Systematic Reviews

A systematic review is a type of knowledge synthesis text that answers a specific and clearly formulated research question, using a pre-specified, unbiased and rigorous methodology. It, therefore, provides a reliable and meaningful summary of evidence and a "bigger picture" on what is known about the specific research question. You could look at a systematic review as a "one-stop shop" for a summary of evidence on a specific research question.

To conduct a systematic review, a comprehensive search of ALL published literature is done using an explicit and systematic strategy within a specified timeframe. Depending on the level/quality of evidence needed, or other reasons, grey literature may or may not be included. This is different from a literature review where there is no explicit search strategy used, and grey literature is excluded. The relevant literature is identified, selected, critically appraised and analysed. A meta-analysis (statistical technique) may follow if the research question is best answered with quantitative data. The meta-analysis collects numerical data from the selected studies, analyses them quantitatively and summarises the findings. This is all made clear in a protocol beforehand.

A systematic review therefore has a:

1. Specific research question.
2. Thorough and transparent methodology; including an explicit search strategy, search terms and databases used in the search.
3. Clearly stated inclusion and exclusion criteria for assessing the search results/ studies.
4. A systematic presentation and synthesis of the findings including characteristics of the studies.

Significance in healthcare

In healthcare, due to their methodological rigour, systematic reviews are the reference standard for synthesising evidence. They are used to support the development of clinical practice guidelines as well as informing policy. For example, a systematic review in healthcare may ask a question on a specific treatment/intervention in a group of people with a certain health condition. The review will then summarise the results of all the studies that can be found on that condition, giving evidence on how effective the current interventions are. It will look at what clinical trials have been conducted, their quality, the effects the treatment and measure the health outcomes. In the hierarchy of locating studies of clinical effectiveness, systematic reviews of trials are regarded as the highest and best evidence. Cochrane systematic reviews are recommended in healthcare.

Steps of a systematic review process

1. Formulate your single research question that is specific, clear and focused. PICO is a useful tool for formulating quantitative clinical questions and PICO for qualitative questions.

2. Check that there are no existing systematic reviews or current systematic review protocols already addressing your question. This ensures that work is not duplicated, and research resources are not wasted. You may then need to either amend or refine your research question. In some cases, there may be an already existing systematic review that is either of poor quality or an update is required. In such cases, check whether an update or a new systematic review is already in progress. You can check for this kind of information using various resources including the Cochrane Database of Systematic Reviews, Cochrane protocols and PROSPERO.

3. Assemble your research team to work with and familiarise everyone with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The team should ideally include a subject area specialist e.g. your supervisor, a specialist well versed in systematic review methods and a librarian or information specialist that has had training in systematic review methods.

4. Develop and register your protocol which details the rationale, objectives and methods of the review. The search strategy methods, literature selection and appraisal methods, inclusion and (or) exclusion of the criteria, quality assessment methods, data abstraction methods etc. should all be clearly stated. The PRISMA for systematic review protocols (PRISMA-P) checklist is a useful tool for protocol development and reporting. The protocol can be refined in the process. Once it is ready, register your protocol. You can register it with PROSPERO or the Cochrane Collaboration. The UCT Faculty of Health Sciences Library has listed more organisations here.

5. Run a comprehensive search strategy, searching for **ALL** relevant studies including grey literature-work with the UCT Faculty of Health Sciences librarians and information specialists for this. Use databases that you have identified in your protocol. Track the retrieved papers using a reference manager such as EndNote.

6. Select and critically appraise the studies to be included in the review. Begin by screening titles and abstracts to identify potentially relevant studies. Following this, use the predefined inclusion and (or) exclusion criteria to screen full text studies. It is highly recommended that at least two independent reviewers are involved in the screening of all the studies. You can use software tools such as Rayyan and Covidence for this screening and selection process. Keep track of the included and excluded using the PRISMA Flow diagram.

7. Extract relevant data from all the included individual studies. For this, you can use an excel worksheet, review matrix, Rayyan or Revman. Your chosen data extraction tool should be piloted beforehand to ensure that it

meets all the needs of your review. A third part should also be involved in this step-in order to strengthen fairness.

8. Evaluate the risk of bias of the included studies. Use a specified risk of bias tool, such as the Cochrane RoB Tool, to assess potential biases in terms of study design and any other factors.

9. With a third party involved, synthesise your data in writing based on the totality of evidence/ findings. Include the detailed methodology used e.g. search strategy, used databases, searched key terms and selection criteria. This is important for updating your systematic review with new research in future. A meta-analysis may be performed thereafter if required (refer to the point on meta-analysis in the second paragraph above). Provide recommendations or future research directions to strengthen the body of evidence. Use tools such as manuscript templates from target journals and the PRISMA Flow diagram to structure and organise the systematic review.

10. Publish

Timeline for systematic reviews

Systematic reviews require careful planning, time and effort to complete. An average time for a Cochrane systematic review is at least 12 months

References:

1. Chandler J, Cumpston M, Thomas J, Higgins JPT, Deeks JJ, Clarke MJ. Chapter I: Introduction. In: Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). *Cochrane Handbook for Systematic Reviews of Interventions* version 6.0 (updated August 2019). Cochrane, 2019. Available from www.training.cochrane.org/handbook.
2. Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Prisma Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS med, 6(7), e1000097.
3. Libguides.library.curtin.edu.au. 2020. Libguides: Systematic Reviews In The Health Sciences: What Is A Systematic Review?. [online] Available at: https://libguides.library.curtin.edu.au/c.php?g=863554&p=6191897[Accessed 7 September 2020].

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