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Mapping the evidence on integrated service delivery for non-communicable and infectious disease comorbidity in sub-Saharan Africa: protocol for a scoping review

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ABSTRACT

Introduction The concurrent occurrence of infectious diseases (IDs) and non-communicable diseases (NCDs) presents complex healthcare challenges in sub-Saharan Africa (SSA), where healthcare systems often grapple with limited resources. While an integrated care approach has been advocated to address these complex challenges, there is a recognised gap in comprehensive evidence regarding the various models of integrated care, their components and the feasibility of their implementation. This scoping review aims to bridge this gap by examining the breadth and nature of evidence on integrated care models for NCDs and IDs within SSA, thereby updating the current evidence base in the domain.

Methods and analysis Based on the Joanna Briggs Institute (JBI) framework for scoping reviews, this study will include peer-reviewed and grey literature reporting on integrated care models for NCD-ID comorbidities in SSA. A comprehensive search of published sources in electronic databases (PubMed, Scopus, Embase, the Cochrane Library, Health System Evidence and Research4Life) and grey literature (Google Scholar, EBSCO Open Dissertations and relevant organisational websites) will be conducted to identify sources of information reported in English from 2018 onwards. The review will consider sources of evidence reporting on integrated care model for NCDs such as diabetes; chronic cardiovascular, respiratory and kidney diseases; cancers; epilepsy; and mental illness, and comorbid IDs such as HIV, tuberculosis and malaria. All sources of evidence will be considered irrespective of the study designs or methods used. The review will exclude sources that solely focus on the differentiated or patient-centred care delivery approach, and that focus on other conditions, populations or settings. The reviewers will independently screen the sources for eligibility and extract data using a JBI-adapted data tool on the Parsifal review platform. Data will be analysed using descriptive and thematic analyses and results will be presented in tables, figures, diagrams and a narrative summary.

Ethics and dissemination Ethical approval is not required for this review as it will synthesise published data and does not involve human participants. The final report will be submitted for publication in a peer-reviewed journal. The findings will be used to inform future research.

Study registration OSF: https://doi.org/10.17605/OSF.IO/KFVEY.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The review will use a robust and transparent methodology based on the Joanna Briggs Institute framework, which is widely recognised and applied for scoping reviews.
⇒ The review will include a broad range of sources from different databases and grey literature and will not restrict the inclusion criteria by study design or methods, in order to capture diverse information on the study topic.
⇒ The review will employ a robust search strategy to identify relevant sources of evidence and that will ensure the relevance and applicability of the findings for the context of the study and local settings.
⇒ Limitations include potential heterogeneity and variability of the sources in terms of quality, scope and outcomes, which may limit the comparability and synthesis of the results.
⇒ Since English is one of the most widely spoken languages in sub-Saharan Africa, the review will exclude sources of evidence that are not reported in English, which means that some relevant evidence might be missed.

INTRODUCTION

Non-communicable diseases (NCDs) and infectious diseases (IDs) have a profound impact on global health, resulting in millions of fatalities each year.[1–3] Low-income and

middle-income countries (LMICs) bear a disproportionate burden, accounting for 77% of total global deaths and 86% of premature mortality due to NCDs such as cardiovascular diseases, diabetes, cancer and respiratory diseases.[3] Additionally, IDs such as malaria, HIV/AIDS and tuberculosis (TB) account for a significant proportion of the mortality rates observed worldwide, particularly in LMICs.[1 2 4] The concurrent rising burden of NCDs and IDs posed serious socioeconomic and public health challenges, straining healthcare systems and endangering population health in these countries.[1 2]

The recent increase in the comorbidity or multimorbidity that occurs in individuals with concurrent ID and NCD adds an additional layer of complexity.[5 6] The intricate overlap and interplay between the two diseases can increase the individual's susceptibility to both IDs and NCDs, which either cause or worsen the course of one due to chronic inflammation, weakened immunity, as well as adverse treatment effects.[7–9] For instance, chronic NCDs like diabetes mellitus increase the risk of having active TB three times by weakening immunity,[10] while IDs such as HIV increase the risk of developing cardiovascular diseases two times higher.[11 12]

Patients with such concurrent conditions must deal not only with physical and psychological impacts of each disease, but also multifaceted challenges such as reduced quality of life, stigma and discrimination, complex treatment regimens and higher healthcare costs.[13–16] However, in resource-limited settings, particularly in LMICs, patients will face unique challenges, dealing with the complexities of accessing fragmented healthcare services that are ill-equipped to meet their intertwined and long-term needs.[13 14]

Sub-Saharan Africa (SSA) stands at the epicentre of this complex NCD-ID crisis.[17–20] The region bears the highest global mortality and morbidity burden of IDs while concomitantly battling the rapidly increasing burden of NCD epidemics, which are driven by rapid urbanisation, demographic shifts, changes in lifestyle and inadequate preventive measures.[1 20–23] Studies in different parts of the region reported a high prevalence of comorbidities, such as TB/HIV coinfection rates reaching 25.59% in Ethiopia[24] and 7.9% of patients with TB in Nigeria diagnosed with diabetes.[25] South Africa reports a concerning rise in risk factors for NCDs among HIV-positive patients, with hypertension prevalence climbing from 11.8% to 14.3% over a decade.[26] Similarly, other studies in South Africa,[27] Malawi[28 29] and Kenya[23] have observed substantial NCD comorbidities among patients in HIV care, with hypertension being notably prevalent. This increasing burden of NCDs compounded by the persistent burden of IDs, in the face of limited access to quality healthcare, further exacerbates the dual burden's impact.[20 22 23 30] Moreover, the healthcare systems in most of the countries of this region target prevention of common IDs, with resources and services often aligned with vertical programmes specific to diseases such as TB, HIV and malaria, neglecting concurrent NCD epidemics and the complexities of their comorbidity.[31 32] However, such segregated traditional approach can lead to fragmented and uncoordinated healthcare services, which are ineffective to address the complex interplay of NCD-ID in this era of changed epidemiology.[32–35] Moreover, addressing NCD-IDs' complexities within awkward and under-resourced systems is inefficient, leading to suboptimal health outcomes and increased healthcare costs.[9 31 36 37] Moreover, this creates a unique context with a set of challenges, demanding not only strengthened individual-level care but also harmonised healthcare systems and policy reforms to effectively address the NCD-ID overlap.[32 33]

Consequently, LMICs have been recommended to adopt and implement efficacious preventive and control strategies that can effectively mitigate the escalating burden of NCDs and their related comorbidities, particularly in the SSA region.[33 37–39] Moreover, the contemporary evidence underscores the necessity for integrated care models that simultaneously tackle the co-occurrence of NCDs and IDs, considering their synergistic interactions and shared aetiological factors within complex aetiological pathways.[9 17 33] This approach provides an effective solution by fostering collaboration and coordination among healthcare providers across multiple care domains and levels of the health system.[32 33 37 40] It can optimise resource allocation and enhance efficiency in its utilisation, enhance access to care, reduce healthcare costs and the overall burden on health systems, and ultimately improve patient outcomes.[32 33 36 37 40] Previous experiences and pilot programmes implementing integrated care models in SSA hold valuable lessons in effectiveness, feasibility and potential challenges.[14 33 36 37 40–43]

While previous reviews on this area have provided valuable insights into the integration of HIV and NCD services, they often focused on specific disease combinations or were not region specific, limiting their applicability across the diverse SSA context.[19 33 44–46] Moreover, the emerging evidence indicates variability within the African context in the uptake of integrated models, which are critical aspects to explore. For instance, in Tanzania,[47] there is high acceptability among patients and healthcare providers for integrated care delivery models, while in Ethiopia,[48] the health system faces challenges in providing integrated, person-centred care. In addition, a study done in South Africa reported variability in implementation fidelity among health facilities,[49] while challenges in treatment availability were observed in Malawi.[29 50 51] Understanding the potential reasons for variations in uptake—whether systemic, cultural or policy related—is essential for tailoring effective interventions. Therefore, a need to update our understanding of the evidence and explore additional dimensions of integrated care models are not previously reported.

This gap is particularly evident when considering the Ethiopian healthcare system, which warrants explicit emphasis due to its potential as a representative model for the SSA region. Ethiopia's healthcare system encapsulates the challenges and opportunities prevalent across

SSA, making it an ideal focus for a scoping review that seeks to clarify the concepts of integration and to explore the diversity, complexity and context in which such integration occurs.

Therefore, this scoping review aims to map and synthesise the existing literature on integrated models for NCD and ID care in SSA, identifying the key concepts related to this and gaps in knowledge. It will provide a critical foundation for future research and inform the development of future interventions, while also offering the implications of the existing evidence for practice and policy in SSA, with a particular emphasis on Ethiopia. Moreover, the focus on Ethiopia is justified by its forthcoming role in an implementation study on integrated service delivery model,[52] which will use the findings of this scoping review to inform the development of interventions, while also informing a further systematic review on this topic. This emphasis also allows for a detailed exploration of the current burden of comorbidities in terms of mortality, morbidity and complications within the Ethiopian context, which is reflective of the broader SSA region.

Research question

By systematically mapping and synthesising the existing literature, this scoping review aims to answer the critical question:

- What is known from the literature regarding the models for integrating ID and NCD care in resource-limited settings like SSA and its implications for policy and practice in Ethiopia?

The subquestions are as follows:

1. What are the different types of ID-NCD care integration models used in SSA and their key components including key chronic disease conditions, service types/packages, healthcare professionals involved, care pathways, coordination mechanisms and patient engagement strategies?
2. What types and levels of integration are employed in these models, in what settings are they implemented (eg, primary care, hospitals, community based), and how are they adapted to different resource levels and healthcare infrastructures in SSA?
3. What are the reported effects of these models on key patient and service outcomes for concurrent NCD-ID (morbidity and mortality, quality of life, adherence to treatment and disease control), as well as their cost-effectiveness and feasibility in SSA settings?
4. What are the major challenges and barriers to implementing ID-NCD care integration in SSA, and what factors have been identified as facilitators or best practices for successful implementation?
5. Using Ethiopia as a case study within the SSA region, what are the potential opportunities and challenges for adopting ID-NCD care integration models, and what specific recommendations can be made for improved healthcare outcomes based on the Ethiopian health system context and existing evidence?

METHODS AND ANALYSIS

The proposed scoping review will be conducted in accordance with the Joanna Briggs Institute (JBI) methodology for scoping reviews.[53] The protocol for this scoping review has been registered on OSF.[54] The review process is planned to begin in February 2024.

Inclusion criteria

The inclusion criteria are derived from research questions and objectives using a population, concept and context (PCC) framework based on the JBI guideline for scoping reviews.[53]

Population

The source must report on the patients with coexisting (comorbidities or multimorbidity) chronic conditions (NCDs and/or IDs), as well as key stakeholders involved in healthcare for these patients including healthcare providers and policymakers. Accordingly, 'patients' refer to patients with two overlapping (comorbidity) or more than two (multimorbidity) conditions involving NCDs and/or IDs, based on the definition for chronic diseases.[3] The review will focus on sources that reported on HIV, TB and malaria and/or co-existing NCDs including diabetes, cardiovascular disease, chronic respiratory diseases (chronic obstructive pulmonary disease or asthma), cancers, chronic renal disease, mental disorders, epilepsy and neurocognitive diseases. These are the diseases of public health interest and prevalent in SSA.[1–3 20 31] The sources that report on other conditions or populations that are not relevant to this review will be excluded.

Concept

The source must report on an integrated delivery of healthcare services (model or approach) for patients with NCD-ID comorbidity or multimorbidity. Accordingly, integrated delivery is defined as any approach that seeks to improve the access or quality of care for individuals or populations with these conditions by ensuring that services are well coordinated around their needs. The review will include the sources that measured or reported on the characteristics of and/or outcomes of the integrated approach or model used or tested for the indicated population. Accordingly, the characteristic of integration refers to features such as components, types, levels, dimensions, degrees and strategies of integration as well as the settings where the integration was implemented (such as resource availability, health system characteristics and stakeholder involvement). In addition, the outcomes refer to the patients, service or health system-level outcomes involving the benefits, experiences, feasibility and challenges with integration approaches or model. Sources that have not reported on this concept of integrated approaches or models of care will be excluded from this review. Specifically, the sources that emphasised solely on the epidemiology of co-occurrence of NCD-ID, or differentiated approach to a selected NCD or ID will be excluded.

Context

This review targets sources that report on a resource-limited setting where healthcare resources (financial, human and material) are insufficient to address the healthcare needs of their population, specifically SSA. We will adopt the World Bank classification of low-income and lower middle-income economies as a proxy for low-resource settings—countries in the region of SSA.[55] Therefore, to be included in this review, the source should report on the whole or regional part of SSA (Central, Eastern, Western or Southern Africa), or any country in the region. Specifically, the sources must originate from or targeted any of SSA countries including Angola, Benin, Botswana, Burkina Faso, Cabo Verde, Cameroon, Central African Republic, Chad, Congo, Cote D'ivoire, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia and Zimbabwe. Any sources that reported on any other contexts other than SSA (Africa South of the Sahara) including those targeting countries out of this region will be excluded from this review.

Types of sources

This review will consider both published and unpublished sources of information including studies, reports, preprint articles, dissertations and conference proceedings that fulfilled the above-mentioned inclusion criteria. The review will consider studies of any design, including quantitative, qualitative and mixed-methods studies. Quantitative studies, including experimental and quasi-experimental (randomised controlled trials, non-randomised controlled trials, before-and-after studies and interrupted time-series studies), and observational studies (cohort studies, case–control studies, cross-sectional studies, case series and case reports) will be considered for inclusion.

Qualitative studies of any design that report qualitative data, including but not limited to designs such as phenomenology, grounded theory, ethnography, qualitative description, action research and feminist research, will be included in this review.

Review articles including systematic and scoping reviews, as well as narrative reviews, will also be considered, depending on the research question. In addition, relevant government documents, guidelines, reports (by international, regional and national organisations), policy briefings, conference presentations, dissertations and preprints will also be considered in this review, based on the research objectives. This scoping review will also consider relevant text and opinion (perspective) papers for inclusion.

This review will exclude editorials, letters, study protocols, and any sources of information or abstracts of articles that are not available in full texts, as they do not provide sufficient information for this review.

Search strategy

This scoping review employs a three-stage search strategy to ensure comprehensive coverage of relevant literature. The initial stage involves a series of steps towards development of a full search strategy that will be used to identify peer-reviewed articles in targeted electronic databases including PubMed, Scopus, Embase, the Cochrane Library, Health System Evidence and Research4Life. To develop a full search strategy, first, a limited search of PubMed was done using free text to identify the relevant articles, followed by analysis of the text words in the titles and abstracts, and of the index terms used to describe these articles. This informed the development of an initial search query for PubMed using identified keywords and index terms. Then, the constructed initial search query was imported to the PubReMiner platform,[56] to understand the characteristics of the identified studies, and identify the most commonly used keywords in their title and abstract, and the Medical Subject Headings (MeSH) terms related to the research questions. The identified keywords, synonyms and MeSH terms (index terms) further informed the development of a preliminary search query. The constructed search query was then imported to the Searchrefinery platform in the SR Accelerator Tool,[57] which is an online search query refinery and translator tool used to visualise, test and refine terms based on the quality of the identified results. Moreover, a refined preliminary search query was also imported into the 2DSearch platform,[58] to further visually understand the structure and relationships of the concepts in the query and to further refine it. This platform was also used to eliminate syntactic errors, improve query semantics and provide methods for validating, debugging and translating for limited databases and search platforms.[58] Following refining and debugging, the constructed search query was tailored to the target sources of evidence/databases, automatically using the Polyglot Search Translator platform,[59] for databases such as PubMed, Scopus, EMBASE and the Cochrane Library, and using the 2DSearch platform for other databases.[58] In addition, the search query was manually adapted for other information sources that were not supported by these automatic translator platforms such as Research4life and Semantic Scholar. Moreover, the search queries were further piloted and refined to limited databases, based on the number and quality of the retrieved studies while maintaining a balance between sensitivity (identifying as many relevant studies as possible) and specificity (excluding as many irrelevant studies as possible). A full search strategy for each of the indicated databases is detailed in online supplemental file 1. Finally, searching for the evidence will be done in the targeted databases and sources of grey literature using the piloted final search query.

The databases to be searched and their respective search platforms are provided as follows:

- PubMed (National Library of Medicine; https://pubmed.ncbi.nlm.nih.gov/)
- Scopus (Elsevier; https://www.scopus.com/)
- EMBASE (Elsevier; https://www.embase.com/)
- Cochrane Library (John Wiley & Sons; https://www.cochranelibrary.com/cdsr/reviews)
- Health Systems Evidence (https://www.healthsystemevidence.org)
- Research4Life/HINARI (Research4Life partnership; https://portal.research4life.org/)
- Semantic Scholar (https://www.semanticscholar.org/)
- Europe PMC (https://europepmc.org/)
- Researchrabbit (https://researchrabbit.ai/)
- Connected Papers (https://www.connectedpapers.com/)
- ResearchGate (https://www.researchgate.net/)

A second stage of searching will be done for the sources of unpublished studies and grey literature such as Google Scholar, EBSCO Open Dissertations, and organisational websites such as the WHO and the African Centres for Disease Control and Prevention (CDC).

Sources of unpublished studies and grey literature to be searched include the following:

- Google Scholar (https://scholar.google.com/)
- EBSCO Open Dissertations (https://www.ebsco.com/products/research-databases/open-dissertations)
- Worldwidescience (www.worldwidescience.org)
- Google (https://www.google.com/)

In addition, websites of relevant organisations and agencies such as WHO trial registries, WHO Afro Region, World Bank Group and African CDC will also be searched. These are relevant electronic databases and websites of organisations useful to locate unpublished studies and/grey literature such as preprints, dissertations and theses, conference proceedings, government/organisational reports, policy documents and guidelines.

The third stage will be screening the reference lists of all included sources of evidence for additional studies. Searching for the reference lists of relevant studies included in the review will be done using the Citationchaser tool,[60] to return a list of all referenced records (backward citations) and/or all cited records (forward citations). In addition, other relevant platforms, such as Connected Papers, Researchrabbit and ResearchGate, will be searched to trace similar papers published on the topic. Moreover, an attempt will be made to contact the authors of the evidence sources to request the missing or additional data for clarification (unclear information), where required. The outcomes of this contact will be documented and reported in the review report.

Sources published in English will be included in the review. English is one of the most widely spoken languages in SSA and is the language of the research team. Moreover, the review will consider sources of evidence published from 1 January 2018 onwards. This time frame has been selected to encompass the most recent and relevant evidence published since the significant global shift in healthcare priorities and increased focus on integrated care models following the Sustainable Development Goals agenda.[20 31] Moreover, the decision to select this time frame was data driven with the aim to balance the comprehensiveness of our review with the manageability of the results based on the publication trend analysis across PubMed, Embase and Scopus databases. Our pilot search in these databases indicates that a higher volume of relevant articles on the topic was published between 2018 and 2020, with a decrease in subsequent years, indicating a consolidation phase in publication. This provides a scientific basis for the chosen date range, ensuring the inclusion of a rich body of evidence during a period of high research activity. Therefore, a 5-year range from 2019 to 2023 would exclude pivotal contributions from 2018, a year marked by a peak of research output. This reinforces our decision to include 2018 as the starting point for our search, capturing the peak period of research output, while also extending the range to include latest publications from 2024 would not overwhelm the review process, given a low publication volume in the year. Therefore, the selected time frame balances the inclusion of comprehensive evidence with the practicality of reviewing an extensive literature base, ensuring the review's relevance and currency.

Evidence selection

Following the search, all identified citations from each source will be collated and imported to Zotero V.6.0.30 (Corporation for Digital Scholarship, Virginia, USA).[61] Then, the collated citations will be exported and imported to the Deduplicator platform in the SR Accelerator Tool,[62] and duplicates will be removed. The deduplicated citations will be then imported to Rayyan,[63] a web and mobile application for screening. Titles and abstracts will then be screened by two or more independent reviewers for assessment against the inclusion criteria for the review. Potentially relevant sources will be retrieved in full, and their citation details imported into the Parsifal review platform.[64]

The full text of selected citations will be assessed in detail against the inclusion criteria by two or more independent reviewers. Reasons for exclusion of sources of evidence in full text that do not meet the inclusion criteria will be recorded and reported in the scoping review. Any disagreements that arise between the reviewers at each stage of the selection process will be resolved through discussion or with an additional reviewer.

The results of the search and the study inclusion process will be reported in full in the final scoping review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for scoping review (PRISMA-ScR) flow diagram.[65]

Data extraction

The data extraction will include source identification, and specific details regarding the population, concepts, context, methods, outcomes measured and key findings

relevant to the review questions, based on the JBI data extraction tool for scoping reviews.[66] Specifically, the data extracted will include the following information:

- Source's identification: including information such as title, author, publication year, source type and journal name/publisher.
- Source/study/characteristics: including country of origin, aim, design/methods, settings, population and outcomes measured.
- Concept/intervention: details the intervention or integration approach/model reported by the source including the features and components such as targeted disease conditions, service types/packages, healthcare professionals involved, patient care pathways, coordination mechanisms and patient engagement strategies, as well as the types and levels of integration, the contexts of integration and strategies used to adapt to the different contexts.
- Outcomes measured: this will detail the specific outcomes evaluated by the studies included in the review. For clarity, examples of outcomes measured may include patient-level outcomes such as blood pressure control in hypertensive patients, service-level outcomes like the average wait time for service delivery and health system-level outcomes such as overall cost savings from integrated care models.
- Main findings: this will synthesise the principal findings reported by the studies that directly relate to the main outcomes measured. This will include findings related to the patient outcomes or the effects such as morbidity, mortality, adherence to treatment, quality of life, satisfaction and disease control, as well as outcomes related to the practice, performance, feasibility, cost-effectiveness/effects, access, barriers/challenges and experience/lessons learnt, which will be extracted based on the research questions. The distinction lies in the outcomes being the direct measurements taken by the studies, whereas the main findings are the interpretations or implications of these measurements.
- Conclusions: this will provide summary of the key results, as well as recommendations, best experiences/practices or lessons learnt, and limitations reported, to draw implications for practice, policy and future research in similar settings, with particular emphasis on the Ethiopian healthcare context.

The data extraction tool, which has been piloted for clarity, is included in online supplemental file 2 to provide transparency and reproducibility of the review process. This tool, adapted from the JBI data extraction format, will facilitate a structured and systematic extraction of relevant data using the Parsifal review platform.[64] The data extraction tool will be modified and revised as necessary during the data extraction process from each of the included evidence sources. Modifications will be detailed in the review report. Data extraction process will be done by independent researchers using the online data extraction platform, guided by predesigned data extractors' instructions. Any disagreements that arise between the reviewers during data extraction will be resolved through discussion or with an additional reviewer. The accuracy of the data and information extracted from each source will be verified or validated by comparing them with the original source. Any errors or discrepancies will be corrected or clarified as needed. If appropriate, authors of papers will be contacted to request missing or additional data, where required.

Data analysis and presentation

Data analysis will be done using descriptive and thematic analyses and presented using a narrative approach. First, extracted data will be synthesised using descriptive statistics (such as frequencies, percentages) to provide an overview of the characteristics, distribution and trends of the sources and their findings. This will include a descriptive summary of the number and type of sources, and the countries and settings where they were conducted, the populations and conditions that they focused on, and the interventions and outcomes that they reported on. A descriptive synthesis will be followed by thematic analysis involving codes and categories, to identify and describe the key themes and patterns in the findings, as well as their implications. Specifically, this will include the integration models and key components; the context and implementation; outcomes and effects; challenges and facilitators; and the best practice and implications for Ethiopia.

In this review, the quality or risk of bias of the included sources will not be formally assessed, as this is not a requirement for scoping reviews. However, any limitations or strengths of the sources that may affect the interpretation or generalisation of the findings will be noted and discussed.

The presentation plan will involve the presentation in tables, figures or diagrams followed by narrative summary based on the research questions. The tables, figures or diagrams will be used to present and illustrate the results visually and facilitate the comprehension and comparison of the data. This will include a table summarising the characteristics and findings of each source, a figure showing the PRISMA flow diagram of the screening and selection process, and a diagram depicting the thematic map of the key themes and categories from the thematic analysis.

Moreover, a narrative summary will be used to present and discuss the findings, providing a comprehensive and coherent description and interpretation of the results. This will be organised in a way that it addresses the research questions and objectives of the review, as well as relate the findings to existing frameworks or models from the literature.[67] The narrative summary will also identify any limitations of the scoping review and suggest areas for future research. Finally, the report of the scoping review will be prepared following the structure and content recommended by the JBI Manual for Evidence Synthesis[66] and the PRISMA-ScR reporting guidelines.[65]

Patient and public involvement

None.

Ethics and dissemination

Ethical approval was not required for this review as it will synthesise published data and does not involve human participants. The final report will be submitted for publication in a peer-reviewed journal. The findings will be used to inform subsequent studies, serving as a foundational component of the evidence and knowledge mapping process.

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Contributors SAI, AZK, KAA and IAS developed the research questions and inclusion criteria of this protocol, while SAI, SSS, FA, HGA, MS, AH and AG designed and pretested the search strategy and study selection plan. SSS, ST, AAA, HM and DTB designed and tested the data extraction tool, and made the data analysis and presentation plan. The preparation of this manuscript involved contributions from the authors and the assistance of an artificial intelligence (AI) technology named Bing Copilot. The AI was used specifically for language editing to enhance the clarity, coherence and readability of the text. The authors provided the initial drafts and subsequently reviewed and refined the AI-generated suggestions to ensure the final content accurately reflected the intended research findings and adhered to scientific standards. The use of Bing Copilot facilitated a more efficient editing process and contributed to the overall quality of the manuscript. The AI performed tasks such as grammar checking, sentence structure improvement and consistency checks to enhance the readability and professionalism of the text. This use of AI aimed to support the authors in presenting their research in a clear and concise manner, suitable for the academic community and peer review. The AI did not contribute to the research content within the manuscript. The process involved inputting draft sections of the manuscript into the AI interface, which then provided suggestions for language improvements. These outputs were carefully reviewed and selectively incorporated by the authors to maintain the scientific integrity and authorial voice of the manuscript. A summary of the AI's input, output and the authors' review process can be provided as supplemental files or additional information upon the editor's request.

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