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COMMENTARY

Scoping reviews: time for clarity in definition, methods, and reporting

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Abstract

Objectives: The scoping review has become increasingly popular as a form of knowledge synthesis. However, a lack of consensus on scoping review terminology, definition, methodology, and reporting limits the potential of this form of synthesis. In this article, we propose recommendations to further advance the field of scoping review methodology.

Study Design and Setting: We summarize current understanding of scoping review publication rates, terms, definitions, and methods. We propose three recommendations for clarity in term, definition and methodology.

Results: We recommend adopting the terms "scoping review" or "scoping study" and the use of a proposed definition. Until such time as further guidance is developed, we recommend the use of the methodological steps outlined in the Arksey and O'Malley framework and further enhanced by Levac et al. The development of reporting guidance for the conduct and reporting of scoping reviews is underway.

Conclusion: Consistency in the proposed domains and methodologies of scoping reviews, along with the development of reporting guidance, will facilitate methodological advancement, reduce confusion, facilitate collaboration and improve knowledge translation of scoping review findings.

Keywords: Scoping review; Methodology; Scoping study; Reporting; EQUATOR; Knowledge synthesis; Terminology

Estimates for the generation of research evidence suggest that 75 trials and 11 new systematic reviews are published daily [1]. This volume of health research evidence implies that knowledge syntheses are essential to advance practice and research through consolidation of evidence. Such reviews can also help knowledge users work more efficiently to make evidence-based decisions [2]. Among the various types of knowledge synthesis, the scoping review has become increasingly popular.

Scoping reviews are a form of knowledge synthesis, which incorporate a range of study designs to comprehensively summarize and synthesize evidence with the aim of informing practice, programs, and policy and providing direction to future research priorities [3]. Scoping reviews have been used to answer a range of research questions from identifying social determinants of health associated with cervical screening for women living in middle- and low-income countries, informing improved coverage and research gaps [4], to improving our understanding of how social network analysis interventions could support the implementation of change in health care organizations [5].

We conducted an electronic search for "scoping study" or "scoping review" from 1997 to 2013 in Medline, EMBASE, CINAHL, and PsychINFO and identified 249 of them. Until 2009, less than 10 scoping reviews were published annually. Since 2009, consistent yearly increases have occurred with 85 reviews published in 2013 up to December 5 (Fig. 1). Scoping reviews have likely been embraced because they are relevant to both emerging and established fields. In emerging areas of evidence, there is a diversity of study methodologies and the trajectory published articles of some content areas makes it difficult to ascertain the extent of the landscape. In established fields where there may be an abundance of evidence, scoping

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What is new?

Key findings

- Variability in labeling, definition, methodology, and reporting currently limits the potential of scoping reviews

What this adds to what was known?

- Recommendations are offered for a consistent label, definition, and methodology

What is the implication and what should change now?

- Reporting guidance for the conduct and reporting of scoping reviews are forthcoming

reviews can provide an understanding of the ''lay of the land''. As a method of knowledge synthesis, scoping reviews have potential to advance health care practice, policy, and research. However, variability and lack of consensus on scoping review terminology (the label we give them), definition, methodological conduct, and reporting prevent scoping reviews from fully reaching this potential. In this article, we propose recommendations to further advance the field of scoping review methodology.

Arksey and O'Malley published one of the first methodological frameworks for conducting a ''scoping study'' [3]. Proposed as a methodological guide on which to build, this six-stage framework consisted of identifying the research question, searching for relevant studies, selecting studies, charting the data, collating, summarizing and reporting the results, and consulting with stakeholders to inform or validate study findings. In 2010, we (H.L.C., D.L., K.O.B.) drew from our scoping study experiences to build on this methodological framework and proposed recommendations for each stage of the scoping study framework, highlighting considerations for advancement, application, and relevance of scoping studies in health research [6]. This article was labeled ''highly accessed'' and has been viewed over 16,000 times, indicating the interest in scoping reviews and the pressing need for its ongoing advancement. Since its publication, we continue to observe variability pertaining to terminology labeling for scoping reviews (eg, ''scoping review,'' ''scoping study,'' ''scoping method,'' ''mapping of research,'' ''literature review,'' ''scoping exercise method''), definition, methodological conduct and reporting of scoping reviews in the field of health research, making it challenging for readers to evaluate the methodological rigor and quality of conduct for this growing form of knowledge synthesis. Consistent with our observations of variability in the methodological conduct of scoping reviews, a scan of the reference lists for the 2012 scoping reviews found in our search and those we could readily access (56 of 64) indicated that less than half (48%, 27 of 56) referenced Arksey and O'Malley.

One of the most widely used descriptions of the scoping review is the one proposed by Arksey and O'Malley in 2005: ''scoping studies aim to map rapidly the key concepts underpinning a research area and the main sources and types of evidence available, and can be undertaken as standalone projects in their own right, especially where an area is complex or has not been reviewed comprehensively before'' [3]. Recently, Daudt et al. proposed a revised definition: ''scoping studies aim to map the literature on a particular topic or research area and provide an opportunity to identify key concepts, gaps in the research; and types and sources of evidence to inform practice, policymaking, and research'' [7]. Daudt et al. further suggest that scoping reviews should include some form of quality assessment for included studies, a criterion that until now has defined scoping reviews by its absence [3]. Competing definitions raise several potential consequences including difficulties collaborating across different research groups, different estimates of the prevalence of scoping reviews, and difficulty sharing and retrieving information.

Although no imperative exists for a single term and definition of scoping reviews, clarity and consistency in these domains, along with consistent use of existing methodological guidance and the development of reporting guidance would facilitate methodological advancement, reduce potential confusion between practitioners and researchers, facilitate communication and collaboration among researchers and methodologists, and improve knowledge translation of scoping review findings.

1. Clarity in label, definition, and methodology

We offer three recommendations.

1. We recommend that everybody adopt consistent use of the terms ''scoping review'' or ''scoping study'' when conducting this type of synthesis.
2. We recommend the use of the following definition:

A scoping review or scoping study is a form of knowledge synthesis that addresses an exploratory research

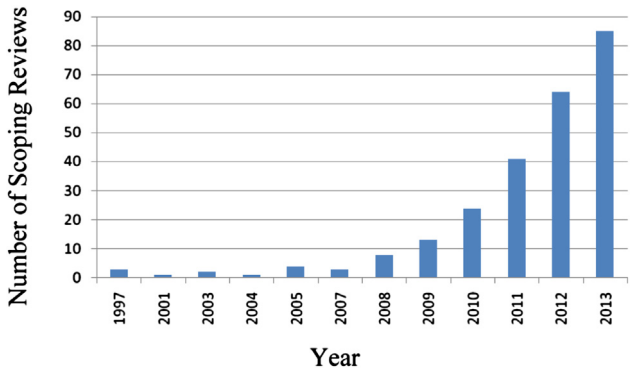

Fig. 1. Scoping reviews by year, 1997–2013. Note: Search conducted to December 5, 2013.

Table 1. Arksey and O'Malley framework stages for the conduct of scoping reviews combined with the Levac et al. enhancements

Arksey and O'Malley framework stage	Description of scoping review stage	Levac et al. enhancements
#1 Identifying the research question	The scoping review question must be clearly defined as it plays a role in all subsequent stages including search strategy. In order to examine and summarize breadth, scoping review questions are broad.	1. Despite the broad nature of the question, ensure adequate clarity to guide the scope of inquiry including concept, target population, and health outcomes of interest. 2. Determine the research question in conjunction with the purpose for conducting the scoping review. Use the rationale for the scoping review to help define the purpose. 3. Stipulate the outputs (eg, framework, list of recommendations) that will be the result of the review.
#2 Identifying relevant studies	This stage involves identifying the relevant studies and developing a plan for where to search, which terms to use, which sources to search, time span, and language. Sources include electronic databases, reference lists, hand searching of key journals, and organizations and conferences. Comprehensiveness and breadth is important; however, so too are the practicalities of time, budget and personnel resources. Decisions need to be made upfront about how feasibility issues will impact the search.	1. Use the research question and purpose to guide decision-making around the scope of the review. 2. Justify all decisions for limiting the scope of the review and acknowledge any potential limitations as a result. 3. Ensure the team has the content and methodological expertise necessary for the review.
#3 Study selection	Study selection involves post-hoc inclusion and exclusion criteria. These criteria are based on the specifics of the research question and on new familiarity with the subject matter through reading the studies.	1. Study selection is not linear, but rather an iterative process that involves searching the literature, refining the search strategy, and reviewing articles for study inclusion. 2. Improved clarity in decision-making for study selection can be achieved using the following steps: • Conduct an initial team meeting to discuss inclusion and exclusion criteria. • Use two reviewers to independently review abstracts and full text articles • Incorporate a third reviewer in situations of disagreement to determine final inclusion. • Hold reviewer meetings at the beginning, midpoint and final stages of the abstract review process to discuss challenges and uncertainties related to study selection and to go back and refine the search strategy if needed.
#4 Charting the data	A data charting form is developed and used to extract data from each study. A ''narrative review'' or ''descriptive analytical'' method is used to extract contextual or process-oriented information from each study.	1. The research team should collectively determine which variables to extract in order to answer the research question. 2. Charting should be considered an iterative process in which reviewers continually extract data and update the data charting form. 3. Reviewers should pilot the charting form on five to ten studies to determine whether their approach to data extraction is consistent with the research question and purpose. 4. Contextual or process-oriented data may require a qualitative content analysis approach.
#5 Collating, summarizing, and reporting the results	An analytic framework or thematic construction is used to provide an overview of the breadth of the literature. A numerical analysis of the nature and extent of studies using tables and charts is presented. A thematic analysis is then presented. Clarity and consistency are required when reporting results.	1. Researchers should undertake the following three steps: • Analyze (including descriptive numerical summary analysis and qualitative thematic analysis) • Report the results (including the outputs as defined in the first stage) • Discuss the findings as they relate to the study purpose and implications for future research, practice and policy

(*Continued*)

Table 1. Continued

Arksey and O'Malley framework stage	Description of scoping review stage	Levac et al. enhancements
#6 Consultation	This optional stage provides opportunities for consumer and stakeholder involvement to suggest additional references and provide insights beyond those in the literature.	1. The value of consultation should be considered for every scoping review. 2. The process for consultation should include the following steps: • Establish a clear purpose for the consultation • Use preliminary findings to inform the consultation • Clearly articulate the type of stakeholders to consult and how stakeholder data will be collected, analyzed, reported and integrated within the study • Incorporate opportunities for knowledge transfer and exchange with stakeholders in the field

Adapted from Levac et al., 2010.

question aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching, selecting, and synthesizing existing knowledge.

This definition builds on the descriptions of Arksey and O'Malley and Daudt to provide a clear definition of the methodology while describing the key characteristics that make scoping reviews distinct from other forms of syntheses.

3. Until such time as further methodological guidance is developed, we advocate for the use of the methodological steps outlined in the Arksey and O'Malley framework [3] and further enhanced by Levac et al. [6] for the conduct of scoping reviews. See Table 1 for a summary of the Arksey and O'Malley framework stages combined with the Levac et al. enhancements.

2. A call for reporting guidance

The Enhancing the QUAlity and Transparency Of health Research (EQUATOR) Network is an international initiative for the promotion of transparent and accurate reporting of research studies. Through the use of reporting guidelines, developed using established EQUATOR processes and housed on their Web site, it would be possible to critically appraise published scoping reviews and would increase the reproducibility, completeness, and transparency of reporting the methods and results of scoping reviews. Such work will also provide guidance in the form of a scoping review reporting guidance checklist for researchers, peer reviewers, and authors on characteristics to consider in the conduct and reporting of scoping reviews.

The process to develop guidance for the reporting of scoping reviews is underway and will include established steps similar to those used for the development of other reporting guidelines such as Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA): identifying the need for guidance, reviewing the literature, conducting a Delphi consensus exercise to generate a list of appropriate items for consideration, conducting a face-to-face to meeting to finalize items, developing guidance and an explanatory document, and creating dissemination strategies for the guidance [8]. Similar to the benefits obtained from the development of PRISMA, this guidance will allow for rigorous evaluation of the reporting and methodological quality of scoping reviews.

3. Conclusion

Knowledge synthesis is important in health care research and practice because it can make sense of abundant volumes of primary research. Scoping reviews are an increasingly popular methodology to synthesize evidence that can be influential for policy and practice. However, variability in labeling, definition, methodology, and reporting currently exists, which limits their potential. We provide recommendations for a consistent label, definition, and methodology. Reporting guidance for the conduct and reporting of scoping reviews are forthcoming. We look forward to achieving a future in which methodologically rigorous scoping reviews can be evaluated for their contribution to advancing the health care field.

References

[1] Bastian H, Glasziou P, Chalmers I. Seventy-five trials and eleven systematic reviews a day: how will we ever keep up? PLoS Med 2010;7(9):e1000326.
[2] Tricco AC, Tetzlaff J, Moher D. The art and science of knowledge synthesis. J Clin Epidemiol 2011;64:11–20.
[3] Arksey H, O'Malley L. Scoping studies: towards a methodological framework. Int J Soc Res Methodol 2005;8:19–31.
[4] Williams-Brennan L, Gastaldo D, Cole DC, Paszat L. Social determinants of health associated with cervical cancer screening among women living in developing countries: a scoping review. Arch Gynecol Obstet 2012;286(6):1487–505.
[5] Chambers D, Wilson P, Thompson C, Harden M. Social network analysis in healthcare settings: a systematic scoping review. PLoS One 2012;7(8):e41911.
[6] Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. Implement Sci 2010;5:69.
[7] Daudt HM, van Mossel C, Scott SJ. Enhancing the scoping study methodology: a large, inter-professional team's experience with Arksey and O'Malley's framework. BMC Med Res Methodol 2013;13:48.
[8] Moher D, Schulz KF, Simera I, Altman DG. Guidance for developers of health research reporting guidelines. PLoS Med 2010;7(2):e1000217.