Sociodemographic Groups at Risk: Race/Ethnicity

Dawn Kleindorfer, MD

Typically, when the term “health disparity” is used, disparities in health related to or associated with race and/or ethnicity are what is meant. Disparities related to race and ethnicity are indeed the topic of this discussion, but there are many other types of health disparities that are often tightly linked to race/ethnic disparities, such as those related to sex, socioeconomic status, and region (such as the Stroke Belt), that should not be overlooked.

Why do health disparities in race/ethnic minority groups occur? There are many potential explanations, including genetic factors and common environmental exposures. There are also likely many potential important cultural differences in perceptions of health and the healthcare system that shape the behavior of inhabitants of their culture, including but not limited to social support structure, mistrust/varying expectations of the medical system, dietary differences, physical activity norms, medical compliance, fear and/or denial, and fatalism. There are many “access to care” issues for race/ethnic minorities that could potentially interfere with health, such as poverty, health literacy and numeracy, language barriers, access to transportation, and child care. Finally, the intrinsic structure of the healthcare system lends itself to health disparities. Previously, it has been shown that the majority of care for race/ethnic minorities is provided by very few providers, who are then overwhelmed and unable to provide the highest quality of care.1 Also, medical professional stereotyping or discrimination and cultural biases are likely prevalent in some areas. Overall, the Institute of Medicine report regarding racial disparity in 2003 showed that even when access to care issues were controlled for, the overall quality of care was poorer for race/ethnic minorities.2

A thorough review of all racial disparities in stroke is not possible within the focus of this short review. Therefore, this review will focus mostly on racial disparities regarding stroke in US blacks, the racial group found to be at the highest risk for stroke death compared with all other race/ethnic minorities within the United States (Figure 1).3 National statistics from death certificate data have long shown an increase in stroke mortality for blacks,4 but until recently, it was unclear whether this was related to higher stroke incidence or a higher fatality rate after stroke. It has now been shown that this higher stroke mortality exists because blacks have a higher stroke incidence compared with whites, although the case-fatality rate is similar between the 2 races.5 Within the Greater Cincinnati/Northern Kentucky population of 1.3 million, a large epidemiology study of stroke has been ongoing since 1988 that captures all hospitalized cases of stroke, along with a sampling of out-of-hospital events every 5 years. This allows the calculation of standardized stroke incidence rates for blacks and whites. Overall, blacks had nearly double the incidence of stroke (including ischemic and hemorrhagic subtypes) when compared with whites (Table 1). Interestingly, there was a striking association with age, in that blacks younger than 55 years seem to be at particularly high risk (2 to 5 times higher risk than similarly aged whites), but by the time elderly ages are achieved, the racial disparity is significantly attenuated. Unfortunately, this racial disparity in stroke incidence does not appear to be changing over time, as there was still a significant disparity in 1999 as there was in 1994.6

Socioeconomic disparity was mentioned earlier as a possible contributor to race/ethnic disparities; therefore, this was explored within the same Greater Cincinnati population as a possible explanation for the increased stroke incidence among blacks. With the use of aggregate measures of socioeconomic status (percentage of citizens within a US census tract living below the poverty level), incidence rates for whites and blacks were calculated as stratified by poverty status of the community of residence, and the contribution of socioeconomic status to the excess

Figure 1. Relative risk of stroke mortality by age and ethnicity, United States, 1997.
risk of blacks was obtained (Figure 2).\textsuperscript{7} Based on these assumptions, community socioeconomic status explained 39% of the excess stroke incidence risk in blacks, leaving 61% unaccounted for. Caution should be used in interpreting these results, however, as many investigators question the validity of typical socioeconomic indicators when comparing across racial groups (eg, is a high school diploma in 2 different parts of town equivalent? Does income truly reflect the stress and/or danger of a person’s occupation?).

Risk factor prevalence and control among blacks has long been thought to contribute to racial disparities in stroke. In general, hypertension is more prevalent, more difficult to control, and less likely to be diagnosed among blacks than whites.\textsuperscript{8} Blacks also tend to have an earlier age of onset of hypertension,\textsuperscript{9} and responses to medications are different between blacks and whites.\textsuperscript{10} Similarly, diabetes is more prevalent, and rates of diabetes are increasing faster among blacks than whites,\textsuperscript{11} in part likely due to faster increases in obesity rates among blacks.\textsuperscript{12} Sacco et al\textsuperscript{13} investigated the importance of different risk factors within a triethnic community in Northern Manhattan and found that hypertension and diabetes were the most important for blacks and Hispanics, whereas atrial fibrillation and coronary artery disease were relatively more important for whites (Table 2). This emphasizes that racial disparities in stroke are likely due in part to racial disparities in other diseases, and collaborations with investigators studying racial disparities in diseases such as hypertension and diabetes are especially important.

Results regarding racial disparities in stroke acute care and preventive treatments have been mixed. Some studies have found a consistent racial disparity in the use of recombinant tissue-type plasminogen activator for acute ischemic stroke (ie, blacks receive it less often than whites),\textsuperscript{14} whereas others have found no such association.\textsuperscript{15} Most studies of antiplatelet medication use after ischemic stroke have not found a difference by race,\textsuperscript{16} although in some studies, warfarin was used slightly less in blacks.\textsuperscript{17} A recent study found that blacks were less likely to receive and use smoking cessation interventions, even after controlling for socioeconomic factors.\textsuperscript{18} Although nationwide studies have found that blacks in general receive less medical diagnostic testing,\textsuperscript{19} another large study within the Veterans Administration medical system of stroke-specific diagnostic testing did not find racial disparities, except for in the use of cerebral angiography.\textsuperscript{20} Blacks have been found to be less frequently cared for by a neurologist,\textsuperscript{21} which some studies have found improves outcomes, although this finding is controversial.\textsuperscript{22} There does not seem to be a difference in the access to rehabilitative services, although disposition to rehabilitation ap-

### Table 1. Race-Specific Annual Incidence of First-Ever Stroke per 100 000 Population in 1993–1994 vs 1999: Inpatient Ascertainment Only

<table>
<thead>
<tr>
<th></th>
<th>1993–1994 (95% CI) All Black White</th>
<th>1999 (95% CI) All Black White</th>
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</thead>
<tbody>
<tr>
<td>All stroke subtypes</td>
<td>158 (151–165) 238 (212–264) 148 (141–156)</td>
<td>158 (151–165) 226 (202–250) 148 (141–156)</td>
</tr>
<tr>
<td>Ischemic</td>
<td>139 (132–146) 199 (176–223) 132 (125–139)</td>
<td>138 (131–144) 194 (171–216) 130 (123–137)</td>
</tr>
<tr>
<td>Subarachnoid hemorrhage</td>
<td>7 (5–8) 10 (5–15) 6 (5–8)</td>
<td>7 (6–9) 11 (6–16) 7 (5–8)</td>
</tr>
</tbody>
</table>

Age- and sex-adjusted to the 2000 US Census.

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Figure 2. Regional incidence rates per 100 000, stratified by race. Rates are adjusted for age and sex.
A discussion of racial disparity as it specifically relates to hemorrhagic stroke subtypes is warranted, although the data are less robust than those for ischemic stroke. In general, blacks have a higher incidence of intracerebral hemorrhage when compared with whites, as in ischemic stroke. In addition, there is a racial difference in the typical location of hemorrhage, a factor well known to be correlated with outcome: blacks are more likely to have deep or brainstem hemmorhages, whereas whites are more likely to have lobar hemmorhages. Owing to the lower incidence rates of subarachnoid hemorrhage, estimates of racial disparity in this subtype should be interpreted cautiously.

Knowledge of stroke warning signs and risk factors may be an important contributor to racial disparities that is often overlooked. Previous surveys of public knowledge have found that those at the highest risk, especially minority populations and the elderly, have the least stroke knowledge and lower rates of awareness of stroke risk factors, such as hypertension. In addition to knowledge of the warning signs and risk factors, knowledge of potential treatments and the understanding that stroke is an emergency also differ among races, an important consideration for application of acute treatments in the future, which may lead to racial disparities in treatments as well.

This extremely brief overview of racial disparity in stroke highlights the enormity of the problem that clearly needs to be addressed. However, if we are to attempt to intervene to address these disparities, the first question becomes at what level? Nationally? Within the local community? Or on an individual level? Of course, individual level interventions would be ideal; personalized interactions have the best opportunity for appropriate and relevant changes to be made to affect future risk among minority patients. However, individual interactions may not address larger problems that are beyond the ability of a single practitioner to address, and it is usually not possible to reach every person at risk within a community on an individual level. National level interventions are often quite difficult, because to make the intervention broad enough for the nation often means that it is directed and relevant to very few. Therefore, community-based research and intervention is likely the route that will allow interventions to be the most relevant and directed and yet still reach larger numbers of people at risk. A recent example of this community-based approach is the use of beauty salons and barber shops in the black community as a venue for distributing health information. By using locally known and trusted community champions and working with the community to produce self-sustaining strategies, community-based interventions will likely be the best target for reducing local race/ethnic disparities in health in the future.

In addition, large epidemiologic studies are crucial for measuring our successes (or failures) in addressing racial disparities in stroke. Interventions done to address racial disparities may be done on a community level, as suggested, but often lack any standard against which to measure success or areas that still need improvement. The ongoing REGARDS study, with 30 000 enrolled participants, will provide desperately needed data regarding racial and geographic disparities in the development of stroke and will complement other population-based studies that follow changes over time in stroke disparities.

Acknowledgment
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Disclosures
None.

References

Table 2. EFs and 95% CIs for Stroke Risk Factors Among Whites, Blacks, and Hispanics for NOMASS Participants

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Whites</th>
<th>Blacks</th>
<th>Hispanics</th>
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<tbody>
<tr>
<td>Hypertension</td>
<td>0.25 (0.01 to 0.45)</td>
<td>0.37 (0.16 to 0.57)</td>
<td>0.32 (0.15 to 0.43)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>0.00 (0.00 to 0.10)</td>
<td>0.14 (0.04 to 0.25)</td>
<td>0.10 (0.04 to 0.19)</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>0.20 (0.06 to 0.39)</td>
<td>0.03 (0.02 to 0.08)</td>
<td>0.02 (0.00 to 0.04)</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>0.16 (0.008 to 0.35)</td>
<td>0.02 (0.06 to 0.13)</td>
<td>0.06 (0.001 to 0.14)</td>
</tr>
<tr>
<td>Physical activity</td>
<td>0.18 (0.07 to 0.36)</td>
<td>0.29 (0.19 to 0.44)</td>
<td>0.38 (0.24 to 0.44)</td>
</tr>
</tbody>
</table>

*Significantly different EF attributed to atrial fibrillation in whites compared with blacks and Hispanics.

pears to be =3 days later for blacks than whites. Functional outcome months after ischemic stroke has been shown to be consistently worse for blacks than whites. Functional outcome months after ischemic stroke has been shown to be consistently worse for blacks than whites.

**Key Words:** risk factors ■ race/ethnicity