Tips for Designing and Executing a High-Quality Systematic Literature Review

See the video webinar at www.jaoa.org for more detailed information

CONTEXT

- Literature reviews are the first step in any academic research cycle
- They should precede any original research (pilot study or case series)
- Before you undertake any experiment, you should be well-versed in the existing data

GOALS

- The goals of a systematic review are twofold
    - document the state of the science, and
    - identify a knowledge or research gap
- The motivation and endgame should not be publication
    - Rather, this is a learning opportunity that may eventually result in publication if you find there is a gap

SELECTING A TOPIC

- The "right" systematic review literature topic will be:
    - An area where the literature is rich and well-documented but hasn't been gathered in a single source
    - An area where clinical practice differs from what the literature recommends (this could mean the literature is either ahead of or behind practice)
    - An area where innovations are happening and will push the science forward quickly
- Your topic should be neither too broad nor too narrow. Consider all inclusion/exclusion criteria in terms of PICO in developing your topic:
    - Patients
    - Interventions
    - Comparators
    - Outcomes
- Your topic should not just distill the literature, but give meaning to it. Your goal is to give your colleagues a touchstone to navigate the high volume of literature available to them, not just add to it.

WHERE TO SEARCH

- Primary sources include MEDLINE, PubMed, Cochrane, EMBASE, SCOPUS, Web of Science
- Secondary and "gray" sources fall outside the mainstream of published journal and monograph literature; they are not controlled by commercial publishers
    - Includes ClinicalTrials.gov, Google Scholar, and others
- Primary sources should make up the bulk of your search strategy and results

WHAT TO SEARCH

- Use MEDLINE/PubMed medical subject headings (MeSH) to develop your list of related keywords
- Specific terms are better
- Use Boolean logic and the "limit" option in PubMed to filter according to your inclusion/exclusion criteria

RECORD KEEPING

- Clear, thorough, accurate record-keeping is crucial
- Your research question may/*should* be refined over time as you learn more
- Any eventual article will be accompanied by a PRISMA diagram; this should guide and dictate your record-keeping
- Consult a library scientist and/or faculty mentor
- Choose and stick with an organization tool
    - Excel
    - EndNote
    - RefWorks

CONSIDER EBM

- Evidence-Based Medicine rankings (levels of evidence, or LOE) can also help you classify and even limit your search
- Tracks the "strength" of data based on study methodology
- Consider tracking the LOE and reporting it in your final summary

COMMON BARRIERS

- Language barriers
- Positive vs negative result publication bias
- Randomized, controlled trial bias
- Publication delays
- Missing qualitative patient value or patient experience documentation

EVALUATING YOUR FINDINGS

- What you have found will dictate how you move forward – and even *whether* you move forward
- Some questions you might consider include:
    - Is the problem or issue and its significance (scope, severity, relevance) clearly defined?
    - Could the problem have been better addressed from another perspective?
    - What is the research orientation (eg, quantitative, qualitative, mixed methods)?
    - Does the material add to the understanding of the field? Is it useful for practice? Are the results generalizable?
    - Are there documented examples disproving your theories? Is there controversy in the field?
    - What are the strengths and weaknesses of the source material? What are the strengths and weaknesses of YOUR search?
    - Were the source(s) conclusions valid? Are your conclusions valid?
- Consider an independent review of the themes you've identified in the literature by team members or peers not involved in the research

WRITING YOUR PAPER

If you find that there is a contribution to be made by your study – if it's truly not been covered in the literature – and you are ready to write a paper, your article should have the following structure.

- Introduction
    - Should place your study in the context of the existing literature
    - Describes your "why"
- Methods

    - Clearly and thoroughly discuss your search methods
    - After reading the article, a reader should be able to replicate your search
- Results
    - Should summarize the Results presented in the literature by *topic, not by source study*
    - Does the source material lend itself to a meta-analysis?
    - *This is an additional step that transforms a systematic review into a different type of study.*
    - Diagrams: PRISMA flowchart (required); summary table showing elements of each source article (recommended)
- Discussion
    - Gives context to your results
    - Summarize major achievements in the area of research
    - Summarize main areas of debate
    - Present outstanding research questions
- Conclusion
    - Brief summary of the state of the science and the path forward

COMMON ERRORS

- Citations are too old (10 years)
- Too few or too many citations provided
- The most extreme studies are the only ones cited
- Studies conflicting with the authors' conclusions are missing
- Inappropriate attribution
- Reliance on secondary literature
- Authors' own work is overcited
- Inadequate synthesis/interpretation is given (not a book report)
- Discussion is too detailed
- Organization is poor
- *…and junior authors without clinical experience undertake and/or choose to format their research as a narrative review, which should be left for senior experts with a wealth of clinical experience that lends context to a more limited literature review.*

QUESTIONS?

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See below for a list of resources to support your systematic review methodology.

RESOURCE LIST

OVERVIEWS

Maggio LA, Sewell JL, Artino AR Jr. The Literature Review: A Foundation for High-Quality Medical Education Research. J Grad Med Educ. 2016;8(3):297-303. doi:10.4300/JGME-D-16-00175.1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4936839/

Cooper C, Booth A, Varley-Campbell J, et al. Defining the process to literature searching in systematic reviews: a literature review of guidance and supporting studies. *BMC Med Res Methodol* 2018; 18: 85. doi.org/10.1186/s12874-018-0545-3. https://bmcmedresmethodol.biomedcentral.com/articles/10.1186/s12874-018-0545-3

Pautasso M. Ten simple rules for writing a literature review. *PLoS Comput Biol.* 2013; 9(7): e1003149. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3715443/

Bolderson A. Writing an effective literature review. J of Med Imag and Rad Sci. 2008; 39(2): 86-92. doi.org/10.1016/j.jmir.2008.04.009. https://www.jmirs.org/article/S1939-8654(08)00057-X/fulltext#articleInformation

How to Write a Systematic Review: A guide for medical students (Rory J Piper, BMedSci(hons) Secretary, NSAMR, 2013 University of Edinburgh): https://sites.cardiff.ac.uk/curesmed/files/2014/10/NSAMR-Systematic-Review.pdf

SEARCH METHODOLOGY

Ecker ED, Skelly AC. Conducting a winning literature search. Evid Based Spine Care J. 2010;1(1):9-14. doi:10.1055/s-0028-1100887. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3609008/

Medical College of Wisconsin Literature Search Overview: https://mcw.libguides.com/search

Search flowchart infographic: https://mcw.libguides.com/ld.php?content_id=54427950

Grewal A, Kataria H, Dhawan I. Literature search for research planning and identification of research problem. Indian J Anaesth. 2016;60(9):635-639. doi:10.4103/0019-5049.190618 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5037943/

ORGANIZING YOUR RESULTS

VCU Libraries Research Guides, How to Conduct a Literature Review (Health Sciences): https://guides.library.vcu.edu/health-sciences-lit-review/organize

PRISMA flow diagram: http://prisma-statement.org/documents/PRISMA%202009%20flow%20diagram.pdf

EVIDENCE-BASED MEDICINE

Tenny S, Varacallo M. Evidence Based Medicine (EBM) [Updated 2020 Feb 17]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK470182/

Burns PB, Rohrich RJ, Chung KC. The levels of evidence and their role in evidence-based medicine. Plast Reconstr Surg. 2011;128(1):305-310. doi:10.1097/PRS.0b013e318219c171 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3124652/