Review Article

SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS: A REVIEW

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ABSTRACT

Systematic reviews and meta-analyses are essential steps for summarizing and concluding the evidence accurately and reliably. They help to keep the evidence up-to-date. Based on the summary of evidence, policymakers can make judgments by analyzing the risk-benefit ratio of interventions. They also provide a basis for a starting point for clinical practice guideline developers and offer summaries of previous research for funders wishing to support new researchers.

***Key words:** Systematic review, meta-analysis*

INTRODUCTION

A systematic literature review (SLR) is a rigorous academic search process that aims to identify and evaluate all relevant literature on a specific topic in order to draw conclusions about the question at hand[1] SLR involves identifying, selecting, and critically appraising research in order to answer a specific research question. The SLR should adhere to a clearly defined protocol or plan, with criteria clearly stated before the review is conducted. It is a comprehensive and transparent search conducted across multiple databases and grey literature, allowing other researchers to replicate and reproduce the process. The search strategy is carefully planned with a specific focus or a defined question in mind. It identifies the type of information searched, critiqued, and reported within known timeframes. The review must include the search terms, search strategies (including database names, platforms, and dates of search), and any limits applied[2].

Systematic reviews and meta-analyses (SR/MAs) are considered the highest level of evidence-based research in the field of health-related disciplines. Well-conducted SR/MAs are essential for maintaining contemporary evidence-based practices.

A systematic review is conducted when there is both heterogeneity and homogeneity within the sample, and qualitative inferences are made as a result. On the other hand, a meta-analysis is conducted when the sample is homogeneous, and quantitative inferences are drawn from the results. In contrast to a systematic review, other types of reviews are often descriptive, with authors selecting articles based on their own perspectives, leading to lower quality evidence.[3,4]

METHODS

Systematic steps for conducting systematic reviews and meta-analyses (SR/MAs)

Researchers can follow five sequential steps to conduct SR/MAs:

Step 1: Frame a research question

The first step in conducting SR/MAs involves formally defining or "framing" a research question. The population, intervention, comparison, and outcome (PICO) framework should be used to identify different components of clinical evidence for SR/MAs. The PICO framework, identified by the Cochrane Collaboration, can be helpful in addressing such questions.[5,6]

a. Who is the individual or patient in question?
b. What is the relevant intervention or cause for the issue?
c. Is there a similar intervention to compare with?
d. Lastly, what is the desired outcome?

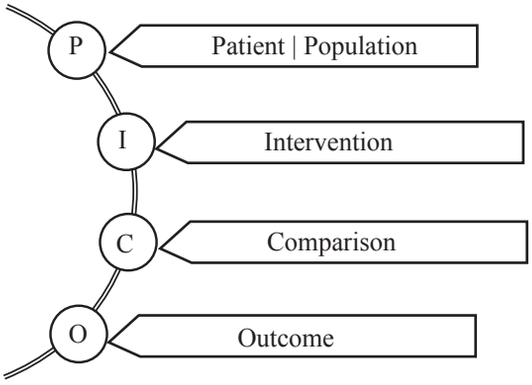

Figure 1. PICO Framework of systematic review

Source:https://academy.pubrica.com/research-publication/systematic-review/what-are-the-pico-elements-in-systematic-review/

It is crucial to select a topic of interest with a sufficient amount of available literature for a review. A preliminary "scoping" review can help determine if there is enough literature to conduct a useful review. It is important to choose a question that will yield an appropriate amount of data for the review to be conducted.[2]

Step 2: Search and re-search the literature

It is essential to establish a protocol for systematic reviews and meta-analyses (SR/MAs) that clearly outlines the criteria for selecting studies based on the SR question. This protocol should provide transparent reasons for including or excluding studies before conducting literature searches. Additionally, the protocol should specify the minimum acceptable level of study design that the researcher will assess, such as whether they will only review randomized controlled trials or also include observational cohort studies.

Furthermore, it is crucial to register the systematic review protocol with organizations such as the Cochrane Collaboration or The International Prospective Register of Systematic Reviews (PROSPERO). It is also important to check if the planned SR review is already in progress or registered before starting your own review.[7-9]

Step 3: Search and re-search the literature

This step involves conducting a thorough search of the literature to identify relevant sources for summarization and analysis. This is typically done through keyword searches on electronic databases, as well as other sources such as unpublished literature. The goal is to provide a comprehensive and unbiased coverage of reliable and up-to-date information. It is recommended to search at least two, and preferably three to five, reliable databases such as Google Scholar, Web of Science, PubMed, EMBASE, and Cochrane Database. Using Boolean operators like "AND", "OR", and "NOT" can help in combining keywords to refine the search results. The researcher must choose research articles from each database within specific time frames. For instance, if the researcher wishes to review articles from 2010 to 2020, they must retrieve all relevant articles from the databases they plan to use for the review. Additionally, the researcher can filter the articles according to the criteria specified by the databases, such as publication date, subject area, availability of full text, and language (e.g. English).[7,10] The researcher must use Mendeley and EndNote to manage selected articles, specifically to check for and remove duplicate articles. After downloading all the articles from selected databases, the researcher needs to upload them to either Mendeley or EndNote. The researcher then needs to report the exact number of articles identified from the databases, the number of articles lost while uploading to Mendeley or EndNote (records marked as ineligible by automation tools), and the number of duplicated articles. After that, the researcher can remove duplicates in Mendeley or EndNote. After removing duplicates from Mendeley, the researcher should keep records of all articles and then start to shortlist articles according to the preferred reporting items for systematic reviews and meta-analyses (PRISM) guidelines.[11]The one step is the records screen, which involves removing all unrelated articles by reading the title and abstract. It is important to note any reports sought for retrieval, indicating that an article is highly relevant to the review but was accidentally removed. After that, to find reports assessed for eligibility, a researcher must thoroughly read the full article and remove any unrelated articles again. A flow diagram can be used to illustrate the article searching and selection process.[7,10,12]

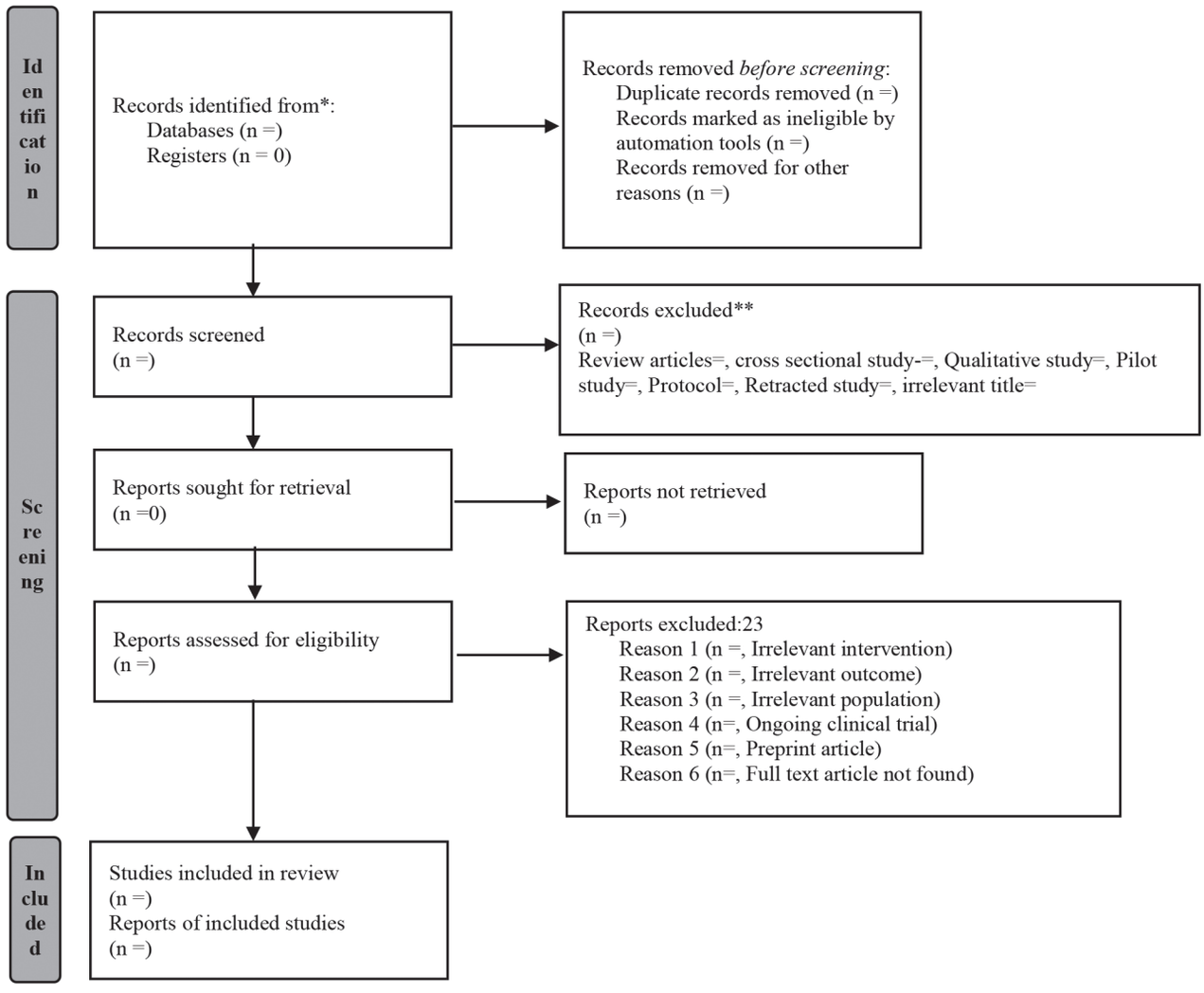

Figure 2. PRISMA flow diagram

Source: https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/s13643-021-01626-4

Step 4: Be critical

This stage of a systematic review involves critically summarizing the identified literature, identifying bias, and making useful recommendations based on one's own analysis. It is important for the researcher to closely follow the PRISMA guidelines.[13] Design-based quality checklists and critical appraisal guides can assist in determining the significance of identified studies for making recommendations or their suitability for meta-analysis. The Cochrane Collaboration tool is essential for assessing the risk and bias in randomized controlled trials, particularly in the context of meta-analysis.[8]The quality of the finally selected article for the systematic review can be evaluated using the quality assessment tool for quantitative studies developed by the Effective Public Health Practice Project (EPHPP).[14] The process of data synthesis will include organizing study characteristics, assessing study quality and outcomes, and investigating the potential risks of publication bias and other biases in each study. This review must demonstrate enough originality to contribute new knowledge to the academic field.[3,4]

Step 5: Find a logical structure

A researcher can follow the IMRAD (Introduction, Methods, Results, and Discussion) format. The introduction should describe the research question and provide background information on the topic. When writing methods, the key question to ask yourself is whether a reader could replicate the search based on the information provided, at a minimum, the researcher needs to mention specific databases and years searched, keywords used, and the inclusion and exclusion criteria. When presenting results, once sources have been collected and analyzed, it is important to report the

synthesized information in a logical, organized way, that is, by grouping the sources in some way for example, by similar findings or by level of evidence. In the discussion section, as well as emphasizing what this new work adds to the body of knowledge. It is important to discuss the limitations as well as strengths of this review. In general, tables, boxes and diagrams, PRISMA Flow Diagram can assist in presentation and understanding and can be used to explain complex ideas or highlight original messages.

Step 6: Reviewing your review

The final step in writing a narrative is to utilize feedback to revise the review before submitting it to a journal. The main goal is to ensure that the review is clear and accurate, without any ambiguities, inaccuracies, or inconsistencies. It is recommended to have others, including native English speakers, peers, and senior colleagues, read the revised work to identify any issues. Addressing these issues before submission can help the reviewer get the most out of subsequent peer review. It is also important to read the review aloud to yourself or someone else, including a non-expert, to catch any errors missed when reading silently. Finally, submit the revised manuscript for peer review without prior review[1,15]

CONCLUSIONS

The use of evidence-based systematic reviews (SR) and meta-analyses (MAs) has become increasingly necessary and important in the healthcare setting. It is essential to follow standard protocols and guidelines when conducting SR and MAs. Healthcare professionals rely on them to stay up to date with developments in their field. Additionally, these reviews are often used as a starting point for developing clinical practice guidelines based on the evidence collected through SR and MAs.

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