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Editorial

Systematic Review Methodology: Conducting High-Quality Reviews and Understanding Their Significance in Evidence-Based Practice

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Abstract:

Systematic reviews play a crucial role in evidence-based research, providing a platform for evaluating and synthesizing existing literature. They are especially valuable in addressing complex questions and identifying patterns across multiple studies, thereby aiding in the identification of knowledge gaps and prioritization of future research. This review aims to provide a guide for researchers, students, and others interested in conducting systematic reviews by outlining the key components, including formulating a research question, searching for relevant literature, appraising evidence quality, and reporting findings. By following these guidelines, systematic reviews can be transparent, reproducible, and credible. The significance of systematic reviews has increased in various fields, such as education, psychology, and medicine, due to the exponential growth in published studies. This guide emphasizes the importance of a rigorous and structured approach to conducting high-quality systematic reviews that contribute to the current understanding of complex issues, inform clinical practice and policy, and ultimately impact medical practices and policies.

Key-Words:

Systematic Review, Evidence-Based Practice, Research Question, Literature Search, PICO Framework, Data Extraction, Quality Assessment, Risk of Bias, Reporting Guidelines, PRISMA.

Introduction:

Systematic reviews are a crucial component of evidence-based research, providing a platform to assess and investigate existing data from an extensive range of studies [1]. They are especially useful when attempting to address complex queries or discover patterns across multiple studies [2,3]. By implementing

• Assess the quality of the included studies: Assess the quality of the included studies using a standardized tool, such as the Cochrane Risk of Bias tool. This can help to identify sources of bias and ensure that the results are robust and reliable.

Assessing the quality of evidence

Assessing the quality of studies is an essential phase in conducting a systematic review. This vital aspect encompasses scrutinizing and weighing the strength, validity, and reliability of all included studies. The quality appraisal can significantly affect any final deductions derived from this comprehensive analysis as well as determining how far-reaching its practical implications are for clinical practice or policy-making purposes [8, 16].

An high-quality study is more inclined towards providing accurate and reliable findings, unlike a low-quality one that may be affected by bias or inaccuracies. Through evaluation of studies' quality, reviewers can pinpoint any bias or limitations within the existing literature whilst making informed determinations concerning conclusions drawn from such assessments.

Different approaches can be used to assess the quality of evidence in systematic reviews. Here are some examples:

• Cochrane Risk of Bias Tool [17]: This tool is used to assess the risk of bias in randomized controlled trials. It evaluates the methods used in the study to address six types of bias: selection bias, performance bias, detection bias, attrition bias, reporting bias, and other

an organized method for identifying, evaluating, and synthesizing relevant literature sources, systematic reviews can aid researchers in recognizing knowledge gaps whilst prioritizing future scientific study that could potentially impact medical practices and policies [3].

In recent times, the significance of systematic reviews has significantly increased in various fields such as education, psychology, and medicine. The exponential growth in the number of studies published within these domains makes it difficult for researchers to keep pace with current evidence. Nonetheless, by offering a means through which existing data can be methodically evaluated and consolidated into one coherent piece of work; systematic reviews effectively decrease this information overload whilst ensuring that decisions are grounded on reliable available evidence sources [1].

The main objective of this review is to provide individuals with a guide on the process involved in conducting a systematic review. This guide targets researchers, students, and anyone else interested in carrying out such reviews successfully. Its aim is to provide clear directions that enable easy navigation through the key components, including formulating a research question, finding relevant literature, appraising evidence quality as well as recording findings. Following these directives should result in excellent systematics that are transparent, reproducibility and credible for its audience's consumption.

Discussion

What is a Systematic Review?

Systematic reviews are considered the gold standard for synthesizing evidence and making informed decisions in various fields, such as healthcare and medicine, social sciences, among others [3]. They can provide an objective summary of available evidence and act as a standard for synthesizing information. Thus, they prove themselves to be particularly useful tools towards making informed decisions based upon rigorous research methodologies. Important to be aware that a systematic review is different from a meta-analysis, as a meta-analysis utilizes statistical methods [2].

An important benefit of systematic reviews is their capability to reduce distortion. Through implementation of a rigorous and clear procedure for detecting and choosing studies, systemic reviews can lessen the likelihood of selectively choosing or omitting research inconsistent with goals [1]. This is attained by biases. The tool categorizes each study as having low, high, or unclear risk of bias for each of these domains.

• Newcastle-Ottawa Scale [18]: This tool is used to assess the quality of non-randomized studies, such as cohort studies and case-control studies. It evaluates the quality of the study based on three categories: selection of study groups, comparability of study groups, and assessment of outcome.

• AMSTAR 2 [19]: This tool is used to assess the quality of systematic reviews. It evaluates the methods used in the review, such as the search strategy, selection of studies, assessment of risk of bias, and synthesis of the results. The tool categorizes the review as having high, moderate, low, or critically low confidence in the results.

• ROBINS-I [20]: This tool is used to assess the risk of bias in non-randomized studies of interventions. It evaluates the methods used in the study to address seven types of bias: confounding, selection of participants, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes, and selection of the reported result.

• GRADE [21]: This tool is used to assess the overall quality of the evidence from a systematic review. It evaluates the quality of the studies included in the review and the consistency of the results. The tool categorizes the overall quality of the evidence as high, moderate, low, or very low.

Reporting the review

In the process of completing a systematic review, it is important to report on its findings to effectively relate them to their targeted audience. The reporting should be both transparent and comprehensive while also following pre-established guidelines that are designed for ensuring rigorousness and clarity throughout [1, 2, 6]. As such, accessibility must remain at an all-time high when presenting this critical information to those who seek it out.

The process of reporting a systematic review typically involves the following steps:

• Writing the report: Begin by writing the report, which typically includes an abstract, introduction, methods, results, discussion, and conclusion. The report should

developing clear criteria selection criteria based on which studies to include or exclude, along with utilizing standardized approaches when assessing study quality and risk of bias.

Among the benefits of systematic reviews is their ability to pinpoint areas in scientific literature that remain underexplored, which need further research. This benefit proves critical when tackling complex issues requiring a multidisciplinary approach [4]. Conducting comprehensive examinations of existing evidence from varying disciplines and standpoints empowers researchers where there is lack of consensus or conflicting evidence, thereby facilitating more precise guidelines for future research.

The application of systematic reviews extends beyond academic research purposes; they can also provide crucial insights for policymakers and clinicians [4]. By consolidating all the available evidence in a way that is clear and transparent, this approach empowers decision-makers to identify best interventions or treatments pertinent to specific populations or conditions.

Developing a research question

The process of carrying out a systematic review demands developing a clear research question. This practice is important in ensuring that the review is focused, relevant and answerable which consequently guides the search strategy, study selection and data analysis. A good research question leads to good research [5]. The question should be specific enough to obtain a manageable number of studies, but not too specific that there are not enough published reports available [2]. The absence of a clear research question could lead to lack of coherence within the analysis, thereby rendering any outcomes convoluted or impractical. By posing a clear inquiry, this guarantees that your investigation remains pertinent towards its intended readership while concurrently holding value for informed deliberation purposes.

In the process of formulating a research inquiry for a comprehensive review, it is essential to adhere to specific directives that will guarantee precision and feasibility in answering the question at hand. Considering this, we present some steps which should be followed:

• Start with a broad topic: Begin by identifying a broad area of interest or concern that you wish to explore.

provide a clear and comprehensive summary of the methods, results, and conclusions of the systematic review.

• Structuring the report: The report should be structured in a clear and organized manner, with headings and subheadings that guide the reader through the review. The use of tables, figures, and graphs can also help to present the data in a clear and accessible way.

• Using reporting guidelines: Reporting guidelines, such as PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), can help to ensure transparency and rigor in reporting [1, 2, 6, 22]. These guidelines provide a standardized framework for reporting systematic reviews and can help to ensure that all relevant information is included and presented in a clear and transparent way.

• Peer-review: The systematic review report should be reviewed by independent reviewers to ensure that it is comprehensive, accurate, and transparent [23]. This can help to identify any potential biases or limitations in the review and ensure that the conclusions are robust and reliable.

Content of a Systematic Review

Based on contents of the PRISMA guidelines, the key components include the title, abstract, methods, results, discussion, and may include funding if that is relevant [1, 22]. In terms of content, a typical systematic review report includes the following elements:

Title:
The title should be accurately reflect the content of the review in a clear and concise manner, while including key information such as the topic, population, intervention/exposure, comparison and outcomes (PICOS) so that readers can quickly identify what the paper is about. The title should be specific, avoiding vague or too broad topics, and should align with the guidelines of the journal [24, 25].

Abstract:
The aim of the abstract is to provide an overarching summary of the systematic review that remains succinct and clear. It should offer a brief synopsis of the research question, methodology, results and

This could be a particular health condition, intervention, or population [5].

• Refine the topic: Once you have identified a broad topic, refine it by focusing on a specific aspect that you wish to explore [5]. For example, if your broad topic is "diabetes," you could refine it by focusing on a specific intervention, such as "exercise for people with type 2 diabetes."

• Use the PICO framework: The PICO framework is a useful tool for developing focused and answerable research questions [2, 6]. PICO stands for Patient/Population, Intervention, Comparison, and Outcome. Use this framework to structure your question and ensure that it is focused and answerable. For example, "In adults with type 2 diabetes (P), does exercise (I) compared to standard care (C) result in improved glycemic control (O)?"

• Ensure feasibility: Consider the feasibility of answering the question within the scope of a systematic review [2, 5]. Ensure that there is sufficient literature available to answer the question, and that the question is not too broad or complex to be answered through a systematic review.

Performing a Literature Review

Searching for relevant studies is a critical step in the systematic review process. It involves identifying and selecting studies that meet the inclusion criteria for the review and provide relevant data to answer the research question. The search process should be comprehensive, transparent, and reproducible to ensure that all relevant studies are identified.

The process of identifying relevant studies typically involves the following steps:

• Developing a search strategy: This involves identifying the search terms and keywords that will be used to search relevant databases [7, 8]. The search strategy should be comprehensive and inclusive of all relevant studies and may involve a combination of controlled vocabulary terms and free-text keywords.

• Identifying relevant databases: The next step is to identify the relevant databases that will be searched [7]. This may include electronic databases such as PubMed, Embase, MEDLINE, Web of Science, and Google Scholar [9]. Other sources can include grey literature sources such as conference proceedings,

and conclusions. The abstract should provide enough information to allow readers to quickly determine the relevance of the review to their own work [25].

Introduction:
The introduction should provide a detailed overview of the research question, its importance, and its relevance to current knowledge. It should also provide a clear rationale for the review and identify any gaps or limitations in the existing literature. The introduction should be focused and concise and should provide a clear roadmap for the reader of what to expect in the subsequent sections of the paper [1].

Methods:
The methods section is a critical component of the systematic review as it details the approach used to identify, select, and evaluate studies. It should provide a detailed description of the search strategy, inclusion and exclusion criteria, study selection, data extraction, and quality assessment methods. The methods section should be written in a clear and precise manner to enable readers to replicate the review. The systematic review protocol should be reported in enough detail to enable readers to evaluate the review's validity and reliability [1, 26].

Results:
The results section should provide a detailed summary of the findings of the systematic review. This should include a description of the included studies, the quality of evidence, and the synthesis of the findings. Results should be presented in a clear, concise, and organized way using tables, graphs, or other visual aids to help readers understand the results [1, 2].

Discussion:
The discussion section is where the authors critically evaluate the evidence presented in the results section. They should explain how the findings of the systematic review contribute to the current understanding of the research question and identify any inconsistencies, limitations, or gaps in the existing literature. The authors should also explain how the findings could be applied to clinical practice or policy and identify areas for future research [1].

Conclusion:
The conclusion should provide a summary of the key findings and conclusions of the systematic review. It should be supported by the evidence presented in the results and discussion sections and should include recommendations for future research or practice [1, 2].

dissertations, and government reports.

• Conducting the search: Once the search strategy and databases have been identified, the search can be conducted [7]. The search should be comprehensive and reproducible and may involve the use of multiple databases and search engines [10].

• Selecting and screening studies: The next step is to screen the search results to identify studies that meet the inclusion criteria for the review [7]. This typically involves a two-stage process: first, screening titles and abstracts to exclude irrelevant studies, and then screening full-text articles to determine if they meet the inclusion criteria [11].

Screening and selection

When selecting and screening studies, it is important to follow some guidelines to ensure that the process is rigorous and transparent. Here are some steps to consider:

• Develop clear inclusion and exclusion criteria: Clearly define the criteria for including or excluding studies in the review [2, 8, 12]. This may include criteria related to the study design, population, intervention, comparison, and outcome.

• Use standardized screening forms: Use standardized screening forms to ensure consistency and reproducibility in the screening process [1, 8]. This may include forms for screening titles and abstracts, and full-text articles.

• Conduct a pilot screening: Conduct a pilot screening to test the inclusion and exclusion criteria and the screening forms [8]. This can help to identify any issues or inconsistencies in the screening process before conducting the full search.

• Conduct screening in duplicate: Conduct screening in duplicate, with two independent reviewers screening each article [8]. This can help to ensure that all relevant studies are identified and reduce the risk of bias in the screening process.

Data extraction and synthesis

A necessary step of the systematic review process is data extraction and synthesis. This involves acquiring informative data from included studies, then

Conclusions:

In conclusion, writing a systematic review is a rigorous and structured process that requires careful planning, attention to detail, and a commitment to transparency and rigor. By following the steps outlined in this guide, researchers and students can conduct high-quality systematic reviews that provide valuable insights and inform decision-making in a wide range of fields. Developing a clear research question, searching for relevant studies, assessing the quality of evidence, and reporting the review are all critical components of the systematic review process. By using standardized methods and reporting guidelines, researchers can ensure that their systematic reviews are transparent, reproducible, and trustworthy. Systematic reviews play an essential role in evidence-based research and are increasingly important in today's information-rich environment.

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synthesizing those findings to draw valuable conclusions [13, 14, 15].

When discussing the process of data extraction, it is important to investigate each chosen study and extract relevant information. This could involve analyzing various elements, including but not limited to study design, population characteristics and demographics, as well as any interventions that were administered during their participation in these experiments or trials, and examining what outcomes resulted from this. The pertinent facts extracted are subsequently entered within either a spreadsheet format or more sophisticated database platform where further analysis and synthesis can take place.

The synthesis of information requires scrutinizing the gathered data to generate significant conclusions regarding the intervention's efficacy or correlation between it and outcome measures. Depending on the research question and data type, this may entail carrying out a meta-analysis, qualitative synthesis, or mixed-methods synthesis.

The significance of using a standardized approach for extracting and synthesizing data ensures that the process is transparent, reproducible, and thorough. Through following standardized approaches, the findings may be compared between different studies while lessening any probabilities of bias or inaccuracies.

Some guidelines for using a standardized approach to data extraction and synthesis include [13, 14, 15]:

• Develop a data extraction form: Develop a standardized data extraction form that includes all relevant variables and outcome measures. This can help to ensure that data is collected consistently across studies and that all relevant data is captured.

• Conduct data extraction in duplicate: Conduct data extraction in duplicate, with two independent reviewers extracting data from each study. This can help to reduce the risk of errors and ensure that all relevant data is captured.

• Use a standardized approach to data synthesis: Use a standardized approach to data synthesis, such as a meta-analysis or a qualitative synthesis, to ensure that the process is transparent and reproducible. This can also help to reduce the risk of bias and ensure that the results are meaningful and useful.

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