

# Conducting high quality scoping reviews: challenges and solutions.

KHALIL, H., PETERS, M.D.J., TRICCO, A.C., POLLOCK, D., ALEXANDER, L.,  
MCINERNEY, P., GODFREY, C.M. and MUNN, Z.

2021

## **Guidance to conducting high quality scoping reviews**

Hanan Khalil <sup>1</sup>, Micah DJ Peters <sup>2,3,4</sup>, Andrea C Tricco <sup>5</sup>, Danielle Pollock <sup>6</sup>, Lyndsay Alexander<sup>7</sup>, Patricia McInerney <sup>9</sup>, Christina M Godfrey <sup>8</sup>, Zachary Munn<sup>6</sup>

1. School of Psychology and Public Health. Department of Public Health, La Trobe University, Melbourne, Australia. The Queensland Centre of Evidence Based Nursing and Midwifery: A Joanna Briggs Institute Centre of Excellence.
2. Rosemary Bryant AO Research Centre, UniSA Clinical and Health Sciences, University of South Australia, Adelaide, Australia.
3. School of Nursing, Faculty of Health and Medical Sciences, University of Adelaide, Adelaide, Australia.
4. The Centre for Evidence-based Practice South Australia (CEPSA): a Joanna Briggs Institute Centre of Excellence.
5. Li Ka Shing Knowledge Institute of St. Michael's Hospital, Unity Health Toronto, Toronto, Canada; Epidemiology Division and Institute of Health Management, Policy, and Evaluation, Dalla Lana School of Public Health University of Toronto, Toronto, Canada; Queen's Collaboration for Health Care Quality Joanna Briggs Institute Centre of Excellence, Queen's University, Kingston, Canada
6. JBI, Faculty of Public Health, University of Adelaide, Adelaide, Australia
7. School of Health Sciences, Robert Gordon University, Aberdeen UK. The Scottish Centre for Evidence-based Multi-professional Practice: A Joanna Briggs Institute Centre of Excellence
8. Queen's Collaboration for Health Care Quality: A JBI Centre of Excellence, School of Nursing, Queen's University, Kingston, Ontario, Canada
9. The Wits-JBI Centre for Evidence-Based Practice, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

### **Corresponding author:**

A/Professor Hanan Khalil

La Trobe University, Department of Public Health

Level 3.06, 360 Collins Street, Melbourne, Vic 3000, Australia

### **Acknowledgments**

We would like to acknowledge the support, feedback, and advice we have received on the development of the updated scoping reviews methodology from the JBI Scientific Committee. We also acknowledge and thank previous members of the group for their past contributions.

ACT is funded by a Tier 2 Canada Research Chair in Knowledge Synthesis. All other authors do not have any conflict of interest.

**Keywords:** scoping reviews; methodology; quality; reporting

## **1. Introduction**

Scoping reviews have been increasingly used by various groups including graduate and post-graduate students, researchers, healthcare providers and policy-makers.<sup>1</sup> Reasons for conducting scoping reviews were described previously in several studies.<sup>2,3</sup> Briefly, they include; mapping how research is conducted in a certain area or field, clarifying concepts and characterizations in the literature, identifying key factors/issues related to a concept, analysing and identifying knowledge gaps, examining how research is undertaken in a particular field and as a precursor to a systematic review.<sup>4,5,6</sup>

The first framework of scoping reviews was published in 2005 by Arksey and O'Malley.<sup>7</sup> The authors provided the key components of a scoping review but lacked detailed methodological guidance on how to undertake one.<sup>7,8</sup> This was followed by a contribution from Levac and colleagues (2010) in which they reflected upon the proposal of Arksey and O'Malley and provided an update to the framework.<sup>9</sup> However, further detailed and step by step methodological guidance was needed to increase understanding for authors undertaking a scoping review.<sup>10,11</sup>

In 2013, JBI (and its collaboration) formed a methodological group to develop clear, detailed and comprehensive guidance for conducting scoping reviews.<sup>12</sup> The JBI methodology was led by multi-disciplinary researchers in the field along with various stakeholder consultations.<sup>13</sup> Examples of these included; online surveys and conference workshops with clinicians, students and researchers. This has led to a significant increase in the publication of scoping reviews as seen in Google Scholar as well as submission to the journal JBI Evidence Synthesis. To date, there are more than 1,500 citations of the JBI scoping reviews methodologies.

The JBI scoping review methodology group has continued to update the methodology with the latest version of this guidance released in 2020.<sup>6</sup> During this development process and from our own experience working with researchers, students, editors and end users of scoping reviews, we have identified a number of potential issues for those conducting and using scoping reviews. This discussion paper outlines some of the complexities and provides potential recommendations to address these issues, with the aim of assisting reviewers to conduct high quality scoping reviews and improve the conduct and reporting of these reviews internationally.

## **2. Discussion**

### **2.1 Lack of people trained in scoping reviews**

Scoping reviews are an emerging methodology and a formal guide to their use was only published in 2015 by the JBI scoping review methodology group.<sup>4,14</sup> This is in contrast to the systematic review, which has methodology guidance that has been around for decades. As such, further information and education is required for those conducting a

scoping review, as well as the stakeholders utilizing the results of scoping reviews and journal editors/peer reviewers of scoping reviews.

In order to address this issue, there are an increasing number of courses, online resources, and videos to assist authors who require training in scoping reviews.<sup>14</sup> These include [scopingreviews.jbi.global](http://scopingreviews.jbi.global) and some of these are listed on the Scoping Review Network site and elsewhere.<sup>15-18,20,21,</sup>

## **2.2 Determining when a scoping review is appropriate**

Scoping reviews are designed to answer different types of questions from systematic reviews. Scoping reviews ask “what has been done previously?” or “what does the literature say?” about a particular topic, whereas systematic reviews have more focused questions and ask questions such as “does this intervention work for this group of patients?”. There are cases where authors have chosen a scoping review approach rather than other knowledge synthesis methods seemingly to expedite their review and ‘skip’ risk of bias assessment. This has been identified from our own experience with students and researchers as well as in discussions with colleagues.

Munn et al (2018) detail several differentiations between scoping reviews and systematic reviews and how to determine which is appropriate for the intended objectives.<sup>5</sup> For example, if the intention of the review authors is to make clinical recommendations, then a scoping review will not be appropriate as it does not perform a risk of bias assessment to ensure that the quality of included studies is established prior to synthesis.<sup>17</sup> However, in emerging fields there may be a need to determine areas where further research is required, therefore a scoping review is a more appropriate approach to allow for a broader research question more suited to descriptively mapping a body of literature on an emerging topic. Such a scoping review may then usefully lead to recommendations for future research.

Our recommendations on this issue include that authors should carefully read the guidance for how and when to choose a scoping review approach. Scoping reviews should not be conducted if the end users or the authors want to make specific recommendations for practice. To assist authors, clear information resources and training in the conduct of scoping reviews is required. This is one of the reasons why the Scoping Review Network has been established, to provide a central repository where scoping review authors can connect and find guidance.<sup>15</sup>

## **2.3 People conducting scoping reviews when a different type of evidence synthesis would be more appropriate**

There are several types of evidence synthesis that exist and experts in the field have identified 20 or more unique methods.<sup>19,20</sup> Selecting the specific synthesis method to use should be based on the question that the authors seek to answer. A different method will be more appropriate to follow based on the question and objectives.

As such, an online tool exists to allow authors and stakeholders the opportunity to decide which knowledge synthesis method might be the most appropriate for their specific research question (<https://whatreviewisrightforyou.knowledgetranslation.net/>). Answering a series of five simple questions, authors can currently select from eight different types of knowledge synthesis methods; qualitative evidence synthesis will be added in the near future to this tool.<sup>3</sup>

## **2.4 Difficulties with knowing what data to extract and how to analyse the results**

### **2.4.1**

A scoping review, like a systematic review requires a clearly formulated question. Without this the reviewers may extract data that is unrelated to the question. It also requires that reviewers have some understanding or familiarity with the subject matter. It has been noted that when reviewers lack knowledge of the field, they tend to want to extract data related to several variables – often those that are seldom reported and thus find difficulty in locating and extracting data that is actually relevant to answering their review questions.

There have been varying approaches in the analysis of evidence in scoping reviews, with multiple examples of scoping reviews having included formal analysis such as interpretive thematic analysis or meta-analysis. These tend not to be recommended for scoping reviews due to the types of questions they address as well as the absence of formal methodological quality assessment.

The term ‘mapping’ is commonly utilised when describing an approach to analysing evidence. However, misinterpretations over the meaning and how this is achieved may have occurred. Mapping can determine the scope of a range of evidence in a given field. Mapping is particularly useful in collating data on geographic location of the studies, participant groups, or methodologies used by the included studies.<sup>9,10</sup>

However, mapping can prove problematic with qualitative data where quantitative mapping may not be appropriate. For example, clarifying a key concept, such as stigma as it relates to an area. Authors may feel drawn to utilising thematic analysis to draw together their understanding. This confusion could have been exacerbated by Arksey and O’Malley (2005) who although they stated that synthesis or aggregation of the evidence is not required, but a ‘thematic construction’ of the evidence is useful.<sup>7</sup> Levac et al (2010) also included the term thematic analysis, however, they further extended upon this by stating it was more a qualitative descriptive approach.<sup>10</sup>

The most recent update of JBI scoping reviews has addressed this issue and provided clear guidelines and examples on the analytical approach of scoping reviews.<sup>13</sup> The current guidelines reiterate that analyses which contain more than basic descriptive approaches (quantitative or qualitative) are not normally appropriate for scoping reviews as the objective is not to synthesise or assess certainty of the results to provide guidance for practice.<sup>13</sup> If the authors feel that the available knowledge is more suited to this type

of analysis, then the research question might be adjusted and then be more suited to a systematic review. To assist with data extraction, a standard, modifiable template is available with the JBI guidance.<sup>5</sup>

## **2.5 Presenting the results**

### **2.5.1**

Presenting the results in a scoping review appears to often be a challenge for reviewers and may require some careful planning and creativity to achieve a clear presentation. Tables are useful for linking concepts related to the review question, but it is also possible that separate variables can be presented in a new table that allows them to be classified or analysed against accepted classification systems. Tables are useful for example, when one wishes to identify geographical locations from which most information originates, as well as growth of information in that concept over time periods. Gap maps are another way of allowing one to trace the development of information over time and to demonstrate the increasing awareness of certain concepts.<sup>6</sup>

To address this issue, there is a range of ways to present different data in scoping reviews (as well as other review types) and authors are encouraged to consider how their audience would best understand the information they are striving to present. There are now many varied and creative approaches to developing and presenting results in scoping reviews. For example, evidence maps using software such as Evidence gap maps (accessed from <https://www.3ieimpact.org/evidence-hub/evidence-gap-maps>) is available. Additionally, scoping review authors may look to the field of data visualisation for inspiration and guidance in data presentation, such as developing bubble plots, infographics, and Wordless. However, use of more traditional presentation methods are still relevant so review authors should ensure that the data is clearly presented and avoid multiple different presentation styles that may detract from the results rather than add clarity. Time spent by review authors to consider and plan data presentation related to the scoping review question(s) during the protocol development stage is time well spent. Informative rather than 'beautiful' or repetitive data presentation styles add to the quality of the overall scoping review and assist interpretation for the reader.

## **2.6 Poor quality of some scoping reviews**

Another complexity is the poor quality of some published scoping reviews. This sets an inadequate standard for the field. For example, it appears to be common that many believe that an a-priori protocol is not required or necessary for a scoping review - especially given that scoping review protocols cannot be registered with the PROSPERO database. However, Open Science Framework and Figshare allow for scoping reviews to be registered. Protocols may also be published in journals such as JBI Evidence Synthesis or uploaded to ResearchGate. Regardless, all scoping reviews should begin with a well-defined topic and a carefully developed and detailed protocol, which will guide the conduct and reporting for the entire review, whilst supporting transparency and minimising reporting bias.<sup>6</sup>

To improve the quality of scoping reviews in terms of reporting and methodological conduct, there now exists the PRISMA-ScR and the JBI methodological guidance. These should be referred to in all scoping reviews to improve the overall quality of scoping reviews. To assist with complying with the PRISMA-ScR, a simplified, fillable checklist has been developed.<sup>13,21</sup> Additionally, there now exist training and software programs to support high quality scoping reviews.<sup>21,22</sup> Authors of scoping reviews and journal editors/reviewers should ensure there is a protocol available before conduct and publication of a scoping review is considered.

## **2.7 Ensuring the conclusions of ScRs are not overstretched (i.e., practice or policy recommendations)**

There is often a tendency for reviewers to want to write the conclusion and recommendations section of their review as one would for a systematic review, i.e. to draw definitive conclusions for practice. Scoping reviews do not undertake a risk of bias assessment of the included evidence, therefore, no assurance of the quality of the included evidence underpinning the results can be made. Without a risk of bias assessment, clinical recommendations cannot be graded on the verity of those findings. Scoping reviews allow the reviewers to conclude the scope and extent to which something is being done or being used in relation to the review question. For example, scoping reviews are important in identifying and highlighting research gaps which require further investigation.<sup>6</sup>

As authors of scoping reviews we need to be cognisant of the fact that scoping reviews are exploratory/descriptive and not explanatory/analytical in nature.<sup>13</sup> Review authors need to communicate clearly with stakeholders and end users supporting our work to ensure they do not get a wrong impression about what a scoping review can deliver or underpin. Additionally, editors and peer reviewers need to ensure that scoping review authors do not overstep their mark when drawing conclusions and pay careful attention to how any recommendations or implications are worded.

## **2.8 Misconceptions on scope and function and lack of editor, peer reviewer and author understanding of scoping reviews**

Scoping reviews have been published in a wide variety of journals. However, personal experiences and anecdotal evidence suggest that it is apparent when reading some of the published scoping reviews that some journal editors may not be knowledgeable about the details of the methodology. It is also apparent from the comments and requests from some peer reviewers, as well as reports from students and colleagues, that some are not entirely familiar with the requirements and rigors of scoping review methodology. This can result in both poor quality scoping review articles being accepted for publication as well as in high-quality scoping reviews being rejected or criticised unwarrantedly.

Assessment of published scoping reviews also reveals a number of instances where published literature reviews or even commentaries have been misleadingly titled ‘scoping reviews’.<sup>24,25</sup> Inaccurate labelling of other papers – particularly those at risk of increased

bias in reporting – can diminish readers’ estimation of the value and rigor of scoping reviews in general and perpetuate confusion regarding what is and what isn’t best practice when conducting and reporting scoping reviews.

Where editors and peer reviewers may lack specific understanding or knowledge regarding best practice scoping review methodology, editors and/or peer reviewers may make requests to authors/reviewers to align the reporting of their scoping review with other more common systematic review methodology.<sup>23</sup> For example, editors may request the scoping review authors to conduct risk of bias appraisal (which is optional for scoping reviews) or to conduct a meta-analysis (which is not recommended for scoping reviews) or to suggest specific practice or policy recommendations based on the results (again is not recommended for scoping reviews). Because the research question drives the research methodology, it is vital that editors and peer reviewers are able to access clear guidance to distinguish between systematic reviews and scoping reviews, and other types of paper based upon the approach they have taken and the questions they pose.<sup>24</sup>

There are guidelines and templates available to assist review authors with the conduct of scoping reviews. These in turn can assist both peer reviewers and editors to establish benchmarks for their acceptance of scoping review manuscripts. The PRISMA- ScR serves as a template for the conduct of scoping reviews and together with the methodological guidance from international research organizations such as JBI, editors have validated tools to inform their acceptance of such manuscripts. Journal editors could consider recommending or mandating that authors who submit scoping reviews should complete and submit an accompanying PRISMA-ScR checklist in the same manner that many journals already require a PRISMA checklist for systematic reviews (or other relevant reporting guideline) be submitted depending upon the research design.

## **Conclusion**

We recommend authors who are planning to undertake scoping reviews, ensure their research questions can be adequately answered using a scoping review methodology and to check the PRISMA-ScR checklist to avoid the above mentioned shortfalls in the conduct and presentation of their scoping review .

## **Acknowledgements**

We would like to acknowledge the support, feedback and advice we have received on the development of the updated scoping reviews methodology from the JBI Scientific Committee. We also acknowledge and thank previous members of the group for their past contributions.



## References

1. Tricco, AC, Lillie, E, Zarin, W, O'Brien, K, Colquhoun, H, Kastner, M, Levac, D, Ng, C, Pearson Sharpe, J, Wilson, K, Kenny, M, Warren, R, Wilson, C, Stelfox, HT & Straus, SE 2016b, 'A scoping review on the conduct and reporting of scoping reviews', *BMC Med Res Methodol*, vol. 16, pp. 15.
2. Pham, MT, Raji, A, Greig, JD, Sargeant, JM, Papadopoulos, A & McEwen, SA 2014, 'A scoping review of scoping reviews: advancing the approach and enhancing the consistency', *Res Synth Methods*, vol. 5, ed. 4, pp. 371-85.
3. Munn, Z, Peters, MD, Stern, C, Tufanaru, C, McArthur, A & Aromataris, E 2018a, 'Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach', *BMC Med Res Methodol*, vol. 18, no. 1, pp. 143.
4. Peters MDJ, Godfrey CM, McInerney P, et al. *Methodology for JBI scoping reviews. The Joanna Briggs Institute Reviewers' Manual 2015*. Adelaide, South Australia: The Joanna Briggs Institute; 2015.
5. Munn, Z., Peters, M. D., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC medical research methodology*, 18(1), 143.
6. Peters MDJ, Godfrey C, McInerney P, Munn Z, Tricco AC, Khalil, H. Chapter 11: Scoping Reviews (2020 version). In: Aromataris E, Munn Z (Editors). *Joanna Briggs Institute Reviewer's Manual*, JBI, 2020. Available from <https://reviewersmanual.joannabriggs.org/>
7. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005; 8: 19–32. 4.
8. Khalil, H., Peters, M., Godfrey, C.M., McInerney, P., Soares, C.B. and Parker, D., 2016. An evidence-based approach to scoping reviews. *Worldviews on Evidence- Based Nursing*, 13(2), pp.118-123.
9. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implementation Science*. 2010; 5(1):69.
10. Peters, M.D.J., Godfrey, C., McInerney, P., Baldini Soares, C., Khalil, H. and Parker, D., 2017. Chapter 11: scoping reviews. *Joanna Briggs Institute Reviewer's Manual*. The Joanna Briggs Institute.
11. Khalil, H., Bennett, M., Godfrey, C., McInerney, P., Munn, Z. and Peters, M., 2020. Evaluation of the JBI scoping reviews methodology by current users. *International Journal of Evidence-Based Healthcare*, 18(1), pp.95-100.
12. Pearson A, Wiechula R, Court A, Lockwood C. The JBI model of evidence-based healthcare. *Int J Evid Based Healthc* 2005; 3: 207–15.
13. Tricco, A.C., Lillie, E., Zarin, W., O'Brien, K.K., Colquhoun, H., Levac, D., Moher, D., Peters, M.D., Horsley, T., Weeks, L. and Hempel, S., 2018. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Annals of internal medicine*, 169(7),

pp.467-473.

14. Stern C, Munn Z, Porritt K, et al. An international educational training course for conducting systematic reviews in health care: the Joanna Briggs Institute's comprehensive systematic review training program. *Worldviews Evid-Based Nurs.* 2018;15(5):401–8.
15. [scopingreviews.jbi.global](http://scopingreviews.jbi.global)
16. Scoping reviews. Accessed from <https://guides.library.unisa.edu.au/ScopingReviews> (date of access, 14/05/2020).
17. Munn Z, Aromataris E, Tufanaru C, Stern C, Porritt K, Farrow J, Lockwood C, Stephenson M, Moola S, Lizarondo L, McArthur A. The development of software to support multiple systematic review types: the Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI). *International journal of evidence-based healthcare.* 2019 Mar 1;17(1):36-43.
18. Stern C, Munn Z, Porritt K, et al. An international educational training course for conducting systematic reviews in health care: the Joanna Briggs Institute's comprehensive systematic review training program. *Worldviews Evid-Based Nurs.* 2018;15(5):401–8.
19. Sutton A, Clowes M, Preston L, Booth A. Meeting the review family: exploring review types and associated information retrieval requirements. *Health Information & Libraries Journal.* 2019 Sep;36(3):202-22.
20. Tricco AC, Zarin W, Ghassemi M, Nincic V, Lillie E, Page MJ, et al. Same family, different species: methodological conduct and quality varies according to purpose for five types of knowledge synthesis. *J Clin Epidemiol.* 2018; 96:133-42.
21. Pussegoda K, Turner L, Garritty C, Mayhew A, Skidmore B, Stevens A, Boutron I, Sarkis-Onofre R, Bjerre LM, Hróbjartsson A, Altman DG. Systematic review adherence to methodological or reporting quality. *Systematic reviews.* 2017 Dec;6(1):131.
22. Tricco, A. C., Soobiah, C., Antony, J., Cogo, E., MacDonald, H., Lillie, E., Tran, J., D'Souza, J., Hui, W., Perrier, L., Welch, V., Horsley, T., Straus, S. E., & Kastner, M. 2016c, 'A scoping review identifies multiple emerging knowledge synthesis methods, but few studies operationalize the method', *J Clin Epi*, 73, 19–28.
23. Campbell JM, Kavanagh S, Kurmis R, Munn Z. Systematic reviews in burns care: poor quality and getting worse. *Journal of Burn Care & Research.* 2017 Mar 1;38(2):e552-67.
24. Moher D. Optimal strategies to consider when peer reviewing a systematic review and meta-analysis. *BMC medicine.* 2015 Dec;13(1):274.

**Table 1. Challenges associated with scoping reviews**

1. Lack of people trained in scoping review methodology
2. Determining when a scoping review is appropriate
3. People conducting scoping reviews when a different type of Knowledge Synthesis would be more appropriate
4. Difficulties with knowing what data to extract and how to analyse the results
5. Presenting the results
6. Poor quality of some scoping reviews
7. Ensuring the conclusions of scoping reviews are not overstretched (i.e., for practice or policy recommendations)
8. Misconceptions on scope and function and lack of editor, peer reviewer and author understanding of scoping reviews

### **What is new?**

#### **Key findings**

- Scoping reviews are designed to answer different questions to systematic reviews. Their aims are to map the literature and identify a research question for a systematic review if needed.
- Data extraction in scoping reviews often include information on the studies, participants, methodologies undertaken, context and concept.
- Data presentation of scoping reviews can be done in various ways including; tables, graphs, bubble plots, infographics and other schematic presentations.

### **What this adds to what was known?**

- Scoping reviews can make a significant contribution to science and stakeholder decision-making when conducted appropriately.
- By overcoming the challenges when conducting scoping reviews, researchers can ensure that scoping reviews are better placed to meet their aims and objectives.

### **What is the implication and what should change?**

- Using both the Joanna Briggs scoping reviews methodology and PRISMA-ScR will enable researchers to address challenges associated with scoping reviews.
- A more focused approach on how to address challenges in undertaking scoping reviews has the potential to result in better quality reviews that will meet the objectives of the reviews and will aid in correct interpretation of the results.