

How to conduct a *systematic search* for a Systematic Literature Review.

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Introduction

Literature reviews are a comprehensive examination of literature which address a common aim and are increasingly popular in nursing and health related sciences (Aveyard and Bradbury-Jones 2019). Literature reviews are required to advance practice as part of an evidence-based approach and are often a requirement of academic advancement in the form of a Dissertation or Thesis. Literature reviews enable conclusions to be drawn from a large number of studies (Harari et al. 2020). However, there are many different types of review, and although most share a commitment to comprehensive searching, these do vary in their structure and methodology (Grant and Booth 2009, Aveyard and Bradbury-Jones 2019). This article will discuss the typical requirements of a systematic search; however, always check the methodology required for the type of review being conducted as the acquisition of literature may be different.

Systematic reviews and Systematic Literature Reviews

Systematic Reviews are essential to evidence based practice and the cornerstone of improving patient care and advancing professional practice. Systematic Reviews, typified by organisations like the Cochrane Collaboration, use explicit and auditable criteria for undertaking the review. These reviews are a fundamental part of the evidence base and their methodological robustness explain their positioning at the top of the hierarchy of evidence. Systematic Reviews from organisations like the Cochrane Collaboration typically, use a team of independent researchers, review all the existing relevant literature (sourcing unpublished as well as published research, and research in different languages), often investigate narrow questions typically around treatment efficacy, take months to years to conduct and should provide reliable recommendations to inform clinical practice (Davis 2016). In addition, Systematic Reviews often include meta-analysis whereby data from the original primary research are pooled to determine the overall treatment effect of all the studies when combined.

Some use the term 'Systematic Literature Review' interchangeably with Systematic Review. Others use Systematic Literature Review to denote a review conducted in a systematic way but without the full rigour of a Cochrane style Systematic Review. These 'Systematised' Literature Reviews, as Grant and Booth (2009) would classify them, are commonly undertaken by an individual, perhaps as part of an educational qualification. Such reviews are therefore significantly limited by time and resources and will often limit the retrieval of literature, so the review is feasible. These limits enable a review to be achieved in weeks to months (Davis 2016) and thus suit the timeframe of many educational programmes.

A systematic search

The primary aim of a systematic search is to locate literature which answers a specific question (Davis 2016). The scope, time and resources available for the review will determine if *all* of the literature on a subject is to be sourced, or if a proportion of this is more appropriate. In either case, the search strategy is crucial and must be conducted well. The requirements of the search are

specific to the type of review being conducted; however, characteristically these should be comprehensive and repeatable (Harari et al. 2020). The rigour and transparency of the search is so important that if this is wrong, the findings will be biased. Do not underestimate the time it takes to complete this stage.

Search strategy

Developing the search strategy is a commonly frustrating exercise even though it may initially seem straightforward (Aveyard 2019). Thinking carefully about the search before the searching is commenced is time well spent (Aveyard 2019). Once a topic is identified a scoping exercise should be commenced which identifies possible search terms by exploring literature, websites, textbooks, government publications and other relevant material.

To plan the formal stage of searching, a well-designed question is required, and this should be framed within a model such as PICO (population, intervention, comparison, outcome), PIO (population, intervention, outcome) or PEO (population, exposure, outcome). Using a model allows the key concepts within the question to be identified so that a search strategy can be developed that will generate as many appropriate search terms as possible (Wakefield 2015) (see Table One for an example). Once the main search terms have been identified, truncation, wild cards and thesaurus terms also need to be considered.

Concept	Population	Exposure	Outcome
Key words	Nurse Nurses Nursing Nurs*	Manual handling Patient handling Moving and handling Patient lifting	Backpain Back Pain Back-ache Backache bad back back spasm back disorder
MeSH term	(MH "Nurses")	(MH "Moving and Lifting Patients")	(MH "Back Pain") (MH "Low Back Pain")

Table 1: Search terms and synonyms

Databases

Multiple databases should be searched because different databases will return studies from different journals. Popular, and recommended, healthcare databases include Medline, PubMed, Embase, CINAHL, PsychINFO and AMED. However, there are lots of others.

Although combined searching is possible in many gateway services, such as EBSCO, and library databases, it is not recommended that you use combined database searches when completing a systematic search. Each database has unique features in the way it searches and indexes literature. Specific thesaurus such as MeSH (Medline Subject Headings) terms will help to identify papers by the way they have been annexed and is more specific than a simple key word search. These thesaurus searches are not transferable between databases.

The aim of the initial searches is to build a 'high sensitivity' search around each important concept in your question that will identify all of the literature relevant to this concept. Therefore, each key word search should be individually executed in the database. All search terms which are equivalent to each other are then combined using the Boolean operator OR. Use of the Boolean operator AND then allows you to move to a 'high precision' search where concepts are joined together. In this final

search papers will only appear in the results list if all your required concepts appear in the paper together (see Figure One).

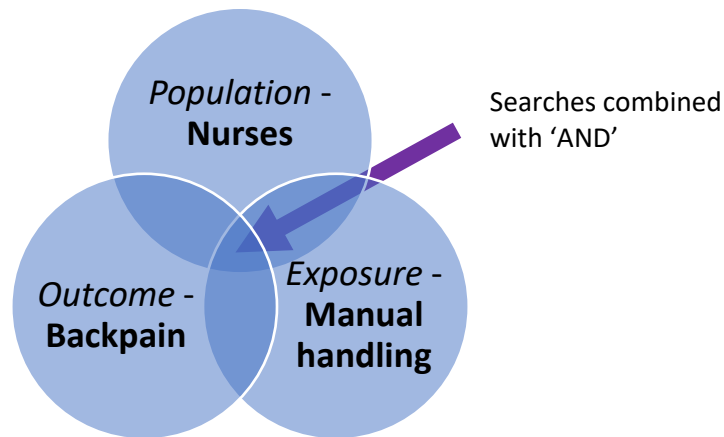


Figure 1: example of 'AND' Boolean search

In an ideal world this process would reliably produce a results list that is feasible for the stage of 'review by title and abstract'. However, having several thousands of papers in the results list is an indicator that the search is not yet precise enough. At this stage limits are useful and appropriate limits for a Systematic Literature Review restricted by time and resources may be publication date, language of publication and peer review. It is worth saying that a limit of 'full text', which may be tempting, is never appropriate for a Systematic Literature Review, regardless of time and resources, as this feature is licence specific and will only return results which your organisation has a licence to access as full text. Therefore, the aims of a Systematic Literature Review cannot be achieved if this limit is applied. Any papers that are not available immediately full text can be sourced through an interlibrary loan, speak with the librarian about this. If the search is still not precise enough, review the search protocol and consider using limits for any key word searches by restricting these to appearing in the abstracts only.

However, even more frustrating than an imprecise search is a search that returns little or no results. It may be that there is no research in this field in which case a Systematic Literature Review may not be possible. Alternatively, the question could be revised by widening its scope, changing the inclusion criteria, and the search re-actioned. Although this process can be immensely frustrating, it is crucial to get right. Asking for support and advice from a librarian is often key to a successful search strategy. Additional advice at this stage is to always save the database searches so these are easily available when writing up the review (Bettany-Saltikov 2012).

Complimentary searches

Not all studies are indexed in the databases and it is possible that a relevant citation is missed. Therefore, combining a database search with complimentary searching is essential (Davis 2016). Complimentary searching includes a review of citations from relevant papers, forward searches of papers that cite relevant papers, hand searching of individual journals, and web based searches (Harari et al. 2020).

Review by title and abstract

Once a rigorous, transparent and repeatable search is completed that confidently leads to relevant papers these can be screened by their title and abstract. At this point the results can be downloaded and imported to referencing software such as EndNote or Mendeley so that duplicates can be

removed and the process of review by title and abstract can be commenced. At this stage resist the temptation to read the full text. Simply add papers to a folder if they appear relevant to the review question.

Review by full text

Once all the papers returned in the search have been screened, the papers in the folder can be reviewed by full text. This stage of the process requires each paper to be read in full and assessed against the inclusion and exclusion criteria. These criteria need to be set so there is a transparent rationale for why each paper was included or excluded. Most of these criteria will be set before reviewing the papers, other criteria will only be set as the papers are reviewed. For example, excluding paediatric studies may be the intention from the start but because the evidence base is still too large for a feasible review, a criterion that also excludes those over 70 may be added. At this stage all decisions must be recorded about why studies were included or excluded from the review (Wakefield 2015).

Following completion of this stage a feasible amount of literature will have been identified for the Systematic Literature Review. This literature will then require appraisal and synthesis in a way that is congruent to the review methodology chosen.

Further reading

Further advice on how to conduct systematic searches are contained within the guidance for Systematic Review from the Cochrane Collaboration (Higgins et al. 2019), The Centre for Reviews and Dissemination (2008) and The Joanna Briggs Institute (Aromataris et al. 2017). In addition reporting guidelines have been developed by Moher et al. (2009) in the form of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement and PRISMA flowchart (See Figure Two). However, core texts from Bettany-Saltikov (2012), Coughlan and Cronin (2017), Aveyard et al. (2016) and Aveyard (2019) are also thoroughly recommended for their clear advice on how to complete a Systematic Literature Review in health sciences.

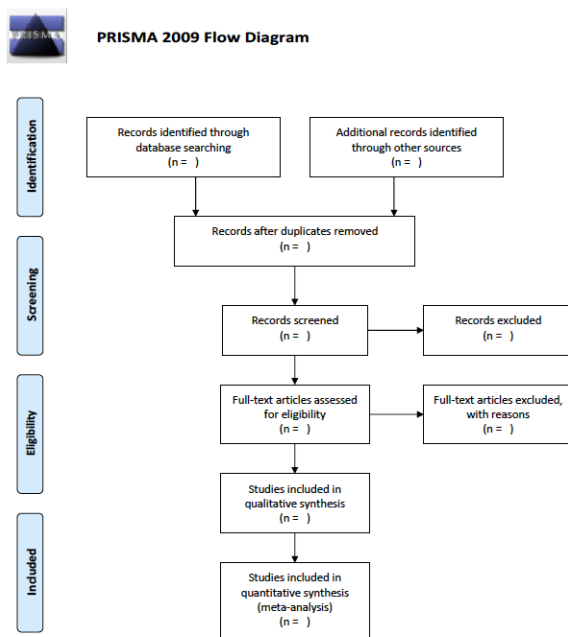


Figure 2: PRISMA flowchart (Moher et al. 2009)

Conclusion

This article has described the systematic searching process within Systematic Literature Reviews. Recommendations for practitioners and students embarking on a Systematic Literature Review include being realistic about the time it takes to search, to scope the evidence base first and plan the search strategy in advance and in detail, to seek advice and support from a librarian and document all decisions so these can be accounted for in the final writing up of the review. A final piece of advice is to look at other reviews using the same review methodology published in leading journals which illustrate how others have managed this review type. These recommendations will help to ensure the review is methodologically robust.

References

- Aromataris, E., Munn, Z. & (Editors) (2017) Joanna Briggs Institute Reviewer's Manual. The Joanna Briggs Institute. Available from <https://reviewersmanual.joannabriggs.org/> [accessed on 01/02/2020]
- Aveyard, H. (2019) *Doing a literature review in health and social care : a practical guide*, Open University, Maidenhead.
- Aveyard, H. & Bradbury-Jones, C. (2019) An analysis of current practices in undertaking literature reviews in nursing: findings from a focused mapping review and synthesis. *BMC Medical Research Methodology*, **19**(1), 105.
- Aveyard, H., Payne, S. & Preston, N. (2016) *A post-graduate's guide to doing a literature review in health and social care*, Open University Press, Maidenhead.
- Bettany-Saltikov, J. (2012) *How to do a systematic literature review in nursing : a step-by-step guide*, Open University Press, Maidenhead.
- Centre for Reviews and Dissemination (2008) *Systematic Reviews: CRD's guidance for undertaking reviews in health care*, CRD University of York, York.
- Coughlan, M. & Cronin, P. (2017) *Doing a Literature Review in Nursing, Health and Social Care*, SAGE, Los Angeles.
- Davis, D. (2016) A practical overview of how to conduct a systematic review. *Nursing Standard*, **31**(12), 60-71.
- Grant, M.J. & Booth, A. (2009) A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal*, **26**(2), 91-108.
- Harari, M.B., Parola, H.R., Hartwell, C.J. & Riegelman, A. (2020) Literature searches in systematic reviews and meta-analyses: A review, evaluation, and recommendations. *Journal of Vocational Behavior*. <https://doi.org/10.1016/j.jvb.2020.103377>
- Higgins, J., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M. & Welch, V. (eds.) (2019) *Cochrane Handbook for Systematic Reviews of Interventions version 6.0 (updated July 2019)*, John Wiley & Sons, Chichester.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. & The PRISMA Group (2009) Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med*, **6**(7), e1000097. doi:10.1371/journal.pmed1000097
- Wakefield, A. (2015) Synthesising the literature as part of a literature review. *Nursing Standard*, **29**(29), 44-51.