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Review article

Evidence synthesis strategies and indications for scoping and systematic reviews: A methodological guide and recommendations for radiography research

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Objectives: This review provides methodological guidance, including essential preparatory steps, for conducting systematic literature reviews (SLRs) to produce practical and evidence-based findings that influence the pillars of radiography practice. It also highlights the differences between a scoping review (ScR) and a SLR.

Key findings: SLRs differ from ScRs in their aims, scope, and methodological requirements. SLRs aim to answer specific research questions through comprehensive searches, critical appraisal, and synthesis of empirical studies, while ScRs map the extent of literature on a concept and are more flexible in methodological requirements. Essential components for both include formulation of precise research questions, protocol development, comprehensive literature search, screening and data extraction processes, and evidence synthesis. In addition, a high-quality SLR requires registration of the review protocol and specific qualitative synthesis approaches (e.g., meta-aggregation and meta-synthesis) and/or quantitative synthesis, such as meta-analysis. There are concerns about the lack of a radiography-specific database, necessitating the use of general databases (e.g., PubMed, Scopus, PsycINFO, etc) and discipline-specific sources (e.g., Radiography and related journals). There is also frequent heterogeneity of study designs in radiography research, which can limit the feasibility of meta-analysis in quantitative evidence synthesis.

Conclusion: Both SLRs and ScRs are essential for advancing evidence-based radiography practice. However, researchers need to adhere to established methodological standards to ensure transparency, reproducibility, and relevance of the findings. This will enhance research uptake in clinical practice, education, and policy and inform future research directions.

Implications for practice: Radiography researchers should select review types based on research objectives, apply rigorous and transparent methods, and consider multidisciplinary collaboration to strengthen evidence synthesis. Additionally, training in evidence synthesis methods will improve the rigour and relevance/impact of radiography review articles.

Introduction

Scientific research is inherently cumulative, with findings from subsequent studies building upon previous ones and contributing to a more comprehensive understanding of the field.[1] Over the last three decades, radiography research has experienced significant knowledge accumulation,[2,3] as evidenced by the proliferation of peer-reviewed and impact-rated radiography journals.[2] However,

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the translation of knowledge into practice is still in its early stages,[4] despite the increasing need for evidence-based practice in clinical radiography.[5–8] This underscores the potential of systematic literature review (and meta-analysis) methodology to offer a coherent and contextual understanding of findings within specific and trending fields of radiography. This methodology enables evidence synthesis, without which research users face an overwhelming array of fragmented reports, which can hinder their ability to draw meaningful conclusions or support evidence-based clinical radiography practice.[9,10]

The literature review methodology seeks to address these challenges,[11,12] however, as the term review, defined as "to view, inspect, or examine a second time or again",[13] is broad and general in scope, various types of reviews are in existence to specify the direction of the search.[11] Nevertheless, each review type is distinguished by specific methods and purposes, determined by the context and objectives of the inquiry.[14] These types include systematic (literature) reviews with/without meta-analysis, narrative reviews, umbrella reviews, rapid reviews, scoping reviews, mapping reviews, and systematised reviews.[14] Of these review types, Iweka and colleagues[15] have reported an increasing volume of published systematic literature reviews (SLRs) across Radiography and related medical radiation science journals. Despite this increase, the authors of this work have observed some quality concerns regarding methodological rigour and confusion between the principles guiding SLRs and scoping review (ScR).

SLRs differ from other types of reviews because they follow a rigorous and structured methodological approach designed to address a clearly defined clinical question through a comprehensive analysis of the existing body of relevant peer-reviewed publications.[16] The required methodological rigour, transparency, and reproducibility associated with SLRs make them a reliable method for evidence synthesis.[14,16] SLRs serve as an evidence synthesis methodology that summarises and integrates original knowledge to provide the highest form of evidence to guide clinical practice.[17] Furthermore, because they include a risk of bias assessment as part of their process, they are a relatively less biased methodological approach.[18] Generally, SLRs need to demonstrate strong internal validity and contribute to the external validation of findings from mostly independent included studies, thereby improving their overall reliability. When complemented by meta-analysis, they increase statistical power, helping to identify true associations.[17] Similarly, when complemented by a form of meta-synthesis,[19–21] they offer a deeper and more nuanced understanding of phenomena. This methodological guide aims to firstly, highlight the differences between a ScR and a SLR and outline the critical preparatory steps, methodological approaches, and essential guidance for conducting SLRs to generate practical, evidence-based findings that influence practice, policy, and guidelines through radiography research.

Comparative analysis of some key features of scoping and systematic reviews

ScRs are useful for examining the scope or extent of evidence on a given concept and are suitable in situations where a SLR is not plausible.[22] In their review of social accountability in radiography education, Abuzaid et al.[23] indicated that (i) ScRs' systematic but flexible approach allowed for a "*thorough exploration of educational practices, capabilities, and gaps in radiography*" while (ii) its iterative approach "*allowed adjustments as insights emerged, providing a robust foundation for advancing socially accountable radiography education and practice*" (p. 3). To include all relevant evidence on the concept, ScRs may include both empirical and non-empirical studies[24] or only focus on empirical studies. For example, Diaby and colleagues' ScR on clinical decision-making within diagnostic radiography[25] included journal articles, case studies, conference papers, educational materials and study-based anthologies. A full comparative analysis of some key features and steps for the conduct of ScRs and SLRs is provided in Table 1.

Indications for systematic and scoping reviews

Knowledge or evidence synthesis attempts to summarise all relevant and accessible studies on a given question to enhance the understanding of inconsistencies in diverse evidence, potentially identify gaps in the evidence, and make recommendations for future research.[42,43] Many evidence synthesis approaches exist.[44–46] Nonetheless, knowledge synthesis in healthcare has largely focused on SLRs.[46]

In radiography, SLRs have been conducted to explore various concepts, including workplace violence and associated risk factors,[47] radiation risk communication,[48] technique optimization,[49] and patient experience of high technology medical imaging,[50] among others. In contrast, ScRs have been used to explore the attitude of medical radiation professionals towards radiation protection,[51] clinical decision-making within diagnostic radiography,[25] research practices and methodological reviews in radiography,[52] sustainable strategies adopted in nuclear medicine,[53] the role of radiology in diagnosing intimate partner violence,[54] among others. Table 2 presents selected examples of SLRs published in the *Radiography* journal within the last five years (2021–2025). These examples were purposively selected to provide modality (i.e., digital radiography, computed tomography, magnetic resonance imaging, ultrasound, radiation therapy, and nuclear medicine) and thematic (e.g., workforce and sustainability) representation of current topical issues in practice. Collectively, these examples reveal notable strengths and areas for improvement. Strengths include increasing adherence to recognised reporting guidelines (e.g., PRISMA) and methodological diversity in the use of both quantitative and qualitative synthesis approaches. However, inconsistent pre-registration of protocols and variable depth in describing search strategies and data synthesis methods were notable areas of weakness. While we acknowledge that a holistic methodological review is needed to confirm these, the identified inconsistencies highlight the need for clear methodological guidance.

Evidence synthesis strategies for systematic reviews

The authors observed a general strength in the evidence synthesis approaches employed in ScRs across Radiography research but not for SLRs. Thus, this section of the guidance focuses on the methods of evidence synthesis employed in SLRs in radiography research, which broadly follow the three approaches suggested by Harden and Thomas.[64] (1) Quantitative syntheses,[55,57] which involve a set of statistical methods[21,65] and different meta-analytic approaches, including subgroup analysis,[55,59] meta-regression,[59] multivariate meta-analysis,[66] and network meta-analysis.[62] (2) Qualitative evidence syntheses,[50,67] which involve interpretive (e.g., meta-synthesis) and integrative/aggregative (e.g., meta-aggregation) approaches.[31,68–70] These approaches are used synonymously, although there are discrete differences between them[38,71] (see Table 3). (3) Mixed methods[8,58,60] syntheses, which include studies with diverse designs and synthesis approaches such as critical interpretive synthesis, framework synthesis, and narrative synthesis.[72,73] The rationale for conducting a SLR informs the choice of synthesis approach. The aims and key features of the different forms of these evidence synthesis strategies for SLRs are

Table 1
Comparison of characteristics of scoping and systematic reviews.

Characteristics	Scoping Reviews	Systematic Reviews
Features		
Reason(s) for undertaking review	To map the extent of (literature on) a concept and evidence and help identify areas for future research.[11,22,24,26] Very useful in situations where SLRs are incongruent with the review objectives.[22]	Aims to systematically search for, appraise and synthesise research evidence.[11]
Key decider (Outcome)	Appropriate for answering clinically relevant questions but with limited or no implications for practice.[22]	Appropriate for addressing the feasibility and/or effectiveness of a treatment or practice.[27]
Examples of methodological guidelines	Arksey & O'Malley,[24] Levac, Colquhoun, and O'Brien's extension,[28] Peters et al.,[29] JBI ScR.[27]	JBI guidelines,[27,30,31] the Cochrane handbook for SLR of interventions[32]/diagnostic test.[33]
Standardization and clarity of reporting	PRISMA extension for ScRs.[34]	The PRISMA 2020 statement.[35]
Implication for practice statement	Implication for practice not always required due to the absence of risk of bias.[22,26]	Provision of implications for practice is a requirement.[22]
Review protocol	A priori review protocol is required but not accepted in PROSPERO. Review authors may publish their protocols in registers such as the Open Science Framework. The review approach is inclusive, flexible and iterative and thus any deviations from the protocol should be clearly reported.[26,29,36]	A priori review protocol is required and should be published.[37] The approach used should be transparent, thorough, and rigorous to enhance reproducibility.[22]
Steps		
1. Identify the question or objectives	The review is exploratory and typically addresses a broad question and/or identifies certain characteristics or concepts in studies.[36] Thus, a single and precise review question or objective may not be feasible.[22] May be guided by the Population, Concept, and Context (PCC) framework.[29]	A pre-determined specific review question on a particular concept is required.[22] based on the Population, Intervention, Comparison, Outcome (PICO) or Sample, Phenomenon of Interest, Design, Evaluation, Research type (SPIDER) frameworks.[38,39]
2. Define inclusion and exclusion criteria	The completeness of searching for evidence is determined by time and/or scope constraints and may include research in progress.[11] May include within and across disciplines.[40]	An exhaustive and comprehensive literature search is required.[11]
3. Search for evidence/studies	Evidence search is undertaken via electronic databases, reference lists, hand searching of key journals, relevant organizations, existing networks, and conferences.[24]	Studies are identified on electronic databases and hand search of reference lists.
4. Select evidence/studies	Evidence is selected based on a pre-determined inclusion and exclusion criteria. Includes both empirical and non-empirical evidence.[29]	Studies are selected based on pre-determined inclusion and exclusion criteria[11] and mainly includes empirical original research
5. Extract evidence/data	Descriptive summary of evidence.[24]	Data extraction includes descriptive details of the included studies[30] and is performed by two independent reviewers to minimize bias and reduce error.[32]
6. Chart evidence/Assess quality	Evidence is usually provided as a tabular chart, although may include a quality appraisal. Thus, risk of bias assessment is generally not performed.[11,22] However, review authors may assess and report the risk of bias depending on the purpose of the review.[41]	Quality assessment and risk of bias assessment required.[11]
7. Synthesise and/or Present results	Narrative commentary of evidence with no specific synthesis of the evidence.[11]	Data synthesis required[11] and may include different approaches such as thematic synthesis, meta-aggregation, meta-analysis, etc

provided in Table 3. Table 3 also highlights how these synthesis strategies have been used in radiography research.

The essential methodological considerations for SLRs and ScRs

The relevance of SLRs and ScRs to strengthen the evidence base in radiography research will lie strongly on the methodological rigour with which they are conducted. This will be guided by already established guidelines for the conduct of SLRs[93] and ScRs.[34] Regardless of the study design adopted, SLRs and ScRs conducted with rigorous methodology aid in a better understanding of diagnosis, interventions, treatment response and service efficiency across both diagnostic and therapy radiography studies.[32,94] The methodological considerations for conducting SLRs and ScRs are outlined below. In addition, Fig. 1 demonstrates the essential steps for conducting SLRs.

a. **Formulation of review topic, questions and eligibility criteria**
   i. SLRs and ScRs in radiography should have a succinctly formulated topic and review questions that closely follow the Population, Intervention, Comparison and Outcomes (PICO)[95,96] and the PCC frameworks,[29] respectively, or any of the variants.
   ii. The title should also identify the article as a “systematic review” and/or “meta-analysis” or “scoping review”, as appropriate, to help in easy identification of the review type when indexed or searched for in journal databases.[97]
   iii. Reviewers should also clearly specify inclusion and exclusion criteria to determine the eligibility of articles addressing the review questions.

b. **Protocol Registration**
   i. It is strongly advised that, before initiating a search as part of the formal conduct of the SLR, authors should create and pre-register a review protocol[95,98] on PROSPERO[99] or the Open Science Framework.
   ii. Protocol registration helps to ensure transparency and accountability by outlining the planned objectives, methods, and analytical or synthesis approaches in advance. It also helps reduce unnecessary duplication and prevents questionable review practices by reducing bias and the risk of selective reporting to achieve desired review outcomes. Of note, protocol pre-registration maybe exempted under certain circumstances, see the work of Akudjedu and colleagues.[90]

Table 2
Selected examples of published SLR studies across Radiography research.

Reference[a]	Practice area of focus	Research Question/Aim	Number of included records	Guideline	Pre-registration status		Evidence synthesis strategy
					Pre-registered?	Database details	
Steffensen et al. 2021[49]	Direct Digital Radiography	To determine the effectiveness of adjusting radiographic acquisition parameters on image quality of x-ray images acquired on a direct digital radiography system.	23 studies	PRISMA	Yes	PROSPERO ID: CRD42019137806	Interpretive Qualitative synthesis: narrative synthesis.
Arruzza et al. 2022[55]	CT and Ultrasound	To determine the current diagnostic accuracy of CT and ultrasound for suspected acute appendicitis in adults.	31 studies	PRISMA for Diagnostic Test Accuracy	Yes	PROSPERO ID: CRD42021248995	Mixed methods evidence synthesis: meta-analysis plus narrative summary
Newhouse et al. 2022[56]	Ultrasound	To explore and evaluate the diagnostic value and accuracy of ultrasound in diagnosing hydatidiform mole throughout all trimesters of pregnancy.	8 studies	Not specified	No	N/A	Mixed methods evidence synthesis: meta-analysis plus narrative synthesis
Iqbal and Currie, 2022[57]	SPECT/CT	Does SPECT/CT accurately diagnose patients with avascular necrosis of the head of the femur compared with other diagnostic investigations?	7 studies	PRISMA	No	N/A	Quantitative synthesis -meta-analysis
Anudjo et al. 2023[58]	Environmental Sustainability	To explore and integrate current evidence regarding environmental sustainability in clinical radiology and radiotherapy departments.	14 studies	PRISMA	No	N/A	Interpretive Qualitative synthesis -narrative synthesis
Al Balushi et al. 2024[8]	Radiography research and Evidence-based practice	To systematically explore the barriers to evidence-based practice and research implementation in clinical radiography practice internationally.	31 studies	Cochrane Collaboration guide	No	N/A	Interpretive Qualitative synthesis -textual narrative synthesis
Kusumaningtyas et al. 2024[59]	Mammography	To evaluate the correlation between breast density measurements obtained from various software and visual assessments by radiologists using full-field digital mammography	22 studies (comprising a total of 58,491 women)	PRISMA	Yes	PROSPERO ID: CRD42024543612	Quantitative synthesis -meta-analysis
Susiku et al. 2024[60]	Workforce shortage, competences and employability	What characteristics of pre-registration radiography education programmes are associated with adequate knowledge, skill acquisition and graduate employability?	40 studies	PRISMA	No	N/A	Interpretive Qualitative synthesis -Braun and Clarke's thematic analysis
Inggriani et al. 2025[61]	MRI	In patients presenting with signs and symptoms of perianal fistula, how accurate is apparent diffusion coefficient in differentiating between active and inactive lesions?	21 studies (comprising of 1007 patients)	PRISMA for Diagnostic Test Accuracy	Yes	PROSPERO ID: CRD42024596604	Quantitative synthesis -meta-analysis
Amadita et al. 2025[62]	CT	To explore the literature on novel MAR methods targeting large metal artefacts in fan-beam multidetector CT to examine their effectiveness in reducing metal artefacts and their impact on image quality.	36 studies	PRISMA for network meta-analyses	Yes	PROSPERO ID: CRD42022314883	Mixed methods evidence synthesis: pairwise meta-analysis plus narrative synthesis
Pang et al. 2025[63]	Radiotherapy	To assess the effect of abdominal deep inspiration breathhold radiation therapy comparing with thoracic breath hold on cardiac toxicity in left-sided breast cancer patients.	4 studies (comprising of 166 patients)	PRISMA	No	N/A	Quantitative synthesis -meta-analysis

[a] The *Radiography* journal was chosen as a source for relevant articles due to its broad international authorship and readership across education, clinical practice, and research domains. The review articles were not identified through a comprehensive systematic search; rather, they were chosen to illustrate current practices in SLRs in radiography.

Table 3
Summary of aims, key features, and some applications of the various SLR evidence synthesis approaches in radiography research.

Evidence synthesis approach	Aims	Key feature/Recommendations	Some applications in radiography research
Quantitative syntheses (meta-analysis)	Integrates quantitative findings from multiple studies to produce a consistent outcome greater than the sum of their parts[74] The results of quantitative evidence describe the effect of the studied intervention.[21]	The larger the sample size, the greater the reliability of the findings.[32]	Meta-analysis was used to evaluate the practical application of novel algorithms and machine learning in reducing computed tomography metal artefact for hip and shoulder implants.[62] They were also used to provide insights into the effectiveness or diagnostic accuracies of various interventions (e.g., modalities or techniques).[55–57,59,61]
(i) Subgroup analysis	To compare the effect in different subgroups of studies (similar to analysis of variance in primary studies).[75]	Divides the studies based on intervention, population, or contextual features and examines differences in estimated effects across the subgroups.[75]	A combination of subgroup analysis and meta-regression has been used to evaluate the correlation between breast density measurements obtained from various software and visual assessments by radiologists using full-field digital mammography.[59]
(ii) Meta-regression	Used to explore relationship between study characteristics and effect sizes[75,76]	Provides a generalization of subgroup analysis.[75,76]	
(iii) Multivariate analysis	Useful when, for example, effect sizes for different interventions, effects at two-time point, or effects on two outcomes are included in one study.[66]	Requires specialist statistical expertise and software. Need information about within-study correlations.[72]	
(iv) Network meta-analysis	Network meta-analysis is used to compare multiple interventions simultaneously by analysing studies and making different comparisons in the same analysis.[72,77]	Assumes that all interventions included in the "network" are equally applicable to all populations and contexts of the studies included. Requires specialist statistical expertise.[72]	Used to synthesise literature on computed tomography metal artefact reduction for hip and shoulder implants using novel algorithms and machine learning.[62]
Qualitative evidence syntheses	Seek to examine patterns and common trends within a specific concept and to increase understanding of evidence-based practices.[21] Essential for advancing evidence-based practice by enhancing understanding of the studied phenomenon[30,31,78]	Methodological choice (interpretive vs integrative) depends on the aims and process for achieving these, including strategies for literature search, quality appraisal, data extraction, and synthesis.[71]	Used to explore heterogeneous optimization techniques for radiographic acquisition parameters.[49] Are suitable for synthesising phenomenologically oriented concepts[79–81] and other qualitative studies.[82]
(i) Interpretive qualitative evidence synthesis (also known as meta-synthesis[21,71])	Useful for theory development or increasing the generalizability of research outcome and/or generating new insights.[20,71,73,83]	Includes synthesis methods such as meta-ethnography, thematic synthesis, and meta-study.[20,38,73,84]	Used to synthesis literature on the current evidence of continuous professional development (CPD) activities in radiography and to provide recommendation for practice improvement among European radiography societies.[67]
(ii) Integrative qualitative syntheses (e.g., meta-aggregation[38,85])	'Aggregate' findings of included literature[86] with a focus on identifying similar themes across studies[38] in the form of "lines of action" that make appropriate recommendations to inform practice or policy.[87]	Involve studies with different qualitative methodologies.[88] The synthesist avoids reinterpretation of results from included studies.[87]	Used to synthesise literature on undergraduate medical radiation science students' experiences with challenging clinical encounters.[89]
Mixed-methods evidence syntheses	Useful for addressing the effectiveness of interventions by exploring the existence of contextual factors (i.e., qualitative) and describing why and how they affect variables (i.e., quantitative).[64,73]	The approach of combining studies of diverse designs fosters triangulation of findings, thus enhancing the utility of the synthesized evidence for practice and policy.[30]	Used to synthesise literature on the global impact of the COVID-19 pandemic on clinical radiography practice and provided recommendations for future services planning.[90]
(i) Critical interpretive synthesis	Seeks to produce a theory[72]	Involves a highly iterative approach to refining the research question and data analysis.[72]	
(ii) Framework analysis	Useful for developing a framework for public involvement in health service research.[91]	It uses a deductive approach and an *a priori* coding framework that can be informed by theory, reflect the review questions, and generated from the researchers' discussions and an initial reading of included studies.[72]	
(iii) Narrative synthesis	Generates an initial theory of why the intervention and/or implementation is effective.[72]	Includes a toolbox for transforming and translating qualitative and quantitative evidence.[72]	Has been used to understand the need "*to increase the effectiveness and facilitate expansion of Radiographer Reporting*"[92] (p.1106).

Table 4
Study designs and some relevant Quality appraisal/Risk of Bias tools.

Study design	Quality/Risk of Bias Tool	Commentary
Diagnostic Test Accuracy studies	QUADAS-2, CEBM appraisal sheet	The QUADAS-2 tool consists of four phases: summarizing the review question, adapting the tool to produce review-specific guidance, constructing a flow diagram, and judging bias and applicability. The tool enhances transparency in RoB assessment and applicability of primary diagnostic accuracy studies.[112]
Qualitative studies	CASP tool for qualitative studies (CASP 2013), CEBM appraisal sheet	The CASP tool is a generic tool to assess the strengths and limitations of qualitative research. This tool is user-friendly and ideal for novices and has been identified as an effective tool for assessing the transparency of research practice and reporting standards.[113]
Non-randomised studies	ROBINS-1	Evaluates risk of bias in estimates of the effectiveness or risk-benefit analysis of an intervention from studies that did not apply randomisation in assigning interventions.[114]
Randomised Controlled Trials	ROB-2, JADAD, CEBM appraisal sheet	RoB-2 provides a framework for considering the ROB in the findings of any type of randomized trial. The assessment is specific to a single trial estimate of the relative effect of two interventions.[115,116] The Jadad scale is a tool for assessing the methodological quality of clinical trials.[116]
Case controlled studies	NOS - Newcastle–Ottawa quality assessment scale	The Newcastle–Ottawa Scale (NOS), a quality assessment scale, NOS is recommended by the Cochrane Collaboration for assessing case–control and cohort studies. It consists of eight items, categorized under selection, comparability, and outcome or exposure.[117]

c. **Systematic search, article screening and data extraction**

i. There is currently no known database specific to the radiography discipline. However, radiography-related publications are mostly indexed in universal medical and health databases like MEDLINE and EMBASE, and occasionally in discipline-specific databases such as CINAHL (nursing and allied health professions), PsycINFO (Psychology and psychiatry), CANCERLIT (oncology)[33,100] etc. These are good sources for identifying relevant studies for SLRs and/or ScRs in radiography.

ii. Beyond databases, a comprehensive literature search should also include a reference list of relevant papers,[101] manual searching of key radiography journals like *Radiography, Journal of Medical Imaging and Radiation Sciences (JMIRS), Journal of Medical Radiation Sciences* (JMRS) etc, grey literature and consultations with experts in the topic area.[93]

iii. Authors are encouraged to specify both where and how their searches were conducted, filters used in each database, the search string (with Boolean operators) of all used databases and the dates of the searches.[97] These ensure the completeness and recency of the review and reproducibility of the process, an essential feature that facilitates future updates when required.[96,102–104]

iv. There is no consensus on the minimum number of databases to be searched for a SLR; however, searching a single database is deemed inadequate and increases the risk of selection bias.[105] Reviewers are therefore expected to plan this stage of the review carefully.

v. There might be the need to conduct an updated search prior to publication in cases where the initial search was conducted over 6–12 months before to ensure any newly published paper in the topic area is captured.[16,32]

vi. At least two review authors are recommended to screen collated papers (using platforms such as Covidence™ or "Rayyan"[106]) and disagreements should be resolved through a consensus discussion between the reviewers or the arbitration of a third reviewer.[16,100] This ensures a reduced potential for errors and biases since this activity is highly subjective and critical to the synthesis and interpretation of the data.[105] The degree and rate of disagreement between reviewers may be reported for transparency and the literature search, screening and selection activity should be presented in a flow diagram for the readers' ease of understanding.

vii. Specific details of the search process should be reported in the abstract, method and result sections of the SLR during write up.[32] It is crucial to keep a record of all excluded papers with reasons for exclusions, promoting transparency and providing an audit trail of this activity.

viii. Failure to report clear details of the eligibility, search and screening processes makes the SLR identical to narrative reviews that summarise published evidence based on authors' preferences[102].

ix. On completion of the screening and selection of papers, authors can proceed with extracting relevant data that addresses the review questions, including study characteristics, methodological details and key study findings.[33] Data extraction sheets should be developed and agreed to by all reviewers and possibly piloted using a representative sample to assess usability and ensure that no required item is missed.[32]

x. How data is extracted and synthesised depends heavily on the research paradigm adopted by the selected papers (see Tables 2 and 3); therefore, radiography authors undertaking SLRs are encouraged to further explore and perhaps consider the usefulness of an experienced systematic reviewer/methodologist/statistician within their research team.

d. **Quality Assessment, Risk of Bias and Certainty of Evidence**

i. SLR authors are expected to conduct methodological quality assessment, often called risk of bias (RoB) of the selected papers for analysis. RoB describes the likelihood of research findings to misrepresent the true outcome due to weakness in the study design and data analysis.[107] It is important for SLR authors to ensure that the quality assessment or risk of bias tool adopted is tailored for the specific study design of the appraised paper. Table 4 provides information on some study designs and relevant appraisal tools.

ii. Methodological quality can also include other important considerations like imprecision, reporting completeness, ethics, and applicability.[108]

iii. For any tool chosen for quality appraisal, a clear assessment criterion for deciding the quality of studies should be

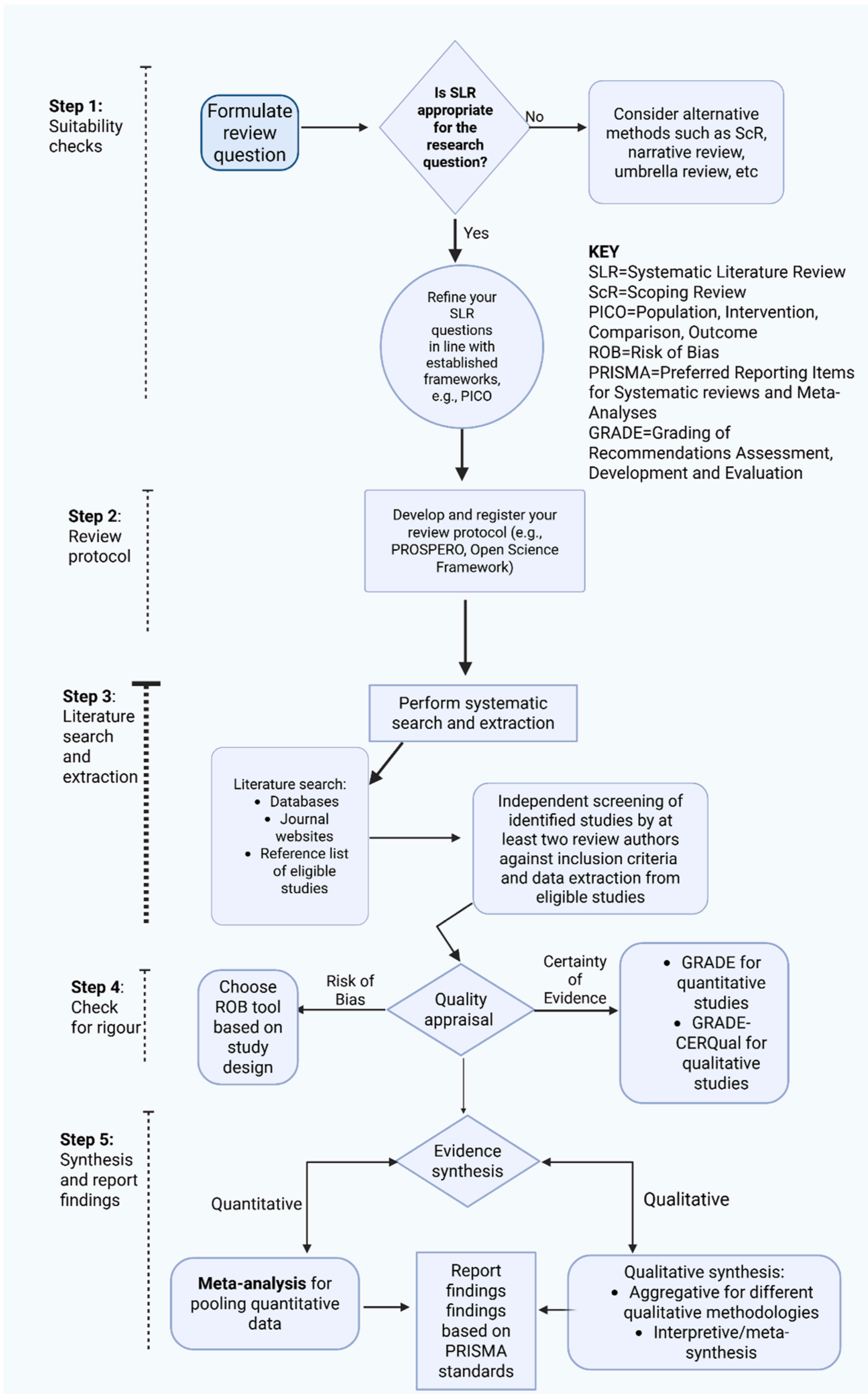

Figure 1. Visualisation of the essential steps for conducting SLRs. Figure created in BioRender (https://BioRender.com).

provided to enable readers determine the appropriateness of the process and if all potential sources of bias were considered.[97]

iv. A summary of the RoB assessment for papers included in each synthesis should be provided using tables and figures.[33]

v. Reviewers should also consider the potential for publication bias and its impact on the review, where research studies with positive results and more significant findings are favoured for publication over others.[100,105,109–111]

vi. On completion of the review, it is important for authors to identify possible limitations at each stage of the review process that could affect the validity and generalisability of the findings.

Conclusion

This methodological guide emphasises that to ensure rigorous, relevant, and practical outcomes for radiography education, practice, and policy, SLRs and ScRs practices should include (i) careful question formulation, (ii) prospective protocol registration, (iii) comprehensive and transparent literature searching across multiple sources, and (iv) dual-reviewer screening and data extraction. In addition, review authors should (v) use design-appropriate appraisal tool and undertake risk of bias assessment. It is equally important and recommended that they (vi) use fit-for-purpose synthesis approaches in line with PRISMA guidance and accompanied, where applicable, by certainty of evidence assessments. These practices are important due to the existing heterogeneous study designs and the lack of a discipline-specific database, which complicates independent study pooling strategies across Radiography research. Of note, this does not preclude producing rigorous, practice-relevant conclusions when appropriate methods are applied transparently.

Sustaining these practices/standards and ensuring consistent adherence requires researcher capability building across the profession. Consequently, we encourage research teams to involve experienced SLR researchers, information specialists, methodologists and statisticians to enforce reporting and protocol standards. Further, we recommend that educators embed evidence synthesis training within the curricula and continuing professional development. By embedding these practices, radiography researchers can produce reviews that not only summarise existing knowledge with rigour but also accelerate the translation of evidence into patient-centred imaging and therapy, guiding better decisions today and setting a higher standard for future studies.

Ethics approval and consent to participate

Not applicable.

Availability of data

Data required for this study may be made available by the author(s) upon reasonable request.

Author contributions

TNA: Conceptualisation, Writing- Original Draft preparation, Visualisation, Writing- Reviewing and Editing, project administration.

JLA: Writing- Original Draft preparation, Visualisation, Writing-Reviewing and Editing.

EI: Writing- Original Draft preparation, Writing- Reviewing and Editing.

SD: Writing- Original Draft preparation, Writing- Reviewing and Editing.

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