

BMJ Open Effects of COVID-19 on malaria elimination initiatives in sub-Saharan Africa: a scoping review protocol

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To cite: Nunu WN, Ndirangu J, Tsoka-Gwegweni J. Effects of COVID-19 on malaria elimination initiatives in sub-Saharan Africa: a scoping review protocol. *BMJ Open* 2023;**13**:e076140. doi:10.1136/bmjopen-2023-076140

► Prepublication history for this paper is available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2023-076140>).

Received 29 May 2023

Accepted 28 September 2023

ABSTRACT

Introduction The occurrence of the COVID-19 pandemic significantly impacted health systems, resulting in varied outcomes of different variables in terms of health. Due to the nature of the causative organism that is spread mainly in the air, the disease rapidly spread to numerous countries, leading to a series of mitigation measures being proposed and implemented, including but not limited to travel restrictions, decongesting and in some instances closure of workplaces and schools and banning of social gatherings. This could have negatively impacted implementing strategies meant to ensure the effective management of malaria, hoping to eliminate it in different countries in sub-Saharan Africa (SSA). This review seeks to explore the effect of the COVID-19 pandemic on malaria elimination initiatives in SSA.

Methods and analysis An exploratory scoping review will be conducted on literature (searched using keywords and a search strategy) sources published in English on Web of Science, Cochrane Library, PUBMED, Dimensions, ProQuest, Scopus and African Journals Online. These would then be imported to Rayyan Software for screening for possible inclusion. The JBI Guidelines on Reviews, Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews checklist would guide the data collection, extraction and analysis from the accessed literature. Furthermore, charting, trends and developing themes would ensure the findings are presented comprehensively and yet understandable. The data collection and analysis process leading to the final submission of a review paper to a journal will be conducted from September 2023 to February 2024.

Ethics and dissemination An application for ethical approval was lodged with the Health Sciences Research Ethics Committee at the University of the Free State in Bloemfontein, South Africa. This ethics committee granted ethics clearance (ethics number: UFS-HSD2022/1754). Results will be communicated through peer-reviewed publications, presentations, conferences, workshops and other means and forums to reach the critical stakeholders.

INTRODUCTION

The COVID-19 pandemic significantly impacted health systems, resulting in varied outcomes of different health variables.¹ Generally, future health programme planning presents challenges as unforeseen and uncontrolled occurrences can derail plans. In

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The scoping review covered a wider range of databases reported to have a 96% and above comprehensiveness rate in literature search.
- ⇒ Assesses the impact of COVID-19 on the effectiveness of intervention strategies meant to aid the elimination of malaria in a broader scope of sub-Saharan Africa (SSA).
- ⇒ Includes both peer-reviewed and some grey literature (in unpublished theses), intending to keep a broader scope.
- ⇒ The review focuses only on studies that report malaria issues in SSA, which might reduce the study's generalisability to other contexts.

December 2019, the first case of COVID-19 was confirmed in Wuhan, China.² Due to the nature of the causative organism that is spread mainly in the air, the disease rapidly spread to numerous countries, leading to a series of measures being proposed and implemented.^{3 4} Such measures included non-pharmacological measures in managing the spread of the COVID-19 virus through travel restrictions, decongesting and, in some instances, closure of workplaces and schools and banning social gatherings.¹ This has been reported to have had varied impacts on the implementation and effectiveness of different interventions meant to promote different aspects of health, including those targeted at managing malaria in different sub-Saharan Africa (SSA) countries.^{5–7}

Malaria has been one of SSA's biggest concerns regarding morbidity and mortality.^{8 9} In 2016, over 216 million cases were reported globally, with SSA contributing to over 90% of these cases.¹⁰ It is further reported that from 2015, malaria cases dropped from 58.9 per 1000 at-risk population to about 56.3 per 1000 in 2019.^{11–14} The cases then rose to 59 per 1000 at-risk populations just after the COVID-19 pandemic 2020.^{11–14} It is further reported that in 2020, malaria deaths increased by 10% compared with 2019, to an



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estimated 625 000, up from 405 000 deaths reported in 2018 before the COVID-19 pandemic.¹² Various countries have used different strategies to try and eliminate this disease, particularly in SSA.¹⁰ Great progress has been realised in several countries where malaria is endemic, with some close to eliminating it.¹⁰ It is reported that between 2019 and 2021, an estimated 13.4million cases were attributed to the disruptions to malaria programmes.¹² These figures are against a backdrop of a reduction of malaria cases from 82 per 1000 population at risk to 57 in 2019 before increasing to 59 in 2020.¹² This scenario has been linked to disturbances of intervention strategies caused by a myriad of strategies meant to reduce the spread of COVID-19, such as travel bans and lockdowns, just to name a few.^{12 15 16}

As much as significant strides have been realised through the discovery of vaccines and are expected to play a major role in the fight against malaria, authors argue that vaccines alone will not be sufficient to eradicate malaria.^{17–20} Evidence suggests that more research is still being done to refine vaccines used to immunise at-risk populations to improve their efficacy and consider all necessary factors vital for success.²¹ It is further argued that there is a need to invest in health professionals, improve data usage, and ensure universal access to quality health services.¹⁸ In light of this, there is also scepticism that progress toward eliminating malaria could have been negatively impacted by the COVID-19 pandemic, which disrupted the implementation of interventions meant to ensure effective management of malaria aimed at eliminating it.²² Due to limited resources in most SSA countries, there are fears that this pandemic could have seriously impacted the programmes targeted at eliminating malaria in different country contexts. There is also suspicion that the response to the COVID-19 pandemic has yielded varied outcomes in different country contexts in SSA.

Aim and objectives of the scoping review

This scoping review, therefore, seeks to explore the effects of COVID-19 on malaria elimination initiatives in SSA. This review seeks to answer the broader review question,

‘Has the COVID-19 pandemic affected the effectiveness of malaria elimination initiatives/interventions in SSA?’.

This review proposes to use available literature to fulfil the stated specific objectives and review questions captured in table 1.

METHODS AND ANALYSIS

Patient and public involvement

This study is a review protocol and does not involve human participants.

Design

A scoping review would be conducted on literature sources (that meet the inclusion and exclusion criteria) found online in databases that would be described in-depth under the literature. Scoping reviews are generally a quick and new method of reviewing the literature to establish the status concerning specific aspects of interest.²³ It enables a rapid assessment to establish key aspects that underpin a research area, enabling researchers to understand the key facets and progress made in the specific area of interest.^{23–25} This proposed review would use an exploratory approach to assess and critique the available evidence and determine the impact that COVID-19 has had on malaria elimination initiatives in SSA countries. Figure 1, therefore, presents a map that shows the boundaries that denote Sub-Saharan African countries. This study is expected to be conducted from February 2023 to March 2024, when the final review manuscript is submitted to a Journal. The detailed breakdown of the activities is presented in table 2.

Literature search

This scoping review would access literature in reputable databases, including Web of Science, Cochrane Library, PUBMED, Dimensions, ProQuest (theses and dissertations, international conferences), Scopus and African Journals Online (AJOL) (for grey literature). The following search string “Eliminat* AND malaria* AND (vaccin*” OR insecticide* OR bednets OR “malaria aware*” campaign*” OR initiat*) AND (“COVID-19” OR

Table 1 Objectives and the research questions to be addressed by the review

Review objectives	Review questions
Identify and document the literature sources that report on the progress of malaria elimination programmes before and during the COVID-19 pandemic in sub-Saharan Africa (SSA), ie, from January 2015 up to December 2022	What is the number/volume of studies that have addressed the impact of COVID-19 on malaria programmes in SSA?
Document the trends of occurrence (incidence and prevalence rates) of malaria before and during the COVID-19 pandemic	Are there any differences in malaria trends before and during the COVID-19 pandemic?
Determine the effect that the COVID-19 pandemic had on the different strategies to eliminate malaria in different country contexts in SSA	Has the COVID-19 pandemic impacted the effectiveness of the interventions meant to manage malaria in SSA?
Gather and analyse the proposed strategies or interventions in literature to ensure the elimination targets remain a reality in the post-COVID-19 times in SSA	Are there any proposed interventions or strategies (reported in the literature) that could aid the realisation of elimination status targets concerning malaria in SSA?

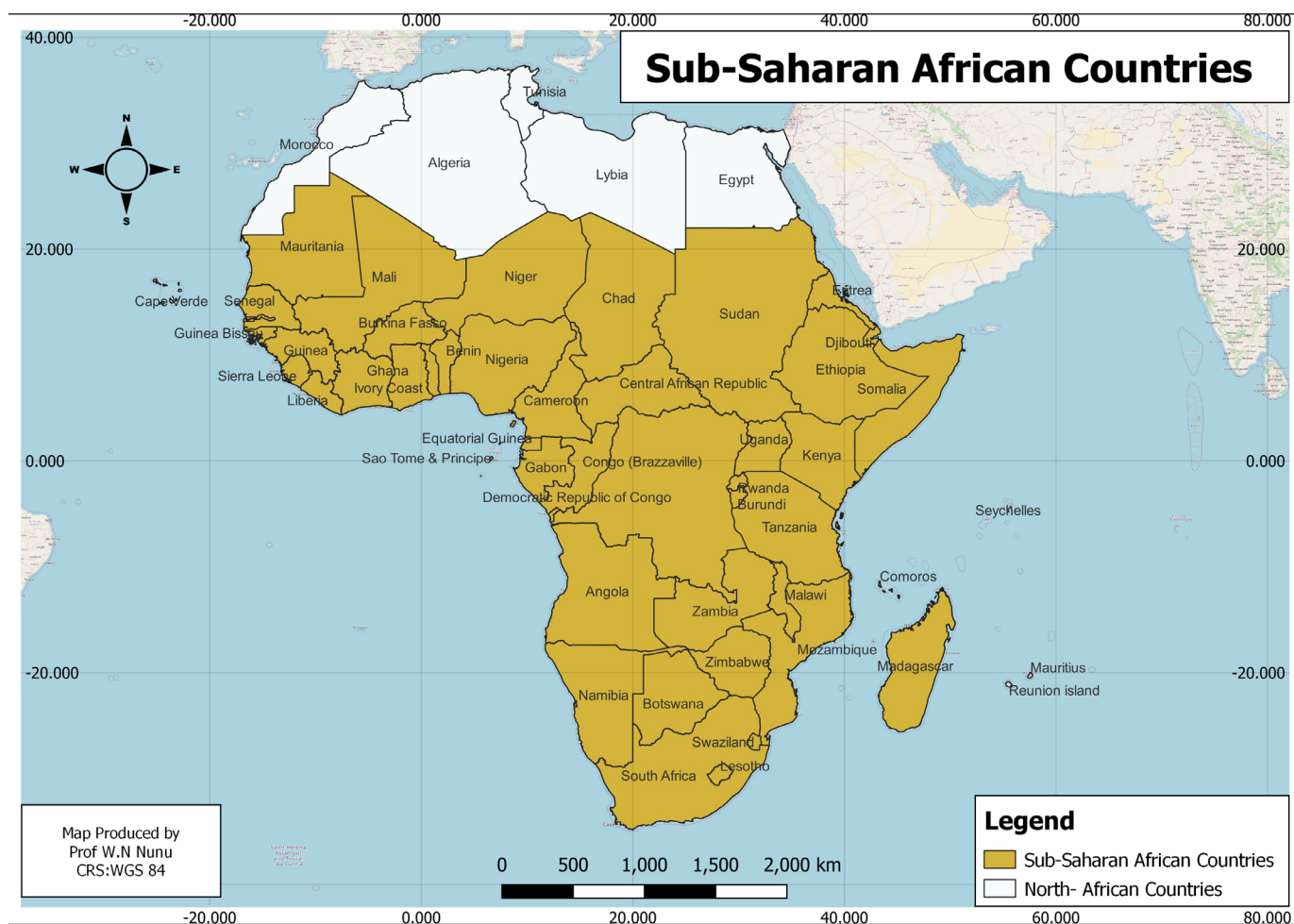


Figure 1 Map indicating the boundaries of the literature search.

“SARS-CoV-2” OR “Coronavirus”) would be used to search for the literature sources in the listed databases. Downloaded literature would be imported into Rayyan, a literature review software that includes and excludes literature to ensure that only relevant sources are included.^{26 27} This would ensure that almost all the work that has been done on the subject matter is accessed and comprehensive findings obtained on the state of matters of how the COVID-19 pandemic has impacted the malaria elimination initiatives as the software also offers suggestions on possible missed literature in line with the search terms and strategy.²⁸ It has been reported that Web of Science, Scopus and Dimensions, the combination of the three

databases, would give an accuracy rate of over 96% in accessing required literature, thus making the scoping review using these databases comprehensive.²⁹ The inclusion and exclusion criteria and the keywords that would be used to search for literature are presented in detail in table 3.

Data extraction

The Population, Intervention, Comparison, Outcomes, Healthcare Contexts (PICOH), the JBI Guidelines on scoping reviews and the Preferred Reporting Items for Systematic Reviews and Meta- Analyses extension for Scoping Reviews (PRISMA-ScR) checklist framework would guide the development of a data extraction tool that would enable contextual data to be collected that respond to the specific review questions and objectives that are spelt out in table 1 of this protocol.^{30–32} These frameworks would ensure that data is collected on the Populations (sociodemographic characteristics and more), Interventions (different interventions that have been implemented in the management of malaria), Comparison (comparison of the different interventions, including their objectives and targets), Outcomes (detail on what have been the products of these interventions in as far as malaria management is concerned), Healthcare

Table 2 Proposed time schedule

Objective	Schedule
Ethics approval	February to March 2023
Data collection	April to June 2023
Data analysis, interpretation and write-up	September to December 2023
Peer-review	January to February 2024
Journal submission	March 2024

Table 3 Inclusion and exclusion criteria for the scoping review

Inclusion criteria	Exclusion criteria	Keywords
▶ Peer-reviewed articles published in reputable journals from January 2015 to August 2023. These will include original research (qualitative/quantitative) and review articles. ▶ Books, book reviews and book chapters published by reputable publishers that address the subject matter. ▶ Conference proceedings, dissertations/theses and abstracts published in reputable peer-reviewed journals. ▶ Grey literature published in reputable sources. ▶ Official reports, for example, those published by the WHO. ▶ Studies published only in the English language and addressed the context of sub-Saharan Africa (SSA). ▶ Indexed in Web of Science, Cochrane Library, PUBMED, Dimensions, ProQuest (theses and dissertations, international conferences), Scopus and African Journals Online.	▶ Opinion papers and commentaries. ▶ Research protocols. ▶ Website articles that are not peer-reviewed. ▶ Newspaper articles. ▶ Social media content.	▶ Malaria in SSA. ▶ Malaria incidence and prevalence in SSA. ▶ Malaria mortality and morbidity in SSA. ▶ Interventions to eliminate malaria in SSA. ▶ Impact of COVID-19 on malaria elimination initiatives.

Contexts (mention of the different country contexts and comparison of impacts made).³⁰

Data analysis

The findings would be analysed through charting^{33 34} and guided by the 22-principle PRISMA-ScR checklist for scoping reviews.³² First, a data extraction tool would be developed as informed by the objectives of this review to ensure that information extracted from the literature sources answers key issues in the objectives. Developing the data extraction tool would ensure uniformity among authors in data extraction and minimise conflicting decisions on the extraction process. Charting would then be done, thus providing a logical description of the results obtained in the existing and reviewed literature sources in line with the stated objectives and the review questions presented in [table 1](#). This method allows for the presentation of broad findings in a simplified and synchronised manner while ensuring that the findings can be understood.^{33–35}

Strategies for enhancing rigour

This scoping review would follow up-to-date methodological guidance from scholars who have crafted frameworks such as the PICOH, PRISMA-ScR checklist and the JBI Guidelines on scoping reviews.^{30–32} This would ensure that the review is done comprehensively and presents thoroughly interrogated findings and inferences. The above frameworks would enable authors to plan, conduct and report the findings of the scoping review in a manner that has scholarship embedded in it.^{36 37} Furthermore,

it should be noted that searching literature sources would involve a librarian to ensure the investigation is as comprehensive as possible. All authors would review the sources for possible inclusion, extract data and analyse it independently. Conflicts that might arise in the inclusion and the data analysis processes would be discussed and ironed out.

Data analysis/synthesis

The extracted data would be synthesised quantitatively and qualitatively to indicate the reported number of cases before and during the COVID-19 pandemic and the impact that this pandemic would have had on the effectiveness of the malaria elimination strategies. Themes of the different impacts would be presented as qualitative findings.

Ethics and dissemination

An application for ethical approval was lodged with the Health Sciences Research Ethics Committee at the University of the Free State in Bloemfontein in, South Africa. This ethics committee (after two rounds of review) granted ethics clearance (ethics number: UFS-HSD2022/1754). It should be noted that no patients were involved in this scoping review. This review provides a window of opportunity for determining the impact that the COVID-19 pandemic had on malaria elimination initiatives. This review would provide insight to guide programming in ensuring that the set targets are met even during and post-COVID-19 pandemic. This would ensure that informed decisions are made in ensuring

flexible interventions resilient to disturbances are crafted and implemented. This review would also be insightful in guiding areas where research lags in the fight against malaria. This would, in turn, ensure contextual interventions are developed and further improve preparedness in case of other outbreaks of pandemics. Results will be communicated through peer-reviewed publications, presentations, conferences, workshops and other means and forums to reach the critical stakeholders.

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Acknowledgements A UFS librarian will be engaged to access the comprehensive literature sources. Mr Mbekelzi Dabengwa will support with using Rayyan software to assist in the inclusion and exclusion criteria on the obtained literature sources. Dr Darleen Struwig for the guidance on manuscript drafting and formatting.

Contributors WN developed this review protocol in preparation for the actual review as part of the Post Doctoral Fellowship programme. JN conceptualised the research idea and reviewed and provided substantial inputs on the draft manuscript. JT-G provided mentorship and reviewed the draft manuscript. All authors read and approved the manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

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