Stroke in Indigenous Africans, African Americans, and European Americans

Interplay of Racial and Geographic Factors

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Background and Purpose—The relative contributions of racial and geographic factors to higher risk of stroke in people of African ancestry have not been unraveled. We compared stroke type and contributions of vascular risk factors among indigenous Africans (IA), African Americans (AA), and European Americans (EA).

Methods—SIREN (Stroke Investigative Research and Educational Network) is a large multinational case–control study in West Africa—the ancestral home of 71% AA—whereas REGARDS (Reasons for Geographic and Racial Differences in Stroke) is a cohort study including AA and EA in the United States. Using harmonized assessments and standard definitions, we compared data on stroke type and established risk factors for stroke in acute stroke cases aged ≥55 years in both studies.

Results—There were 811 IA, 452 AA, and 665 EA stroke subjects, with mean age of 68.0±9.3, 73.0±8.3, and 76.0±8.3 years, respectively (P<0.0001). Hemorrhagic stroke was more frequent among IA (27%) compared with AA (8%) and EA (5.4%; P<0.001). Lacunar strokes were more prevalent in IA (47.1%), followed by AA (35.1%) and then EA (21.0%; P<0.0001). The frequency of hypertension in decreasing order was IA (92.8%), followed by AA (82.5%) and then EA (64.2%; P<0.0001) and similarly for diabetes mellitus IA (38.3%), AA (36.8%), and EA (21.0%; P<0.0001). Premorbid sedentary lifestyle was similar in AA (37.7%) and EA (34.0%) but lower frequency in IA (8.0%).

Conclusions—Environmental risk factors such as sedentary lifestyle may contribute to the higher proportion of ischemic stroke in AA compared with IA, whereas racial factors may contribute to the higher proportion of hypertension and diabetes mellitus among stroke subjects of African ancestry. **(*Stroke*. 2017;48:1169-1175. DOI: 10.1161/STROKEAHA.116.015937.)**

Key Words: case–control study ■ cohort study ■ death ■ risk factors ■ stroke

Stroke is a leading cause of death, disability, and dementia globally with 87% of the burden being borne by low- and middle-income countries.[1] The World Health Organization estimates indicate that death from stroke and disability-adjusted life years lost to stroke are ≈7 times higher in low- and middle-income countries—including much of Africa—than

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in high-income countries.[2] In sharp contrast to high-income countries, estimates from the GBD study (Global Burden of Disease) suggest that stroke incidence is rising in African countries where as a major health challenge, it is levying a heavy toll on the developing economy by affecting a relatively younger age group.[1,3,4]

For poorly understood reasons, people of African ancestry have a higher risk of stroke, earlier age of occurrence, poorer outcomes, and relatively higher percentage of strokes being hemorrhagic type than people of other ancestry.[3–5] The Ibadan-Berlin Stroke Study, which compared stroke patients in Nigeria and Germany, suggested that regional variations in the burden of stroke risk factor may account for regional differences in the proportions of stroke phenotypes.[6] Indeed, the GBD 2013 illustrated the existence of regional differences in distribution of stroke risk factors.[7] This was corroborated by the INTERSTROKE study,[8,9] which demonstrated regional differences in stroke type and risk factors but did not decipher if the regional variations in the contributions of risk factors were because of racial (including genetic) and geographical (environmental) differences.[8–10]

The relative contribution of racial and geographic factors to stroke and its risk factors among people of African ancestry (regardless of their present geographical location) is still unknown.[11,12] A rare opportunity to unravel this is provided given that 71% of African Americans (AA) are of the Niger-Kordofanian ancestry from West Africa from where they migrated several centuries ago.[13,14] Therefore, as a first step to deciphering the relative contributions of racial (including genetic) and geographic (environmental) factors for stroke in present day indigenous West Africans and AA (most of who originated from West Africa), we characterized the stroke type and risk factor profile of strokes in these populations in contrast to European Americans (EA).

Specifically, we compared characteristics and risk factors of strokes in indigenous Africans (IA) in West Africa within the SIREN (Stroke Investigative Research and Educational Network), the largest study of stroke in Africa to date,[4,11] with strokes in AA and EA within the REGARDS study (Reasons for Geographic and Racial Differences in Stroke) in the United States.[12] Our central hypothesis a priori was that the characteristics of stroke and vascular risk factors in stroke with strong racial underpinning would be similar among IA and AA, but different from that among EA. Vascular factors with dominant racial (probably genetic) underpinnings discovered may be generalizable to people of African ancestry and serve as rewarding targets for stroke prevention and other interventions in this population.

Methods

The detailed protocols of the SIREN[11] and REGARDS[12,15] studies have been published elsewhere. SIREN is a case–control study, whereas REGARDS is a population-based cohort study. A brief summary of the protocols is presented in the online-only Data Supplement. This is a comparative analysis of stroke subjects in both studies.

Data Harmonization and Risk Factor Definitions

For the purpose of this comparison and because those aged 45 to 54 were not initially recruited in the REGARDS study, we included only people aged ≥55 years in both studies.

For both studies, risk factor definitions were standardized as follows:

- Hypertension was defined as sustained systolic blood pressure (BP) ≥140 mm Hg or diastolic BP ≥90 mm Hg, history of hypertension (SIREN only), or taking antihypertensive medications before stroke.[8,9]
- Diabetes mellitus was defined based on history of diabetes mellitus, use of medications for diabetes mellitus, fasting plasma glucose levels ≥126 mg/dL (or ≥200 mg/dL if failing to fast), and HBA1c > 6.5%.
- Dyslipidemia was defined according to the recommendations of the US National Cholesterol Education Program as high fasting serum total cholesterol ≥200 mg/dL or high-density lipoprotein ≤40 mg/dL[16] or low-density lipoprotein ≥130 mg/dL or triglyceride ≥150 mg/dL or history of use of statins before stroke.
- Smoking status was defined as never, former, or current smoker. In SIREN, current smokers were classified as individuals who smoked any tobacco in the past 12 months and included those who had quit within the past year. Former smokers were defined as those who had quit greater than a year earlier. In REGARDS, current smokers were defined by a positive response to Do you smoke cigarettes now, even occasionally? Past smokers were defined as noncurrent smokers who responded positively to Have you smoked at least 100 cigarettes in your lifetime?
- Alcohol intake was categorized into never or former drinker, or current drinker.[8,17]
- In SIREN, history of cardiac disease included myocardial infarction, rheumatic valvular heart disease, prosthetic heart valve, atrial fibrillation or flutter based on self-reported history, clinical examination, review of baseline ECG and echocardiography.[8,17] In REGARDS, cardiac disease was defined by baseline ECG evidence of a myocardial infarction, self-reported physician diagnosis of myocardial infarction, or previous coronary artery bypass graft, angioplasty, or coronary stenting.
- Obesity: Both studies assessed height (m) and weight (kg); body mass index (kg/m^2) was calculated and classified as underweight (<18.5), normal (18.5–24.9), overweight (25–29.9), or obese (30+).[8,17]
- Physical activity: In SIREN, individuals were classified as sedentary if they were not involved in any form of physical exercise (including walking, cycling, or gardening) or strenuous exercise (jogging, football, and vigorous swimming) before the stroke.[8,17] In REGARDS, individuals were classified as sedentary if they responded zero to how many times per week do you exercise enough to sweat?[18] All participants were categorized into 2 groups as no exercise and at least some exercise.

Statistical Analysis

Descriptive statistics including means and SD for continuous variables and proportions for categorical variables were computed. Differences in means and proportions were assessed using Bonferroni-corrected 2-sample t tests and χ^2 tests, respectively. All statistical tests were performed using a 2-sided level of α=0. 0167 after adjustment for multiple comparisons.[19,20] Data management and analyses were performed using MS Excel and IBM SPSS Statistics for Windows, version 24.0 (IBM Corp, Armonk, NY).

Results

Demographic Characteristics of Study Participants

The present analysis of 1928 stroke subjects included 811 IA recruited in the SIREN study, 452 AA, and 665 EA participants in the REGARDS study who had a stroke event. Overall, 53% of stroke subjects were men, comprised 55.5% IA, 41.2% AA, and 58% EA with significant differences between the 2 African groups and between Africans and EAs (Table). The mean (±SD) age at onset of stroke was significantly different across the 3 groups being 68.0±9.3, 73.0±8.3, and 76.0±8.3 years among IA, AA, and EA, respectively (P<0.0001).

Stroke Types and Subtypes

Stroke was hemorrhagic in 27.0% of IA compared with 9.6% among AA and 11.8% among EA ($P<0.0001$; Figure I in the online-only Data Supplement). Among those with ischemic stroke with single pathogenic subtype information, frequencies of cardioembolic strokes decreased in order from EA (45.7%), AA (33.5%), and IA (9.7%). Conversely, small-vessel strokes increased in order from EA (21.0%), AA (35.1%), and IA (47.1%). Large-vessel strokes were more common in IA (43.1%) than in EA (25.4%) and AA (22.2%).

Risk Factors for Stroke

Hypertension was prevalent at frequencies of 92.8% and 82.5% among IA and AA compared with 64.2% among EA ($P<0.0001$). Dyslipidemia was found in >80% of subjects with no significant differences among the groups. However, mean total cholesterol, low-density lipoprotein cholesterol and high-density lipoprotein cholesterol were significantly higher among the 2 black populations compared with EA (Table). Diabetes mellitus was present in 38.3% and 36.8% of IA and AA, respectively, compared with 21.0% among EA ($P<0.0001$.) Cardiac disorders were more prevalent among EA (31.7%) compared with AA (25.0%) and IA (12.5%) and observed to increase with increasing age of subjects regardless of ethnicity with age-adjusted estimates (SE) of 29.5% (2.1), 24.2% (2.3), and 12.0% (1.2), respectively (online-only Data Supplement).

Body mass index was significantly lower in IA compared with EA and AA, whereas physical activity rates was significantly higher among IA (91.5%) compared with AA (62.3%) and EA (66.0%). Whereas only 2.2% of IA stroke subjects were current smokers, 18.3% of AA and 14.4% of EA stroke subjects were. Similarly, current alcohol consumption was lower among IA, 16.6%, compared with 36.1% and 53.8% among AA and EA, respectively (Figure II in the online-only Data Supplement).

Ischemic Stroke Risk Factor Profile

The prevalence of risk factors for ischemic strokes among the 3 groups is shown in Table III in the online-only Data Supplement. Diabetes mellitus was significantly more prevalent among IA (43.7%) and AA (38.1%) than among EA (21.4%) with ischemic strokes, respectively.

Hemorrhagic Stroke Risk Factor Profile

Age at onset of hemorrhagic strokes ascended in the order of IA older than AA older than EA. A male preponderance for hemorrhagic stroke was observed among EA (70.6%) and IA (60.7%) but not among AA (42.5%). Hypertension was present in 90% of hemorrhagic stroke subjects of African ancestry compared with 56% among EA (Table IV in the online-only Data Supplement). However, there were no notable differences in the frequencies of diabetes mellitus or dyslipidemia among the 3 groups for this stroke type.

Discussion

This study is among the first to directly contrast the characteristics of the stroke type and risk factors between indigenous and diasporan Africans and to compare these Africans to EA. We found significant racial and geographic differences in predisposition to stroke and its subtypes both between stroke subjects of African descent and also between those of African descent compared with EA. Stroke subjects of African ancestry had significantly higher prevalence of hypertension and diabetes mellitus, comparable frequencies of dyslipidemia, and lower prevalence of cardiac disorders in comparison with EA. Further racial variations were observed in alcohol consumption, cigarette smoking, and physical inactivity, being higher among EA compared with people of African ancestry.

Stroke Type

In spite of the dissimilarities in risk factor profiles between stroke subjects of African and European origins, stroke types seemed to be more strongly influenced by geographic location. The frequencies of ischemic and hemorrhagic strokes were similar among AA and EA compared with IA. However, subtle but significant differences emerged in ischemic stroke pathogenic subtypes among the 3 groups. Small-vessel (lacunar) strokes whose pathophysiology is underpinned by hypertension and diabetes mellitus were observed at high frequencies among IA and AA compared with EA. In the SLESS (South London Ethnicity and Stroke Study), small-vessel stroke was 2.6 times more common in black patients compared with whites after controlling for risk factors.[21] Most but not all previous studies have found an increased predilection of small-vessel stroke among blacks,[21–25] and epidemiological studies among black individuals in the United States and United Kingdom have reported higher frequencies of subclinical markers of small-vessel disease including small deep infarcts and white matter hyperintensities.[26–28] It is unclear whether there are ethnic differences in the impact of elevated BP on stroke risk or that genetic factors account for these differences.

Cardioembolic strokes were more frequent among EA than among African descendants probably because of older age of EA as reflected in the age-adjusted analysis conducted in the present study and the reported lower frequency of atrial fibrillation among blacks.[29] We observed a higher frequency of large-vessel disease among IA in SIREN compared with AA and EA in the REGARDS cohorts. Other studies have found a higher frequency of intracranial large-vessel disease among blacks, whereas extracranial large-vessel disease was more common among whites.[21,25]

Hemorrhagic strokes were more than twice as frequent among IA than AA and EA stroke subjects reflecting the global trends in stroke type distribution.[7,8] We observed that the mean systolic BP of IA with hemorrhagic stroke of 168 mm Hg was ≈35 and 40 mm Hg higher than that among AA and EA, respectively, clearly supporting the notion that low levels of awareness and control of BP may be a key driver of this stroke type in low- and middle-income countries. However, whereas 90% of hemorrhagic stroke subjects of African ancestry shared the commonality of hypertension as the dominant risk factor for this stroke variety, only 56% of EA had hypertension, also suggesting that biological factors may be at play here as well.

Table. Comparison of Characteristics of Stroke and Stroke Risk Factors in IA, AA, and EA

Characteristic	IA, Group A	AA, Group B	Prevalence Difference (95% CI), A vs B	*P* Value, A vs B
Age, mean±SD, y	68.0±9.3	73.0±8.3	5.0 (4.0 to 6.0)*	<0.0001
Age categories, n (%), y				
55–64	325/811 (40.1)	75/452 (16.6)	23.5 (18.7 to 28.3)	<0.0001
65–74	275/811 (33.9)	193/452 (42.7)	8.8 (3.1 to 14.4)	0.0513
>75	211/811 (26.0)	184/452 (40.7)	14.7 (9.2 to 20.1)	0.0004
Male sex, n (%)	450/811 (55.5)	186/452 (41.2)	14.3 (8.7 to 20.0)	<0.0001
Incident stroke type, n (%)†				
Ischemic	592/811 (73.0)	376/416 (90.4)	17.4 (13.2 to 21.6)	<0.0001
Hemorrhagic	219/811 (27.0)	40/416 (9.6)	17.4 (13.2 to 21.6)	<0.0001
Vascular risk factors				
Hypertension	710/765 (92.8)	372/451 (82.5)	10.3 (6.4 to 14.3)	<0.0001
Systolic BP, mean±SD, mm Hg	151.5±30.8	135.6±16.8	15.9 (13.2 to 18.6)*	<0.0001
Diastolic BP, mean±SD, mm Hg	93.1±18.3	79.1±10.2	14.0 (12.4 to 15.6)*	<0.0001
Dyslipidemia, n (%)	657/795 (82.6)	363/450 (80.7)	2.0 (−2.5 to 6.5)	1.0000
Total cholesterol, mean±SD, mmol/L	5.0±1.6	5.0±1.2	0.0 (−0.1 to 0.2)*	1.0000
LDL cholesterol, mean±SD, mmol/L	3.1±1.4	3.0±1.0	0.1 (0.0 to 0.3)*	0.0785
HDL cholesterol, mean±SD, mmol/L	1.3±0.5	1.4±0.5	0.1 (0.0 to 0.2)*	0.0005
Triglycerides, mean±SD, mmol/L	1.4±0.8	1.3±0.8	0.1 (−0.0 to 0.2)*	0.6309
Diabetes mellitus, n (%)	304/794 (38.3)	159/432 (36.8)	1.5 (−4.2 to 7.1)	1.0000
Cardiac disease, n (%)	96/767 (12.5)	111/444 (25.0)	12.5 (7.8 to 17.1)	<0.0001
BMI, mean±SD, kg/m^2	26.4±5.1	29.7±5.9	3.3 (2.7 to 3.9)*	<0.0001
BMI categories, n (%)				
Underweight	9/339 (2.7)	4/449 (0.9)	1.8 (−0.2 to 3.7)	0.2044
Normal	142/339 (41.9)	89/449 (19.8)	22.1 (15.6 to 28.5)	<0.0001
Overweight	124/339 (36.6)	171/449 (38.1)	1.5 (−5.3 to 8.3)	1.0000
Obese	64/339 (18.9)	185/449 (41.2)	22.3 (16.1 to 28.5)	<0.0001
Smoking, n (%)				
Never smoked	672/759 (88.5)	196/449 (43.7)	44.9 (39.8 to 50.0)	<0.0001
Current smoker	17/759 (2.2)	82/449 (18.3)	16.0 (12.3 to 19.7)	<0.0001
Past smoker	70/759 (9.3)	171/449 (38.0)	28.9 (23.9 to 33.8)	<0.0001
Alcohol categories, n (%)				
Never	471/763 (61.7)	169/452 (37.4)	24.3 (18.7 to 30.0)	<0.0001
Current	127/763 (16.6)	163/452 (36.1)	19.4 (14.3 to 24.6)	<0.0001
Past	165/763 (21.7)	120/452 (26.6)	4.9 (−0.1 to −9.9)	0.1527
Exercise				
None	63/744 (8.5)	165/438 (37.7)	29.2 (24.2 to 34.2)	<0.0001
At least some	681/744 (91.5)	273/438 (62.3)	29.2 (24.2 to 34.2)	<0.0001

(*Continued*)

Table. Continued

Group A+B	EA, Group C	Prevalence Difference (95% CI), (A+B) vs C	*P* Value, (A+B) vs C	Prevalence Difference (95% CI), A vs C	*P* Value, A vs C
69.8±9.3	76.0±8.3	6.2 (5.0 to 7.4)*	<0.0001	8.0 (7.1 to 8.9)*	<0.0001
402/1263 (31.8)	73/665 (11.0)	20.7 (15.3 to 26.1)	<0.0001	29.1 (25.0 to 33.2)	<0.0001
469/1263 (37.1)	226/665 (34.0)	3.1 (–3.6 to 9.7)	0.1114	0.8 (–4.8 to 4.9)	1.0000
392/1263 (31.1)	366/665 (55.0)	23.8 (17 to 30)	<0.0001	29.0 (24.2 to 33.9)	<0.0001
636/1263 (50.3)	386/665 (58.0)	7.7 (0.9 to 14.5)	0.0006	2.6 (–2.5 to 7.6)	1.0000
968/1227 (78.9)	561/629 (89.2)	10.3 (5.5 to 15.1)	<0.0001	16.2 (12.3 to 20.1)	<0.0001
259/1227 (21.1)	68/629 (11.8)	10.3 (5.5 to 15.1)	0.0308	16.2 (12.3 to 20.1)	<0.0001
1082/1216 (89.0)	424/661 (64.2)	24.8 (19.4 to 30.2)	<0.0001	28.7 (24.6 to 32.8)	<0.0001
148.8±26.1	130.2±17.0	15.4 (12.4 to 18.4)*	<0.0001	21.3 (18.8 to 23.8)*	<0.0001
87.5±15.6	75.6±9.5	12.3 (10.5 to 14.1)*	<0.0001	17.5 (16.0 to 19.0)*	<0.0001
1020/1245 (81.9)	552/651 (84.8)	2.9 (–2.4 to 8.1)	0.3232	2.2 (–1.7 to 6.0)	0.7753
5.0±1.4	4.9±1.0	0.1 (–0.0 to 0.3)*	0.0685	0.1 (–0.0 to 0.3)*	0.2373
3.1±1.2	2.8±0.9	0.3 (0.1 to 0.4)*	<0.0001	0.3 (0.2 to 0.4)*	<0.0001
1.3±0.5	1.2±0.4	0.1 (0.0 to 0.1)*	0.0005	0.0 (–0.0 to 0.1)*	0.4536
1.4±0.8	1.7±1.1	0.4 (0.2 to 0.5)*	<0.0001	0.3 (0.2 to 0.4)*	<0.0001
463/1226 (37.8)	136/648 (21.0)	16.8 (10.3 to 23.3)	<0.0001	17.3 (12.7 to 21.9)	<0.0001
207/1211 (17.1)	207/654 (31.7)	14.6 (8.7 to 20.4)	<0.0001	19.1 (14.9 to 23.4)	<0.0001
28.8±5.6	27.9±5.3	0.3 (–0.4 to 1.1)*	0.5662	1.5 (1.0 to 2.0)*	<0.0001
13/788 (1.6)	9/661 (1.4)	0.3 (–1.8 to 2.4)	1.0000	1.3 (–0.6 to 3.2)	0.5691
231/788 (29.3)	182/661 (27.5)	1.8 (–5.5 to 9.0)	1.0000	14.4 (8.1 to 20.6)	<0.0001
295/788 (37.4)	280/661 (42.4)	4.9 (–2.9 to 12.7)	0.1666	5.8 (–0.6 to 12.1)	0.2232
249/788 (31.6)	190/661 (28.7)	2.9 (–4.2 to 9.9)	0.6678	9.9 (4.4 to 15.2)	0.0012
868/1208 (71.9)	270/662 (40.8)	31.1 (24.7 to 37.4)	<0.0001	47.8 (43.4 to 52.1)	<0.0001
99/1208 (8.1)	95/662 (14.4)	6.2 (1.6 to 10.7)	0.0002	12.1 (9.2 to 15.0)	<0.0001
241/1208 (20.0)	297/662 (44.9)	24.9 (18.7 to 31.1)	<0.0001	35.6 (31.3 to 40.0)	<0.0001
640/1215 (52.6)	191/665 (28.7)	24.0 (17.3 to 30.6)	<0.0001	33.0 (28.1 to 37.9)	<0.0001
290/1215 (23.9)	358/665 (53.8)	30.0 (23.6 to 36.4)	<0.0001	37.2 (32.6 to 41.8)	<0.0001
285/1215 (23.5)	116/665 (17.4)	6.0 (0.2 to 11.8)	0.0045	4.2 (0.0 to 8.3)	0.1352
228/1182 (19.3)	220/648 (34.0)	14.7 (8.5 to 20.8)	<0.0001	25.5 (21.3 to 29.6)	<0.0001
954/1182 (80.7)	428/648 (66.0)	14.7 (8.5 to 20.8)	<0.0001	25.5 (21.3 to 29.6)	<0.0001

Significance was assessed at α=0.05/3 to adjust for multiple testing. Unadjusted *P* values are available on request. AA indicates African Americans; BMI, body mass index; BP, blood pressure; CI, confidence interval; EA, European Americans; HDL, high-density lipoprotein; IA, indigenous Africans; and LDL, low-density lipoprotein.

*Mean difference.

†Stroke type undetermined among 36 AA and 36 EA stroke subjects who were identified by death certificate.

Stroke Risk Factors

Consistent with findings from the GBD and INTERSTROKE studies,[7,8] hypertension was the most prevalent vascular risk factor identified among stroke subjects, lending itself as a prime target for public health interventions particularly among subjects of African descent. Achieving and sustaining BP control is a global challenge, particularly in low- and middle-income countries with substantial regional differences in levels of awareness and control of this most potent vascular risk factor.[30] Again, we found a substantially higher prevalence of diabetes mellitus among stroke subjects of African descent, which agrees with data from the United States, where these 2 group comparisons (black versus EA) have been performed.[21,31–33] The higher rate of physical activity in IA may account for their lower body mass index compared with AA and EA.[34] Rates of use of alcohol and cigarette smoking were significantly lower in IA compared with AA or EA suggesting an environmental effect.

A few limitations in our study are worth noting. The current analysis was restricted to stroke subjects ≥55 years of age because REGARDS initially recruited subjects ≥55 years of age (expanding to the inclusion of those 45–54 approximately a year into recruitment). It is known that strokes among blacks (particularly IA) tend to occur at younger ages hence the risk factor profile explored in the present study may not be generalizable to subjects <55 years. Because of differences in study design as a case/control study, the assessment of risk factors was performed poststroke in SIREN but was also based on reported prestroke conditions, whereas as a prospective study, the risk factor assessment was performed solely pre-stroke in REGARDS. So, for example, part of the higher BP levels in SIREN may be attributable to poststroke increases in BP (compared with the prestroke BP levels in REGARDS). In addition, data collection in REGARDS is protocol driven where each of the risk factors was systematically assessed, whereas data in SIREN were clinically driven with greater variation in the approach. Strokes were defined in REGARDS using the World Health Organization criteria, whereas in SIREN, strokes were defined using clinical criteria. As a longitudinal study, there could be changes in the risk factor status of participants between the time of assessment and the stroke event (averaging ≈4 years, with a maximum of 11 years). Nevertheless, differences occurring consistently both in IA versus EA and AA versus EA can be attributed to race and not study design or timing of assessment because the timing of assessment and study design are identical for AA and EA.

Conclusions and Implications

Race seems to play a major role in predisposition to vascular risk factors for stroke among subjects of African descent, whereas geographical location potentially influences stroke type occurrence. It is possible that the genetic ensemble of the 2 racial groups plays a greater role in predisposition to vascular risk factors for stroke, but ultimately, environmental factors modulate the expression of end-organ disease.

This finding needs to be explored further with genomic and epidemiological tools to unravel the precise genomic variants that predispose Africans to these unique vascular risk factors and quantify the environmental factors that modulate risk factor effect. Meanwhile, vascular risk factors to which people of African descent are predisposed should be targeted to control the burden of stroke in this population.

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Disclosures

None.

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