

Systematic Review in Nursing Research

Ms. Lilee Verma

Assistant Professor, Obstetrics and Gynaecology in Nursing, Apollo College of Nursing, Hyderabad, Telangana

Systematic review

A Systematic Review is a specific type of review that uses rigorous and transparent methods in an effort to summarize all of the available evidence with no biases.

A review is an overview of the research that's already been completed on a topic. What makes a systematic review different from other types of reviews is that the research methods are designed to reduce bias.

Systematic review vs. meta-analysis

Systematic reviews often quantitatively synthesize the evidence using a meta-analysis. A meta-analysis is a statistical analysis, not a type of review.

A meta-analysis is a technique to synthesize results from multiple studies. It's a statistical analysis that combines the results of two or more studies, usually to estimate an effect size.

Systematic review vs. literature review

A literature review is a type of review that uses a less systematic and formal approach than a systematic review. Typically, an expert in a topic will qualitatively summarize and evaluate previous work, without using a formal, explicit method.

Although literature reviews are often less time-consuming and can be insightful or helpful, they have a higher risk of bias and are less transparent than systematic reviews.

Seven Steps for Conduction of Systematic Review

The adjective systematic to review can only be justified if it is based on a specific review question.

Step I Formulate a research question

Frame question for a review (Review Question), which is not synonymous with research question. The review question should be specific in the form of clear, unambiguous and structure. What were the outcomes or study designs?

A good research question for a systematic review has four components, which we can remember with the acronym PICO:

- Population(s) or problem(s)
- Intervention(s)
- Comparison(s)
- Outcome(s)

Step II Develop a protocol

A protocol is a document that contains our research plan for the systematic review. This is an important step because having a plan allows us to work more efficiently and reduces bias.

Our protocol should include the following components:

- Background information: Provide the context of the research question, including why it's important.
- Research objective(s): Rephrase the research question as an objective.
- Proposed methods
 - Selection criteria: State how we'll decide which studies to include or exclude from the review.
 - Search strategy: Discuss the plan for finding studies.
 - Analysis: Explain what information we'll collect from the studies and how it will synthesize the data.

Step III Identification of RELEVANT Publications

Efforts are to be made to capture as many as relevant publications. It is to be done by two independent reviewers to eliminate researchers bias (may be unintentional)

- Databases: Search multiple databases of peer-reviewed literature, such as PubMed or Scopus. Think carefully about how to phrase your search terms and include multiple synonyms of each word. Use Boolean operators if relevant.

- **Handsearching:** In addition to searching the primary sources using databases, you'll also need to search manually. One strategy is to scan relevant journals or conference proceedings. Another strategy is to scan the reference lists of relevant studies.
- **Gray literature:** Gray literature includes documents produced by governments, universities, and other institutions that aren't published by traditional publishers. Graduate student theses are an important type of gray literature, which you can search using the Networked Digital Library of Theses and Dissertations (NDLTD). In medicine, clinical trial registries are another important type of gray literature.
- **Experts:** Contact experts in the field to ask if they have unpublished studies that should be included in your review.

Step IV Apply the selection criteria

Applying the selection criteria is a three-person job. Two of you will independently read the studies and decide which to include in your review based on the selection criteria you established in your protocol. The third person's job is to break any ties.

To increase inter-rater reliability, ensure that everyone thoroughly understands the selection criteria before you begin.

If you're writing a systematic review as a student for an assignment, you might not have a team. In this case, you'll have to apply the selection criteria on your own; you can mention this as a limitation in your paper's discussion.

We should apply the selection criteria in two phases:

1. **Based on the titles and abstracts:** Decide whether each article potentially meets the selection criteria based on the information provided in the abstracts.
2. **Based on the full texts:** Download the articles that weren't excluded during the first phase. If an article isn't available online or through your library, you may need to contact the authors to ask for a copy. Read the articles and decide which articles meet the selection criteria.

It's very important to keep a meticulous record of why it is included or excluded each article. When the

selection process is complete, we can summarize what we did using a PRISMA flow diagram

What is PRISMA?

PRISMA stands for Preferred Reporting Items for Systematic Reviews and Meta-Analyses. It is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses.

The PRISMA Statement consists of a 27-item checklist and a 4-phase flow diagram.

Why PRISMA?

PRISMA is the recognized standard for reporting evidence in systematic reviews and meta-analyses. The standards are endorsed by organizations and journals in the health sciences.

Benefits of using PRISMA

- Demonstrate quality of the review
- Allow readers to assess strengths and weaknesses
- Permits replication of review methods

Step V Interpretation of the findings

The risks of biases should be explored. Explanation of heterogeneity helps in determination. Whether the overall summary can be trusted, and, if not, the effects observed in high quality should be used for generating evidence.

Step VI Summarizing the evidence

The research gap analysis and summarizing it in the tabular form is an important step. While identifying the research gap the researcher should be in clear understanding of 7 types of research/knowledge gaps. The gaps identified, may be one or more of the seven types.

1. **Qualitative:** Summarize the information in words. we'll need to discuss the studies and assess their overall quality.
2. **Quantitative:** Use statistical methods to summarize and compare data from different studies. The most common quantitative approach is a meta-analysis, which allows you to combine results from multiple studies into a summary result.

Generally, you should use both approaches together whenever possible. If you don't have enough data, or the data from different studies aren't comparable, then

you can take just a narrative approach. However, you should justify why a quantitative approach wasn't possible.

Step VII: Write and publish a report

The purpose of writing a systematic review article is to share the answer to the research question and explain how we arrived at this answer.

Our article should include the following sections:

- Abstract: A summary of the review
- Introduction: Including the rationale and objectives
- Methods: Including the selection criteria, search method, data extraction method, and synthesis method
- Results: Including results of the search and selection process, study characteristics, risk of bias in the studies, and synthesis results
- Discussion: Including interpretation of the results and limitations of the review
- Conclusion: The answer to our research question and implications for practice, policy, or research

When to conduct a systematic review

A systematic review is a good choice of review if we want to answer a question about the effectiveness of an intervention, such as a medical treatment.

To conduct a systematic review, we'll need the following:

- A precise question, usually about the effectiveness of an intervention. The question needs to be about a topic that's previously been studied by multiple researchers. If there's no previous research, there's nothing to review.
- A team of at least three people. Best practices require three people for certain steps of the systematic review process. Ideally, in addition to your research team you'll also have an advisory group of about six people.
- If we're doing a systematic review on our own (e.g., for a research paper or thesis), we should take appropriate measures to ensure the validity and reliability of your research.
- Access to databases and journal archives. Often, our educational institution provides us with access.
- Time. A professional systematic review is a time-consuming process: it will take the lead author about six months of full-time work. If we're a student,

individual should narrow the scope of systematic review and stick to a tight schedule.

- Bibliographic, word-processing, spreadsheet, and statistical software. For example, we could use EndNote, Microsoft Word, Excel, and SPSS.

Pros and cons of systematic reviews

A systematic review has many pros.

- They minimize research bias by considering all available evidence and evaluating each study for bias.
- Their methods are transparent, so they can be scrutinized by others.
- They're thorough: they summarize all available evidence.
- They can be replicated and updated by others.

Systematic reviews also have a few cons.

- They're time-consuming.
- They're narrow in scope: they only answer the precise research question.

To verify that the report includes everything it needs, we can use the PRISMA checklist.

Once our report is written, we can publish it in a systematic review database, such as the *Cochrane Database of Systematic Reviews*, and/or in a peer-reviewed journal.

CONCLUSION

Systematic reviews is essential to accurately and reliably summarise evidence relating to the efficacy and safety of healthcare interventions. The clarity and transparency of these reports, however, are not optimal. Poor reporting of systematic reviews diminishes their value to clinicians, policy makers, and other users.

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