Stroke prevention strategies in Africa: a scoping review protocol

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ABSTRACT

Objective: The objective of this scoping review is to map the existing strategies on methods and interventions for primary and secondary stroke prevention in Africa.

Introduction: Stroke is among the leading causes of disability globally. African nations have higher stroke mortality and case fatality rates than the industrialized world, leading to significant social and financial costs, which necessitates efficient preventative methods. Despite the high prevalence of stroke in Africa, the scope of stroke-prevention strategies in Africa is unknown. Consequently, mapping diverse approaches to preventing stroke in Africa could provide direction for future research into stroke prevention in Africa.

Inclusion criteria: This review will incorporate studies that report methods or strategies used for stroke prevention in Africa. All primary and gray literature will be considered for inclusion. No language or date restrictions will be applied.

Methods: The JBI methodological framework for scoping reviews will be adopted for this scoping review. A 3-step search strategy consisting of an initial limited search, a full search, and a screening of the reference lists of all included articles will be undertaken. Databases such as CINAHL, Scopus, PubMed, PEDRo, DORIS, Global Health, Web of Science, and Open Access Thesis and Dissertations will be searched. All search results will be screened, and relevant data extracted by 2 independent reviewers. The findings will be presented in the final scoping review and illustrated in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram.

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Keywords: Africa; health planning; scoping review; stroke; stroke prevention

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Introduction

Globally, stroke is one of the leading causes of death and a major cause of disability.[1, 2] In the last 30 years, 70% of stroke deaths and 87% of stroke-related disabilities were reported in low- and middle-income countries (LMICs).[3,4] About half a century ago, stroke was not common in Africa[5]; however, stroke occurrence and mortality in Africa are rising exponentially, which has one of the highest indices of stroke burden in the world.[4,6] This increase in stroke in Africa is driven by both sociodemographic,[7–9] pollution exposure,[8,9] and lifestyle change[10] and has a detrimental effect on society and individuals.

In Africa, a systematic review by Akinyemi and colleagues[11] in 2021 noted that the annual incidence rate of stroke was around 316 cases per 100,000 person-years while the prevalence rate was around 1460 cases per 100,000 person-years. Akinyemi noted that stroke 3-year fatality in Africa was greater than 80%, with about 5.5% to 11% mortality.[11] Additionally, Africans tend to have strokes within the 4th and 6th decade (40 to 60 years) of their lives. In South Africa, stroke was declared a catastrophic illness by the Joint World Congress of Stroke in 2007,[12] and is being complicated by the high burden of HIV infection, with an estimated prevalence of 20% and most people infected aged <50 years.[13]

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The economic burden of stroke is staggering, and although the actual economic cost of stroke care is not known, it is logical to infer that the high stroke burden places great pressure on the poorly funded and already fragile health care system of the African continent, leading to significant health care expenditure, in addition to the social costs incurred by patients and families. A study in rural South Africa estimated that stroke accounts for 1.6% to 3% of health care expenditure, with 80% of that incurred by inpatient care.[14] A Togolese study estimated a direct cost per stroke patient of €936 in 17 days, which is about 170 times more than the average annual health spend of a Togolese.[15]

Stroke is preventable, and a focus on prevention is essential to mitigate the growing burden in Africa. Preventive measures to reduce the risk of stroke may provide additional cross-cutting advantages for the population. For instance, programs or strategies on hypertension, cholesterol, and HIV/AIDS reduction can have a spiraling effect, also reducing mortality due to other chronic diseases, such as chronic kidney disease, coronary heart disease, cancer, and risk of dementia.

Effective stroke prevention calls for comprehensive risk reduction, including blood pressure control.[16] Two main strategies have been proposed for the prevention of stroke and they include a high-risk strategy and a population-based strategy,[17] each of which employ different methods (activities and interventions) to achieve risk reduction. The high-risk strategy recognizes and targets populations at very high risk of developing stroke. Interventions under the high-risk strategy may be classified as those related to changes in lifestyle and those related to pharmacological treatment. Most clinical guidelines for cerebrovascular disease emphasize lifestyle change as the first line of the prevention strategy. Studies have shown that reducing salt intake, increasing fruit and vegetable consumption, increasing physical activity, losing weight, quitting smoking, limiting alcohol consumption, and managing psychosocial stress are methods to reduce cardiovascular risk.[18] A pharmacological treatment strategy focuses on risk factor reduction, such as managing hypertension and diabetes. Hypertension has been identified as a leading risk factor for stroke and controlling it remains one of the most effective strategies to reduce the risk of stroke.[19,20]

The second strategy for stroke prevention, the population-based approach, targets the entire population to reduce risk factors utilizing a health systems approach with mass mobilization, population-based health education programs, and policy and legislative changes.[17] Various stroke-prevention strategies target several levels of stroke prevention, which include primary and secondary measures.[3] Secondary prevention strategies for stroke are strategies for preventing a recurrence of stroke, while primary prevention strategies include measures for avoiding a first-ever stroke.

Developed nations such as the United Kingdom,[21] the USA,[22] and countries in Latin America and the Caribbean[23] are implementing successful programs, such as restriction of tobacco and alcohol use, promotion of increased physical activities, and encouraging healthy dietary practices, to reduce the risk of stroke. In Africa, some interventions for stroke prevention have also been explored. For example, in Malawi, a national non-communicable diseases (including cardiovascular risk factors for stroke) prevention and management policy was introduced in 2017.[24] Similarly, a national cardiovascular disease prevention program in Mauritius targets reductions in hypertension, smoking, and hypercholesterolemia.[25] Ojo and colleagues explored adapting a skills-based stroke-prevention intervention for communities in Ghana,[26] while in Nigeria, a phone-based intervention under nurse guidance has been suggested for lowering blood pressure and preventing a repeat stroke in stroke survivors.[27]

The available evidence favors use of both populations-based and high-risk strategies for primary and secondary prevention in developing countries to reduce the risk of stroke.[17] Furthermore, the United Nations General Assembly's 2015 call for a one-third reduction in premature mortality due to noncommunicable diseases by 2030 should provide impetus to African countries to remove barriers to cerebrovascular disease prevention.[28] Ironically, while significant improvement in stroke prevention and care has been observed in high-income countries, stroke prevention and care in Africa is neglected and disjointed.[5,24]

Given the burden of stroke in Africa, it is important to understand the scope of stroke-prevention strategies on the continent. A comprehensive preliminary search of MEDLINE (PubMed), the Cochrane

Database of Systematic Reviews, and *JBI Evidence Synthesis* was conducted on October 12, 2022, and no current or in-progress scoping reviews on stroke prevention in Africa were identified. Thus, there is a need to map out stroke-prevention strategies to provide a theoretical background that can guide further decisive action in policy formulation and research that can improve stroke prevention in Africa. The outcome of this proposed scoping review will provide a succinct overview of the existing strategies and identify gaps for future research on stroke prevention in Africa. Findings from this study could be a basis for policymakers, health workers, and health facility managers to identify stroke-prevention strategies that could be evaluated, refined, and implemented to aid stroke prevention in Africa. Furthermore, this study seeks to map the existing evidence on the stroke-prevention strategies in Africa.

Review questions

i) What prevention strategies for stroke prevention have been used in Africa?
ii) In which countries, contexts, and settings have stroke-prevention strategies been implemented in Africa?
iii) Who are the key implementers (eg, non-governmental agencies, governmental agencies, health care practitioners) of stroke-prevention strategies in Africa?

Inclusion criteria

Participants

This review will include studies that focus on strategies used in the primary or secondary prevention of stroke irrespective of age, gender, ethnicity, comorbidity, and other sociodemographic factors.

Concept

This scoping review will examine stroke-prevention strategies used in the prevention of stroke, including the types, implementers of such strategies, and where these stroke-preventative strategies have been used.

These methods could include evidence of any of the high-risk strategies (which include studies related to changes in lifestyle and those related to pharmacological treatment for stroke prevention) or population-based strategies for stroke prevention in Africa. It could also include studies that target both primary and secondary levels of stroke prevention. Secondary prevention strategies for stroke are aimed at preventing a recurrence of stroke, while the primary prevention strategies include measures for avoiding first-ever stroke.[29]

Context

This scoping review will consider studies conducted in Africa in any health care– or community-based settings in any of the independent countries or regions of Africa.

Types of sources

This scoping review will consider both experimental and quasi-experimental study designs, including randomized controlled trials, non-randomized controlled trials, before and after studies, and interrupted time-series studies that investigated strategies aimed at preventing both primary and secondary stroke. This review will also include descriptive observational study designs, including case series, individual case reports, and descriptive cross-sectional studies. Unpublished articles, opinion pieces, policy documents, guidelines, and dissertations that include information on strategies for stroke prevention will be included in this review. Literature reviews and systematic reviews will be excluded; however, the reference lists of relevant systematic reviews will be screened for studies. Studies on stroke prevention strategies conducted outside the African continent will be excluded from this study.

Methods

The proposed scoping review will be conducted following the JBI methodology for scoping reviews.[30,31] This protocol is registered with Figshare (https://doi.org/10.6084/m9.figshare.21679904.v1).

Search strategy

The search strategy will aim to locate and identify published and unpublished studies. A 3-step search strategy will be utilized in this review. First, an initial limited search of PubMed was undertaken to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles, were used to develop a full search strategy. A complete search strategy of PubMed is presented in Appendix I. The second phase will be implementing the search strategy, including all identified keywords and index

terms, which will be adapted for each included database and/or information source. The last phase will be to search for additional relevant studies in the reference lists of all included studies. Where necessary, authors of articles will be contacted for further information. There will be no date restrictions applied in the search.

The databases to be searched will include CINAHL (EBSCOhost), Scopus, MEDLINE (PubMed), PEDRo, Global Health (EBSCOhost), Web of Science, and Database Of Research Into Stroke (DORIS). Open Access Theses and Dissertations (EBSCOhost) will be searched for unpublished and gray literature. There will be no language restrictions on the articles included in the study. If the need arises, relevant papers in other languages will be translated by colleagues and associates who are native speakers of the language the papers were published in. However, we anticipate that the number of non-English-language papers will be minimal, as English is widely spoken in Africa and is the lingua franca for science communication.[30]

Study selection

Following the search, all identified records will be collated and uploaded into Mendeley v1.19.8-dev3 (Mendeley Ltd., Elsevier, Netherlands) and duplicates removed. The titles and abstracts will be reviewed by 2 independent reviewers (OLO, JN) to determine whether they meet the review's inclusion criteria. Potentially relevant sources will be retrieved in full, and their citation details imported into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI; JBI, Adelaide, Australia).[31] The full text of selected citations will be assessed in detail against the inclusion criteria by 2 independent reviewers (OLO, JN). Reasons for the exclusion of articles/studies 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 (VN).

Data extraction

Data will be extracted from papers included in the scoping review by 2 independent reviewers (OLO, JN) using a self-developed data extraction tool (Appendix II). The data extracted will include specific details about the participants, concept, context, study methods, and key findings relevant to the review question. The data extraction form will be pilot tested on a sample of papers, as recommended by the *JBI Manual for Evidence Synthesis*,[32] to ensure all pertinent data are captured. The data extraction form will be modified and revised as necessary during the process of extracting data from each included evidence source; modifications will be detailed in the scoping review. Any disagreements that arise between the reviewers during data extraction will be resolved through discussion or with an additional reviewer (VN). If appropriate, authors of papers will be contacted via email (with a maximum of 2 reminders) to request missing or additional data.

Data analysis and presentation

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 (PRISMA) flow diagram.[33] The geographical location, context, settings of studies, and the key implementers/enablers of stroke prevention strategies in Africa will be presented in tables and synthesized into relevant charts and graphs. The stroke-prevention strategies and other relevant results of the study reported will be presented in a tabular and narrative summary.

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Author contributions

CIU and VN conceived the idea for the study. CIU and OLO drafted the manuscript with input from VN. All authors approved the manuscript and agreed on the methodology.

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Appendix I: Search strategy

PubMed

Search conducted: May 3, 2023

Search number	Query	Records retrieved
4	#1 AND #2 AND #3	2121
3	"stroke"[MeSH Terms] OR "cerebrovascular accident"[All Fields] OR "cerebrovascular accidents"[All Fields] OR "stroke"[MeSH Terms] OR "stroke"[All Fields] OR "cva"[All Fields] OR "CVAs"[All Fields] OR "cerebrovascular apoplexy"[All Fields] OR "brain vascular accident"[All Fields] OR "brain vascular accidents"[All Fields] OR "apoplexies"[All Fields] OR "stroke"[MeSH Terms] OR "stroke"[All Fields] OR "apoplexy"[All Fields] OR "acute stroke"[All Fields] OR "acute strokes"[All Fields] OR "acute cerebrovascular accident"[All Fields] OR "acute cerebrovascular accidents"[All Fields] OR "haemorrhagic stroke"[All Fields] OR "ischaemic stroke"[All Fields] OR "cerebrovascular event"[All Fields] OR "cerebrovascular events"[All Fields]	436,653
2	"prevention and control"[MeSH Subheading] OR ("prevention and control"[MeSH Subheading] OR ("prevention"[All Fields] AND "control"[All Fields]) OR "prevention and control"[All Fields] OR "prophylaxis"[All Fields] OR "prophylaxies"[All Fields] OR "prophylaxy"[All Fields]) OR "prevention and control"[All Fields] OR ("prevent"[All Fields] OR "preventability"[All Fields] OR "preventable"[All Fields] OR "preventative"[All Fields] OR "preventatively"[All Fields] OR "preventatives"[All Fields] OR "prevented"[All Fields] OR "preventing"[All Fields] OR "prevention and control"[MeSH Subheading] OR ("prevention"[All Fields] AND "control"[All Fields]) OR "prevention and control"[All Fields] OR "prevention"[All Fields] OR "prevention s"[All Fields] OR "preventions"[All Fields] OR "preventive"[All Fields] OR "preventively"[All Fields] OR "preventives"[All Fields] OR "prevents"[All Fields]) OR ("controling"[All Fields] OR "controllability"[All Fields] OR "controllable"[All Fields] OR "controllably"[All Fields] OR "controller"[All Fields] OR "controller s"[All Fields] OR "controllers"[All Fields] OR "controlling"[All Fields] OR "controls"[All Fields] OR "prevention and control"[MeSH Subheading] OR ("prevention"[All Fields] AND "control"[All Fields]) OR "prevention and control"[All Fields] OR "control"[All Fields] OR "control groups"[MeSH Terms] OR ("control"[All Fields] AND "groups"[All Fields]) OR "control groups"[All Fields]) OR "preventive measures"[All Fields] OR "primary prevention"[All Fields] OR "secondary prevention"[All Fields]	6,695,248
1	(("africa"[MeSH Terms] OR "africa"[All Fields] OR "africa s"[All Fields] OR "africas"[All Fields] OR "Western Africa"[All Fields] OR "North Africa"[All Fields] OR "Sub-Sahara"[All Fields] OR "East Africa"[All Fields] OR "Southern Africa"[All Fields]) AND "Northern Africa"[All Fields]) OR "Central Africa"[All Fields] OR "Southern Africa"[All Fields] OR ("algeria"[MeSH Terms] OR "algeria"[All Fields]) OR ("angola"[MeSH Terms] OR "angola"[All Fields] OR "angola s"[All Fields]) OR ("benin"[MeSH Terms] OR "benin"[All Fields] OR "benin s"[All Fields]) OR ("botswana"[MeSH Terms] OR "botswana"[All Fields] OR "botswana s"[All Fields]) OR "Burkina Faso"[All Fields] OR ("burundi"[MeSH Terms] OR "burundi"[All Fields]) OR ("cameroon"[MeSH Terms] OR "cameroon"[All Fields] OR "cameroons"[All Fields] OR "cameroon s"[All Fields]) OR "Cape Verde"[All Fields] OR "Central African Republic"[All Fields] OR ("chad"[MeSH Terms] OR "chad"[All Fields]) OR ("comoros"[MeSH Terms] OR "comoros"[All Fields] OR "comoro"[All Fields]) OR "Cote d'Ivoire"[All Fields] OR "Democratic Republic of the Congo"[All Fields] OR ("djibouti"[MeSH Terms] OR "djibouti"[All Fields]) OR ("egypt"[MeSH Terms] OR "egypt"[All Fields] OR "egypt s"[All Fields]) OR "Equatorial Guinea"[All Fields] OR ("eritrea"[MeSH Terms] OR "eritrea"[All Fields]) OR ("eswatini"[MeSH Terms] OR "eswatini"[All Fields] OR "swaziland"[All Fields]) OR ("ethiopia"[MeSH Terms] OR "ethiopia"[All Fields] OR "ethiopia s"[All Fields]) OR ("gabon"[MeSH Terms] OR "gabon"[All Fields]) OR ("gambia"[MeSH Terms] OR "gambia"[All Fields] OR "gambia s"[All Fields]) OR ("ghana"[MeSH Terms] OR "ghana"[All Fields] OR "ghana s"[All Fields]) OR ("guinea"[MeSH Terms] OR "guinea"[All Fields] OR "guinea s"[All Fields] OR "guineas"[All Fields]) OR "Guinea-Bissau"[All Fields] OR ("kenya"[MeSH Terms] OR "kenya"[All Fields] OR "kenya s"[All Fields]) OR ("lesotho"[MeSH Terms] OR "lesotho"[All Fields]) OR ("liberia"[MeSH Terms] OR "liberia"[All Fields] OR "liberia s"[All Fields]) OR ("libya"[MeSH Terms] OR "libya"[All Fields]) OR ("madagascar"[MeSH Terms] OR "madagascar"[All Fields] OR "madagascar s"[All Fields]) OR ("malawi"[MeSH Terms] OR "malawi"[All Fields] OR "malawi s"[All Fields]) OR ("mali"[MeSH Terms] OR "mali"[All Fields]) OR ("mauritania"[MeSH Terms] OR "mauritania"[All Fields]) OR ("mauritius"[MeSH Terms] OR "mauritius"[All Fields]) OR ("morocco"[MeSH Terms] OR "morocco"[All Fields]) OR ("mozambique"[MeSH Terms] OR "mozambique"[All Fields] OR "mozambique s"[All Fields]) OR ("namibia"[MeSH Terms] OR "namibia"[All Fields] OR "namibia s"[All Fields]) OR ("niger"[MeSH Terms] OR "niger"[All Fields]) OR ("nigeria"[MeSH Terms] OR "nigeria"[All Fields] OR "nigeria s"[All Fields]) OR "Republic of the Congo"[All Fields] OR ("rwanda"[MeSH Terms] OR "rwanda"[All Fields] OR "rwanda s"[All Fields]) OR "Sao Tome and Principe"[All Fields] OR ("senegal"[MeSH Terms] OR "senegal"[All Fields] OR "senegal s"[All Fields]) OR ("seychelles"[MeSH Terms] OR "seychelles"[All Fields]) OR "Sierra Leone"[All Fields] OR ("somalia"[MeSH Terms] OR "somalia"[All Fields] OR "somalia s"[All Fields]) OR "South Africa"[All Fields] OR "South Sudan"[All Fields] OR ("sudan"[MeSH Terms] OR "sudan"[All Fields] OR "sudans"[All Fields] OR "sudan s"[All Fields]) OR ("tanzania"[MeSH Terms] OR "tanzania"[All Fields] OR "tanzania s"[All Fields]) OR ("togo"[MeSH Terms] OR "togo"[All Fields]) OR ("tunisia"[MeSH Terms] OR "tunisia"[All Fields]) OR ("uganda"[MeSH Terms] OR "uganda"[All Fields] OR "uganda s"[All Fields]) OR ("zambia"[MeSH Terms] OR "zambia"[All Fields] OR "zambia s"[All Fields]) OR ("zimbabwe"[MeSH Terms] OR "zimbabwe"[All Fields] OR "zimbabwe s"[All Fields])	842,884

Appendix II: Draft data extraction instrument

S/No.	Author, year of publication	Country	Title	Aim	Study design	Setting (community-based or hospital-based)	Participants/study population	Level of stroke prevention (primary, secondary, or tertiary)	Type of prevention[a]	Description of specific type of prevention strategy[b]	Enablers/implementers of strategies[c]	Important result(s)
1.												
2.												
3.												

[a]High-risk strategy that includes interventions related to lifestyle change or pharmacological treatments; population-based approach (health-system approach) that includes mass mobilization, health education programs, policy, and legislative changes.
[b]*These include interventions related to lifestyle changes, pharmacological treatment, mass mobilization, health education programs, policy, and legislative changes.*
[c]*May include enablers such as non-governmental agencies, governmental agencies, or health care practitioners/researchers.*