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Considerations for conducting a scoping review in pharmacy education

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ABSTRACT

Interrogating the literature is among the first steps a researcher undertakes when actuating a research project or also when any scholar might seek to know what has been done in an area, best practices for conducting a certain activity, or simply to seek answers for a question ranging from one's own personal curiosity to those that might affect departmental or institutional guidance. Decisions on the type of review process to undertake is one that is not taken lightly. This methods commentary outlines the reasons for conducting a scoping review versus a systematic review for topics related to pharmacy education. Considerations for conducting the scoping review are outlined including considerations for writing a protocol prior to conducting a scoping review, to potential platforms to use for transparency of sharing data, processes related to guidelines for data extraction and types of search strategies utilized.

1. Introduction

Interrogating the literature is among the first steps a researcher undertakes when actuating a research project or also when any scholar might seek to know what has been done in an area, best practices for conducting a certain activity, or simply to seek answers for a question ranging from one's own personal curiosity to those that might affect departmental or institutional guidance. A researcher might overtly seek or come across a review paper that in some form synthesizes relevant literature to gain even greater perspective on various contributions that have already been made in the topic area along with gaps of knowledge and/or methodological shortcomings among research that has already been published. Likewise, a researcher might be interested in initiating a review themselves, as they believe others within or even outside a discipline would benefit from the publication of a review.

The decision on selection of a review strategy is not one to be taken lightly. Systematic reviews have long been deemed useful and have been instrumental within the lexicon of research and/or review strategies in its first formal guise described in the 1970s as a 'meta analysis' undertaking.[1] In 1975, critical appraisal and synthesis of research findings in a systematic manner emerged under the term 'meta analysis'.[1] The first framework for conducting a scoping review was introduced in 2005,[2] and since then, iterations and extensions of scoping review frameworks have been at the forefront of the published literature.[3,4] These have informed the current 2020 Joanna Briggs Institute (JBI) guidelines, along with utilizing a multidisciplinary approach drawing from diverse stakeholders' (clinicians, students and researchers) research experience and forming a JBI scoping review methodology working group for conducting scoping reviews.[5,6] 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.[7]

2. Why consider a scoping review search strategy?

Scoping reviews may be a preferred search strategy when there is emerging methodology to explore the available literature, a requirement to explore, identify or map key concepts in the literature, set research agendas, a requirement to identify implications and impact and/or identify any potential knowledge gaps in the literature.[3,8–10] Furthermore, scoping reviews have been used to answer a very broad range of research questions from identifying social determinants of health for disadvantaged populations in middle- and low-income countries[11] to improving our understanding of how social network analysis interventions could support the implementation of change in health care organizations.[12] Scoping reviews are often cast as publications that 'map' the depth and breadth of the literature in a field. Through such systematic mapping, authors describe the main concepts that underpin a topic and can illuminate gaps in the literature. Scoping reviews are

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generally driven by broad, exploratory research questions and typically incorporate studies that employ a variety of research designs.[4]

New scopes and emerging areas in education, evolving educational frameworks or where a body of work has not yet been comprehensively reviewed and therefore not amendable for utilizing a systematic review strategy, may warrant consideration for a scoping review methodology.[13] For example, a scoping review may be more appropriate as a search strategy to identify what has been done to date whereas a systematic review may be the option for when a researcher identifies a plethora of published foundational works and requires further insights into established interventions.[5]

3. How does a scoping review differ from a systematic review?

Scoping reviews are defined as reviews that categorize, map or group literature (often emerging literature) in a given field in terms of its nature, characteristic features and volume. Systematic reviews are defined as a review that systematically summarizes research evidence that utilizes reproducible methods to search, critically appraise and synthesize on a specific topic.[14]While both review options use different approaches to extracting evidence, that evidence serves different purposes. Scoping reviews are conducted for different reasons compared to that of a systematic review and as such have different aims, focus and search strategies, however while some scoping reviews are approached with flexibility in their conduct, for example so that they can be tailored to the needs of decision-makers,[3,15] some often follow a structured approach which is outlined in their search strategy section of the paper, hence the reasons why some authors describe their scoping reviews as a systematic scoping review.[16,17] In some cases scoping reviews may serve as a precursor to conducting a full systematic review.[9] However, in most cases scoping reviews are driven by the topic area and considerations on the timely and emerging nature of the topic area, how novel the topic area is and whether there has been any previous foundational work conducted in this space. Therefore, the topic area drives the type of review process. Table 1 outlines the methodological differences between a scoping review search strategy compared with a systematic review search strategy and outlines the types (through exemplar studies) of topic areas that could be considered for both review types.

4. Considerations where to commence?

The Joanna Briggs Institute (JBI) Manual for Evidence Synthesis posits that to enhance rigor in the methodology for conducting a scoping review, the development of a protocol is an important consideration as it pre-defines the objectives, search methods and reporting mechanisms with transparency preventing duplication of the research by other researchers.[34] Protocols for scoping reviews usually outline the background for developing the scoping review, processes for conducting the scoping review including the search strategies, how the selection criteria (inclusion and exclusion criteria) will be developed, how records are going to be screened, how data will be extracted, how many reviewers will be involved with the process, how the data will be analyzed and what the potential implications or impact for conducting the scoping review. Additional information may be included in the protocol, for example funding/grant acknowledgments, any researchers' conflicts of interest or any further acknowledgments with the development of the protocol. An example of a published protocol for a scoping review was developed to explore the most appropriate knowledge synthesis methods to conduct a review.[35]

Some journals offer protocols as a 'manuscript type' for publication. However, not all journals offer this and as such protocols should still be considered to be developed as Step 1 to undertaking the scoping review with acknowledgement in a published manuscript that a protocol was developed. For transparency, researchers who would like access to that protocol, could be in the form of a request to the lead investigator / corresponding author.

4.1. Considerations on choices of platforms available to support transparency of data and minimizing reporting bias

Scoping reviews cannot be registered with platforms that encourage systematic review registration.[9] For example, systematic reviews are often registered with PROSPERO database, an international register of prospective register for systematic reviews.[36] This leaves a gap for a location to register scoping reviews and where to access that data for greater transparency of reporting and data sharing between researchers. The transparency of the timing of data collection, and data sharing is essential for the wider researcher community because there is no point a researcher spending the time to conduct a scoping review if another research team has already commenced this process. Also sharing data during the process of conducting the review provides greater rigor and transparency of the research methodology.

There are limited platforms that have been utilized for sharing, searching and aggregating data derived from a Scoping Review search strategy. These include Open Science Framework (OSF)[37] (a free open-source platform to support research collaboration), ResearchGate (RG)[38] (a free platform to support appropriate data sharing), Figshare[39] (a repository to store and share data), and journal repositories that offer scoping review protocol submissions. These include the Joanna Briggs Institute (JBI) Evidence Synthesis,[34] the official journal of JBI.

In addition to the public platforms, the researchers may consider documenting the process on other platforms apart from the traditional Excel spreadsheets. For example, Covidence,[40] a platform utilized to be shared with the research team (either internal or external to the organization) for review, collaboration and final consensus of the included and excluded records. This platform will also provide the final appropriate PRISMA flow chart derived from the data extraction to be used in the writing phase of the manuscript.

4.2. Search strategy and guidelines for scoping reviews

There are guidelines for scoping reviews that follow a structured approach to the search strategy and should be formed in collaboration with other independent reviewers.[8] Arksey and O'Malley[2]described a six-step framework for conducting scoping reviews. These steps include the following: (a) identifying the research question, (b) identifying relevant studies, (c) selecting the studies to be included, (d) charting the data, (e) collating, summarising and reporting results and (f) consultation with stakeholders. Over time, scholars have suggested modifications to the steps.[3–7] Some of these modifications are captured in the Preferred Reporting Items for Systematic Reviews and Meta-analysis Extension for Scoping Reviews (PRISMA-ScR),[41] the first reporting guideline specific to scoping reviews.

Typically, as scoping reviews involve topic areas that are emerging or evolving, both scientific data base searches and a grey literature search strategy are adopted. The grey literature is literature (or records) that are not traditionally indexed in scientific data bases[21] but may inform one of the reasons for conducting the review (ie to explore, identify, map knowledge gaps, or to inform policy or future practice for institutions or professional bodies).

4.3. Consider the search terms as part of the objectives/questions to be raised by the review

Table 1 provides a few exemplar topics for which scoping reviews in pharmacy education might be beneficial, even needed. Obviously, though, there are a myriad of other topics even within the somewhat narrowly confined nature of pharmacy education. A key to successful conduct (and meaningful results) of a scoping review is the set of terms used to define the review. Education is generally regarded as a low-consensus discipline.[42] Among other things, this means that many terms in education are used somewhat synonymously, sometimes incorrectly so, and that researchers have a tendency to 're-invent the

Table 1
Exemplar topics for consideration of systematic or scoping reviews.

Review Type	Aims	Focus	Other considerations for search strategy	Exemplar Topic Areas
Systematic Review	Aims to provide answers to well-defined questions and uses evaluation tools to assess the quality of studies.[2]	Focuses on a predefined question where study designs are clearly identified.[2] Usually the body of literature on the topic area has been extensively studied.	Indexed Scientific literature	**Established teaching and learning strategies that have continually evolved:** Flipped classrooms strategies[18] Blended Learning Strategies and effectiveness[19] **Areas of interest that builds on a body of previous works:** Complementary medications in pharmacy education[20]
Scoping Review	Aims to provide an overview by mapping the available literature of broader and emerging topics with no requirement to assess the quality of the studies.[2,13] Aims to answer different types of questions posed by the research team. Identifies, clarifies definitions and examines key characteristics, concepts, and factors related to the topic area, highlighting the knowledge gaps.[9]	Focuses on broader and emerging topic areas where diverse study designs may apply.[2] As an emerging topic area, often the body of literature is limited and other search strategies are required to be utilized such as a Grey Search Strategy.[21]	Search strategies include indexed scientific and literature which may not be indexed in the scientific data bases (Grey literature eg: policy and institutional documents and websites, white papers, annual project reports, working papers, institutional and professional body website policy documents). There is a systematic approach to searching Grey literature.[21]	**Curriculum Consideration Topics:** Digital literacy (DL) – to identify the approaches utilized to integrate DL into curriculum.[22] Hidden Curriculum (HC): to identify the definitions of what is considered a hidden curriculum, descriptions of a HC and the outcomes.[23] Curriculum considerations of Learning outcomes- achieved through constructive alignment of assessment.[24] **Emerging strategies related to Interprofessional education and integration into curricula:** Integration of pharmacy education within other health professional curricula- explore to inform optimal design of integration.[25] Interprofessional application in pharmacy education.[26] Innovations in pharmacy education (as driven by Covid-19).[27] Competency-based pharmacy education: identify the evidence during all stages of pharmacy education (including undergraduate, postgraduate and for continuing life-long learning).[28] **Emerging Teaching strategies** Feedback as an effective pedagogy on learning in pharmacy education- to identify the breadth and depth of evidence of the use of feedback in education or training and identify potential gaps.[29] Teaching strategies for professional identity in pharmacy education – to identify strategies utilized to enhance professional identity formation and professionalism.[3031] **Emerging scopes and fields and/or technologies for education and training** Artificial Intelligence (AI) in pharmacy education: Identify the current literature of AI use and gaps for future research.[32] MyDispense education through simulation: Appraisal of the literature of how this open-source tool is utilized in pharmacy curricula.[33] Educational needs of future pharmacy staff in further training for new Professional Pharmacy Services (due to the evolving scopes of practice).[17]

wheel', often generating new terms and even concepts with little difference from what had been previously established, or at least ostensibly established.[43] Pharmacy education has likewise been referred to as a low-consensus discipline, often seeking to actuate itself further by overcoming barriers that impede progress such as disagreements on priorities to teach students and methods by which those concepts should be taught.[44] As such, the selection of terms is far more critical; that is, a less than relatively exhaustive list, or use of terms that restrict use of similar terms could result in excluding many important articles for the search, which remember, differs in objective from a systematic review in that one is literally attempting to assist colleague members in identifying solutions to a problem. At the same time, use of too many terms, particularly those with overly broad or multiple meanings, coupled with less-than-optimal search rules by the review investigators, could result in an abundance of noise that in the end serves the search itself nor its potential readers, any great benefit.

Paramount to good science in conducting scoping reviews is adequately naming and refining the research question.[45] It is also important balance feasibility with breadth and comprehensiveness of the scoping process as well as developing and aligning the inclusion criteria with the objective(s) and/or questions(s) of the research.[6] The objective or question should be informative and give a clear indication of the topic of the scoping review.[46] The core concept examined by the scoping review should be clearly articulated to guide the scope and breadth of the inquiry. This may include details that pertain to elements that would be detailed in a standard systematic review, such as the "interventions", and/or "phenomena of interest", and/or "outcomes" (as relevant for the particular scoping review). Then, 'context' must be considered. The context should be clearly defined and may include, but is not limited to, consideration of sociobehavioral contexts, student parameters, curricular areas, and other components that might either impact the inclusion of putative papers and/or provide the desired level of breadth but remaining germane to the desired question and even readership of the paper ultimately published.

4.4. Considerations for analyses approaches in scoping reviews

Considerations for analyses will differ between research teams depending on the scope of the research and why it was commissioned to be conducted. Once the data has been extracted, the next stage is for the research team to have the discussions around the data analyses processes. Key components, insights and/or outcomes derived from the studies (although studies included in scoping reviews are not required to be quality measured or assessed)[41]or derived from records extracted from the Grey Literature search, form the basis of discussions around synergies in the data, unexpected outcomes and insights drawn. These can now be considered in terms of the research aims.

5. Writing phase: manuscript considerations

5.1. Title of manuscript considerations

In Scoping Reviews, there are considerations for how the title of the manuscript is presented. Titles need to reflect the research in a concise statement which outlines the 'Population (for example, this may include focus and characteristics of participants utilized for this review), Concept (study concept, for example a concern or current educational practice) and Context (for example this may include a geographical region or, educational intervention' (PCC) of the scoping review.[8,13] The PCC is used to ascertain the selection inclusion and exclusion criteria for conducting the review.[13] Furthermore, the title should include an indication that it is a Scoping Review. For example, in the manuscript titled: "Educational needs of a community pharmacy staff in minor ailment service delivery: a systematic scoping review" clearly indicates in the title the type of review methodology that was utilized[17].

5.2. Writing the methodology section

Presenting methodology involves outlining the search strategy (both via scientific data bases and how grey literature if utilized was searched).

The methodology section should include detailed information regarding the diversity and identification of electronic data bases utilized and the reasons for their inclusion, eligibility criteria and processes that indicate the study selection (utilizing the PCC criteria as mentioned above). Furthermore, details outlining how data extraction would be undertaken and the processes that will be undertaken to reach consensus as to which data would be extracted and utilized for the basis of the review.

5.3. Displaying results section considerations

Presenting results has its associated challenges such as it implies that the researcher has the skills to know what data is important to extract and the methods used to analyze and synthesize that data.[9]

Results should include the following:

(i) A Prisma Figure for scoping reviews (PRISMA-ScR) as outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram for scoping review search strategies.[15,41] This figure includes information regarding the number of data records extracted through the screening and eligibility processes as well as the number of records excluded.

(ii) Table of scientific data extraction that outline the data records extracted which may include features such as the title of the manuscript, author, date of publication, country of origin, aims or objectives of the study, sample size, study objectives, study design, if an invention is identified then this should be included in the table of results, key themes, key findings/outcomes that relate to the review question.[13]

(iii) Table of the grey literature data extraction which may outline the non-scientific sources, type of record extracted, date of record (if known), author (if known), key findings/outcomes.

6. Discussion considerations

It might be easy to overlook the importance of the Discussion section when writing up the results of a scoping review in pharmacy education. The Discussion section is obviously important even for a systematic review but might even more critical for a scoping review aimed to capture the breadth of a nascent topic such as in a scoping review whose aim at least in the larger sense is to assist your colleagues in identifying the relevant literature in a topic of mutual interest. As per the Granada Statements, scoping reviews can contribute greatly to our understanding of a topic and mitigate those circumstances where we have been frustrated in pinpointing the various facets in a given phenomenon to avoid restating the obvious.[47–55] Even while the purpose of a scoping review is not to provide some sort of definitive conclusions, context still is extraordinarily important. There are no golden rules for discussing the results; however, one might consider what one would want from a scoping review if they were reading it and provide the reader with that sort of assistance; i.e., the generosity and collegiality borne from undertaking the review.[56] Yet, in this section it might be tempting to discuss issues that are tangential to the purpose of the review. Alignment between the summarized evidence of the review and the review question and objectives is critical to the review's cohesion. Some recommendations to consider are as follows.[57]

Firstly, *ensure that all elements of the review question(s) and objective(s) have been addressed?* If so, the discussion section can focus on the extent of evidence available and place this evidence into context. Given the nature of scoping reviews, there are circumstances where review questions and objectives may not be addressed due to insufficient literature.

If this is the case, the discussion section provides an opportunity to discuss gaps in knowledge, new hypotheses, and considerations for future research. Secondly, *address the review question adequately*. The discussion section provides an opportunity to demonstrate the alignment of review results with review questions and objectives. When conducting a scoping review, the information that is located can highlight new avenues of inquiry. It can be tempting to discuss these tangential subjects in the discussion section, without re-focussing on the primary aim of the review. Thirdly, *the discussion should adequately situate with the context of the relevant field of literature, practice, and/or policy*. A good discussion section will highlight the contribution the review has made to the relevant field through reflecting on what has preceded the review and projecting the potential implications for future investigation and planning. The discussion will also include a description of the strengths and limitations of the review. A significant strength of a scoping review will be the demonstration of compliance with a rigorous methodological and reporting framework. This can be achieved by transparently documenting the review process and adhering to PRISMA-ScR.[15,41] Review limitations that may be described can be divided into two broad categories: limitations relating to the methodology of the scoping review and limitations of the available research, literature, policy, and practice documents that were available to address the review questions; and objectives. Guidelines, limitations, and recommendations.

In any event, the scoping review should be one that is greatly edifying for your colleagues in pharmacy education and useful for them not only to better understand a phenomenon but also save them valuable time when exploring solutions to a given problem or phenomenon. Remember that some review results will likely come from grey literature such as White Papers and other documents including institutional policy reports, with some that might be regarded as somewhat proprietary in nature. The point of the review should indeed help us locate the breadth of a phenomenon, assist one another, act as a point of scholarship and as a token of collegiality, and demonstrate for our colleagues' potential future directions in our teaching practices, our engagement of students, and potentially for our carrying pharmacy education forward.

7. Summing it up

The purpose of this commentary was to highlight an area, or type of manuscript that is growing in its use, but still could potentially be leveraged further in pharmacy education. While this paper highlights various methodological considerations, its gist is not a "how to" on scoping reviews, as these have been published elsewhere and with specific intention on delving into finer methodological/search strategies and distinctions. Rather, the point here was to highlight some major considerations for the methodological conduct but even more so highlight the difference between scoping and systematic reviews. It also serves to recognize that there are a number of areas in pharmacy education that are prime for the use of scoping reviews, which highlight the breadth of a particular area and gathers literature from potentially myriad sources. In that way, the publication of a scoping review is not only scholarly but commensurate with collegiality in that a proper scoping review can spare our colleagues from hours of searching to identify what has been written in a given area and derive answers to a question that could assist our peer educators on a matter of intellectual curiosity or even assist them with ideas that can inform a pedagogical strategy, method, or entire course. Exploratory Research in Clinical and Social Pharmacy (ERCSP) welcomes well-conducted scoping reviews that can benefit the wider readership.

CRediT authorship contribution statement

Cherie Lucas: Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Methodology, Investigation, Data curation, Conceptualization. **Shane P. Desselle:** Writing – review & editing, Visualization, Validation, Resources, Methodology, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

The author is an Editorial Board Member/Editor-in-Chief/Associate Editor/Guest Editor for *[Journal name]* and was not involved in the editorial review or the decision to publish this article.

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

As mentioned above, I am an Associate Editor for ERCSP and lead author on this methodology paper. Shane is the Editor for ERCSP and is the second author for this paper. This paper will go out for review as does every paper. I have no financial competing interests for this paper and the work conducted.

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