**A Systematic Scoping Review of Systematic Reviews in Palliative Medicine Education**

Zheng Hui Mah, Ruth Si Man Wong, Ryan Ern Wei Seow, Eleanor Kei Ying Loh, Nur Haidah Ahmad Kamal, Ryan Rui Song Ong, Lorraine Hui En Tan, Min Chiam, Annelissa Mien Chew Chin, Jamie Xuelian Zhou, Gillian Li Gek Phua, Yoke-Lim Soong, Jin Wei Kwek, and Lalit Kumar Radha

**Abstract**

**Introduction**

Increasing use of systematic reviews (SR) to identify and analyse the effectiveness of various interventions in Palliative Medicine education (PME) has raised concerns over its ability to capture the rich tapestry of clinical, psychosocial, cultural and historical issues associated with educational processes given PME’s multi-professional and context-specific nature. A systematic scoping review (SSR) is employed to scrutinise the role of SRs in PME and to capture commentaries and opinion pieces in grey literature regarding SR use.

**Methods**

We employ Krishna’s ‘Split Approach’ that sees concurrent use of Braun and Clarke’s approach to thematic analysis and Hsieh and Shannon’s approach to directed content analysis to independently review identified articles from five bibliographic databases and seven medical education journals. In keeping with the ‘Split Approach’, an iterative process was conducted to enhance the reproducibility, transparency and structure of the systematic review.

**Results**

A total of 8438 titles and abstracts were reviewed, and 83 full-text articles were included following snowballing of references. The five themes identified using Braun and Clarke’s approach to thematic analysis were deemed similar to the categories identified using Hsieh and Shannon’s approach to directed content analysis: These include the History and Evolution of SRs; Methodology of SRs; Philosophical Underpinnings of SRs; Benefits and Limitations of SRs; and Applications and Misapplications of SRs.

**Conclusion**

Limited by its positivist perspective, SRs have a restricted role in the study of PME. This is primarily a result of failure to capture PME’s complex longitudinal, multi-professional nature which compromises understanding of the issues. However, its structured approach can be adapted to support other research approaches.

**Keywords:** Medical education; Palliative care; Scoping review; Systematic review; Knowledge syntheses.
Introduction

As Palliative Medicine (PM) continues to gain mainstream acceptance, education and training programs in palliative medicine education (PME) have struggled to keep up [1-6]. Many program designers, administrators and host organizations are thus employing systematic reviews (SRs) to examine and guide their practice [7-9]. However, this approach has drawn some consternation.

Whilst SRs offer a systematic [10, 15, 18, 33, 34, 37, 39, 40], transparent [19-23, 25, 33-38] and rigorous [32] means of synthesizing literature on specific areas of interest [10-17], reliance upon an a priori approach to appraise and summarize evidence [11, 15, 20-31] to ensure reproducibility [20, 22, 23, 26, 41] and reduce bias [10, 13, 22, 26, 27, 34, 37], this approach is not without problems. This is because such a methodology fails to consider PME’s longitudinal, evolving, multi-professional, psychosocially, culturally, experientially, context-specific, learner dependent, and situational nature. This is especially pertinent in PME given the role of SRs in informing practice guidelines [13, 26-28, 30, 31, 35, 40, 42, 43], policy briefs and guideline development [13, 14, 22, 26-28, 30, 35, 41-44], as well as assisting decision-making [13, 14, 20, 22, 26-28, 30, 31, 35, 37, 40-43].

To better understand prevailing critiques of SR use in PME, a systematic scoping review (SSR) is proposed to better guide SR’s role in PME.

Methodology

This SSR acknowledges PME as a socio-cultural construct informed by experiences of its learners as well as the influence of individual historical, socio-cultural, ideological and contextual factors on learners, tutors and host organizations in diverse educational settings [39, 45-47]. As a result, all sources of information given effective quality appraisal and contextualization are seen to enhance understanding of PIF

A. Defining the Research Questions

The research team was guided by medical librarians at the Yong Loo Lin School of Medicine (YLLSoM) at the National University of Singapore and the National Cancer Centre Singapore (NCNS), as well as local educational experts and clinicians at the NCCS, the Palliative Care Institute Liverpool, YLLSoM and Duke-NUS Medical School (henceforth the expert team). The expert team not only helped in determining the research question but participated in all stages of this SSR.

The focus of this review is guided by the question “What is known about SR use in PME?” These questions were designed on the PCC (population, concept and context) elements of the inclusion criteria. A PICOS format was also adopted to guide the research processes [48, 49].

B. Inclusion Criteria

A combination of Levac, Colquhoun [50]’s adaptation of Arksey and O’Malley [51]’s methodological framework for conducting scoping reviews and the PRISMA-P protocol was used to identify pertinent articles to be included in this review. A PICOS format was adopted to guide the research processes as outlined in Table 1.

C. Search

With guidance from two medical librarians from NCNS and YLLSoM, members of the research team carried out independent searches in five bibliographic databases (PubMed, ERIC, Embase, Scopus and Google Scholar) for articles published up till 31st December 2019. The searches were carried out between 17th December 2019 and 24th April 2020. Only articles published in English were included. Additional hand searching of seven leading journals in medical education (Academic Medicine, Medical Teacher, Advances Health Sciences Education, BMC Medical Education, Medical Education, Teaching and Learning in Medicine and Perspectives on Medical Education) was conducted and the references of the included articles were also reviewed (snowballing).

A broad search using: “palliative medicine”, “critical care”, “end-of-life care”, “terminal care” AND “medical education” or their combinations within healthcare students and healthcare professionals was adopted to ensure the inclusion of relevant SRs in medical education.

The research team independently reviewed all the articles from the final list of abstracts and created individual lists of full-text articles to be reviewed. ‘Negotiated consensual validation’ [52] was used to achieve consensus on a final list of full-text articles to be reviewed. It was also used to achieve consensus on a final list of included articles for data analysis.

Approach to Data Analysis

To enhance the trustworthiness of the analysis, we adopt Krishna’s ‘Split Approach’ [53] that sees concurrent and independent analysis of the included articles using Braun and Clarke’s approach to thematic analysis and Hsieh and Shannon’s approach to directed content analysis.

Braun and Clarke’s approach to thematic analysis

Braun and Clarke [54]’s approach to thematic analysis was used to study the included papers as it was deemed appropriate for analyzing socio-culturally influenced educational processes and could circumnavigate the wide range of research methodologies used in the articles, preventing the use of statistical pooling and analysis [55-63].

Themes were identified from the first 10 included articles via an iterative process. Two authors independently constructed ‘codes’ from the ‘surface’ meaning of the text. A common understanding of the ‘codes’ was then established via discussion, with initial codes being grouped correspondingly. Using
<table>
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<tr>
<th>PICOS</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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<tr>
<td>Population</td>
<td>Palliative medicine, palliative care, terminal care or end-of-life care</td>
<td>Non-palliative care medical specialties such as Surgery, Emergency Medicine, Cardiology, Obstetrics and Gynaecology etc.</td>
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<td></td>
<td>Medicine, nursing and allied health specialties (such as Pharmacy, Dietetics, Chiropractic, Midwifery, Podiatry, Speech Therapy, Occupational and Physiotherapy)</td>
<td>Non-medical specialties such as Clinical and Translational Science, Alternative and Traditional Medicine, Veterinary, Dentistry, Computer Engineering</td>
</tr>
<tr>
<td>Intervention</td>
<td>Medical education to teach palliative medicine</td>
<td>No mention of medical education in palliative medicine</td>
</tr>
<tr>
<td>Comparison</td>
<td>Comparisons of medical education in palliative medicine</td>
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<tr>
<td>Outcome</td>
<td>Outcomes and impact of medical education curriculum in palliative medicine</td>
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<tr>
<td>Study design</td>
<td>Articles in English or translated to English</td>
<td>Non-English language</td>
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<tr>
<td></td>
<td>Only systematic reviews</td>
<td>Non-narrative reviews</td>
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<tr>
<td></td>
<td>No restriction on time of publication</td>
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<td></td>
<td>No restriction on country of publication</td>
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<td></td>
<td>Databases: PubMed, Embase, PsycINFO, ERIC</td>
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A common coding framework and code book were established. Articles were charted according to: Author(s), Year of publication, Origin, Aims, Population, Methods, Curricula and Limitations.

Three members of the research team independently coded and analyzed the remaining articles using the coding framework and book to form more inclusive overarching concepts. Subthemes and themes were attained through collapsing codes and larger inclusive concepts into even larger groups, with discussions held to identify specific characteristics of each theme [54]. This process was completed when thematic saturation was achieved through multiple discussions between the research and expert teams.

Hsieh and Shannon’s approach to directed content analysis

Concurrently, three independent team members employed Hsieh and Shannon’s [64]’s approach to directed content analysis to evaluate if both analyses would provide similar results. Krishna’s ’Split Approach’ is employed as Hsieh and Shannon’s approach addresses limitations in Braun and Clarke’s approach by accounting for contradictory data and increasing validity identified themes [65]. This ‘Split Approach’ also decreases inherent biases and streamlines interpretations of terminology of different research team members. Directed content analysis adds ‘consistency’ by using prevailing data to identify codes and categories. The codes were used systematically and objectively, improving the validity and reliability of a positivist approach [65]. This approach is transparent as the identified categories are clearly delineated and referenced.

Themes and categories identified through use of Braun and Clarke’s and Hsieh and Shannon’s approaches respectively were compared with themes and insights drawn from the tabulated summaries of the included reviews (Appendix A).

The narrative produced from consolidating these themes/categories/tabulated summaries was guided by the STORIES (STructured apprOach to the Reporting In healthcare education of Evidence Synthesis) statement [55] and the Best Evidence Medical Education (BEME) Collaboration guide [56].

Results

8487 titles and abstracts were reviewed, 25 full-text articles were initially included and snowballing of references saw a further 58 full-text articles included. The PRISMA Flow Chart may be found in Figure 1.

Iterative process and engaging experts

Analysis of the 83 included articles using Braun and Clarke’s approach to thematic analysis identified five themes: 1) History and Evolution of SRs, 2) Methodology of SRs, 3) Philosophical Underpinnings of SRs, 4) Benefits and Limitations of SRs, 5) Applications and Misapplications of SRs.

The categories for Hsieh and Shannon’s approach to directed content analysis were drawn from Aromataris and Munn’s JBI Reviewers’ Manual [66] for SRs for directed content analysis include the 1) Rationale for Conducting SRs, 2) Historical Development, 3) Methodological Approaches to SRs, 4) Benefits & Limitations.

In keeping with Krishna’s ‘Split Approach’, the findings were discussed with the expert team and it was determined that themes and categories could be combined and studied together in tandem.

1. History and Evolution of SRs

One of the earliest organizations to set guidelines on the
reporting of SRs is the Cochrane Collaboration which forwarded ‘Cochrane Handbook for Systematic Reviews of Interventions’ [67]. In addition the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) introduced its guideline on SRs in 2009. The PRISMA guidelines in 2015 characterized SR by the presence of a clearly stated set of objectives with an explicit, reproducible methodology, a systematic search that attempts to identify all studies that would meet the eligibility criteria, an assessment of the validity of the findings of the included studies (such as assessment of risk of bias and confidence in cumulative estimates), and a systematic presentation and synthesis of the characteristics and findings of the included studies [32]. These specifications and approaches have seen SRs move to the top of the evidence hierarchy, informing evidence-based policy and practice, and in identifying knowledge gaps for future research [11, 13, 16, 22, 25, 27, 30, 34, 37, 68-73].

The evolution of SRs provides a glimpse into the changes in the ontological and epistemological stance taken by scholars. Indeed, the historical development of SRs can be divided into three major periods – the foundational period (1970 – 1989), institutionalization (1990 – 2000), and diversification (2001 – present). The foundational period was influenced by the need for reliable and reproducible reviews for policy development and is also characterized by the development of aggregative synthesis methods to combine results of studies. The institutionalization period is marked by the establishment of various organizations promoting evidence-based practice, and developing standards and tools for producing systematic reviews. Both aggregative and interpretive synthesis methods were developed during this period. The diversification period saw the development of mixed methods research. This was influenced by the importance of knowledge translation to all stakeholders – at political, professional and individual levels. New types of reviews and synthesis methods have been developed to address different review questions, to accelerate the review process, as well as to deal with different types of data [20].

The evolution of SRs introduced new methods of knowledge synthesis. Shifting away from the aggregative nature of traditional SRs, newer forms of SRs are seen as configurative. Configurative reviews try to interpret and understand the world,
through arranging information and developing concepts [74]. They typically generate theory or are used to understand the development of a research tradition [42]. Pertinent examples of the evolved SRs are discussed below. It is important to note that the discussion is non-exhaustive and that other spin-offs exist in the current research sphere but have not been discussed in this paper.

Meta-narrative reviews are an example of a new type of review that have evolved from traditional SRs. Meta-narrative reviews look at how particular research or epistemic traditions have unfolded over time and shaped the kind of questions being asked, and the methods used to answer them [75]. The

<table>
<thead>
<tr>
<th>Original Systematic Review</th>
<th>Evolved Systematic Review</th>
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<tr>
<td>Greater focus on empirical data collection:</td>
<td>Greater focus on epistemological perspective:</td>
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<tr>
<td>· Reviews that are collecting empirical data to describe and test predefined concepts can be thought of as using an ‘aggregative’ logic. The primary research and reviews are adding up (aggregating) and averaging empirical observations to make empirical statements (within predefined conceptual positions) [74].</td>
<td></td>
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<tr>
<td>· Aggregative reviews collect empirical data to describe and test predefined concepts, whereas configurative reviews attempt to interpret and understand the world. For example, aggregative reviews (including systematic reviews) can investigate the effect of a health or social intervention, the accuracy of a diagnostic tool, or the cost-benefit ratio of an intervention [42].</td>
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<td>· Research reviews vary in their ontological, epistemological, ideological, and theoretical stance, their research paradigm, and the issues that they aim to address [74].</td>
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Focus on quantitative data:

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<th>Original Systematic Review</th>
<th>Evolved Systematic Review</th>
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<td>· In the context of medicine, systematic reviewing was usually conceived as summarising results from RCTs, via meta-analysis [15].</td>
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Purpose of SR: Conducted mainly to inform policy

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<th>Original Systematic Review</th>
<th>Evolved Systematic Review</th>
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<tr>
<td>· This foundational period was influenced by the need for reliable and reproducible reviews for policy development, the expansion of RCTs, and the computerization of bibliographic databases [20].</td>
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<tr>
<th>Original Systematic Review</th>
<th>Evolved Systematic Review</th>
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<tr>
<td>· Development of mixed methods research [20].</td>
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Focus on quantitative and qualitative data:

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<th>Original Systematic Review</th>
<th>Evolved Systematic Review</th>
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<td>· Qualitative research began to be seen as providing a useful supplement to quantitative findings: it was believed that, while the latter indicated whether a policy or practice is effective in principle, these other kinds of evidence could offer useful contextual information, including about how the policy or practice is perceived and responded to by the people involved, which could moderate judgments about its likely effectiveness ‘in the real world’ [15].</td>
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Purpose of SR: Conducted to answer a broader range of research questions and inform the masses:

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<th>Original Systematic Review</th>
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<tr>
<td>· The conceptual and methodological development of systematic reviews during this diversification period was influenced by the importance of knowledge translation to all users (at political, professional, and individual levels) [20].</td>
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<th>Original Systematic Review</th>
<th>Evolved Systematic Review</th>
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<tr>
<td>· New types of reviews and synthesis methods have been developed to address different review questions [20]. Integrates a synthesis of qualitative evidence to explain different intervention and implementation effects that more closely align with the broader evidence-based health care context [73].</td>
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<th>Original Systematic Review</th>
<th>Evolved Systematic Review</th>
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<tr>
<td>· Development of mixed methods research [20].</td>
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Table 2: Summary of the Evolution of Systematic Reviews

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gain understanding into societal issues [77].

A summary of the evolution of systematic reviews is outlined in Table 2.

2. Methodology of SRs

The methodologies used to synthesize SRs are shown in Table 3 below.

3. Philosophical Underpinnings of SRs

Whilst there is a dearth of information in the literature, a focus on quantitative data [18, 19, 22, 40] and its aggregative nature [14, 18, 33, 34, 78] underlines SR’s positivist tradition [42, 74].

4. Benefits and Limitations of SRs

Benefits of SRs

In addition to the rigour [32] and transparency [19-23, 25, 33-38] afforded by its methodology, SRs prevent research waste by reducing duplication of efforts and enhancing collaboration [37] across studies and aiding the formulation of future studies to demonstrate its said effect [80].

Limitations of SRs

Inconsistency in terminology

SRs rely on clearly delineated and consistent terminologies which are a problem in medical education where educational practices are often conflated [10, 13, 15, 18, 25, 28, 36, 37, 42, 43, 70, 73, 81].

Lack of impact

The actual impact of these highly focused studies that do not necessarily consider the wider practices and environment [10, 18, 27, 71] has also been open to conjecture [15, 19, 33, 36, 70, 71, 73, 81] whilst the absence of critical reflection in systematic reviews, raises concerns that results may be misleading, and potentially harmful [19].

Rapidly obsolete

SRs rapidly go out of date [16, 27, 28, 39, 73, 82], due to production and publication time lags [83]. Indeed, it has been suggested that most prevailing SSRs are outdated [15, 16, 67].

Inherent biases

Although the methodological rigour of SRs reduce the possibility of bias in research, biases exist as a result of deficiencies in the design, conduct, and reporting of SRs [35], the absence of clear guidelines [13, 15, 21, 25, 27, 28, 30, 36, 39, 43, 70, 71, 73, 81-84], as well as the publication of studies that have only positive results [34, 38, 39]. Rigid reliance upon a priori inclusion and exclusion criteria, can lead to omission of key documents [10, 19, 25, 33, 36, 39, 43, 69, 85] and the omission of studies not published in English [79, 86]. There is susceptibility to bias inculcated by commercially-funded research or other ideological conflicts [13, 15, 19, 25, 28, 35, 81, 86].

Does not accommodate qualitative research

SRs may not accommodate qualitative research as it may be inappropriate or impossible to specify a clearly focused review question; to adopt completely reproducible and transparent search and sele [87-99].

Discussion

In addressing its primary research question, this SSR reveals that the SR’s adoption of philosophical realism sees knowledge in the form of an authoritative truth derived from empirical evidence [100]. However, a reliance on deductive reasoning limits its use in PME [74]. Whilst techniques such as meta-ethnography [100] and realist reviews offer better understanding of the complex world and multiple potential realities and outcomes [73], these approaches have not been used in PME [4, 101-108].

Aside from its aggregative approach that hinders the use of qualitative research, SRs are limited by their reliance upon clearly defined terms to guide its search process. This is especially problematic in medical education where education approaches such as mentoring, tutoring, supervision, advising and career guidance as well as distinct education techniques such as novice, peer, group and e-mentoring are often conflated [109, 110]. In this light, researcher bias may affect the selection of articles to be reviewed in the preliminary stages.

Critically, inclusion of articles that are seen to be methodologically robust may see potentially interesting articles omitted, thus depriving readers and reviewers of critical discussion points and perspectives. Indeed, exclusion of grey literature and qualitative studies further compromise the applicability of the SRs produced. Similarly, a focused approach may limit articles of education studies across different settings, populations and education goals. When overlaps occur, these may very well provide fresh perspectives on effective educational interventions, frameworks or practice.

SR use in education is further curtailed given its reliance on robust data. Yet, aside from the use of mixed methods and qualitative data, much of the assessment tools used in data collection are often not validated, evidence based nor longitudinal. This limits the quality and the quantity of data that may be included in the SRs. Moving towards quality assessments remains a problem when there is no effective and available means of conducting quality appraisals of grey literature.

A further consideration about SRs is the synthesis of the discussions. Whilst it may be argued that they are based on the data ascertained, the weight and direction taken is largely determined by the authors and thus their intrinsic biases. This is especially problematic in medical education where contextual considerations have significant implications on the process and outcomes as do regnant program goals.

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Table 3: Methodological evolution of SRs

<table>
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<tr>
<th>Original framework</th>
<th>JBI Guidelines</th>
<th>PRISMA Guidelines</th>
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**Definition of SSR**

A systematic review attempts to collate all empirical evidence that fits pre-specified eligibility criteria in order to answer a specific research question. It uses explicit, systematic methods that are selected with a view to minimizing bias, thus providing more reliable findings from which conclusions can be drawn and decisions made.

A scoping review aims to provide a map of what evidence has been produced from disparate or heterogeneous sources as opposed to seeking only the best evidence to answer a particular question related to policy or practice. Changes: Articulates that scoping reviews draw from a breadth of sources, removes the emphasis away from being 'rapid' process.

**Item 1: Title and Review Information**

- Succinctly states the intervention(s) reviewed and the problem at which the intervention is directed.

**Item 2: Abstract**

- 400 words or fewer.
- Without sacrificing important content.

**Item 3: Plain Language Summary**

- Summarizes the review in a straightforward style.

**Item 4: Main Text**

- Background
- Objectives
- Methods
- Results
- Discussion
- Author’s Conclusions
- Acknowledgements
- Contributions of Authors
- Declarations of Interest
- Differences Between Protocol and Review
- Published Notes

**Item 5: Studies and References**

- Studies are organized under four fixed headings:
  - Published Data Only; Published and Unpublished Data; Unpublished Data Only; Published Data Only (Unpublished sought but not used)

**Item 6: Tables**

- Characteristics of Included Studies
- Risk of Bias (optional)
- Characteristics of Excluded Studies
- Characteristics of Studies Awaiting Classification
- Characteristics of Ongoing Studies
- Summary of Findings

**Item 7: Critical appraisal**

- The number of studies/sources included how they are organized to address the objective and questions of the review.

**Step 6: Extracting the evidence**

- Extraction results to inform objectives/questions organized by participants, concept, and context.

**Step 7: Charting the evidence**

- The number of studies/sources included how they are organized to address the objective and questions of the review.

**Step 8: Searching for the evidence**

- Comprehensive report on search strategy including published and unpublished literature; include a flow diagram

**Step 9: Selection of sources of evidence**

- Methods

**Step 10: Data charting process**

- Item 8: Data Items
- Item 10: Data charting process

**Step 11: Data items**

- Item 11: Data Items
- Item 12: Critical appraisal (optional)

**Step 12: Data charting process**

- Item 14: Synthesis of results
## Item 6: Data and Analyses
- Results of studies included in a review are organized in a hierarchy.

## Step 8: Summarizing the evidence in relation to the objective/s and question/s
- Provide detail to support inclusion of each source
- Clear, concise answers to the questions/objectives of the SSR.
- Identify implications and gaps.

## Results

### Item 17: Selection of sources of evidence
- Item 18: Characteristics of sources of evidence
- Item 19: Critical appraisal (optional)
- Item 21: Synthesis of results (optional)

### Discussion
- Item 24: Summary of evidence
- Item 25: Limitations
- Item 26: Conclusions

## Item 7: Figures
- Must have a caption
- Provided with a brief description
- Must be referred to in the review text

## Item 8: Sources of Support to the Review
- Should acknowledge grants as well as their sources

## Item 9: Feedback
- Authors should prepare a reply to the feedback

## Item 10: Appendices

## Step 9 (throughout):
- Consultation of information scientists, librarians, and/or experts (throughout)

### Note: consultation step was excluded as it could be "considered a knowledge translation activity, which could be done for any type of knowledge synthesis"

## Item 27: Funding

### Overall, whilst SRs offer a systematic approach to the review of various aspects of medical education, its focused approach provides a poor fit for the widely entwined and often qualitative data upon which medical education appears to be built on.

### Limitations

There are a few limitations to this review. For one, only papers written or translated into English were included in this SSR. This limits the geographical and linguistical diversity of the review and, as such, the applicability and generalizability of the findings may be limited.

Whilst an expert team was consulted throughout the various stages of the SSR to ensure trustworthiness of the research process and reduce the researcher bias, the process of selecting the articles to be reviewed remained limited by the search terms used. This may raise questions over the sustainability of the ‘Split Approach’. In order to support a large research and expert term as well as establish and maintain communication platforms to facilitate negotiated consensual validation and reiterative discussions, expenses incurred in the form of time and money need to be taken into close consideration.

Yet, having a large research team allows for independent and concurrent use of dual approaches to data analysis which enables the attenuation of bias and a means of providing a more rigorous, accountable, and transparent verification of both the data and the analysis.

### Conclusion

This SSR suggest that despite its focused perspective SRs could occupy a very specific role in PME and this role needs to be clarified before it is employed further. Yet it is also clear that there are many aspects of this structured approach that offers an opportunity to inform future studies of PME. Perhaps most critically, the design and development of validated, evidence based and longitudinal assessment tools used in data collection must be explored further in order enhance the efficacy of SRs. In addition, the curation of quality appraisal tools for evaluating grey literature would certainly proffer new perspectives and broaden the potential of SRs in PME and beyond.

### Acknowledgements

#### Contributors

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### Funding

No funding was received for this study.

### Prior Presentations

None

### Conflict of Interest

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Data Availability

All data generated or analysed during this study are included in this published article.

Declarations

All authors have made significant contributions in designing, collating, interpreting the data, drafting, editing, and/or revising the research work for intellectual content. All the authors provide consent to the final version of the manuscript to be published and agree to be accountable for the accuracy of the data.

References


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