Burden and Predictors of Poststroke Cognitive Impairment in a Sample of Ghanaian Stroke Survivors

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Background and Objective: There are limited data on vascular cognitive impairment (VCI) from low- and middle-income countries where the stroke burden is burgeoning. The aim of this study was to characterize the burden, determinants, and effects of VCI on health-related quality of life in sub-Saharan Africa (SSA). *Methods:* From January 2015 to February 2016, we collected information on 147 consecutive stroke survivors (>45 years) seen at a tertiary hospital in Ghana and 49 demographically matched stroke-free controls. Data collected included demographics, clinical factors, health-related quality of life, and presence of depression. Cognitive status was evaluated using a standard Vascular Neuropsychological Battery that assessed memory, executive function and mental speed, language, and visuospatial–visuoconstructive functioning. Expert VCI guideline and *Diagnostic and Statistical Manual of Mental Disorders*—Fourth Edition criteria were used to classify stroke patients into no VCI, VCI but no dementia, and vascular dementia (VD). *Results:* The mean age ± standard deviation of the stroke survivors was 59.9 ± 13.7 years, of which 47.6% were women. Among the cohort, 77 out of 147 (52.3%) had no VCI, 50 of the 147 (34.0%) had VCI without dementia, and 20 of the 147 (13.6%) had VD. Three factors remained significantly associated with VCI: increasing age for each successive 10-year rise (odds ratio [OR] 1.44, 95% confidence interval [CI]: 1.03-2.02), lack of formal education (OR 5.26, 95% CI: 1.01-27.52), and worse functional disability on the modified Rankin scale (OR 2.46, 95% CI: 1.61-3.75). Patients with VD had the poorest health-related quality of life. *Conclusions:* Half of the Ghanaian stroke survivors encountered in this cross-sectional study had evidence of cognitive dysfunction. Future studies in SSA will need to identify strategies to address this immense burden. **Key Words:** Vascular dementia—risk factors—quality of life—Ghana.

Introduction

Stroke is a devastating medical disorder associated with significant morbidity and mortality, particularly in low- and middle-income countries (LMICs) in sub-Saharan Africa (SSA).[1-4] In addition to physical disability, stroke survivors often experience profound alterations in cognitive function as well as mental health impairments, with adverse repercussions for stroke patients, their families, and the society at large.[5] Poststroke neurocognitive dysfunction is a multidomain impairment of the cognitive ability with a predilection for attention and concentration, executive function, memory, language, and visuospatial domains of cognition.[6-8] Vascular cognitive impairment is a spectrum is a spectrum that spans from mild impairments in single cognitive domains topoststroke dementia (PSD),

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with nearly 65% of stroke survivors estimated to suffer from cognitive impairments and about 30% developing dementia.[9,10]

A myriad of factors have been posited to predispose to poststroke vascular cognitive impairment (VCI), including sociodemographic variables such as age, educational attainment, occupation, and environmental enrichment; and cardiovascular risk factor profile and stroke-related characteristics, as well as neuroimaging correlates such as the number, size and sites of the lesions, white matter changes, lacunar infarcts, strategic infarcts, cerebral microbleeds, medial temporal lobe atrophy, and global cerebral atrophy.[11-16]

Characterizing the burden, spectrum, determinants, and implications of poststroke cognitive impairments in LMICs in SSA has received little attention largely due to the perennial paucity of neurologists and mental health practitioners, although stroke burden on the continent is enormous. Among the few studies conducted in SSA among Nigerian stroke survivors, 40% have been identified with cognitive impairment without dementia and 8% have been identified with PSD 3 months after stroke onset.[11] It remains unknown whether these findings are applicable to other African populations of diverse cultural backgrounds or subjects who have survived stroke for more than 1 year. Our objective for the present study is therefore to assess the burden, predictors, and impact on a stroke-specific, health-related quality of life of VCI among a cross section of Ghanaian stroke survivors attending a neurology clinic in a tertiary Medical Center. The harmonized National Institute of Neurological Disorders and Stroke and Canadian Stroke Networks (NINDS-CSN)[9] established common standards for VCI assessments, which were used in the present study.

Methods

Study Design and Setting

This cross-sectional study was approved by the Committee on Human Research Publication and Ethics of the School of Medical Sciences, Kwame Nkrumah University of Science and Technology, and the Komfo Anokye Teaching Hospital, Kumasi, Ghana. The study was conducted at the Neurology Clinic of the Komfo Anokye Teaching Hospital, a tertiary medical center in Kumasi, Ghana. Kumasi is the second largest city in Ghana with an estimated population of 4 million inhabitants. The neurology clinic was instituted in 2011 and currently runs once a week, providing care for adults over 16 years with neurological disorders from 6 out of the 10 administrative regions of Ghana and serves an estimated population of 10 million.[17]

Study Participants—Stroke Subjects

Consecutive stroke survivors attending the neurology service at Komfo Anokye Teaching Hospital were approached for enrollment in the study after obtaining informed consent. Stroke subjects should have had stroke for at least 3 months to enable the resolution of acute poststroke delirium in accordance with Desmond et al.[18] Stroke diagnosis and primary types were confirmed using a computed tomography (CT) scan taken at the onset of stroke in 125 out of 147 stroke survivors (85%) due to the high cost of CT scans in the region, with the WHO criteria used to classify the remainder.

We excluded (1) stroke subjects under 45 years; (2) stroke survivors on sedatives; (3) those with profound aphasia without a proxy; (4) those with a significant physical illness and motor, visual, or hearing impairments that precluded paper-based neuropsychological evaluations; (5) any comorbid psychiatric or neurological illness such as schizophrenia, manic–depressive disorder, major depression, Parkinson's disease); (6) any systemic disorders capable of impairing cognition, such as chronic kidney disease and decompensated liver disease; and (7) failure to give consent or to complete the assessments. Recruitment of the study participants was performed from January 2015 to February 2016.

Study Participants—Stroke-Free Subjects

Forty-nine stroke-free controls were recruited for comparison with the neuropsychological data from stroke survivors from communities in the Kumasi Metropolitan Assembly from an ongoing epidemiological study on stroke in West Africa.[19] Stroke-free status was ascertained using a pictorial version of a locally validated 8-item Questionnaire for Verifying Stroke-Free Status.[20] Control subjects were excluded if they had a known background of dementia (*Diagnostic and Statistical Manual of Mental Disorders*—Fourth Edition [DSM IV] criteria) and psychiatric illnesses, or were unable to provide consent or to complete the evaluations required for the study. Controls were closely matched for age, gender, and educational attainment.

Evaluation of Study Subjects

We first collected demographic information including age, gender, marital, educational, and occupational status, as well as location of residence. The vascular risk factor profile was assessed for stroke survivors based on self-report, the use of relevant medications, and a review of medical records for evidence of hypertension, diabetes mellitus, dyslipidemia, atrial fibrillation, or other cardiac disorders, cigarette smoking, and alcohol use. The following criteria were used to assess the vascular risk factor status:

- The weight of study subjects was measured in kilogram using a scale with the patient standing at the anatomical position on a scale, and the height in centimeter was measured using a stadiometer with the patient standing at the anatomical position in