

# **Volume of gray brain matter significantly lower in people with early onset psychosis, finds study**

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New research from the Institute of Psychiatry, Psychology & Neuroscience has found an association between a reduction in gray matter in the brain and early onset psychosis (EOP).

The study, published in *Molecular Psychiatry*, is the largest ever [brain](#) imaging study in EOP and has provided unprecedented levels of detail about the illness. It shows that in contrast to other mental health disorders, people with EOP have a reduced volume of [gray matter](#) across nearly all regions of their brain. Researchers hope that this detailed mapping could be used to assist in future diagnosis, as well as to track the effects of treatment in patients with EOP.

EOP occurs before the age of 18 during a critical period of development in the brain. Individuals diagnosed with the illness are likely to experience severe and long-lasting symptoms that respond less well to treatment. Despite this, research into EOP has been limited in sample size and statistical power.

The study represents an international effort, combining [brain scans](#) from Norway, Spain, Canada, Italy, Australia and the UK, 482 individuals with EOP being compared to 469 healthy controls. An analysis of the data revealed that individuals with EOP had lower volumes of gray matter in almost all regions of the brain compared to the healthy controls, with a marked effect in the left median cingulate—an area of the brain associated with the formation and processing of emotions, learning and memory.

Dr. Matthew Kempton, Reader in Neuroimaging Psychiatry at King's IoPPN and the study's senior author, said, "Early onset psychosis can have a devastating impact on a person's life and well-being, but our understanding of the illness is still sadly relatively limited. This study, the largest neuroimaging analysis of EOP to date, used newly developed technologies to combine scans from different sites to examine hundreds

of thousands of data points measuring volume in the brain.

"We found that people with EOP experience a lower volume of gray matter in nearly all regions of their brains compared to people without the illness. This detailed map will hopefully provide the basis for future research, as it could help as a diagnostic tool, and even track the effectiveness of treatments."

Further analysis of the data revealed that those individuals who developed EOP at a later age had lower volumes of gray matter in a number of small brain regions compared to those with an earlier age of onset.

Shuqing Si, the study's first author from King's IoPPN, said, "Gray matter's primary purpose is to process information in the brain and plays a significant role in day-to-day functions like memory, emotions and movement. This study used specially created software (ENIGMA-VBM) developed at King's that can accurately map where there have been local increases and decreases in brain volume. It's allowed our team to process significantly more data and has meant that our sample reflects brain scans from many parts of the world. The effectiveness of this software means we're now investigating the brains of those with several other disorders."

**More information:** Mapping gray and white matter volume abnormalities in early-onset psychosis—an ENIGMA multicenter voxel-based morphometry study, *Molecular Psychiatry* (2024). [DOI: 10.1038/s41380-023-02343-1](https://doi.org/10.1038/s41380-023-02343-1)

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