Biological Aging and Impacts Long-Term Health Accelerated by Losing Loved Ones

Researchers in the United States evaluated the associations between the loss of a family member and biological aging.

The relationship between health and bereavement throughout life is well established. Nevertheless, specific life stages may be susceptible to health and mortality risks. For example, the loss of a sibling or parent in early life is traumatic and linked to cognitive impairment, poor mental health, and higher cardiometabolic and mortality risks later in life. However, familial death at any age poses health risks.

Moreover, repeated losses compound health risks. Biological aging is the progressive loss of resilience and integrity of cells, tissues, and organs. It is measured using the deoxyribonucleic acid (DNA) methylation algorithms called the epigenetic clocks. Only a few studies have investigated associations between aging markers and loss across developmental periods.

Study

In the present study, researchers evaluated associations between familial loss and biological aging. They used data from 'Add Health,' a nationally representative longitudinal cohort in the United States (US). The cohort enrolled participants in 1994-95 and followed them up through wave 5 in 2018. The fifth wave involved an additional home examination for blood sample collection.

Participants with blood samples who reported loss(es) were included. Between 2018 and 2024, the team profiled and constructed clocks using whole-blood DNA from 4,700 wave 5 participants. They calculated four biological clocks: DunedinPACE, Horvath, PhenoAge, and GrimAge. DunedinPACE measures the pace of aging, while the other three measure epigenetic age acceleration.

The death of a parent, sibling, partner/spouse, or child was included, and total losses were pooled. Parental loss at any time across waves was assessed. Loss at varying developmental periods (childhood, adolescence, and adulthood) was classified. Any loss in adolescence or childhood included deaths of parents and siblings before the participant was aged 18.

Losses in adulthood included parent, spouse, child, and sibling deaths when the participant was aged ≥ 18. Covariates included chronological age, ethnicity/race, household income, parental education, and smoking. Linear regression models assessed the associations between the number of losses and biological aging measures, adjusted for covariates.

Results

Overall, the sample included 3,963 participants aged 38.36, on average, at the fifth wave. Around 50.3% of subjects were males, 72.5% were White, and 16% were Black. Approximately 40% of participants experienced at least one loss. Parental loss was the most common loss, and most losses occurred during adulthood.

DunedinPACE, GrimAge, and PhenoAge increased with the number of losses. Participants with only one loss had older biological age on DunedinPACE and GrimAge clocks relative to those without loss. Individuals with ≥ 2 losses were likely to have older biological ages on DunedinPACE, GrimAge, and PhenoAge clocks but not Horvath.

Individuals with parental loss in childhood, adolescence, or adulthood were likely to have an older GrimAge, DunedinPACE, and PhenoAge than those without loss. Parental loss was not associated with biological aging on the Horvath clock. Participants with any loss during adolescence or childhood had similar biological age to those with no loss in childhood.

By contrast, subjects with any loss in adulthood had older biological ages on DunedinPACE and GrimAge clocks than those without any loss in adulthood. Further, the biological ages of participants with and without a parental loss in childhood were similar. Conversely, individuals with parental loss in adulthood had older biological ages on all clocks except the Horvath clock.

Conclusion

The results indicate that accelerated biological aging might be a key mechanism linking exposure to familial death with later morbidity/mortality risks. Loss experiences were associated with older biological age and a higher pace of aging, as measured by GrimAge, PhenoAge, and DunedinPACE. No associations were observed between loss and biological aging measured by the Horvath clock.

Further, losses in adulthood had greater associations with biological aging than those in adolescence or childhood. Together, the findings illustrate how familial loss affects biological aging and, thereby, health and mortality. Future studies should emphasize social support and develop coping strategies to mitigate the negative impact of loss on aging.

Source:

https://www.news-medical.net/news/20240730/Losing-loved-ones-accelerates-biological-aging-and-impacts-long-term-health.aspx