

Childhood maltreatment associated with cerebral grey matter abnormalities

June 18 2014



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According to the World Health Organisation (WHO), [child maltreatment](#) is defined as all forms of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power.

Until now, the results of structural neuroimaging studies carried out have been inconsistent. A new study, published in the *American Journal of Psychiatry* and carried out by experts at London's King's College and the FIDMAG, Sisters Hospitallers Foundation for Research and Teaching, has provided new findings.

"Childhood maltreatment acts as a severe stressor that produces a cascade of physiological and neurobiological changes that lead to enduring alterations in the brain structure," Joaquim Radua, researcher at FIDMAG and the British centre and the only Spanish author involved in this study, told SINC.

In order to understand the most robust abnormalities in [grey matter](#) volumes, the research team, which includes the National University of Singapore, carried out a meta-analysis of the voxel based morphometric study on childhood maltreatment.

VBM is a neuroimaging analysis technique that allows investigation of focal differences in brain anatomy comparing magnetic brain resonance of two groups of people.

The study included twelve different groups of data made up of a total of 331 individuals (56 children or adolescents and 275 adults) with a history of childhood maltreatment, plus 362 individuals who were not exposed to maltreatment (56 children or adolescents and 306 adults).

In order to examine the cerebral regions with more or less grey matter volumes in maltreated individuals, a three-dimensional meta-analytical neuroimaging method was used called 'signed differential mapping' (SDM), developed expressly by Radua.

Abnormalities not related to medication

Relative to comparison subjects, individuals exposed to childhood maltreatment exhibited significantly smaller grey matter volumes: in the right orbitofrontal/superior temporal gyrus extending to the amygdala, insula, and parahippocampal and middle temporal gyri and in the left inferior frontal and postcentral gyri.

"Deficits in the right orbitofrontal-temporal-limbic and left inferior frontal regions remained in a subgroup analysis of unmedicated participants, indicating that these abnormalities were not related to medication but to maltreatment," indicated Radua.

On the other hand, the Spanish expert pointed out that abnormalities in the left postcentral gyrus were found only in older maltreated individuals. These findings show that the most consistent grey matter abnormalities in individuals exposed to [childhood maltreatment](#) are located in ventrolateral prefrontal and limbic-temporal regions.

These regions have relatively late development, i.e. after the maltreatment and the malfunction could explain the affective and cognitive deficit of people with a history of child abuse.

"These findings show the serious consequences of adverse childhood environments on brain development," adds Radua.

"We hope the results of this study will help to reduce environmental risks during childhood and to develop treatments to stabilise these

morphologic alterations," he concludes.

More information: Lena Lim, Joaquim Radua, Katya Rubia. "Gray Matter Abnormalities in Childhood Maltreatment: A Voxel-Wise Meta-Analysis". *Am J Psychiatry*; in press.

Provided by Spanish Foundation for Science and Technology (FECYT)

Citation: Childhood maltreatment associated with cerebral grey matter abnormalities (2014, June 18) retrieved 25 April 2024 from <https://medicalxpress.com/news/2014-06-childhood-maltreatment-cerebral-grey-abnormalities.html>

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