

## The death of a partner and financial stress have been linked to an increased risk of Alzheimer's disease and differences in brain structure

- A recent study suggests that certain stressful life events can impact brain health differently depending on gender and educational level
- The study, published in the journal *Neurology*, involved 1200 people from the ALFA longitudinal cohort of the Barcelonaβeta Brain Research Center (BBRC), with the support of the "la Caixa" Foundation.

**Barcelona, 3 July 2025.-** Stressful life **events can negatively impact brain health**. Specifically, **grief over the loss of a partner** has been linked to alterations in biological processes associated with Alzheimer's disease, while **unemployment and financial loss** have been associated with structural differences in the brain. These are the main conclusions of a study conducted by the Barcelona Institute for Global Health (ISGlobal), a centre promoted by "la Caixa" Foundation, and the Barcelonaβeta Brain Research Centre (BBRC), a research centre of the Pasqual Maragall Foundation. The results, which highlight differences in the brain's response to stressful events according to gender and educational level, have been [published in the journal \*Neurology\*](#).

Led by [Eider Arenaza-Urquijo](#), an ISGlobal researcher, the study involved **1,200 people** from the ALFA (*ALzheimer's and FAMilies*) cohort at the BBRC, which is promoted by "la Caixa" Foundation. The participants were individuals without cognitive impairment, most of whom had a family history of Alzheimer's disease. *"Using magnetic resonance imaging, we studied the differences in grey matter volume in the brain and analysed Alzheimer's disease biomarkers in the cerebrospinal fluid, such as beta-amyloid protein,"* explains [Eleni Palpatzis](#), a pre-doctoral researcher at ISGlobal and first author of the study.

### The impact of grief and economics on the brain

In Alzheimer's disease, changes in the brain—such as alterations in the levels of certain proteins—can occur years before the first symptoms appear. For example, a **lower ratio of amyloid beta 42/40** is observed; this ratio compares the concentrations of two forms of the protein. Since amyloid beta 42 is more likely to aggregate in the brain, a decrease in this ratio in the cerebrospinal fluid usually reflects greater amyloid beta deposition in brain tissue, making it an important early indicator of Alzheimer's disease. Higher levels of phosphorylated tau, which causes neuronal damage, and neurogranin, which increases when connections between neurons are lost, are also found.

The death of a partner was associated with **changes in these biomarkers**: a lower amyloid beta 42/40 ratio (an effect that was more pronounced **in men**), and higher levels of phosphorylated tau and neurogranin (effects that were more pronounced **in women**). All of these effects were more pronounced **in people with lower levels of education**.

Conversely, unemployment and economic losses were associated with a lower grey matter volume in key brain regions responsible for emotional and cognitive regulation. Gender differences were also evident in these effects; unemployment affected men's brains more, while economic losses had a greater structural impact on women's brains.

### The role of inequality in Alzheimer's

A previous study by the same group already showed that [exposure to stressful life events in middle age can increase vulnerability to Alzheimer's disease](#). However, the prevalence and impact of stressful life events varies according to certain social determinants, such as gender and education; women and people with lower levels of education experience more stressful life events, and it is also in these groups that the prevalence of Alzheimer's is most prevalent. The research showed that different stressful situations affect men and women differently.

*"Men seem to be more negatively affected by the loss of a partner (which affects amyloid-related proteins) and unemployment (which reduces grey matter). This may be because **men tend to have fewer close relationships**, making the loss of a partner more isolating, so the loss of a partner is more isolating for them, and because **unemployment carries a greater social stigma** for men,"* explains [Eider Arenaza-Urquijo](#), ISGlobal researcher and senior author of the study.

*"On the other hand, women seem more vulnerable to financial difficulties, which affect grey matter volume. This could be related to the fact that women have historically had less financial security, and that they tend to report higher levels of economic concern, which negatively impacts their overall mental well-being,"* adds the researcher.

### Reference

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### About ISGlobal

The Barcelona Institute for Global Health, ISGlobal, is the fruit of an innovative alliance between the "la Caixa" Foundation and academic and government institutions to contribute to the efforts undertaken by the international community to address the challenges in global health. ISGlobal is a consolidated hub of excellence in research that has grown out of work first started in the world of health care by the Hospital Clínic and the Hospital del Mar and in the academic sphere by the University of Barcelona and Pompeu Fabra University. Its working model is based on the generation of scientific knowledge through Research Programmes and Groups, and its translation through the areas of Training and Analysis and Global Development. ISGlobal has been named a Severo Ochoa Centre of Excellence and is a member of the CERCA system of the Generalitat de Catalunya.

### Alzheimer's disease in numbers

It is currently estimated that Alzheimer's disease and neurodegenerative diseases affect 900,000 people, a figure that translates to one in ten of those over 65 years of age and a third of those over 85. These diseases are one of the main causes of mortality, disability, and dependency. If an effective cure is not found and life expectancy continues to increase, the number of cases worldwide could triple by 2050, exceeding one and a half million people in Spain alone, a situation that could lead to the collapse of healthcare and care systems.

### About the Barcelonaβeta Brain Research Center and the Pasqual Maragall Foundation

The Barcelonaβeta Brain Research Center (BBRC) is the research centre of the Pasqual Maragall Foundation, supported by the "la Caixa" Foundation since its creation, dedicated to the prevention of Alzheimer's disease and the study of cognitive functions affected in healthy and pathological aging. BBRC research focuses on the preclinical phase of Alzheimer's disease, the period before the first symptoms appear, when changes in the brain associated with the disease already occur. The BBRC has more than 100 professionals dedicated to contributing to the forefront of research into Alzheimer's disease and other neurodegenerative diseases.

The Pasqual Maragall Foundation is a non-profit organization founded in April 2008 in response to the commitment made by Pasqual Maragall, former mayor of Barcelona and former president of the Generalitat de Catalunya, when he publicly announced that he had been diagnosed with Alzheimer's disease. The Foundation's mission is to promote research to prevent Alzheimer's disease and offer solutions that improve the quality of life of those affected and their families.

The Pasqual Maragall Foundation has the support of more than 93,000 members and of:



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