full length evidence reports
  0 Online supplementary materials (hosted by journals)
Figure 1 The proposed new evidence-based medicine pyramid.

(A) The traditional pyramid

(B) Revising the pyramid:
   (1) lines separating the study designs become wavy (GRADE), (2) systematic reviews are ‘chopped off’ the pyramid.

(C) The revised pyramid: systematic reviews are a lens through which evidence is viewed (applied).