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Health and Socioeconomic Inequities as Contributors to Brain Health

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Population aging will lead to a dramatic increase in dementia prevalence across the world. Dementia is the most costly illness in the United States, with an estimated yearly expenditure around $200 billion.[1] Differences in rates of dementia among diverse populations have garnered recent attention, and it is now accepted that health and socioeconomic disparities are stronger determinants than race or cultural identifiers of the differences in dementia prevalence.[2] While the leading risk factors for dementia, including age and genetic risk, are not yet modifiable, a reasonable proportion of risks are attributable to conditions that can be changed across an individual's life span.[3] Dementia prevention depends on actions that promote brain health. Access toquality education, healthy diet, and the treatment of conditions (such as diabetes, hypertension, and smoking) that are major risk factors for developing dementia are not equally available across different countries or even between different regions of the same country. Therefore, health and socioeconomic disparities are contributors to brain health.

Dementia is more prevalent and occurs 10 years earlier in low- and middle-income countries than in high-income countries,[4] an example of disparities in socioeconomic conditions across countries contributing to brain health. It is believed that this difference is a consequence of a higher vulnerability to dementia of the population living in low- and middle-income countries because of conditions associated with low socioeconomic status, such as barriers in access to formal education and leisure activities, poor nutrition, poor living conditions, and stress, that can negatively affect brain health. Low educational attainment, for instance, is associated with higher risk of developing symptoms of dementia and earlier symptom onset by up to 8 years.[5] In turn, lower educational attainment has been

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linked to poor diabetes control and worse cognitive performance in the context of cerebrovascular lesions. Low socioeconomic status in childhood is associated with smaller hippocampal volumes, a higher burden of cerebrovascular lesions,[6] and a higher prevalence of smoking and obesity in adulthood.

Further examples of socioeconomic conditions contributing to brain health include access to quality diet, protection against head injuries, and exposure to stressful situations. Consuminga healthy diet, for instance, is implicated in preserving cognition.[7] A healthy diet, rich in fruits, vegetables, whole grains, fish, and nuts, is not easily accessible for people from a low socioeconomic background because of its expense. Processed foods high in sugar and saturated fats are cheaper and more accessible. Head trauma is also linked to dementia risk. Such injuries can be prevented with use of helmets that are not widely available globally or equally enforced by governments. Posttraumatic stress disorder, a consequence of war, displacement, extreme poverty, and domestic and sexual violence, has also been associated with a higher risk of cognitive impairment.[8]

Low socioeconomic status explains a substantial portion of the racial/ethnic and sex differences reported in dementia rates.[2] In the United States, the highest dementia incidence is found among groups self-identifyingas African American or Native American, while an intermediate risk is seen among groups of Latino American groups compared with non-Hispanic groups.[9] Accelerated rates of cognitive decline are seen among African American individuals compared with older non-Hispanic white individuals. Yet, statistical modelsthat adequately adjust for the social determinants of health find minimal if any influence of race/ethnicity alone.[2]

A Pathway to Improve Brain Health Through Addressing Social Disparities

The prevalence and incidence of dementia is reported to be declining in high-income countries, probably owing to improved living conditions, access to health care, and increasing educational attainment.[10] In contrast, the global prevalence of dementia is expected to increase over the next decades, with the steepest curves ascending in the low- and middle-income countries, where life expectancy is increasing rapidly and inequity is common. To diminish the effect of health and socioeconomic disparities on disproportional rates of dementia, key actions are needed to effectively address inequity.

A first step is to increase funding for research in the area of dementia prevention. In recent years, increased funding and augmented efforts dedicated to dementia research led to important advances in understanding the mechanisms, pathophysiology, and genetics of multiple dementia causes. Action is needed to also emphasize preventive actions throughout the lifetime and to encourage research needed to build a stronger scientific evidence base to address inequities later in life and minimize the effects of disparities not adequately addressed during childhood.

Second, policies developed to address dementia should address the socioeconomic and health inequity contributions to the disproportional risk of dementia. Dementia plans must prioritize actions to reduce inequities in prevention and care. Guaranteed access to early and

accurate diagnosis, medications, and equity in the actions needed to diminish caregiver psychological and financial burden must have high priority. Nonprofit organizations such as Alzheimer's Disease International and the Alzheimer's Association have worked closely with stakeholders in many countries to implement dementia plans. Those organizations also play an important role by publishing comprehensive global dementia reports, supporting patients and caregivers, and funding training programs and research focused on the role of prevention and socioeconomic disparities in dementia.

Recommendations on the use of biomarkers in dementia, especially in clinical settings, should reflect the availability of these tools in regions most affected by disease. While advances in biomarker research, mainly for defining Alzheimer disease, have changed the field of dementia research and care, they are inaccessible in many regions of the world. Overstating the importance of costly biomarkers to define neurodegenerative diseases fortifies inequity and propagates stigma for regions experiencing the greatest effects of dementia.

Awareness of socioeconomic disparities in the disproportional risk for dementia is critically important among all levels of society. Clarity is undermined by the pervasive demand from funders to report racial/ethnic statistics on enrollment into studies, even though the wealth of evidence points to socioeconomic disparities as more important factors than race/ethnicity. Individuals involved in the delivery of health care, including primary care physicians, neurologists, psychiatrists, geriatricians, nurse practitioners, policy makers, patient advocacy groups, and other stakeholders, must advocate to reduce inequities in a path toward efficiently tackling the challenges associated with dementia in our society.

Creating programs to train a wide range of professionals to advocate for addressing inequities in brain health. To reduce the scale and effects of dementia is a global challenge that can be addressed by training programs that focus on a diverse range of professions beyond clinicians, involving broad sectors of society. One such program, the Global Brain Health Institute, was recently established in 2015 with 2 founding sites at the University of California, San Francisco, and Trinity College Dublin (Ireland). Fellows come from diverse professional backgrounds, including health sciences, social science, journalism, and the arts. While the fellows are characterized by their diversity in origin, expertise, and research focus, all share a novel values-based approach concentrated on Global Brain Health Institute core values of authenticity, fairness, openness, respect, courage and empathy.

All the sectors of society should be the proposed actors of the suggested actions, not only the government and health care professionals. An interprofessional approach to the global opportunities to augment brain health should be amplified focusing on better understanding of the health disparities and addressing inequities that contribute to brain health at an individual and societal level.

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