

Review Article

A Systematic Review of Multi-Sectoral Coordination During the COVID-19 Pandemic—Practices, Challenges, and Recommendations for Future Preparedness: A Review Protocol

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Introduction: The COVID-19 pandemic underscored the vital importance of multi-sectoral coordination in managing complex public health crises. Effective collaboration among stakeholders—including governments, health systems, private enterprises, civil society, and academia—has been pivotal in mitigating the pandemic’s impacts. However, significant gaps persist in understanding the mechanisms, benefits, and challenges of multi-sectoral coordination, particularly in low- and middle-income countries (LMICs) such as Kenya. This systematic review seeks to address these knowledge gaps, providing actionable insights to strengthen future pandemic preparedness.

Methods and Analysis: This systematic review will synthesize evidence on multi-sectoral coordination during the COVID-19 pandemic, focusing on key elements, benefits, challenges, and strategies for improvement. Studies meeting predefined inclusion criteria—such as those addressing coordination mechanisms and published in English between 2020 and 2024—will be sourced from electronic databases (PubMed, EBSCO Host, Emerald Insight, and Google Scholar) and reputable gray literature. A narrative synthesis will be conducted for qualitative data, and, where feasible, meta-analysis will aggregate quantitative findings. Subgroup and sensitivity analyses will compare coordination outcomes between LMICs and high-income countries (HICs). Risk of bias will be assessed using CASP and ROBINS-I tools, and confidence in evidence will be evaluated using GRADE and CERQual frameworks.

Ethics and Dissemination: As this review does not involve primary data collection, additional ethics approval is not required. However, the study has received ethical clearance from the University of KwaZulu-Natal and Kenya's National Commission for Science, Technology & Innovation (NACOSTI). The protocol will be disseminated through open-access publications in peer-reviewed journals, presentations at international and regional conferences, and institutional platforms to engage policymakers, researchers, and public health practitioners.

Strengths and Limitations of This Study

Strengths:

- Adherence to PRISMA-P guidelines ensures methodological rigor and transparency in the review process.
- Comprehensive search strategy incorporates both peer-reviewed and gray literature, capturing diverse perspectives on multi-sectoral coordination during the COVID-19 pandemic.
- Use of standardized tools, such as CASP and ROBINS-I, enhances the reliability of risk of bias assessments across qualitative and non-randomized quantitative studies.
- Focus on LMICs, particularly Nairobi County, addresses a critical research gap and provides context-specific insights for global health research.
- Emphasis on actionable recommendations aims to engage policymakers, practitioners, and researchers in improving multi-sectoral coordination frameworks.

Limitations:

- Exclusion of non-English studies may omit relevant data from non-English-speaking regions, limiting the comprehensiveness of findings.
- Reliance on publicly available sources and databases may exclude unpublished or inaccessible studies, particularly from LMICs.
- Heterogeneity of study designs and methodologies may complicate data synthesis and limit the feasibility of quantitative meta-analysis.
- The study timeframe, constrained to research published between 2020 and 2024, may exclude emerging findings from newer studies.
- Variability in the quality of gray literature introduces potential bias, requiring careful evaluation and transparent reporting.

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1. Introduction

1.1. Rationale

The COVID-19 pandemic exposed the fragility of global health systems and highlighted the critical role of multi-sectoral coordination in addressing complex public health crises. Effective coordination between stakeholders such as governments, health systems, private enterprises, civil society, and academia has been pivotal in managing the pandemic's far-reaching impacts^[1]. However, despite its recognized importance, multi-sectoral coordination remains inadequately understood, particularly in low- and middle-income countries (LMICs), where systemic and structural barriers often hinder collaboration^[2].

During the COVID-19 pandemic, intergovernmental collaboration, global partnerships, decentralized humanitarian efforts, digital knowledge-sharing platforms, task forces, and public-private partnerships were used as mechanisms for multisectoral coordination^{[3][4][5][6]}. Existing research points to key gaps in understanding how these mechanisms drive effective coordination during pandemics. Fragmented governance, siloed decision-making, and inconsistent communication have been cited as persistent challenges in LMICs, exacerbating the difficulties of resource mobilization, equitable service delivery, and policy implementation^{[7][8]}. While high-income countries (HICs) have benefited from robust emergency systems and centralized governance frameworks, LMICs such as Kenya face fragmented authority and limited digital infrastructure, which restrict the effectiveness of coordination efforts^{[9][10]}. Moreover, urban LMIC settings like Nairobi County present unique challenges, including high population density, resource inequities, and socio-economic diversity, which require tailored approaches to multi-sectoral collaboration.

This systematic review is necessary to address these critical knowledge gaps. By synthesizing evidence on the mechanisms, benefits, and challenges of multi-sectoral coordination during the COVID-19 pandemic, the study aims to provide actionable recommendations to strengthen future pandemic preparedness. The findings will contribute to global efforts to build resilient public health systems while offering context-specific insights for LMICs where the need for effective coordination is most urgent. Addressing these gaps will not only enhance pandemic preparedness but also inform strategies for tackling other complex public health challenges in resource-constrained settings.

1.2. Objectives

The primary objective of this systematic review is to comprehensively examine the key elements, benefits, and challenges of multi-sectoral coordination during the COVID-19 pandemic. Additionally, the review aims to identify and evaluate strategies to enhance coordination mechanisms for future public health emergencies. To achieve these objectives, a hybrid framework combining the **PICO** and **SPIDER** methodologies will be employed, facilitating the integration of both quantitative and qualitative evidence.

Research Questions

PICO Framework (Quantitative Focus):

- **Participants:** Stakeholders involved in multi-sectoral coordination, including government officials, health agencies, private sector actors, civil society organizations, and academic institutions.
- **Interventions:** Coordination mechanisms such as task forces, public-private partnerships, incident management systems, and inter-agency committees.
- **Comparators:** Contextual comparisons between Low- and Middle-Income Countries (LMICs) and High-Income Countries (HICs) to identify differences in coordination mechanisms and outcomes.
- **Outcomes:** Evaluation of the key elements of coordination mechanisms, observed benefits (e.g., improved resource mobilization, enhanced governance), challenges (e.g., fragmented governance, communication breakdowns), and actionable recommendations for strengthening multi-sectoral coordination.

SPIDER Framework (Qualitative and Mixed-Methods Focus):

- **Sample:** Include stakeholders from both LMICs and HICs involved in multi-sectoral coordination during the COVID-19 pandemic. This includes government officials, health agencies, private sector actors, civil society organizations, and academia in each context.
- **Phenomenon of Interest:** Multi-sectoral coordination during the COVID-19 pandemic, with an emphasis on how these processes, mechanisms, and factors differ or align between LMICs and HICs.
- **Design:** Include studies that explore multi-sectoral coordination through qualitative methodologies (e.g., interviews, case studies) and mixed-methods approaches, ensuring that these

designs facilitate comparisons between LMIC and HIC contexts..

- **Evaluation:** Assess and compare the key elements, benefits, and challenges of multi-sectoral coordination in LMICs versus HICs. This includes evaluating the effectiveness of different strategies and contextual factors that influence these outcomes.
- **Research Type:** Include both descriptive studies that outline the elements and challenges of coordination in each context and explanatory studies that explore the underlying reasons for differences and similarities between LMICs and HICs.

Integration of PICO and SPIDER Frameworks

By employing both the PICO and SPIDER frameworks, this systematic review ensures a comprehensive synthesis of the existing literature, capturing both measurable outcomes and nuanced, context-specific insights. The **PICO** framework will structure the analysis of quantitative studies, focusing on interventions and their effectiveness across different contexts. Concurrently, the **SPIDER** framework will guide the examination of qualitative and mixed-methods studies, providing a deeper understanding of stakeholder experiences, processes, and contextual factors influencing multi-sectoral coordination.

Expected Contributions

Addressing these research questions through a hybrid framework will enable the review to bridge critical gaps in understanding and practice related to multi-sectoral coordination in public health crises. The findings will offer a robust synthesis of existing evidence, serving as a valuable resource for policymakers, researchers, and practitioners. This comprehensive analysis will inform efforts to enhance multi-sectoral collaboration, thereby improving responses to future public health emergencies

2. Methods

2.1. Eligibility Criteria

Guided by both the PICO (Population, Intervention, Comparator, Outcome) and SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research Type) frameworks, this systematic review will

include studies that investigate multi-sectoral coordination during the COVID-19 pandemic and meet rigorous inclusion and exclusion benchmarks. Specifically, eligible studies must:

1. **Focus on Multi-Sectoral Coordination Mechanisms:** Address at least one of the following core themes: coordination elements, benefits, or challenges facing interventions such as government-led task forces, public-private partnerships, or inter-agency collaborations (PICO: Intervention/ SPIDER: Phenomenon).
2. **Target Relevant Populations/Samples:** Involve stakeholders such as government officials, private sector entities, civil society organizations, or academic institutions (PICO: Population/ SPIDER: Sample).
3. **Provide Empirical Evidence:** Present primary data or robust secondary analyses that offer quantitative, qualitative, or mixed-methods insights (SPIDER: Design, Research Type).
4. **Outcomes/Evaluation:** Include outcomes that illuminate the effectiveness, barriers, or enabling factors of coordination, offering recommendations for strengthening future pandemic responses (PICO: Outcomes/ SPIDER: Evaluation).
5. **Publication Type and Quality:** Be peer-reviewed journal articles or credible gray literature (e.g., government/WHO reports) published in English from the start of COVID-19 in 2020 through December 2024.

Exclusion criteria comprise editorials, commentaries, opinion pieces, and materials unrelated to multi-sectoral coordination during COVID-19.

2.2. Information Sources

To ensure comprehensive coverage, the review will search multiple electronic databases and gray literature sources. Databases to be included are EBSCO Host (CINAHL, MEDLINE, PsycINFO), Emerald Insight, PubMed, and Google Scholar. Gray literature will include reports and publications from reputable organizations such as the WHO and government bodies. The search will focus on publications within the specified timeframe, reflecting the evolution of multi-sectoral coordination during the pandemic.

2.3. Search Strategy

A systematic search strategy has been developed to identify relevant studies. For example, in PubMed, the search will use the following terms and Boolean operators:

((*"multisectoral coordination"* OR *"inter-agency cooperation"* OR *"cross-sectoral partnership"* OR *"multi-stakeholder engagement"* OR *"collaborative governance"* OR *"integrated pandemic management"* OR *"multi-sectoral coordination"* OR *"multi sectoral co-ordination"* OR *"multi sectoral co-ordination"* OR *"inter agency cooperation"* OR *"inter-sectoral coordination"* OR *"inter-sectoral collaboration"* OR *"collaborative coordination"*) AND (*"effectiveness"* OR *"efficacy"* OR *"outcomes"* OR *"impact"* OR *"success metrics"* OR *"performance indicators"* OR *"evaluation"* OR *"challenges"* OR *"barriers"* OR *"limitations"* OR *"obstacles"* OR *"difficulties"* OR *"constraints"* OR *"issues"*) AND (*"COVID-19"* OR *"SARS-CoV-2"* OR *"coronavirus pandemic"* OR *"CoronaVirus"* OR *"severe-acute-respiratory-syndrome-related coronavirus"* OR *"SARS COV 2"* OR *"COVID 19"*)

Planned limits will restrict results to studies published in English and within the defined timeframe. This strategy will be adapted for use across other databases to ensure consistency and maximize relevant hits. However, for Google Scholar, reviewers will assess only the first ten pages of search results (approximately the top 100 studies) to maintain relevance and feasibility. These studies will be screened based on the predefined inclusion criteria.

2.4. Study Records

Data Management: Study records will be managed using a combination of Excel and EndNote software. These tools will help organize citations, remove duplicates, and streamline the review process.

Selection Process: The study selection process will involve two independent reviewers screening titles and abstracts against the eligibility criteria. Disagreements will be resolved through predefined procedures, including regular reviewer discussions and referral to a third reviewer if consensus cannot be reached.

Data Collection Process: A piloted data extraction tool will be used to collect key details from selected studies. These include the study title, authors, year of publication, journal/source, country, study design, data collection methods, sample size, study population, study setting, coordination mechanisms, reported benefits, challenges, and recommendations. The piloting process will involve testing the tool on a small subset of studies to refine its design and ensure consistency in data extraction. Adjustments based on the pilot will enhance the tool's reliability and alignment with the study objectives.

2.5. Data Items

This review will extract and analyze variables central to understanding the contextual and operational features of multi-sectoral coordination during the COVID-19 pandemic. Key data items include the sectors involved (e.g., health, education, private sector), levels of coordination (e.g., local, national, international), and coordination mechanisms such as task forces and public-private partnerships. The review will examine the components and features of these mechanisms, with a focus on attributes like inclusivity, transparency, and timeliness in decision-making processes. Other data items include resource allocation methods, emphasizing how human, financial, and logistical resources were managed. The benefits of multi-sectoral coordination will be captured through both quantitative outcomes, such as improved efficiency in pandemic responses, and qualitative outcomes, such as strengthened governance frameworks. Challenges and barriers to coordination, such as communication gaps and resource shortages, will also be identified alongside strategies employed to mitigate these issues. Finally, recommendations for both practice and research will be included, providing actionable insights for future improvements.

2.6. Outcomes and Prioritization

The primary outcomes of interest for this review are the identification of key elements and mechanisms of multi-sectoral coordination, and their contributions to improved public health responses, equitable resource allocation, and effective governance during the COVID-19 pandemic. Specific focus will be placed on outcomes such as enhanced efficiency in pandemic response mechanisms, strengthened decision-making processes, and the mitigation of barriers like fragmented authority and communication breakdowns. These outcomes will inform actionable recommendations for improving coordination frameworks, particularly in LMICs like Kenya.

Secondary outcomes will explore the long-term benefits of multi-sectoral coordination, including the institutionalization of coordination mechanisms for future pandemic preparedness and enhanced trust in governance systems. Additional insights will be drawn from cross-sectoral synergies, such as the role of education systems in supporting health responses and civil society in addressing inequities. Variations in outcomes across local, national, and international coordination levels will also be examined, providing a nuanced understanding of how contextual factors and governance structures influence the effectiveness of multi-sectoral approaches.

2.7. Risk of Bias Assessment

The risk of bias in this systematic review will be assessed using standardized tools to ensure the reliability and validity of findings. For qualitative studies, the Critical Appraisal Skills Programme (CASP) tool will evaluate the rigor, credibility, and relevance of the included research. For non-randomized quantitative studies, the Risk of Bias in Non-Randomized Studies of Interventions (ROBINS-I) tool will be used, focusing on confounding factors, participant selection, and outcome measurements. These tools were chosen for their comprehensive frameworks and adaptability to diverse methodologies, ensuring a robust evaluation process.

The assessment will involve two independent reviewers conducting parallel evaluations for each study to enhance objectivity and reduce subjective bias. Any discrepancies will be resolved through discussion, with a third reviewer serving as an adjudicator in unresolved cases. Risk of bias will be assessed at both the study and outcome levels. At the study level, the overall methodological quality will be evaluated to ensure reliability, while the outcome-level assessment will focus on the validity of key outcomes, such as the effectiveness of coordination mechanisms and resource allocation strategies. This dual-level approach ensures that the findings are not only methodologically sound but also directly relevant to the study's objectives.

2.8. Data Synthesis

Qualitative Data

This systematic review will primarily use narrative synthesis to integrate qualitative data, accommodating the diversity of study designs and methodologies. Narrative synthesis allows for the thematic analysis of key areas such as coordination mechanisms, benefits, and challenges, providing rich insights into multi-sectoral coordination during the COVID-19 pandemic. To further enhance this analysis, the Health in All Policies (HiAP) framework will be employed as a guiding structure during the coding process. Specifically, the framework's four pillars; governance and accountability, leadership, ways of working, and resources, financing, and capabilities will be used to systematically map and categorize qualitative findings. This approach facilitates the identification of recurring themes, including communication strategies, decision-making processes, and resource allocation frameworks, while simultaneously illuminating the operational and equity dimensions of multisectoral collaboration. Additionally, contextual comparisons will be drawn to highlight

variations between low- and middle-income countries (LMICs) and high-income countries (HICs), offering a nuanced understanding of the global response to the pandemic. The integration of the HiAP framework ensures that the narrative synthesis not only addresses the heterogeneity of qualitative evidence but also preserves the contextual depth and multidimensional insights required for robust analysis.

Quantitative Data

Where sufficient quantitative data is available, meta-analysis will be considered to statistically aggregate findings related to key outcomes such as the effectiveness of coordination mechanisms or the impact of resource allocation. Meta-analysis will be contingent upon the availability of comparable data across studies, including consistent outcome measures and methodological rigor. A robust risk of bias assessment will be performed for studies included in the meta-analysis to ensure the reliability of pooled estimates. In cases where data heterogeneity precludes meta-analysis, descriptive synthesis will be used to systematically summarize quantitative findings. The structured approach to quantitative data analysis ensures that statistical evidence is rigorously evaluated, whether through meta-analytic techniques or narrative description. Furthermore, the HiAP framework will serve as a lens to interpret quantitative outcomes by linking statistical measures to the core domains of governance, leadership, collaborative processes, and resource deployment. This integration provides additional contextualization, enabling a more comprehensive assessment of how these domains influence the effectiveness of multisectoral coordination during the COVID-19 pandemic.

Subgroup or Sensitivity Analyses

To enhance the applicability and reliability of the findings, subgroup analyses will compare results across LMICs and HICs, examining contextual differences that influence coordination mechanisms and outcomes. For example, the effectiveness of task forces or public-private partnerships may vary significantly depending on resource availability and governance structures. Sensitivity analyses will further test the robustness of findings by excluding studies with high risk of bias or focusing on specific study characteristics such as sample size or methodological quality. These analyses will help identify sources of variability and provide nuanced insights for context-specific recommendations.

2.9. Meta-Bias Assessment

Publication Bias

Publication bias will be systematically assessed to ensure that findings are not disproportionately influenced by studies reporting positive or significant results. For quantitative data, funnel plots will be used to visually identify asymmetry, which may indicate publication bias. Egger's regression test will be applied as a statistical method to quantify bias, provided a sufficient number of studies (minimum of 10) are available for reliable analysis. For qualitative studies, publication bias will be mitigated by incorporating grey literature and non-peer-reviewed sources, ensuring a more comprehensive dataset and reducing the risk of bias toward positive findings.

Selective Reporting

Selective reporting bias will be evaluated by comparing the outcomes described in the methods sections of studies with those presented in the results sections. Discrepancies indicating possible selective omission will be systematically documented. Where applicable, the Outcome Reporting Bias in Trials (ORBIT) framework will be adapted to assess and document selective reporting. Detected biases will be incorporated into the risk of bias assessment and transparently reported in the results section, ensuring methodological rigor.

2.10. Confidence in Cumulative Evidence

Strength of Evidence

The Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) approach will be applied to evaluate the overall confidence in quantitative findings. This comprehensive framework assesses evidence across key domains, including risk of bias, inconsistency, indirectness, imprecision, and publication bias. For qualitative findings, the Confidence in the Evidence from Reviews of Qualitative Research (CERQual) approach will be employed. CERQual evaluates qualitative evidence based on methodological limitations, coherence, adequacy of data, and relevance to the research questions.

Application

The GRADE and CERQual assessments will be applied to all key outcomes, ensuring a holistic evaluation of the evidence base. Confidence levels (e.g., high, moderate, low, or very low) for each outcome or theme will be presented in summary tables, providing a clear, transparent evaluation for policymakers and practitioners. These assessments will ensure that both qualitative insights and quantitative estimates are robust, actionable, and aligned with the study's objectives, thereby enhancing their utility for informing future coordination frameworks and pandemic preparedness strategies.

3. Amendments

All amendments to this protocol will be systematically documented to ensure transparency and maintain the methodological integrity of the review. A detailed amendment log will be established, capturing a version history of the protocol, unique identifiers for each amendment, the affected sections, the date of modification, and a comprehensive explanation of the changes. The log will also include a rationale for each amendment, such as the need for clarification, methodological updates, or adjustments in response to unforeseen challenges during implementation.

To promote accessibility and transparency, all amendments will be publicly disclosed. For protocols registered with PROSPERO, updates will be submitted promptly, including details of the modifications and their justifications. Similarly, amendments to published protocols will be presented through supplementary materials or addendums accompanying the review publication. For each amendment, an explanation of its potential impact on study outcomes or interpretations will be provided, ensuring clarity for readers and stakeholders.

The review anticipates the possibility of amendments in specific areas, such as refining the search strategy to capture additional studies, clarifying inclusion criteria to align with study objectives, or updating the risk of bias assessment tools for newly encountered study designs. Any suggestions for amendments from reviewers or collaborators will be carefully evaluated, documented in the amendment log, and accompanied by justifications for the changes.

Approval of amendments will be managed collaboratively. Significant changes, such as revisions to primary outcomes or methodologies, will require consensus from all reviewers. Minor amendments, such as editorial clarifications, may be approved by the lead author or a designated team member. The

primary author, supported by the supervisory team, will oversee all amendments, ensuring consistency and alignment with the review objectives.

The finalized amendment log will be presented in a supplementary table as part of the review's publication. Updated protocol versions with tracked changes will be shared for internal review, and publicly accessible repositories, such as PROSPERO, will house the most current protocol versions. This approach ensures that all modifications are thoroughly documented, justified, and accessible, maintaining the credibility and rigor of the systematic review.

4. Article Summary

Strengths and Limitations of This Study

- This study employs a robust systematic review methodology guided by PRISMA-P standards, ensuring transparency and reproducibility.
- The inclusion of peer-reviewed articles and reputable gray literature enhances the comprehensiveness of the evidence base.
- The study focuses on multi-sectoral coordination during the COVID-19 pandemic, addressing a critical gap in research, particularly in LMICs like Nairobi County, Kenya.
- The use of standardized tools, such as CASP and ROBINS-I, for risk of bias assessment ensures methodological rigor across diverse study designs.
- A limitation is the exclusion of studies published in languages other than English, which may result in the omission of relevant findings from non-English-speaking regions

5. Ethics and Dissemination

Ethics Approval

This systematic literature review does not involve the collection of primary data, thereby negating the need for additional ethics approval. Nevertheless, the study has undergone comprehensive review and approval by the relevant ethical and research oversight bodies to ensure strict adherence to institutional and national standards.

The **University of KwaZulu-Natal Biomedical Research Ethics Committee (BREC)** granted full ethics approval for the study under an expedited application process. The protocol, registered under

Reference Number: BREC/00007520/2024, is titled “*Assessing Multisectoral Approach to Enhance Pandemic Response: A Case Study of Nairobi County During the COVID-19 Pandemic in Kenya.*” The approval became effective on **25 November 2024**, contingent upon submission of outstanding site permissions. This approval aligns with the requirements for the PhD program at the University of KwaZulu-Natal.

Similarly, the study has been approved by **Kenya’s National Commission for Science, Technology & Innovation (NACOSTI)** under **License Number: NACOSTI/P/24/37716**. The license, issued in accordance with the Science, Technology, and Innovation Act (2013, Rev. 2014), permits the study to be conducted within Nairobi County and remains valid until **16 July 2025**. The project is registered under the same title as approved by BREC.

These approvals ensure the study adheres to ethical standards and regulatory requirements across the jurisdictions of South Africa and Kenya, reinforcing its alignment with international best practices in research ethics

Dissemination Plan

Target Audience

The protocol will be disseminated to key stakeholders in public health, governance, and research to foster engagement and collaboration. Primary audiences include researchers, academics, and policymakers involved in pandemic preparedness and multi-sectoral coordination. Special emphasis will be placed on reaching stakeholders in LMICs, including Nairobi County officials, public health practitioners, and regional bodies such as the African Union. International organizations such as WHO and other global health actors will also be targeted to encourage alignment with broader pandemic preparedness strategies.

Publication

The protocol will be submitted to a high-impact, peer-reviewed journal specializing in public health or global health research, such as *PLOS ONE* or *BMJ Open*. Open-access publication will be prioritized to ensure that the protocol is widely accessible to researchers, practitioners, and policymakers globally. Efforts will also be made to highlight the protocol in regional platforms, such as the *East African Medical Journal*, to ensure relevance to the Kenyan and East African contexts.

Conferences and Presentations

The protocol will be introduced at conferences and academic forums to engage with the global research community and promote awareness of the planned review. Opportunities will include presentations at events like the *World Congress on Public Health* and the *Global Health Systems Research Symposium*. Regional conferences such as the *Kenya Health Forum* and *Africa Health Conference* will be leveraged to gather feedback and foster collaboration with local and regional stakeholders.

Non-Academic Channels

The protocol will be disseminated through institutional and organizational platforms to engage a wider audience. It will be shared on the University of KwaZulu-Natal's website and highlighted in institutional newsletters or reports. Social media platforms such as Twitter, LinkedIn, and research-focused forums (e.g., ResearchGate) will also be used to promote the protocol and encourage engagement from the global research community.

Collaboration

Collaboration with key organizations such as WHO, NACOSTI, and Kenya's Ministry of Health will be sought to amplify the reach and relevance of the protocol. Regional academic institutions and public health networks will also be engaged to encourage adoption and alignment with ongoing pandemic response research.

Timing

The protocol will be disseminated immediately upon acceptance and publication in a peer-reviewed journal. Subsequent presentations and engagements will align with key global and regional events, ensuring maximum visibility and relevance.

Appendix A. PRISMA-P Checklist

This checklist demonstrates compliance with the PRISMA-P (Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols) guidelines. Each item has been addressed in the protocol.

SN	Section	Sub-Section	Item	Included
1	Administrative Information	Title	Identify the protocol as a systematic review protocol	✓ Yes
		Registration	Provide the name of the registry (e.g., PROSPERO) and registration number	✓ Yes
		Authors	Provide names, affiliations, and contact details of all authors	✓ Yes
		Contributions	Specify roles of each author in protocol development	✓ Yes
		Support	List funding sources, sponsors, and institutional support	✓ Yes
		Amendments	Plan for documenting and tracking protocol amendments	✓ Yes
2	Introduction	Rationale	Describe the rationale for the review in the context of existing knowledge	✓ Yes
		Objectives	Provide an explicit statement of the questions being addressed	✓ Yes
		Rationale	Describe the rationale for the review in the context of existing knowledge	✓ Yes
3	Methods	Eligibility Criteria	Define inclusion and exclusion criteria (e.g., participants, interventions, outcomes, study designs)	✓ Yes
		Information Sources	Specify all information sources (e.g., databases, grey literature, date ranges)	✓ Yes
		Search Strategy	Present draft search strategy for at least one database	✓ Yes
		Data Management	Describe methods for managing and tracking study records	✓ Yes
		Study Selection Process	Outline how studies will be screened for inclusion	✓ Yes

SN	Section	Sub-Section	Item	Included
		Data Collection Process	Specify data items to be extracted, including tools and processes	✓ Yes
		Risk of Bias Assessment	Describe tools and methods for assessing bias in included studies	✓ Yes
		Data Synthesis	Describe planned synthesis methods (e.g., narrative synthesis, meta-analysis)	✓ Yes
		Meta-Bias Assessment	Specify methods for assessing publication or reporting bias	✓ Yes
		Confidence in Evidence	Describe methods for assessing confidence in cumulative evidence	✓ Yes
	Ethics and Dissemination	Ethics Approval	Indicate whether ethics approval is required for the review	✓ Yes
		Dissemination Plan	Describe plans for communicating review results (e.g., journals, conferences)	✓ Yes

Appendix B. Search Strategy

Name: Javan Solomon Okello

Title: Protocol: A Systematic Review of Multi-Sectoral Coordination during the COVID-19 Pandemic—Practices, Challenges, and Recommendations for Future Preparedness

Research Questions

1. What are the key elements of multi-sectoral coordination during the COVID-19 pandemic, and what strategies can be implemented to strengthen these elements for future pandemic preparedness?
2. What benefits have been observed as a result of multi-sectoral coordination?
3. What challenges have hindered multi-sectoral coordination during the COVID-19 pandemic, and what practical recommendations can be made to improve multi-sectoral coordination in the context of Nairobi County?

Search Strategy

The study will use a combination of primary and secondary keywords, focusing on "multisectoral coordination

((("multisectoral coordination" OR "inter-agency cooperation" OR "cross-sectoral partnership" OR "multi-stakeholder engagement" OR "collaborative governance" OR "integrated pandemic management" OR " multi-sectoral coordination" OR "multi sectoral co-ordination" OR "multi sectoral co-ordination" OR "inter agency cooperation" OR "inter-sectoral coordination" OR "inter-sectoral collaboration" OR "collaborative coordination")) AND ("effectiveness" OR "efficacy" OR "outcomes" OR "impact" OR "success metrics" OR "performance indicators" OR "evaluation" OR "challenges" OR "barriers" OR "limitations" OR "obstacles" OR "difficulties" OR "constraints" OR "issues")) AND ("COVID-19" OR "SARS-CoV-2" OR "coronavirus pandemic" OR "CoronaVirus" OR "severe-acute-respiratory-syndrome-related coronavirus" OR "SARS COV 2" OR "COVID 19"))

Notes

This protocol is registered on PROSPERO (ID: CRD42023466849).

Statements and Declarations

Contributions

This systematic review protocol was developed through the collaborative efforts of all listed authors, with each contributing significantly to the study. Javan Solomon Okello conceptualized the review, developed the methodology, conducted the initial drafting of the protocol, and ensured its alignment with the study objectives. Prof. Themba and Dr. Julius provided supervision and guidance throughout the development process, critically reviewing the protocol and offering intellectual input to enhance its rigor and coherence. Dr. Bonface Oyugi of WHO AFRO contributed expert insights into systematic literature review methodologies and facilitated access to key resources on multi-sectoral coordination.

Dr. Vivian Nyaata of Kisii University provided logistical and moral support, offering valuable feedback during the drafting and revision phases. Dr. Yasushi Sawazaki inspired the focus on multi-sectoral coordination through his mentorship and insights gained during the JICA-Funded East African

Community Regional COVID-19 Countermeasures project. Prof. Karama of AMREF Kenya supported the NACOSTI clearance process by offering strategic advice and guidance.

All authors have reviewed and approved the final version of this protocol for submission and agree to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately addressed.

Data Availability

This systematic review does not involve the collection of primary data. All data used in this study will be extracted from publicly available sources, including peer-reviewed journal articles and reputable gray literature. The extracted dataset, along with any technical appendices and analysis tools, will be made openly accessible through the Dryad repository.

Conflicts of Interest

The author declares no conflict of interest in relation to the development of this systematic review protocol. The research was conducted independently, and no external parties influenced the study design, methods, or content.

Ethics approvals obtained from the University of KwaZulu-Natal Biomedical Research Ethics Committee (BREC) and Kenya's National Commission for Science, Technology & Innovation (NACOSTI) were carried out in compliance with independent regulatory standards, ensuring the integrity of the research process.

All collaborators, including mentors and supervisors, provided guidance strictly within their academic and professional capacities, without any competing interests affecting the development or direction of this protocol.

Funding

This research was supported by institutional resources from the University of KwaZulu-Natal's Department of Public Health. No specific grant from any funding agency in the public, commercial, or not-for-profit sectors has been received for this study.

Acknowledgments

I would like to express my deepest gratitude to my primary supervisor, Prof. Themba, and co-supervisor, Dr. Julius, for their unwavering guidance, constructive feedback, and mentorship throughout the development of this systematic review protocol. I extend my heartfelt thanks to Dr. Bonface Oyugi of WHO AFRO for his invaluable insights into systematic literature reviews and for providing access to critical resources on multi-sectoral coordination. I am also deeply indebted to Dr. Yasushi Sawazaki, whose mentorship and inspiration shaped my academic pursuits, and to my wife, Dr. Vivian Nyaata of Kisii University, for her steadfast support, encouragement, and thoughtful insights.

This work would not have been possible without the institutional support provided by the University of KwaZulu-Natal (UKZN), particularly the Department of Public Health, whose resources and infrastructure facilitated this research. I also wish to acknowledge the ethical oversight and contributions of Prof. Karama of AMREF Kenya, whose guidance greatly streamlined the process of obtaining clearance from NACOSTI.

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