



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.

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