An overview of the role of librarians in systematic reviews: from expert search to project manager

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Abstract

This article will cover the content provided in two workshops offered at the EAHIL+ICAHIS+ICLC 2015 in Edinburgh, Scotland: Introduction to systematic reviews and the role of the librarian and Project and data management in systematic reviews
Throughout the process of conducting the review, a librarians role can vary from a search expert to project leader depending on the needs of the researchers. This paper will cover all of the steps of the review, describing potential roles for librarians, as well as project and/or data management issues to consider. In addition, negotiating authorship and defining a systematic review service will be discussed.

Key words: systematic reviews; project management; data management; librarians, authorship.

Introduction

Systematic reviews have become a vital part of medical research and evidence-based practices. This research method "attempts to collate all empirical evidence that fits pre-specified eligibility criteria in order to answer a specific research question" (1). There has been a sharp rise in publication of systematic reviews due to the increased call for evidence-based research; high publication rate of primary studies, growing number of professional organizations promoting systematic reviews, and high number of tools available to conduct review. The upsurge in reviews has led to more researchers seeking the assistance of librarians. The importance of including a librarian a systematic review, especially the search process, has been documented and evaluated (1-3). The value of librarians was recognized by the Institute of Medicine of the National Academies when it published its Standards for Systematic Reviews which require that a librarian plan the search strategy.

Throughout the process of conducting the review, a librarian's role can vary from a search expert to project leader. Project management is the process of planning and managing resources and tasks towards a specific goal while predicting and mitigating potential risks. Fortunately, review methods provide a "ready-made phased structure for planning and conducting a review" (4). The main phases or steps of the review are: planning the review, search, selection, risk of bias assessment, coding, and writing the report. The biggest challenge that most review authors identify is time, followed by financial support, method issues, group dynamics, and communication. With each step of the process, it is valuable to pilot processes, evaluate levels of agreement (when appropriate), and obtain expert advice when needed. Data management is the process of controlling the information generated during a research project and archiving disseminating data. While conducting the review, anticipate the needs of those who will re-use the data and at the end publish the data in a useful repository.

Step 1. Planning the review

In the initial reference interview, there are several open questions that are useful in determining needs of the client(s). First, establish that the client's definition of a systematic review matches the standard definition. Next, focus on the main objective(s) and eligibility criteria, asking open

questions to ensure clarity of the objective. Be sure to inquire if any articles have already been located that would include and if related reviews were found. The question or objective of the review needs to be appropriately specific. Several standards call for the use of the Population, Intervention, Comparison, Outcome (PICO) framework for reviews of effectiveness. However, there are many other types of questions that can be answered with a systematic review, and different frameworks may be more appropriate such as SPICE, ProPHEt (5). The framework selected does not matter as much as the question appropriately defined. The eligibility criteria needs to be clearly described, using definitions and citations as appropriate.

Lastly, discuss project management issues including: the role of the librarian, method of providing search results, expected timeline and output of the review, and potential software to collect citations, manage files, communicate, and software specific for review. Table 1 provides a list of software specifically designed for reviews. It is important to discuss the time commitment of the review with a potential author to mitigate unrealistic expectations of the length of time it will take to complete the review. A sample timetable is provided in section 2.3 of the Cochrane Handbook (8). The need for at least two members on the review team should also be discussed. If the review is focused on an effectiveness question, it is recommended that the protocol of the review is registered.

Feasibility and scope of the review objective

The process of scoping a review question is the most difficult and critical step. To determine the feasibility of a question, deliberate over the: novelty of the research question, number of available studies, and amount of time to complete the review. The uniqueness of the question will be determined by searching for related reviews in subject databases (using validated search filters) and databases of reviews (e.g. Cochrane Library, Joanna Briggs Institute, Health Evidence, PubMed Health). When a related review has been located, note its objective and eligibility criteria, resources searched and years covered by the search, and quality of its methods and report. Related reviews need to be described in introduction and findings of these reviews should be compared review in discussion. Some have called for better guidance and standards for integrating previous reviews in reviews (6).

The scoping search is a quick search to determine the estimate amount of articles that will need to be screened. Depending on the amount of time, funding, and team members, the scope of the question may need to alter. Another scenario is that no studies are found on the topic or that a group of similar studies is not located. A different type of review method maybe need to be considered such as a scoping review which aims to address an exploratory research question in order to map key concepts, types of evidence, and gaps in research related to a defined area or field (7).

Name	Developer	Link
Covidence*	The Alfred Hospital, Monash University, National ICT Australia and the University of London	https://www.covidence.org/
Distiller SR	Evidence Partners	https://distillercer.com/
EPPI-Reviewer	Evidence for Policy and Practice Information and Co-ordinating Centre	http://eppi.ioe.ac.uk/cms/Default.aspx?alias= eppi.ioe.ac.uk/cms/er4
RevMan*	Cochrane Collaboration	http://tech.cochrane.org/revman
Sumari	Joanna Briggs Institute (JBI)	http://joannabriggs.org/sumari.html
Systematic Review Data Repository (SRDR)*	Agency for Healthcare Research Quality (AHRQ)	http://srdr.ahrq.gov/

Table 1. *Review specific software*

Step 2. The search

When developing the search, consider what makes this search different: it must be documented, all articles retrieved by the search should be collected and labeled, sensitivity is more important than specificity, and bias during the search is one of the biggest threats to the review. To keep bias to a minimum, follow the most relevant standard appropriate for the type of review, potential journal of publication, or discipline of the topic. For this paper, the Methodological Expectations of Cochrane Intervention Reviews (MECIR) from the Cochrane Collaboration will be used in describing the search and Preferred Reported Items for Systematic reviews and Meta-Analysis (PRISMA) standards for reporting (8-10).

Select resources

The first step of the search is to determine the resources to be searched, starting with bibliographic databases. MECIR requires that MEDLINE, EMBASE, and Cochrane CENTRAL are searched, in an addition to other relevant databases. MECIR also requires that two clinical trial registries are searched: clinicaltrials.gov and World Health Organization (WHO) International Clinical Trials Registry Platform (ICTRP). Appropriate grey literature resources should be searched including reports, dissertations, and conferences. If there are relevant journal titles which are not indexed well, search relevant years and/or sections by hand or browsing. After selection phase, the references of included articles, previous reviews, and other highly relevant articles should be screened. In addition, requests for eligible studies could be sent to appropriate authors, websites, blogs, or professional organizations.

Develop the search

MECIR describes the structure of search to consist of 3 criteria: 1) terms for the health condition and/or population; 2) terms for the intervention(s) evaluated; 3) terms for the types of study design to be included (8). This structure is appropriate for effectiveness reviews and may not make sense to add method types. For each concept of the search, collect all appropriate synonyms, considering: terms used in related reviews, articles found in scoping review, articles published internationally for variations of terms, variations between disciplines for the concept, and historical changes. Cochrane suggests that for each concept, thesaurus terms from the database are combined with keywords in titles/abstracts. Tips for searching:

- when using thesaurus terms, check scope notes;
- in MEDLINE, do not limit by subheadings, although subheadings could be searched;
- use advanced searching techniques as appropriate: truncation, wildcards, proximity searching, and phrase searching;
- do not limit humans, instead limit out animals;
- for study type, use a validated search filter, such as the randomized trials filter within the Cochrane Handbook, section 6.4.11 (8).

Evaluate the search

Next, compare the results with articles previously identified and have the client(s) evaluate the search be screening first 50 retrieved articles. In addition, it is useful to request the search is peer reviewed by another librarian, with the Peer Review of Electronic Search Strategies (PRESS) checklist developed by the Canadian Agency for Drugs and Technologies in Health (11). Modify the search as appropriate, and then work through the other resources to be searched. It is useful to set a date to stop searching but the search may need to be updated within 6-12 months of publication.

Step 3. Selection

Selection is usually divided into two parts: title/abstract screening and selection by full text, which should be completed independently by at least two authors. To start, use the eligibility criteria to create this list of yes or no questions that could be used to sort the abstracts into relevant and irrelevant. Then use the full set of eligibility criteria to screen the relevant articles, labeling reasons for each article that is excluded. The number of articles excluded and reasons for exclusion are added to the PRISMA Flowchart (10). The sorting could be done within citation software, review software, or MS Excel depending on needs of authors. For quality assurance, pilot testing of each process is suggested to ensure a high level of inter-rater reliability between evaluators. Librarians can provide an explanation of the overall process and suggest software.

Step 4. Risk of bias assessment

Risk of bias assessment, also called critical appraisal or assessment, is "the process of assessing and interpreting evidence by systematically considering its validity, results, and evidence" (12). Review authors need to identify included studies' flaws, and then determine the impact of these flaws on the findings of individual study and to findings of review. The Cochrane Collaboration calls for the use of component lists such as the one provided for randomized controlled trials in section 8.5 of the *Cochrane Handbook*. Another source of lists is the Joanna Briggs Institute which has lists for descriptive/case series, qualitative studies, cohort studies, and case control studies. After selecting validated assessment tool, choose a tool for implementing the tool with at least 2 evaluators, such as paper/pencil, web-based survey, RevMan, Covidence, or MS Excel.

A librarian could provide a list of validated risk of bias component lists and provide advice on software.

Step 5. Coding

Coding or data abstraction is the process of systematically collecting characteristics from each study. Each review should have its own unique coding form, but *Cochrane Handbook* does provide a potential list of characteristics in section 7.3 (8). The first step is to select the tool (such as paper/pencil, MS Access, web-based survey software, Systematic Review Data Repository (SRDR), Covidence) and then develop the data collection form. The form should be piloted with a few studies to determine the level of agreement between authors, and then each study should be coded independently by at least two authors (13). Librarians can guide authors to examples of coding forms and discuss the various tools (14). Example coding forms are available from the full reports of reviews from agencies such as Cochrane Collaboration and Agency for Healthcare Research Quality (AHRQ).

Step 6. Writing the report

The final step is summarizing the review into a report. To be author on the paper, the International Committee of Medical Journal Editors recommends that authors meet four conditions: a) contribute to the conception and design or acquisition of data or analyze data; b) draft article or revise; c) approval of final version; d) "agree to be accountable for all aspects of the work" (15). Librarians can meet these requirements by developing the search, writing appropriate sections in the methods/results section, and approving the final report. Additional participation in the review should lead to be listed in a higher place in the order of authors.

There are two sections that a librarian should complete when playing the typical role in a review. First, in the methods section:

- describe the resources including date that search ended;
- describe the concepts included in search and limits and any search filters used;
- describe additional search strategies such as reference searching or requesting articles;
- provide a copy of the MEDLINE search (or most relevant database) for use within the publication, and all other databases (which will most likely be listed in the appendix if published at all).

In the discussion section, there should be a description of the level of confidence that all potentially eligible studies where located. Examine whether limits to the search may have blocked relevant results or other appropriate resources could have been searched.

Systematic review services in libraries

When defining a service, there are several topics to establish. First, clarify the types of services to be offered such as: assisting in determining the objective/scope of a review, developing the search, project management, and/or other parts of the process. Next, determine who will be able to use the services, if payment will be required, and level of work to be completed by client(s) before consultation, e.g. no preparation required, filling out a form, full protocol. Also, develop a list potential ways to provide retrieved articles to client(s) and method to negotiate authorship. Lastly, decide how the service will be marketed and evaluated.

Conclusion

Systematic review authors benefit from a librarian's involvement especially if the librarian has advanced training for reviews (1). Through training and practice, librarians can build skills required for conducting systematic reviews to play a great collaborative role with clients they serve.

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