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New study adds nuance to the understanding of dementia in the Tsimané and Mosetén of lowland Bolivia

Three years ago, researchers made a striking discovery: The Tsimané and Mosetén tribes of lowland Bolivia had exhibited a remarkably low prevalence of dementia — a phenomenon that was attributed to a healthy lowfat diet, intense physical activity and active social engagement.

“We hypothesize that energy gain from food intake was positively associated with late-life brain health in the physically active, food-limited world of our ancestors, but that obesity and other manifestations of a Western lifestyle now lead to greater cognitive aging and dementia in middle and older ages,” UC Santa Barbara anthropologist Michael Gurven said in 2023. When their heads and hearts were studied using advanced imaging, the participants, who have largely non-industrial forager-horticulturalist lifestyles, showed less brain atrophy and better cardiovascular health compared to industrialized populations in Europe and the U.S.

However, a newly published longitudinal study adds more nuance to the story. Appearing in Alzheimer’s & Dementia: Journal of the Alzheimer’s Association, the study revealed that the incidence of dementia in the Indigenous community isn’t dramatically different from that of U.S. or Northern European populations, meaning

that elders were getting dementia at a comparable rate to their Western, industrialized counterparts.

“The surprising finding was that there weren’t big differences in dementia incidence,” said lead author Margaret Gatz, a professor of psychology and gerontology at USC and a senior scientist at the USC Center for Economic and Social Research. “That challenges us to identify the risk factors for developing dementia in the Tsimané population.”

The work was funded in part by the National Science Foundation and the National Institutes of Health.

Prevalence vs Incidence

In the world of epidemiology, there are two measures that describe the presence of a disease within a community. “Incidence” tracks new cases over a given period, while “prevalence” serves as a snapshot of all existing cases at a given point in time.

The study followed 730 adults who did not have dementia at their initial assessment and were revisited about five years later. Researchers identified 22 new dementia cases, resulting in an overall incidence of 7.40 cases per 1,000 person-years, not too different from Western cohorts. During follow-up assessments, the prevalence, or proportion of people with dementia at a given time, was less than 2% — similar to what the team found three years ago, and lower than Western counterparts.

“Essentially, *new* cases among these Indigenous populations may appear at similar rates as those observed elsewhere, but the *total* number of cases at any point in time remains low,” explained Gurven, a co-founder and co-director of the Tsimane Health and Life History Project (THLHP). He raised the logical question: What is happening to folks with dementia?

“One of the reasons for the low prevalence is that they don’t live very long with dementia,” Gurven said.

According to the paper, the nonindustrial tribespeople’s lifestyle can provide context. As forager-horticulturalists in a food-limited world, one of their primary community activities is finding food; in fact, food insecurity is widespread. “If dementia prevents a person from contributing to food production, it can become a

burden on the family, with the older person's decreasing nutritional status contributing to death," the researchers wrote. This, in addition to minimal access to medical care, comorbidities that come with dementia, "as well as insufficient family capacity to provide care may contribute to shortened survival."

"Under their traditional lifeways, the risk of Alzheimer's disease and related dementia is low," Gurven said, "but it may not be as low as we originally thought. A longitudinal study like our new one is critical to get a better picture of disease risk."

While the authors caution that 22 cases are too few to fully discern all of the factors behind low prevalence, the findings add rare incidence data to dementia research among Indigenous peoples. Some Indigenous communities report high dementia prevalence following disruptive integration into dominant societies and greater exposure to chronic disease risks. By contrast, several Indigenous and rural populations retaining subsistence lifestyles report low prevalence.

The dementia observed in the Bolivian communities may also differ from prototypical Alzheimer's disease. Many affected participants showed more difficulty with attention, reasoning and managing tasks than with memory, the hallmark challenge in Alzheimer's.

Preliminary blood analyses found associations between the dementia cases and the amount of neurofilament light chain proteins in blood – a general indicator of neurodegeneration – but not with amyloid or phosphorylated tau protein profiles characteristic of Alzheimer's. Imaging and vascular measures suggested contributions from blood-vessel disease.

"In most Tsimané with cognitive impairment or dementia, the pattern of atrophy in the brain is not typical of Alzheimer's disease," Gatz said. "Rather, there are changes indicative of vascular contributions to cognitive impairment and dementia."

The researchers also found that the APOE (apolipoprotein E) e4 gene variant was one of the strongest risk factors for dementia, alongside old age. However, Gatz noted that APOE4 also affects lipid transport and immune response, so the association doesn't necessarily establish Alzheimer's pathology.

"We need far more data before we can address the balance between lifestyle and genetic factors," she said. "Generally, it is believed that the two have

complementary roles.” Previous research by Gurven and collaborators points to the varied effects associated with the APOE e4 variant, including increased fertility, improved immune function, but also late onset dementia.

Researchers adapted clinical interviews and cognitive tests for language, culture and limited literacy, conducting assessments in Tsimané or Spanish. The THLHP teams also provide medical exams and help coordinate care. Future phases will use improved brain imaging and additional blood biomarkers to investigate vascular injury and Alzheimer’s pathology.

“The research is both immensely challenging and highly rewarding,” Gatz said. “We are grateful for their participation and try to assure that the research is helpful to them.”

These latest findings not only provide more information on how dementia affects the Tsimané and Mosetén communities, but also raise new questions about the factors contributing to dementia risk.

“The next important step is to see why Tsimané lives are cut so short once they have dementia,” Gurven said “That will require us to get back to basics: what is it like to be cognitively impaired in such a setting where the label ‘dementia’ doesn’t even exist? My recent field trips have focused on the daily activities of elders, other health problems they have, and the types of caregiving they receive — or don’t. Old-fashioned ethnography will go a long way to help bring some clarity and hopefully reduce suffering.”

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