Disadvantaged neighborhoods and symptoms of depression associated with premature aging

June 5 2023

Credit: Pixabay/CC0 Public Domain

Feeling depressed and living in a deprived urban neighborhood could be making you age faster, according to a new study led by researchers at

McMaster University.

The findings, published June 5 in *The Journals of Gerontology, Series A: Biological Sciences and Medical Sciences*, showed that living in urban environments marked by material and social inequities, and having depression symptoms, were independently associated with premature biological aging, even after accounting for individual-level health and behavioral risk factors, such as chronic conditions and poor health behaviors.

Parminder Raina, a professor in the Department of Health Research Methods, Evidence, and Impact at McMaster University, led the research team, which included investigators from the Netherlands, Norway and Switzerland.

"Our study used two DNA methylation-based estimators, known as epigenetic clocks, to examine aging at the cellular level and estimate the difference between chronological age and biological age," said Divya Joshi, the study's first author and a research associate in the Department of Health Research Methods, Evidence, and Impact at McMaster.

"Our findings showed that neighborhood deprivation and depressive symptoms were positively associated with acceleration of the epigenetic age estimated using the DNAm GrimAge clock. This adds to the growing body of evidence that living in urban areas with higher levels of neighborhood deprivation and having depression symptoms are both associated with premature biological aging."

Depressive symptoms in the study were measured using a 10-item standardized depression scale. The researchers found an acceleration in the risk of death by one month for every point increase on the depressive symptom score. They theorized that emotional distress caused by depression may result in more biological wear and tear and dysregulation

of physiological systems, which in turn could lead to premature aging.

The researchers assessed neighborhood material and social deprivation using two indices that were developed by the Canadian Urban Environmental Health Research Consortium (CANUE) based on 2011 census.

Social deprivation reflects the presence of fewer social resources in the family and community, and material deprivation is an indicator of people's inability to access goods and conveniences of modern life, such as adequate housing, nutritious food, a car, high-speed internet, or a neighborhood with recreational facilities.

The researchers found an increase in the risk of death by almost one year for those exposed to greater neighborhood deprivation compared to lower neighborhood deprivation.

The study did not find that neighborhood deprivation amplified the effect of depressive symptoms on epigenetic age acceleration.

"Our results showed that the effect of neighborhood deprivation on epigenetic age acceleration was similar regardless of depression symptoms, suggesting that depression influences epigenetic age acceleration through mechanisms unrelated to neighborhood deprivation ," Joshi said.

The research examined epigenetic data from 1,445 participants enrolled in the Canadian Longitudinal Study on Aging (CLSA), a research platform following more than 50,000 participants who were between the ages of 45 to 85 when recruited.

"Longitudinal studies, like the CLSA, are important to confirm associations like those found in this study," said Raina, the study's senior

author and lead principal investigator of the CLSA.

"By following the same group of participants for 20 years, we will be able to determine whether epigenetic changes are stable or reversible over time. We will also gain insight into the mechanisms that are leading to accelerated epigenetic aging."

More information: Divya Joshi et al, Association of neighbourhood deprivation and depressive symptoms with epigenetic age acceleration: Evidence from the Canadian Longitudinal Study on Aging (CLSA), (2023). DOI: 10.1093/gerona/glad118

Provided by McMaster University