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The Sub-Saharan Africa Conference on Stroke (SSACS): An idea whose time has come

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Abstract

Stroke is a leading cause of global morbidity and mortality. Sub-Saharan Africa (SSA), where an unprecedented rise in stroke burden is currently raging, has the highest age-standardized stroke incidence, stroke prevalence, and stroke mortality rates. This is in sharp contrast to the relative decline in stroke incidence in high-income countries over the past four decades through better awareness and control of vascular risk factors. Compared to other groups, Africans tend to have a higher risk of stroke, higher percentage of the hemorrhagic type and much poorer outcomes. Indeed, stroke levies a heavy toll on the developing SSA economy by affecting a relatively younger age group. In this commentary, we examine the disproportionately high burden of stroke in the setting of grossly inadequate resources and evidence-based interventions. We propose an annual pan-regional stroke conference (starting in 2020) to harness global resources and local talent with the goal of galvanizing action to tackle this escalating burden. We anticipate that a successful conference series could become a rallying point for the eventual establishment of an African Stroke Organization.

Keywords

Stroke; Africans; Sub-Saharan Africa; Conference

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1. Introduction

Stroke is a leading cause of death, disability and dementia globally [1,2]. Sub-Saharan Africa (SSA), where an unprecedented rise in stroke burden is currently raging, has the highest age-standardized stroke incidence (up to 316 per 100,000) rate, and prevalence (up to 14.6 per 1000 population) [3], with a 3-year mortality rate of up to 84% [4]. This is in sharp contrast to the relative decline in stroke incidence in high-income countries over the past four decades through better awareness and control of vascular risk factors [1–3,5]. Compared to other groups, Africans tend to have a higher risk of stroke, higher percentage of the hemorrhagic type, much poorer outcomes and associated with a high burden of psycho-social post-stroke co-morbidities [6–13]. Indeed, stroke levies a heavy toll on the developing SSA economy by affecting a relatively younger age group [14]. In this commentary, we examine the disproportionately high burden of stroke in the setting of grossly inadequate resources and evidence-based interventions. We propose a pan-regional conference to harness global resources and galvanize action to tackle the escalating burden.

2. Projected burden of stroke and its risk factors in SSA

Current projections suggest the burden of stroke in SSA will escalate over coming decades due to adoption of western lifestyles, increasing urbanization, lack of risk awareness and poor healthcare infrastructure [4]. These factors are jointly responsible for the increasing burden of vascular diseases which are also risk factors for stroke in SSA [4]. Available evidence show the number of people in SSA with hypertension will increase by 68% from 75 million in 2008 to 126 million in 2025 [5]. Thus developing interventions to reduce the growing burden of stroke based on research conducted in SSA should be a major priority. This is because, both the Global Burden of Disease [15] and INTERSTROKE [16] studies showed geographical variations in relevance of traditional stroke risk factors. Moreover, the genetic architecture of a population may play an instrumental role in risk factor predisposition and ultimately the manifestation of stroke. So, evidence generated from outside the region may not be directly applicable.

3. Low research output from SSA

Despite the disproportionately higher burden of non-communicable diseases (NCDs) in SSA compared to the rest of the world, research output from scholars in SSA is unacceptably low, accounting for < 1% of the world's research output compared with its share of global population at 12%; compared to those from low to middle-income countries in other regions of the world such as Vietnam and Malaysia [17]. Furthermore, the proportion of research conducted by African scholars is abysmally low (3.9%) with over 70% being attributed to collaborating scholars from western countries. Most importantly, there is little intra- and inter-African collaborative research, representing only 0.9%–2.9% of the total research output from Africa. Such low interregional collaboration has resulted in lack of adoption of evidence-based and context-driven practices to mitigate the burden of NCDs in the region. In a report by the Global Forum for Health Research, Council on Health Research for Development and UNICEF/UNDP/World Bank/WHO Special Program for Research and Training in Tropical Diseases proposed that in addition to improving conditions of health

service, fostering career pathways is an important and potentially implementable solution for strengthening research capacity in SSA [18].

Strengthening research capacity is crucial to unravelling the role of genes and their interactions with environmental factors for stroke occurrence and developing tailored interventions for prevention and treatment of stroke and other cardiovascular diseases in SSA. Stroke (including recurrent stroke) is highly preventable via risk factor control [19,20], but a dearth of resources in SSA to administer acute stroke treatment, underscores the notion that while systems of acute stroke care need to be developed, control of stroke risk factors will likely be the most viable strategy for mitigating the escalating SSA stroke epidemic [21,22].

The largest study of stroke on the continent, Stroke Investigative Research and Education Network (SIREN), has examined the dominant risk factors for stroke which can be targeted for prevention [23]. SIREN is a transnational, multicenter, hospital and community-based study involving 4000 cases and 4000 controls recruited from multiple sites (academic safety net hospitals) in Ghana and Nigeria [23]. Cases were hospital-based patients with first stroke within 10 days of onset in whom neurovascular imaging is performed. Etiological and topographical stroke subtypes are documented for all cases. Controls were hospital- and community-based participants, matched to cases on the basis of gender, ethnicity, and age (± 5 years) [23]. Published studies emanating from SIREN have validated stroke screening tools [24–26], developed phenotyping software [27], assessed cardiac indices [28,29], and level of community engagement [30,31]. The 12 topmost modifiable risk factors for all stroke in descending order of population attributable risk were hypertension, dyslipidemia, regular meat consumption, elevated waist-to-hip ratio, diabetes mellitus, income level > $100/month, stress, cardiac disease, added salt at table, and tobacco use, while green leafy vegetable consumption and physical activity were protective [32]. Whereas the factors identified in SIREN could be targeted for stroke prevention, there are numerous barriers mitigating against the control of these risk factors.

4. Barriers against stroke control in SSA

Although sustained adherence to medications for risk factor control will reduce stroke events [33–35], lack of adherence is a leading modifiable barrier to risk factor control [36–39]. Patients whose beliefs are discordant with conventional biomedical concepts have poorer risk factor control than those with concordant beliefs [40–45]. Furthermore, predictors of poor adherence to medication in SSA have been linked to poor patient-provider communication [46–49]. A study in Nigeria found a major reason for non-adherence to anti-hypertensive drugs was that clinicians didn’t provide appropriate guideline based treatment plans (60%) [40].

In turn, ability to provide optimal services by health care workers is influenced by increased patient load, overall rise in workload, and shortage of workers. With a health worker-to-population ratio 0.8 per 10,000 inhabitants, there are clear indications that most SSA countries will not cope with the high demand of caring for chronic diseases. Of relevance to stroke, the neurologist-population ratio in SSA ranges from 1 per 162,885 persons to none in

11 countries (vs. 1 per 29,200 persons in the US) [50], and there are 2.5 physiotherapists and 2 occupational therapists per 100,000 people served. A key issue is the brain drain that has plagued SSA [51], and led to a shortage of health workers available to provide stroke prevention and treatment at available care systems [5,52,53].

5. Potential solutions to stroke prevention and treatment in SSA

The contextually unique landscape of SSA with socioeconomic obstacles, cultural barriers, uncoordinated care, and shortage of physicians [50,54], will require development of culturally-appropriate, affordable, and sustainable interventions, which can be readily scaled up. First, it is imperative to strengthen the health systems in SSA. The World Health Organization (WHO) suggests that health systems should carry out basic functions: provide services; develop health workers; provide equitable access to essential medical products; ensure use of reliable information on health determinants and systems performance; and ensure health system leadership and governance [55]. Furthermore, as chronic disease patients are actually often their own primary carers, their needs and preferences must be taken into account in the development of management plans [56]. Therefore, encounters between patients and their health care professionals become a critical intersection for information exchange, decision-making and motivation [57]. Stroke is a prime example of a common chronic disease that causes substantial morbidity and mortality, and requires long-term medical management and coordinated support. It is believed that informed patients improve their decisions by collaborating with their health-care providers toward a common goal. This results in increased patient involvement leading to a positive effect on the health outcomes [58]. Poor knowledge of chronic diseases leads to problematic treatment practices such as healer shopping within traditional healing systems [59].

Another potential solution to limited healthcare access in SSA is task-sharing or task-shifting. Task sharing involves training non-physician healthcare workers to perform tasks traditionally undertaken by physicians [60]. Task-shifting can potentially result in cost and physician time savings without compromising the quality of care or health outcomes for patients [61–63]. A study from Rwanda showed that task-shifting from a physician-centered to a nurse-centered model reduced the demand on physician time by 76% [64]. The WHO in consultation with a wide range of experts has formulated a set of 22 recommendations that provide guidance to the task-shifting approach [65].

Furthermore, an important and feasible, but underutilized method of monitoring and supervising stroke care delivery and remote training of non-specialist healthcare workers, is mobile phone technology [66]. SSA has a tele-density of up to 95% [67]. Moreover, specialized care in SSA is restricted to a few tertiary centers with limited access to care for the majority of the population who live in rural areas. In high incomes countries, tele-health has been an effective model for bridging the rural-urban gap in access to specialized care services [68], for several major neurological disorders including stroke [68–83], a model which could be adopted, refined and culturally-tailored for SSA. The combination of high burden of NCDs, low levels of access to healthcare services, and high mobile phone penetration highlights the potential of using mobile & tele-technology to provide access to evidenced-based healthcare in SSA. A pilot trial in Ghana has recently demonstrated the

feasibility of utilizing m-health interventions under nurse guidance for blood pressure control among recent stroke survivors [84–86]. Further research has shown some promising results for tele-rehabilitation after stroke [87–90] and other on-going trials are exploring other interventions such as use of cardiovascular polypills to improve medication adherence after stroke in SSA [91,92].

Crucially, social networks can serve to greatly reduce the sense of isolation experienced by scientists [93]. In particular, dedicated forums can permit the integration of technologies to create opportunities to meet and discuss science and serve as an effective medium for teaching and mentoring [93]. Thus, we propose convening a scientific forum that will focus on guiding/encouraging both the current and next generation of African Scholars to work in teams to develop research plans and evidenced based solutions targeted at understanding and reducing the growing burden of stroke in SSA. Appropriate models of research will be required to test dynamic, multidimensional interventions that triangulate on patients, providers, and communities, which are continuously improved with feedback from rapid-cycle measurement of population health outcomes [94]. An annual gathering of researchers, clinicians, and policy makers from various scientific and professional backgrounds, which leverages and contextually adapts existing knowledge dissemination channels and key partnerships, could help to expose research gaps, highlight promising work, foster surveillance, tackle ethical, legal and social barriers; inform policy makers, recognize achievement, and inspire greater interest among post-doctoral scholars/junior faculty to pursue careers in this field; all thereby catalyzing the development and successful implementation of interventions aimed at enhancing stroke outcomes in SSA. Fostering the successful development of the next generation of stroke researchers in SSA is crucial to resolving this growing challenge.

6. Conference proposal

The **S**ub-**S**aharan **A**frica **C**onference on **S**troke (**SSACS**), will be a one-day annual scientific forum focused on cerebrovascular disease in SSA, with the overarching goal of bringing together key stakeholders, identifying gaps in knowledge, setting priorities for stroke care delivery and research, fostering collaborations, and accelerating translation of research findings to improve stroke outcomes in the region. *SSACS* would be intended to as a collaborative initiative with the World Stroke Organization, World Hypertension League, World Federation of Neurology, African Union, African Academy of Sciences, World Federation for Neurorehabilitation, African governmental agencies, local academic institutions, local teaching hospitals, and Stroke Support Groups. SSACS 2020 will be held in Bahir Dar, Ethiopia. We will seek various partners will provide financial and in-kind logistics, space, and personnel to support successful execution of SSACS. SSACS 2020 will focus on stroke epidemiology, community awareness, and stakeholder engagement in SSA.

SSACS will award travel scholarships to 20 promising Post-Doctoral Scholars in SSA (Young Investigators) committed to careers in stroke research. Scholars will present their work at SSACS. Proposed eligible Young Investigator award participants would include: 1) Residency fellows (neurology, neurosurgery, internal medicine, cardiologists); 2) Post-doc allied health professionals (nursing, pharmacy, physical therapy, occupational therapy,

speech therapy, nutritionists); 3) Post-doc researchers (epidemiologists, health services researchers). A Poster Session will invite abstract submissions from early career SSA investigators (post-doc scholars or individuals within 3 years of a first faculty appointment) with an interest in stroke research. This event will be open to all SSACS attendees and will provide a dedicated setting for the participants to practice presenting and receiving feedback on their research. Equally important, it provides an excellent opportunity for networking. SSACS will also feature Early Career Development & Stroke Support Organization (SSO) Sessions. Networking functions will involve scheduled events at the Symposium. Finally, to evaluate effectiveness of SSACS we will assess: 1) Number of Attendees; 2) Attendee Engagement; & 3) Selected Young Investigator Award Scholar Achievements (publications, presentations, positions, awards, and so forth).

The conference proposal is consistent with goals of governmental and non-governmental public health, research, and professional agencies to identify and address health disparities, as well as to foster a capable academic/professional workforce. SSACS is a novel initiative due to: 1) firm commitment from a cadre of distinguished academicians experienced with stroke research and practice in SSA, most of whom are African; 2) robust in-person and online networking activities aimed at enhancing professional advancement; 3) comprehensive program evaluation methods; 4) focus on a single major disease entity, stroke within the context of cardiovascular diseases which are its risk factors, which together substantially burdens SSA and can be studied from a variety of scientific and professional disciplines; 5) close collaboration with several prominent global and regional non-governmental and governmental agencies, to provide an enrichment of events geared at facilitating discourse during SSACS and broadening the exposure of SSA trainees to important opportunities designed to lead to a successful research career in stroke research. Although it is recognized that funding is year to year, it is anticipated that this conference will grow both in length and scope to encompass more budding and seasoned experts from increasingly diverse disciplines all bound by an interest in resolving the growing epidemic of stroke in SSA. In this way a comprehensive and cumulative look at stroke in SSA will occur, and a core curriculum will be realized. We anticipate that beyond 2022, likely accelerated by SSACS-related activities, an African Stroke Organization would be established, and will take on the responsibility of holding future annual conferences on stroke in SSA.

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