Exploring the Primary Stroke Preventive Strategies in Sub-Saharan Africa. A Systematic Review of Literature

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Abstract

Introduction: Stroke is a major cause of death in sub-Saharan Africa, and approximately 80% of all deaths by stroke occur in the region. Evidence indicates that a greater number of years of potential life lost is due to Stroke, also the huge social and economic problem of stroke is large and demands efficient strategies for prevention.

Aim: This descriptive systematic literature review explores the primary prevention strategy of stroke in Sub-Saharan Africa. This report draws on a comprehensive review of the literature.

Methodology. The primary preventive strategies for stroke were systematically searched in Pub Med and Cinahl, Google, Google Scholar, Science Direct, Scopus, etc.

Results: This review summarizes all aspects of the primary preventive strategies under the headings; the awareness of stroke, screening, identifiable risk factors, primary preventive strategies of stroke, and lastly the challenges of primary preventive strategies of stroke in sub-Saharan Africa.

Conclusion: Primary preventive strategies in Sub-Saharan Africa (PPSS) include high-risk strategy and mass strategies. This included identifying risk factors for cerebrovascular diseases and controlling them. It also involved mass awareness of primary prevention strategies of stroke (PPSS) with the mass population campaign and digitalized strategies of prevention.

Introduction

Stroke is the major cause of death and disability globally, afflicting about 13 million people yearly [1]. Men have a greater occurrence than females, mortality is lesser in men when compared to women. In the USA, stroke is considered the fifth foremost reason of death for males, but the third for womenfolk [2]. In Africa, it is established that stroke is a major cause of death in developing countries and that approximately 70% of all deaths by stroke occur in developing countries [3]. Evidence in Sub-Saharan Africa indicates that a greater number of years of potential life lost is from the effect of Stroke, also the huge social and economic problem of stroke demands efficient strategies for prevention, treatment, and rehabilitation in a greater number of years of potential life lost [3]. World Health
Organization states the major risk factor is high blood pressure, while others are smoking, a sedentary lifestyle, poor diet, alcohol, high lipid levels in the blood, obesity, hereditary tendency, stress, depression, and arterial fibrillation [4]. World Health Organization fact sheets 2023 on World Hypertension Day showed that age is also a non-modifiable risk factor [5] for stroke and revealed top ten risk factors: hypertension, dyslipidemia, diabetes mellitus, central obesity, cardiac causes, current smoking, high alcohol intake, unhealthy diet, physical inactivity, and psychosocial factors [5]. The Stroke Investigative Research and Educational Network (SIREN) research found that 98.2% (95% CI 97.2–99.0) of the adjusted Population attributable risks (PAR) of stroke were linked with 11 potentially modifiable risk factors: hypertension, dyslipidemia, regular meat intake, central obesity, diabetes mellitus, low consumption of green leafy vegetables, stress, added salt at the table, cardiac diseases, physical inactivity, and current cigarette smoking [6].

Air pollution globally has been found as an evolving risk factor, as a lot of studies suggest air quality is a crucial cause of cardiovascular health challenges including both Ischemic heart disease and stroke [7,8].

Due to the absence of first-class epidemiological statistics from many regions worldwide, the Global Stroke Statistics paper, in a population-based study on stroke incidence from the Qom area in central Iran, showed a high incidence of stroke, with an age of onset earlier than the global average [9]. This shows a high incidence of stroke, with an age of onset earlier than the global average. It also provides the opportunity to identify trends in stroke incidence in specific regions, and in particular, whether health interventions and better control of risk factors are reducing incidence [9].

Another paper analyzed the incidence and mortality of cerebrovascular disease in Spain [10], it was found that stroke mortality was reduced by half in Spain over this period, consistent with many studies from other high-income countries, showing that a combination of public health measures, and better primary prevention, can reduce the incidence of stroke and cardiovascular disease and emphasizes the importance of developing such approaches globally, including in low middle-income countries (LMIC) [10]. An important step to improving care in LMIC is documenting the current state of stroke services. This is addressed by a collaborative paper from authors across Africa [11]. The authors highlight how stroke used to be viewed as a rare disease in Africa, but that it is now considered one of the common non-communicable diseases with a reported annual incidence in some African countries ranging from 250 to 316 per 100,000 [12], and prevalence rates of 560 to 1460 per 100,000. Moreover, stroke has become one of the leading causes of morbidity and mortality, with a 3-year fatality rate as high as 84% [13]. Despite this heavy burden, the results of the survey reveal a shortfall of well-structured primary stroke prevention and public awareness programs in many African countries [14]. Similarly, acute stroke management is inadequate, with only five stroke units and two centers among the 17 studied countries [11], and a low percentage of recanalization therapy, whether thrombolysis or thrombectomy, being provided in less than 5% of all acute cases. In addition, thrombectomy is available only in 35% of the participating countries [11].

The Global Stroke Factsheet brought out in 2022 shows that the possibility of having a stroke in one's lifetime has increased by 50% over the last 17 years and 1 in 4 people is projected to have a stroke in their lifetime. From 1990 to 2019 [15,16], there has been a 70% surge in stroke occurrence, a 43% proliferation in bereavements due to stroke, a 102% rise in stroke incidence, and a 143% rise in Disability Adjusted Life Years (DALY) [16]. The most outstanding feature is that the majority of the worldwide stroke problem (86% of deaths from stroke and 89% of DALYs) happens in poorer and lesser-middle-income nations [16]. This problem experienced by these income countries has modeled an unparalleled problem to families with less income. (WHO 2022). WHO-backed strategies help to control the weight of stroke through primordial, primary, and secondary prevention and rehabilitation [15].

Recovery time after a stroke is different for everyone can take weeks [17], months, or even years. Some people recover fully, but others have long-term or lifelong disabilities. A stroke can sometimes cause temporary or permanent disabilities, depending on how long the brain lacks blood flow and which part is affected. Complications may include Paralysis or loss of muscle movement. The disability of Stroke is a major problem because it affects the individual ability to engage in activities of daily living [17], and economic activities with the resultant effects of hunger and missed opportunities for family or personal income and causing a situation for missed income. Disability and unhealthiness due to long hospital stays and un-wellness negate good health [17].

On 25 September 2015, 193 Member States of the United Nations adopted the Sustainable Development Goals (SDGs) by General Assembly Resolution A/RES/70/1 [18]. The vision of the resolution was to achieve 17 goals through 169 targets for sustainable development by 2030. The third SDG’s goal is good health and healthy life and focuses on health, which is central and major in the achievement of other sustainable development guidelines. SDG 3 guarantees healthy lives and promotes well-being for everyone irrespective of their age. Thus a link to other goals because good health is key to achieving other goals and
targets. By 2030 SDG 3 aims to reduce by one-third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being [18]. Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol, Substantially increase health financing and the recruitment, expansion, re-training and retaining of the health workforce in developing countries, especially in least developed countries and small island developing States and Universal health coverage including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all. Good health is essential to sustainable development and the 2030 Agenda shows the complexity and connection of the two and takes into account widening economic and social inequalities, rapid urbanization, threats to the climate and the environment, the continuing burden of HIV and other communicable diseases, and evolving threats such as non-communicable diseases [18]. There’s a 31-year gap between countries that have short and long life expectancy regrettably, there is the suggestion of significant disparities in global well-being outcomes drawing the substantial inequalities in the global disease burden, indicating the certainty of these inequalities that presently occur [19]. One instance is on diverse life expectancies for children across the globe, with a 31-year gap between countries with short and long life expectancies [20]. Non-communicable diseases such as cardiovascular diseases (CVDs) pose serious health threats. In 2019, it was expected that about 17.9 million persons lost their lives due to CVDs, which is 32% of all worldwide deaths. Of these deaths, 85% were heart attacks and strokes. Over three portion of CVD deaths were among low- and middle-income countries [20]. WHO, 2021). Out of 17 million premature deaths (under the age of 70) from non-infectious diseases in 2019, 38% were by CVDs [21]. Most cardiovascular diseases can be prevented by addressing behavioral risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity, and harmful use of alcohol. It is important to become aware of cardiovascular disease as early as possible so that management with counseling and medicines can begin. People living in low- and middle-income countries often do not have the benefit of primary health care programs for early detection and treatment of people with risk factors for CVDs [21]. People in low- and middle-income countries who suffer from CVDs and other non-communicable sicknesses have very poor access to effective and equitable health services that respond to their needs. As a result, for many people in these countries detection is often late in the development of the disease and people die at a younger age from CVDs and other non-communicable diseases, often in their most productive years. The poorest people in low- and middle-income countries are most affected [22]. At the household level, evidence is emerging that CVDs and other non-communicable diseases contribute to and cannot be achieved to poverty due to catastrophic health spending and high out-of-pocket expenditure. At the macroeconomic level, CVDs place a heavy burden on the economies of low- and middle-income countries when one is affected by a stroke coupled with regular hospital visits after admission for checks and counseling to prevent a second repeat of stroke. To continually be in a state of good health, an individual has to be in optimal health, through frequently identifying and eliminating risk factors that are modifiable, and engaging in preventive strategies that can stop the menace [22]. Preventive strategies in sub-Saharan Africa are highly necessary to reduce the burden of stroke and reduce disability and health care costs. Primary stroke prevention refers to the treatment of individuals with no history of stroke [23]. Literature suggests that preventive care services in developing countries, and data from developed countries suggest that a strong emphasis on prevention would be needed to reduce the burden of stroke [23]. From a public health point of view, prevention strategies to reduce the risk of stroke would provide more cross-cutting profits. For instance, lowering blood pressure or cholesterol by pharmacological and lifestyle management may decrease mortality due to stroke and additional protracted illnesses, such as coronary artery disorder, and chronic kidney sickness, and decrease the possibility of dementia, reduce health care costs, reduce health care burden, disability wasted years, lost income, loss of opportunity for life dreams and goals [23]. Primary prevention strategies for stroke include tobacco control [24], reduced intake of alcohol, and sodium, promotion of home education, pharmaceutical treatment of atrial fibrillation, and use of poly-pill. It also includes lifestyle change, community-based programs, dietary changes, digital health prevention strategies, and reduction in weight in obese persons. Patients with a protracted condition like stroke will need lifetime pharmaceutical management, life maintenance, self-management skills, caregiver support, and household sustenance to achieve the finest health outcomes [14]. Rehabilitation increases the physical, speech, and cognitive functioning of disabled stroke patients. It is expected that home- or community-based services and tele-rehabilitation may hold special promise for stroke patients in LMICs [24]. All these difficulties place more demand on the already weak health sector, thereby increasing the incidence and burden of stroke. Reliable facts on primary
prevention strategies for stroke in sub-Saharan Africa are scarce in the area necessitating intervention [14]. This systematic literature review seeks to explore the primary prevention strategy of stroke in Sub-Saharan Africa. This report draws on a comprehensive review of the literature and input from policymakers, researchers, and practitioners to address four questions: (1) what the awareness level of primary stroke prevention strategies in sub-Saharan Africa is, (2) what the identifiable risk factors of stroke in sub-Saharan Africa are. (3) What the primary preventive strategies are for stroke in sub-Saharan Africa, (4) Lastly what are the challenges of primary stroke prevention in the region?

The inclusion criteria include studies done 10 years ago, from 2014-2024, and had the primary prevention strategies discussion and reports in sub-Saharan Africa. The various search engines used include the following: Google, Google Scholar, Web of Science, Scopus, Cinhil, Science Direct, PubMed, and the Cochrane Library. While the Boolean symbols used included prevention and stroke.

**Awareness Level of Primary Stroke Prevention in Sub-Saharan Africa**

Primary prevention strategies consciousness is paramount in the region to ascertain the scope and depth of information to be given in health promotion. Literature from the cross-sectional study [24]. Knowledge and practices related to stroke prevention among hypertensive and diabetic patients attending Specialist Hospital, Sokoto, Nigeria by Sarafadeen A A, Kehinde JA Mansur O O, Anas A S, Mohammed T I, revealed that practices to halt Stroke menace were below average and considerably connected with formal education and employment: Therefore findings suggest the need for all stakeholders to focus on both patients' education and empowerment in halting the rising burden of stroke across the region [24].

A similar study on awareness of Stroke, Risk Factors, and Preventive health practices among federal civil servants in Ogun State, Nigeria by Anyasor Chiamaka Ogechi, Aina, and Obafemi Bolajoko [25], revealed that the awareness of stroke risk influences and practice of preventing stroke is insufficient, and not robust enough. This means that there is a need to step up programs on stroke awareness, health promotions, and community enlightenment on stroke and its risk influences and different preventive strategies and practices of stroke to reduce the burden of stroke in sub-Saharan Africa [25]. The use of mass media especially television is highly welcomed for use in such promotions. Additionally, governmental officers and legislators should appropriate reduction modalities to curb the menace, because stroke is one major cause of
death, disability, and dementia globally. The ailment should generate health policies that will obligate all organizations irrespective of government-owned or private to ensure that every worker irrespective of their age goes for routine medical check-ups. Effective stroke promotion should comprise population-wide and individual-based strategies that cover the whole population, with the main concern given to population-wide approaches. Also barriers to effective treatment and management of stroke should be investigated. This will ensure prompt and early diagnosis of stroke and its further prevention [14]. Another descriptive cross-sectional research by, symptoms, and immediate management amongst high and low-risk patients. Ola Ahmed, Fatima Abd, and Osman Ahmed et al [26] were done to assess the level of awareness of stroke risk factors. Low and high-risk groups were engaged from the referral clinics of three tertiary hospitals in Khartoum, Sudan. This revealed that awareness was low between high and low-risk individuals. And advocated for an effective educational program for the whole community [26].

A systematic review of literature by Mayowa O, Fred S Sarfo, and Rufus A et al titled [27]. ‘The Sub-Saharan Africa Conference on Stroke (SSACS): An idea whose time has come ‘revealed that due to better awareness of stroke in high-income countries, there has been a drop in stroke occurrence over the previous four decades [27] but not the same with African countries. Therefore all hands must be on deck for enlightenment campaigns in sub-Saharan Africa so that the knowledge of stroke and primary prevention strategies of stroke (PPSS) will be high among the populace [27]. In the future, more community studies should be carried out on stroke prevention in mainly African countries. As most publications are hospital-based cross-sectional studies which is low on the hierarchy of evidence so, therefore, more shreds of proof are needed [14].

Screening for the Identifiable Risk Factors of Stroke in Sub-Saharan Africa

This systematic review titled “Prevention, management, and Rehabilitation of Stroke in Low- and middle-income Countries by Lijing L Yan, Chaoyang Li, Jie Chen, et al. Their work revealed that screening and primary prevention strategies are necessary for stroke prevention [28]. Screening for the ailment is vital, they identified 10 risk factors for stroke; High blood pressure, smoking, diabetes mellitus, waist-to-hip ratio, diet risk, lack of physical activity, alcohol ingestion, psychosocial stressors, depressive illness, cardiac reasons, and proportion of apolipoproteins B to A1. Non-modifiable factors related to genetics include the age of the individual, gender, and race of origin [29]. While the primary means of prevention were done through healthy modification of lifestyles, lowering of BP, and reduction of sodium, low-income countries face difficulties in these parts due to lack of funds, awareness, and technical ability. Retaining a healthy lifestyle, like no tobacco utilization, a healthful diet, and physical exercises are important strategies for equally primary and secondary prevention of stroke. Controlling high blood pressure is crucial in all populations and the severe phase of the hemorrhagic type of stroke [29]. Other primary preventive approaches comprise education in community programs, poly-pill, preventive strategies’ in managing atrial fibrillation, and digital health machinery.

A systematic review of literature by Mayowa O, Fred S S and Rufus A et al titled [27]. ‘The Sub-Saharan Africa Conference on Stroke (SSACS): An idea whose time has come ‘revealed that due to better control of risk factors, especially vascular type. Stroke in developed countries there has been a decrease in stroke occurrence over the previous four decades. Therefore for primary prevention strategies for stroke to be successful, the identification and screening of stroke risk factors for better control of stroke in sub-Saharan Africa are necessary to ameliorate the burden of stroke in sub-Saharan Africa [27].

What are the Primary Preventive Strategies for Stroke in Sub-Saharan Africa?

A systematic study by Yogeshwar V. K, Suvarna A., Subhash K, and Vladimir H 2018 on Stroke preventive strategies in the developing world [23], in which they postulated two strategies; High-risk strategies (HRS) and a mass strategy. The HRS is done by looking for those individuals with modifiable risk factors and targeted for H-RS, another approach under the HRS is to identify people with probable CVD risk of stroke and target them for H-RS. This tactic posits that a person may not have a particular illness or a health problem, for instance, high blood pressure or high glucose level in the blood [23], but could have a higher general cardiovascular possibility due to existing various risk features, such as pre-hypertension and dysglycemia which did not agree with treatment thresholds as per the present care standards. The backing for this discussion comes from the thought that the risk of cardiovascular issues rises linearly above the systolic blood pressure of 115 mm Hg [30]. This group of persons with high cardiovascular risk factors may be found in communities. For instance, in a Global Study of the prevalence of Acute Myocardial Infarction, a systematic review [31]; determination of preventive planning along with the application of safe treatment methods is critical for developing countries as many of the participants had the smallest cardiovascular risk factor. Based on the discoveries, it is projected that preventive strategy-based programs that should be employed to check CVD risk need to be applied to a bigger part of the population [31]. In summary, the interventional programs under the high-risk approach
may be categorized as those linked to modifications in existence and those related to pharmacological management.

The mass strategy approach involves mass mobilization, the development of health policies [32], legislative modifications, and health education in the community, school, and workplace to promote healthy nutrition, physical exercise, smoking termination, and a decrease in alcohol intake. The constraint of individual-based lifestyle adjustment strategy, there is growing interest in population-based strategies for cardiovascular risk drop. A successful example of a mass health promotion strategy in a developing country is Mauritius [33], where an intervention involving the use of mass media, legislative measures, as well as health education in the community, school, and workplace was used to promote healthy nutrition, increase exercise, smoking cessation, and reduction in alcohol intake, use of technology in increasing access to digital info in developing, also in the same vein the guidelines [34] advocate a combination of population-wide and high-risk strategies to avert stroke and other types of heart issues, because they are essential, and small changes in the circulation of risk influences could lead to key reductions in stroke and CVD occurrence in the populace [34]. The population-wide prevention strategy was advocated by Sir Geoffrey Rose in 1985 as the greatest operative method for primary CVD prevention. As this approach targets numerous behavior and way of life risk factors —including tobacco utilization, poor healthy diet, physical sedentariness, being over-weight, and the dangerous use of alcohol — that are shared for a range of major NCDs, this approach must affect the hazard not only of stroke but also of non-communicable diseases like heart malady, diabetes, and cancer [34].

A systematic review by Valery F, M Owolabi, Graeme J. H et al 2022 page 1008-1019 titled [35]. Digital health in primordial and primary stroke prevention: A systematic review the use of technology as a preventive strategy in stroke burden in sub-saharan Africa[35].

The use of technology in Countries is a new stratagem used to give health mail, offer information about primary and secondary prevention, and sources of health care for stroke in developing countries, especially on a personal level where individuals will be encouraged to restrict their risk factors. Other innovative strategies of such an approach include a Stroke Riskometer [36], a mobile phone tool, and the use of entertainment. Digitalized tools, like smartphones and gadgets, have become an integral part of our everyday lives. These could augment access to primary stroke and cardiovascular disease (CVD) prevention services eg, access to primary care, cost of visiting health professionals, and can back the realization of the health and wellbeing–associated Sustainable Development Goals [35].

Another work Modifiable Stroke Risk Factors in Africa: lessons from SIREN by Andre P. Kengne and Bongani M Mayosi (2018) [37], revealed From a public health viewpoint that interventions are available in preventing and controlling stroke and non-communicable diseases (NCDs) in Africa. Other cost-effective management strategies are:- a population-based tobacco tax increase, restriction on trans-fat, restriction on salt in products [37], and primary health servicing aimed at modifiable risk control. Also developing and endorsing guidelines to ensure that drugs for risk factor treatment are available. Most of these recommendations are included in strategy documents for NCD prevention and control in Ghana and Nigeria [38]. At the continent level, the Pan-African Society of Cardiology (PASCAR) has identified hypertension as the priority condition for action to reduce cardiovascular disease in Africa. PASCAR has issued a ten-point action plan to increase treatment and control rates for hypertension by 25% in Africa by 2025 [39]. In general, however, African countries are doing less than required to meet their NCD prevention and control objectives.

A study on the national Health insurance scheme; a means to effective stroke prevention among hypertensive in sub-Saharan Africa [40] revealed that persistent hypertension is an important reason for stroke in Sub-Saharan Africa. Reasons for this poor blood pressure control are; small income, inactivity in lifestyle, and a diet that is unhealthy [40]. NHIS may be helpful in good blood pressure control amongst hypertensive in Ghana and Nigeria, therefore preventing stroke and other cardiovascular complications of uncontrolled hypertension. Health Insurance is a means of effective primary stroke prevention strategies [40].

**What are the Challenges of Primary Stroke Prevention in the Region?**

Health financing in sub-Saharan Africa is regrettably poor and sub-optimal [41]. The study on NHIS in sub-Saharan Africa showed that out-of-pocket spending is the main reason behind uncontrolled Blood Pressure which is a predisposition to stroke [40]. Universal Health Coverage for all citizens under the NHIS scheme will offer standard health care services to citizens regardless of their income and assist in lowering blood pressure levels and preventing stroke. Careful, evidence-based actions to reduce Non-communicable diseases and Reproductive tract infections (RTIs) [42] will report the changing disease burden in Africa and achieve a more sustainable improvement in health outcomes, more efficient use of resources, and better equity across patients and populations. Pocket spending should be discouraged by establishing insurance packages [42]. The accessibility of funds for
primary stroke prevention should be considered when setting accurate objectives and priorities. Given that the risk of hemorrhagic stroke in developing countries is higher than in developed countries, with a strong emphasis on early detection and management of elevated blood pressure, and also lessening of exposure to air pollutants should be a main [43]. A review by Ronald R. O’Donnell showed that the health sector is burdened by the existing problem of communicable diseases and a large weight of fast emerging non-infectious diseases, particularly Cardiovascular Diseases (CVD). The lack of resources and the massive cost of CVD [44] treatment suggest that primary prevention must be a priority for CVD control in sub-Saharan Africa. Also a practical method for how primary care in sub-Saharan Africa could carefully address the eradication, treatment, and control of CVD in the region. There should be an effective and upgraded preventive program to control stroke in sub-Saharan Africa, also there should be strategic plans to provide primary care clinics with trained allied health workers who are supervised by physicians. The Seychelles approach involves Campaigns to raise awareness [45,46] in the country through the use of media, especially radio, and television. Screening of risk factors in schools through the systematic assessment of body mass index, blood pressure, smoking, and other lifestyle changes.

Discussion

Primary prevention of stroke is better and cheaper than treatment of stroke [47]. There is a wide interval in the information on the global costs of strokes with an average between €610- €220,822.45 based on the cost of the illness [47]. The emphasis is on screening of risk factors, effective population-wide interventions, and education to control and reduce the occurrence. The greatest determinant of cost was inpatient hospital care, representing 44.49% of overall costs, but the increase in the economic burden (health and social care costs) is mainly associated with social care (300%) after one year post-stroke [47].

Each minute, 28 lives between the ages of 30 and 70 are cut short since countries have not taken plan, legislative, and supervisory measures to answer to the necessities of people living with or at risk of cardiovascular diseases, cancers, diabetes, chronic respiratory diseases, or mental health conditions, including preventive, curative, palliative, and specialized care [48]. Twenty-five (25) out of 28 lives die each minute in low- and middle-income countries where the social, economic, and physical environments give populations much lower levels of safety from the risks and costs of NCDs than in high-income countries. Other contributing factors include excessive tobacco use, the injurious use of alcohol, unhealthy diets, physical activity, and air pollution [48]. Surveillance to obtain current epidemiological data, screening for stroke risk factors, and accurate diagnoses of stroke are important for preventing and controlling stroke. However, LMICs face challenges in all three levels of activities; due to lack of resources, creating awareness, and technical capacity. Screening is most successful in high-risk groups; its value to risk reduction in the general population is debatable. However, there is a pressing need to develop and distribute accessible (e.g. mobile), inexpensive, and reliable diagnostic equipment and technologies in LMICs [14,49]. Population-based health education programs should be stepped up [50] like educating the masses, training of health workers, appropriate public health policy formulation, and development of strategies targeting high-risk populations with cardiovascular diseases. Client advocacy on primary prevention strategy begins with awareness programs to enlighten the masses about stroke [49], and associated risk factors to dispel fallacies and myths about what stroke is and is not. Ensure good screening programs for the population to investigate individuals who have risk factors for stroke and institute preventive strategies. Literature has shown times without number that uncontrolled hypertension is the major cause of stroke [14,51], so efforts, therefore, should be channeled to routine checking of blood pressure, and mass-health education at the grassroots [51]. Apart from blood pressure other preventive strategies include tobacco restrictions/ tax, sodium reduction, limiting alcohol intake, avoiding a sedentary lifestyle, improvement on poor dieting, pharmaceutical strategies, and a digitalized form of a prevention strategy. Stroke prevention is an integral part of both the UN declaration on actions on NCDs [51] and the UN Post-2015 Sustainable Developmental Goals. There is overwhelming scientific evidence that actions taken to reduce the risk of stroke will substantially reduce the burden. Prevention of stroke will also have beneficial effects on cognitive decline and dementia. All preventive actions should start early in life and continue during the life cycle. Prevention of stroke is a complex medical and political issue with many challenges. Upscaling efforts to prevent stroke are urgently needed in all regions, and the opportunity to act is now. Verified, cost-effective, prevention strategies are needed, many of which (such as tobacco and alcohol taxes, road safety measures, and fuel-efficient ventilated cook-stoves) require action beyond the health sector [52]. These can deliver broader development benefits in addition to their benefits for health. Selective, evidence-based actions to reduce NCDs and Respiratory tract Infections will address the changing disease burden in Africa and achieve a more
sustainable improvement in health outcomes, more efficient use of resources, and better equity across patients and populations [53]. WHO urges every country, nongovernmental organization (NGO) [48], company, citizen, and person living with an NCD to sustain local and global efforts to attain the set of nine voluntary targets fixed by the World Health Assembly in 2013 for 2025, measured against a 2010 baseline. This will allow countries to achieve SDG target 3.4 (by 2030, decrease by one-third premature mortality from non-communicable diseases over prevention and treatment and promote mental health and well-being) [48], measured against a 2025 baseline, and protect at least eight million lives by 2030 in low-income countries alone.

The limitation of this systematic study was time, resources to view full-text work, and the non-availability of studies done on primary preventive strategies of stroke in sub-Saharan Africa.

**Conclusion**

Primary preventive strategies in sub-Saharan Africa should begin creating awareness of Stroke, especially at the grassroots, identifying risk factors, especially modifiable ones, pharmaceutical strategies including taking daily drugs, and personalized counseling with phones to people with stroke risk factors. Stroke prevention requires an inter-sectorial action plan, with important responsibilities on the part of governmental bodies, non-government organizations, and the health sector as well as communities, organizations, and individuals. Although official development assistance will need to be provided for the lowest-income countries, financing will need to be raised for most countries by the reallocation of resources within the country. All these should be up-scaled in the region to reduce the heavy burden of the ailment.

A combination of prevention, early detection, and treatment is the key to achieving the SDG 3.4 targets. Increased funding and commitments at international and national levels are required to bring about transformative changes needed to address the burden of stroke.

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