Social Determinants of Health and Dementia Risk:

A Summary of the Science and Public Health Impact

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DEMENTIA RISK REDUCTION

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The social determinants of health (SDOH) — the conditions in the environment where people are born, live, learn, work, play, worship and age — are a pivotal component of wellbeing and healthy aging. SDOH affect all aspects of life and health, including the risk of cognitive decline and dementia.

In 2020, the Centers for Disease Control and Prevention (CDC) selected the Alzheimer's Association® as the BOLD Public Health Center of Excellence on Dementia Risk Reduction (Center). The Center collates the scientific evidence supporting dementia risk reduction strategies with a focus on supporting state, local, tribal, and territorial public health agencies as they work to address risk factors for dementia across their communities. A key element of this work includes translation of the latest research on the risk factors for dementia, including SDOH, into actionable tools and resources for these public health agencies.

In 2021, the Center partnered with the Wake Forest School of Medicine to convene a panel of nationally and internationally renowned scientists with expertise in specific areas of dementia and reducing the risk of developing cognitive impairment. The panel's charge was to review, evaluate, and synthesize the currently available knowledge on reducing the risk or delaying the onset of cognitive decline and dementia. Based on the panel's review, the Center developed a series of scientific summaries on the modifiable risk factors for dementia including cardiovascular health, physical activity, diabetes and obesity, traumatic brain injury, tobacco and alcohol, diet and nutrition, sleep, sensory impairment, and social engagement. These summaries have been a useful resource for public health agencies as they develop initiatives to address dementia risk in their communities.

In 2022, the Center took a similar approach to reviewing the evidence on SDOH and their relationship to dementia risk. Again, the Wake Forest School of Medicine led a review, alongside a group of dementia and SDOH expert researchers, of the scientific evidence regarding SDOH and dementia risk and also held a workshop at the 2022 Alzheimer's Association International Conference® (AAIC®) on the topic. Based on this review, the following SDOH were identified, based on the level of research support and strength of evidence, as areas important for public health action: education, economics, food insecurity, racism, discrimination, and inequity, and environment.

The following summaries detail the current state of the science on the impact that SDOH have on dementia risk, as well as the implications of this area on public and community health agencies.

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Social Determinants of Health and Dementia Risk: Economics

What Is Already Known

With Alzheimer's disease and other dementias, the most commonly and traditionally researched modifiable risk factors are at the individual level, such as physical activity and cardiovascular conditions. However, many well accepted social theory models tell us that individual level factors are commonly strongly influenced or sometimes wholly driven by contextual level factors outside of a person's control, such as neighborhood socioeconomic disadvantage. Contextual level factors are also often reflective of structural inequities. Contextual factors can influence a person's ability to access community-level resources that could protect against negative health outcomes. Given this important role, contextual level factors are a growing focus area of dementia research.

Background and Evidence Base

Individual Level Socioeconomic Disadvantage as a Risk Factor

Multiple cohort studies have suggested strong linkage between individual-level poverty and dementia incidence. The English Longitudinal Study of Ageing (ELSA) and the Chinese Longitudinal Healthy Longevity Survey are two of the largest, both reporting increased dementia incidence among individuals in the lowest wealth bracket, independent of other factors. The association between poverty and dementia has been shown in several U.S. studies as well.

Neighborhood as a Contextual Factor

An example of an important contextual factor is one's neighborhood. The neighborhood in which a person lives typically reflects his or her individual-level socioeconomic status. Yet, the neighborhood context itself has been found to influence health outcomes, including dementia risk, over and above these individual level factors.

The Moving to Opportunity study examined the impact of a 1990s policy that allowed applicants for public housing assistance living in one of five urban areas to enter a lottery system, whereby some applicants received housing vouchers to move into wealthier neighborhoods while still receiving assistance. The researchers found that individual-level socioeconomic status did not change regardless of where a family lived. However, health outcomes (such as risk for cardiovascular disease and obesity) markedly improved for families living in the wealthier areas. Thus, although individual-level factors did not change, moving to a less disadvantaged area resulted in an improvement in health. This finding has been replicated in several other studies.

The neighborhood context is, and continues to be, affected by structural inequities such as the practice of redlining, in which until the 1960s, governments and financial institutions coded neighborhoods based on their perceived investment risk. Areas that were deemed at highest risk were outlined in red, and people living in those "redlined" areas were routinely denied financial and other services, thus creating barriers to investment in their homes, communities, and businesses. The people living in these areas were very often disproportionately affected based on their race, ethnicity, and religion. The legacies of such practices continue to reverberate in the present day and can be seen in the regional distribution of modern metrics of neighborhood disadvantage.

Neighborhood Level Socioeconomic Disadvantage as a Risk Factor

Consistent with findings in the Moving to Opportunity study, there is a growing body of literature linking contextual-level economic disadvantage to brain health, independent of individual-level socioeconomic status. Studies show living in a highly disadvantaged neighborhood affects brain development in children as well as midlife brain health. An Australian study reported that memory scores decreased more quickly with age in individuals living in more disadvantaged areas compared with those living in less disadvantaged areas, even after controlling for race and education. It also found that memory scores were uniformly lower in individuals living in more disadvantaged areas across all educational levels.

A 10-year longitudinal study of cognitively unimpaired adults in the United States showed that living in the most highly disadvantaged neighborhoods was associated with accelerated degeneration (cortical thinning) in regions of the brain affected by Alzheimer's disease and more rapid cognitive decline. And, in a cross-sectional study, individuals living in the most disadvantaged areas had lower total brain and hippocampal volumes. The

differences in total brain volume were mediated by cardiovascular disease risk factors, while the differences in hippocampal volume were not.

The association between neighborhood-level economic disadvantage and cognitive impairment is also supported by findings from postmortem studies. For example, brains from 453 deceased individuals from two Alzheimer's Disease Research Center brain banks and autopsy reports were examined for neuropathological features. When the decedent's residential address at death was geocoded, it was found that living in the most disadvantaged neighborhood decile was associated with increased odds and severity of Alzheimer's disease neuropathology.

Implications for Public Health

Addressing economic disparities requires a multi-component, collaborative model. Recently, a number of new programs and tools have been introduced that may support addressing economic disparities across communities.

The Neighborhood Atlas is an open-access tool that allows a user to determine the level of economic deprivation for any neighborhood in the United States. It has been used to inform strategies to mitigate disparities and deploy interventions that address economic disadvantage.

The Centers for Disease Control and Prevention's Replicating Effectiveness Programs Implementation Model is a useful tool for implementing a program that was effective in one group into a new group. This model helps ensure that a program to address disparities is appropriately adapted to the group being served.

State and local governments and community-based organizations also provide various health protecting resources that help address socioeconomic disparities. Examples include community health centers that may deliver free or reduced health care and preventive health services to the surrounding community, and housing assistance programs that offer financial aid and support services to assist families obtain safe and dignified housing.

Discussion

Residing in a highly disadvantaged neighborhood has been linked to dozens of different health outcomes. Findings related to dementia risk include that living in economically disadvantaged neighborhoods is associated with early-age brain development, epigenetic age acceleration, cognitive function overall and Alzheimer's disease pathology.

Social Determinants of Health and Dementia Risk: Education

What Is Already Known

A variety of facets of an individual's health, well-being, and life have been linked to an individual's education, including income, employment, socioeconomic status, housing, prevalence of certain health conditions, and access to health care. Aspects of education as a social determinant of health include the level of educational attainment, the quality of education received, and literacy.

Background and Evidence Base

Years of Formal Education

Studies have long demonstrated that people with more years of formal education – years of schooling in a classroom-based setting taught by professionally trained teachers – are at lower risk for Alzheimer's and other dementias than those with fewer years of formal education. It is important to note that there is no universal, standard definition of low education, meaning there may be inconsistency in definition and measure of education across many of these studies evaluating education and dementia risk. A systematic review published in 2011 found that a majority of the 88 studies examined reported significant effects of lower education on risk for dementia. A meta-analysis concluded that compared with a higher level of education, lower education increases the relative risk of dementia (1.59), especially Alzheimer's dementia (1.80).

An analysis of data from the Harmonized Cognitive Assessment Protocol, a subset of the nationally-representative Health and Retirement Study (HRS), found that each additional year of education was associated with a decreased risk of dementia and concluded that those with lower education bear a disproportionate burden of dementia (along with Black and Hispanic adults). Even among those with a higher genetic risk of developing Alzheimer's disease, higher levels of education decreased the risk.

The benefits of educational attainment on risk for dementia can also be seen at the population level. In 1947, the United Kingdom increased mandatory schooling from age 14 to age 15. A study of the British population showed that the population cohort affected by the policy change (an additional year of mandatory schooling) had less memory decline and better executive function as they aged compared with those not subject to the policy change. Similarly, in the United States, using data from White participants in the HRS born between 1900 and 1947 who did not attend college, researchers found that populations that were subject to increases in state compulsory schooling laws – and thus were required to attend school for longer – had greater improvements in memory and overall cognition in older age, even after adjusting for sex, birth year, state of birth, and state characteristics. Using a more diverse population from the Washington Heights Inwood Columbia Aging Project (WHICAP), study participants born after 1920 – who had more exposure and access to education than those born before 1920 – were found to have had less memory decline as they aged.

In fact, large improvements in educational attainment (high school graduation rates and college attendance), particularly among women, are frequently cited as one possible reason for a decline in the rates of dementia incidence and prevalence in certain population cohorts since the 1970s.

In the WHICAP study, the difference between those born before and after 1920 was particularly evident among Black Americans. At the same time, however, evidence has also shown that years of education may not have the same impact on risk for developing dementia across all populations. For example, the WHICAP data also show that White participants saw greater benefits to indicators of brain integrity with more years of formal education than Black and Hispanic Americans.

Educational Quality

This possible discrepancy in the effect of years of formal education on dementia risk between different racial and ethnic groups has led many to suggest that another key factor may be the quality of education an individual receives.

Project Talent – a large, nationally-representative cohort study – found that students who attended higher quality high schools, particularly schools with a higher number of teachers with graduate training, had greater cognitive abilities nearly six decades later. The study noted that Black students disproportionately attended lower-quality schools, thus potentially explaining at least

some of the difference in education as a protective factor against dementia.

Why Education May Be Protective

Many researchers believe that formal education is protective against Alzheimer's and other dementias not because it prevents the development of pathological brain changes but through a process known as "cognitive reserve." Under this theory, formal education builds the brain's ability to make flexible and efficient use of cognitive networks that allow an individual to continue to carry out cognitive tasks notwithstanding pathological changes to the brain. Recent research that has incorporated technological advances to measure Alzheimer's disease biomarkers suggests that education levels do not have an effect on the development of Alzheimer's brain changes but rather that formal education may help sustain cognitive function in mid- and life-life and delay the development of symptoms.

Literacy

Literacy is also associated with later life cognition. Among older adults in WHICAP who had fewer than five years of formal schooling, those who were illiterate were significantly more likely to have dementia and develop dementia than those who were literate. It did not, however, affect the rate of cognitive decline.

Implications for Public Health

Drop-out prevention programs and initiatives to increase accessibility and affordability of post-secondary education can help individuals attain more years of formal education. Addressing the quality of education – equalizing educational opportunities – is more difficult and requires some re-thinking. Most public schools remain primarily funded by local property taxes, which means the quality of the years of education received are likely linked to local socioeconomic conditions. And while state and federal funding or other programs look to diminish these disparities, they may be tied to expectations that schools in disadvantaged neighborhoods implement programs that were successful in entirely different contexts.

Discussion

The evidence on education as a protective factor for dementia is robust. It is also complicated. Having fewer years of formal education is associated with lower socioeconomic status (SES), which in turn has many effects on a person's health that may be relevant to dementia risk. Lower SES is associated with less physical activity, a higher risk of diabetes, a greater prevalence of hypertension, and being more likely to smoke – all of which are risk factors for cognitive decline and possibly dementia. Lower SES may decrease one's access to, and ability to afford, heart-healthy foods that support brain health; decrease a person's ability to afford health care or medical treatments, such as treatments for cardiovascular risk factors that are closely linked to brain health; and increase the likelihood that an individual lives in a neighborhood with greater exposure to toxic substances that may affect brain health such as air pollution. In addition, higher levels of education have been linked to stronger social networks, which can increase access to information about health-protecting resources.

At the end of the day, fewer years of formal education likely plays both a direct and indirect role in dementia risk: directly as an independent risk factor for dementia; and indirectly by influencing a person's socioeconomic status, which in turn is associated with other risk factors for cognitive decline and dementia. Educational attainment, the quality of education, and SES all reflect inequities in how individuals and populations are treated and have been treated over time.

Social Determinants of Health and Dementia Risk: The Environment

What Is Already Known

Theoretical frameworks and health disparities models have been used to study intersections between the environment and brain health, particularly with aging. Recently, these models have begun to view the effects of the environment on an individual as multifactorial – from both episodic exposure to cumulative exposure over the life course.

Background and Evidence Base

The environment encompasses both built and natural elements. The built environment includes population density, green spaces, public resources (such as community centers and parks), food and nutrition options, transportation options, pollutants, and community cohesion. Features of the natural environment include all things naturally occurring on Earth, including ecosystems, all living species, climate, weather, and natural resources. The different ways in which populations interact with the environment can produce both positive and negative outcomes, including with respect to cognitive decline and dementia.

There is growing evidence that aspects of the environment may increase risk of developing dementia, and may particularly increase risk for disproportionately affected populations. However, it is important to remember that the environment affects several other factors that, in turn, may affect dementia risk. For example, the environment affects socioeconomic factors, such as education, job status, family/social support, income, and community safety. The environment is also related to individual health behaviors, such as tobacco use, diet and exercise, and alcohol use – meaning it could have a bigger impact on dementia risk than the direct effect.

Air Pollution: Outdoor

Several systematic reviews have examined the association between outside pollution (i.e., noise and air) and the risk for Alzheimer's disease and other dementias. The most reported relationship is an association between cognitive decline and particulate matter 2.5, with less clear findings for nitrous oxide, noise pollution, and ozone. The hypothesis to explain the mechanism underlying this relationship is that inhalation of gas particles catalyzes an inflammatory response, followed by microglial activation, which increases the productivity of reactive oxygen species, ultimately resulting in accumulation of amyloid deposition in the brain.

In a study of exposure to primary and secondary sources of particulate matter by race, ethnicity, and residential location (i.e., urban and rural), researchers found that, compared with White Americans, people of color were disproportionately exposed to pollutants and from a wider variety of sources, including industry, utility companies, construction activities, and living close to a highway. This relationship was the same for both rural and urban areas. These findings highlight the systemic issue of environmental racism, a concept developed in the 1980s that describes the disproportionate burden that environmental hazards, such as air pollutants, have placed on communities that are historically underserved. Redlining, zoning regulations, industrial and corporate development, and other policies and practices disproportionately expose these communities to pollutants, which may place them at higher risk for dementia.

Air Pollution: Indoor

According to data from the World Health Organization, 2.6 billion people worldwide use heating or cooking sources (e.g. open fires, simple stoves) that cause indoor pollution due to a poor fuel source such as biowaste or kerosene. There are about 4 million deaths each year related to these heating or cooking sources, with most causes of death being respiratory, cerebrovascular, or cardiovascular in nature. The majority of the people exposed to the byproducts of these fuel sources are women and children, who also comprise the majority of the deaths. Conditions associated with poor indoor air quality include allergies, asthma, and lung cancer. The relationship of these exposures to the development of dementia remains uncertain.

Green Space

Emerging studies have examined the relationship between green space and brain health. Using data from the Nurses' Health Study II, researchers found that increased residential green space was associated with better performance on processing speed and attention tasks as well as on better overall cognition, equating to

being about 1.2 years younger, cognitively, than study participants who did not live near residential green space. This relationship remained after adjusting for levels of air pollution, depression, and physical activity.

Neighborhoods

Several studies have examined the association between brain health and cognitive decline and neighborhood cohesion, density, and resources. Research has shown that those who live in medium to high density communities perform better on cognitive measures than those who live in rural areas, likely due to differences in educational attainment, prevalence of chronic disease, access to health care, and income.

Increasing availability and accessibility of various neighborhood resources including recreational centers, walking paths, and parks has also been linked to higher overall cognitive functioning.

Neighborhood social cohesion and perceived quality may also affect cognitive functioning. One study found that increased physical disorder of a neighborhood and decreased social cohesion is associated with poorer cognitive functioning. Another study indicated that adults who reported greater social cohesion, despite living in a more violent neighborhood, had higher cognitive functioning.

Several studies have also highlighted the association between neighborhoods and an individual's sleep quality, which is associated with risk for dementia. A review of such studies concluded that neighborhood factors such as high environmental noise, lack of social cohesion, and inability to trust one's neighbors were associated with negative sleep outcomes.

Implications for Public Health

The built and natural environment may affect not only cognitive functioning but also health behaviors including diet and exercise, as well as socioeconomic factors such as education, job status, and community safety, making it an important priority area for public health. Efforts to improve the environment, including promoting the use of renewable energy sources, developing more green spaces and walking paths, supporting the expansion of public transit, and planting more trees, may help to improve later life cognition. Additionally, promoting policy changes that address and mitigate the long-standing effects of redlining and other discriminatory practices can help combat environmental racism.

Discussion

The environment in which a person lives may affect dementia risk both directly and indirectly by increasing other risk factors for dementia. An emerging and important area of study is improving the understanding of the contribution of environmental risk factors to dementia risk and how these risk factors differentially affect subgroups of persons at risk for dementia, especially persons from poor and underrepresented communities.

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Social Determinants of Health and Dementia Risk: Food Insecurity

What Is Already Known

Access to nutritious foods that support healthy eating patterns is a key component of overall health and well-being. However, millions of people across the United States face barriers that prevent them from obtaining these essential foods. In 2021, a report from an interagency workgroup convened by the National Institutes of Health noted the urgent need for research on identifying evidence-based solutions and actions to reduce nutrition disparities.

Food insecurity typically does not exist in isolation; people who are food-insecure generally experience multiple overlapping issues, such as lack of affordable housing, social isolation, economic disadvantage, inequities in the built environment, limited medical advantages and other barriers to promoting cognitive health.

Background and Evidence Base

What Is Food Insecurity?

The definition of food insecurity in the United States is sometimes limited to financial access to food, or food affordability. However, food insecurity is broader than that. People often make food choices on the basis of what is available to them, and there are documented disparities in the availability of healthier foods. These disparities result from issues such as distance to supermarkets and transportation to them, the existence of "food deserts" (i.e., areas where high-quality food is difficult to access), and the prevalence of "food swamps" (i.e., areas where fast food and convenience stores are more prevalent than grocery stores or restaurants with healthier options). For many, there is a stigma associated with participation in food assistance programs, which would help improve affordability of healthy foods. Additionally, programs that address food insecurity tend to focus on quantity, not quality, leading to increased consumption of inexpensive, over-processed foods.

Possible mechanisms linking food insecurity to adverse health outcomes include nutritional pathways, psychological pathways (such as added stress from being food-insecure), behavioral trade-offs (e.g., spending money on fresh produce and unprocessed nutrient dense foods may result in less money to spend on medications, gym memberships, and social engagement), and prevention/management of chronic diseases. Additionally, an individual with food insecurity may have time constraints, such as from working multiple jobs and single parenting, that limit the time to prepare more nutritious home cooked meals using fresh foods or to travel from a food desert to a grocery store.

Prevalence of Food Insecurity

Multiple surveys have documented the prevalence of food insecurity in the United States. In 2020, an estimated 1 in 8 Americans experienced food insecurity, which the U.S. Department of Agriculture (USDA) defines as a lack of consistent access to food that fosters an active, healthy lifestyle. Surveillance data from the USDA show that food insecurity is higher among economically disadvantaged households, many of whom are Black and Hispanic. Food insecurity among Black Americans 50 years or older has increased dramatically in recent years while remaining largely unchanged for older adults in other racial and ethnic groups.

Although the COVID-19 pandemic exacerbated food insecurity and heightened awareness of this issue, the rate of food insecurity in the United States has been greater than 10% since the 1980s, suggesting that there are underlying structural and systemic causes, including a fragile food system and disparities that foster food-insecurity year after year.

Food Insecurity and Risk for Dementia

Diet has been found in several studies to be related to Alzheimer's disease risk and is therefore a potentially modifiable risk factor. Higher intake of omega-3 fatty acids, antioxidant nutrients (e.g., vitamin E, carotenoids, flavonoids), and B vitamins has been associated with a reduced risk for Alzheimer's disease. In addition, different food groups, including vegetables, leafy greens, berries, whole grain, and fish, are associated with cognition, slower cognitive decline, and Alzheimer's dementia risk. The Mediterranean and Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) diets are associated with reduced Alzheimer's disease risk; less Alzheimer's disease pathology, cerebral infarcts, and white matter hyperintensities; and higher total brain volume and cortical thickness.

However, those who are food insecure are often unable to access many of these foods and nutrients resulting in unbalanced diets. In addition, data from the National Health and Nutrition Examination Survey (NHANES) showed that food insecurity was associated with lower cognitive functioning on performance-based tests of cognition. One study also reported that food-insecure individuals had reduced intake of whole grains, iron, dairy, and dark green vegetables, which, as noted above, are positively associated with cognitive health.

Studies have also linked a person's overall health with his or her food environment at the neighborhood level, which represents the choices available for obtaining food. One study reported that the presence of supermarkets was associated with a lower prevalence of obesity, a possible risk factor for dementia, while the presence of convenience stores was associated with a higher prevalence of obesity in a large community-dwelling sample of Americans.

Food insecurity is more common among disproportionately affected populations, but it is also prevalent among older adults. Research on racial differences in diet quality is scarce, but some studies have shown that, overall, Black and Hispanic Americans consume fewer fresh fruits and vegetables compared with White Americans. Additionally, studies suggest that Black individuals have overall poorer diets than White individuals. These disparities are likely attributable to a great degree to access to healthier foods.

A recent review examined whether there are racial disparities in the relationship between diet and Alzheimer's disease risk including longitudinal cohort studies that were at least 20% minority. The review included seven studies, with mixed results on race-by-diet interactions. The review concluded that there is insufficient evidence on racial differences in the relationship between diet and Alzheimer's disease risk. Additional research is needed on the food environment, food insecurity, and access to healthy foods, including factors that affect access (socioeconomic and cultural factors, geographic and environmental factors, neighborhood walkability, and social cohesion) and factors related to dietary behavior (nutritional knowledge, education, socioeconomic status, and affordability) – as well as on how all of these factors affect risk for Alzheimer's and other dementias among disproportionately affected populations. Research is also needed to investigate the interactions of these factors and relationships with other possible risk conditions for dementia such as obesity, cardiovascular disease, and depressive symptoms.

Implications for Public Health

Creating a food environment with affordable healthy food choices and basic nutrition education is a key aspect to promote healthy dietary behavior. The Centers for Disease Control and Prevention (CDC) has implemented an initiative to improve access to healthy foods. The CDC works with states and communities to help them use food and nutrition guidelines in settings like work sites, hospitals, colleges, and food banks; leverage partnerships with industry to improve access to healthy foods; and encourage the use of behavioral design practices to help consumers select healthier foods and beverages. However, research is needed in this area to determine how well this initiative is helping older Americans and underserved communities disproportionately affected by food insecurity.

Discussion

Overall, more data in diverse populations and communities are needed. Currently, data are limited on food accessibility and the environment and how these differ among various demographic subgroups. It is important to address the barriers to food security, food accessibility, and diet quality among diverse older adults, and it is also important to have policies that can shape and improve the food/nutrition environment, especially in underserved communities, via food availability, pricing, food taxes, and catering policies.

Social Determinants of Health and Dementia Risk: Racism, Discrimination, and Inequity

What Is Already Known

The National Institute on Aging's Health Disparities Research Framework identifies various factors that can affect a person's health across the lifespan. Fundamental factors representing specific levels of analysis are ethnicity, gender, age, race, disability status, and identity. The sociocultural level of analysis adds sociocultural factors (such as values, norms, prejudice, tradition, religion, and collective responses), social factors (such as institutional racism, family stress, financial stress, occupational stress, residential stress, social mobility, and social network), and psychological factors (such as self-concept, stigma, bias, loneliness, and stereotypes).

Understanding this framework is important for identifying pathways of factors that can place people at increased risk for negative health outcomes.

Background and Evidence Base

Sociocultural factors that can affect dementia risk are socioeconomic status, education, environmental exposures, experiences with racism and discrimination, and cultural exposures. The first three are discussed in separate papers.

Racism

Black and Hispanic Americans are more likely to develop Alzheimer's disease compared with White Americans. While there is some research into how the influence of genetics on dementia may differ by race, these small differences in genetic influence do not account for the large differences in dementia risk across racial groups. Rather, studies point to racism and discrimination – rooted in the rules, practices, and policies of federal and state laws, banking policies, and health care systems – as the main drivers of these disparities. Structural racism pervades many aspects of life that directly or indirectly affect the risk for a wide range of conditions, health outcomes, and chronic diseases, including dementia.

A systematic review and meta-analysis examined racism as a determinant of both physical and mental health. Racism was found to be associated with poorer mental health overall as well as increased depression, anxiety, and psychological stress. It was also associated with poorer general and physical health. These effects were not moderated by birthplace or level of education. Participants who had experienced racism had higher rates of depression, which may increase the risk for dementia later in life. Among Black participants, the added stress experienced by Black individuals occurred in diverse settings such as work and community racism, residential segregation, and other socioeconomic barriers. The stress experienced due to racism may also lead individuals to cope by engaging in unhealthy lifestyle behaviors including poor diet and nutrition and cigarette smoking, activities that can contribute to hypertension and diabetes, both major risk factors for dementia.

Specifically related to dementia, a recent study found those experiencing lifetime discrimination have higher dementia incidence, and those reporting discrimination in two or more domains have an even greater risk for dementia. Similarly, among participants In the Black Women's Health Study, both those who experienced daily racism and those who experienced institutional racism had poor subjective cognitive function.

One study investigating the relationship between residential segregation, dementia, and later life cognition found that dementia incidence was higher and cognitive function was lower across segregated neighborhoods in New York City compared with diverse neighborhoods. Another study of Black individuals from four areas around the country found that residential segregation throughout young adulthood was associated with worse processing speed as early as midlife.

Another study found that among Black individuals, executive functioning and memory were lower among individuals who attended segregated schools compared with those who attended integrated schools. In a different study examining schooling, discrimination, and cognition, it was found that among Black individuals, birth and schooling in the Southern United States were associated with lower global cognition. This effect was, interestingly, most significant among those who attended legally desegregated schools in the South in and around 1954, indicating that experiencing the discrimination and chaos that accompanied desegregation may have outweighed the benefits of integrated schooling found in other studies.

Racial discrimination may not only be a risk factor for dementia, but it can also be a barrier to receiving health care for other risk factors for dementia, including diabetes and hypertension.

Health Inequities

Inequities associated with ethnocultural status can be seen in the prevalence of many chronic diseases. For example, among Americans aged 65 years and older, Black Americans are more likely than White and Hispanic Americans to have experienced hypertension (70.6% versus 54.2% and 57.1%, respectively) and stroke (10.6% versus 7.6% and 7.8%, respectively). Similarly, both Black and Hispanic Americans are more likely than White Americans to have experienced diabetes (32.1% and 32.3%, respectively, versus 18.3%).

Disparities in chronic conditions that are risk factors for cognitive decline and possibly dementia are likely a main driver of inequities in the prevalence of Alzheimer's. Black individuals are two times more likely and Hispanic individuals are one and one-half times more likely than White individuals to develop Alzheimer's disease. They are also more likely to be younger at disease onset and to have greater severity of initial Alzheimer's disease symptoms.

Geographic Influences

Some research indicates a connection between place of birth and later life cognition and dementia risk. One study found that Americans born in the "Stroke Belt," a region of higher stroke mortality in the Southeastern United States, were more likely to have a dementia-related death, even if they moved elsewhere later in life, compared with those born outside of the "Stroke Belt."

A similar study examined dementia risk among long-time residents of Northern California. The study found that despite living in California for more than 20 years during later life, birth in a high stroke mortality state was associated with an almost 30% greater risk of dementia. The study also found that birth in a high stroke mortality state was more common among Black individuals, suggesting that place of birth could contribute to racial disparities in dementia risk. However, it is important to note that regardless of place of birth in this study, Black individuals had the greatest overall risk of dementia.

Implications for Public Health

Studies have shown the impact that racism, discrimination, and other cultural influences can have on overall wellbeing and risk of cognitive decline and dementia. Due to a long history of discriminatory policies and practices, addressing inequities and its root causes will require multisector collaboration, including among public health, policymakers, the education system, and the health care system. In addition, given the studies indicating an effect of residential and school segregation on dementia risk – as well as those demonstrating the impact of lifetime exposure to racism – a life-course perspective to addressing dementia risk is important.

There may also be some sociocultural factors that mitigate dementia risk. Such "resilience factors" could include bi- and multilingualism as well as the high value that some communities (such as Hispanic communities) place on family. These factors could provide a point of public health intervention for protecting against dementia.

Discussion

To move toward equity in brain health promotion and risk reduction, it is essential that future research focuses on the potential causal links between racism, discrimination, and cognitive decline. Ensuring inclusion and diverse representation in clinical studies and other research will help improve health equity as well as the appropriateness and effectiveness of interventions to address these risk factors.