Infections can affect your IQ

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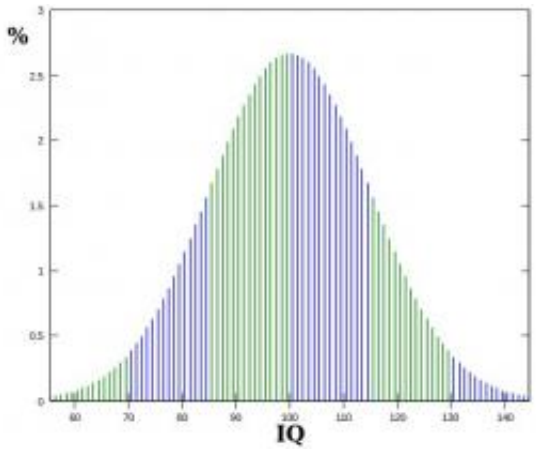

The IQs of a large enough population are calculated so that they conform to a normal distribution with a mean of 100 and a standard deviation of 15. Image: Wikipedia.

New research shows that infections can impair your cognitive ability measured on an IQ scale. The study is the largest of its kind to date, and it shows a clear correlation between infection levels and impaired cognition.

Anyone can suffer from an infection, for example in their stomach, urinary tract or skin. However, a new Danish study shows that a patient's distress does not necessarily end once the infection has been treated. In fact, ensuing infections can affect your cognitive ability measured by an IQ test:

"Our research shows a correlation between hospitalisation due to infection and impaired cognition corresponding to an IQ score of 1.76 lower than the average. People with five or more hospital contacts with infections had an IQ score of 9.44 lower than the average. The study thus shows a clear dose-response relationship between the number of infections, and the effect on cognitive ability increased with the temporal proximity of the last infection and with the severity of the infection. Infections in the brain affected the cognitive ability the most, but many other types of infections severe enough to require hospitalisation can also impair a patient's cognitive ability. Moreover, it seems that the immune system itself can affect the brain to such an extent that the person's cognitive ability measured by an IQ test will also be impaired many years after the infection has been cured," explains MD and PhD Michael Eriksen Benrós, who is affiliated with the National Centre for Register-Based Research at Aarhus BSS and the Mental Health Centre Copenhagen, University of Copenhagen.

He has conducted the research in collaboration with researchers from the University of Copenhagen and Aarhus University.

190,000 Danes participated in the study

The study is a nationwide register study tracking 190,000 Danes born between 1974 and 1994, who have had their IQ assessed between 2006 and 2012. 35% of these individuals had a hospital contact with infections before the IQ testing was conducted.

According to Senior Researcher Michael Eriksen Benrós, part of the explanation of the increased risk of impaired cognition following an infection may be as follows:

"Infections can affect the brain directly, but also through peripheral inflammation, which affects the brain and our mental capacity.

Infections have previously been associated with both depression and schizophrenia, and it has also been proven to affect the cognitive ability of patients suffering from dementia. This is the first major study to suggest that infections can also affect the brain and the cognitive ability in healthy individuals."

"We can see that the brain is affected by all types of infections. Therefore, it is important that more research is conducted into the mechanisms which lie behind the connection between a person's immune system and mental health," says Michael Eriksen Benrós.

He hopes that learning more about this connection will help to prevent the impairment of people's mental health and improve future treatment.

Experiments on animals have previously shown that the immune system can affect cognitive capabilities, and more recent minor studies in humans have also pointed in that direction. Normally, the brain is protected from the immune system, but with infections and inflammation the brain may be affected. Michael Eriksen Benrós' research suggests that it may be the immune system that causes the cognitive impairment, not just the infection, because many different types of infections were associated with a decrease in cognitive abilities. This is the first study to examine these correlations in this manner. The results suggest that the immune system's response to infections can possibly affect the brain and thereby also the person's cognitive ability. This is in line with previous studies, some of which have also been conducted by Dr. Michael Eriksen Benrós, which show that infections are associated with an increased risk of developing mental disorders such as depression or schizophrenia.

The researchers behind the study hope that their results may spur on further research on the possible involvement of the immune system in the development of psychiatric disorders and whether the discovered

correlations contribute to the development of mental disorders or whether they may be caused by e.g. genetic liability toward acquiring infections in patients with reduced cognitive ability. The study has been adjusted for social conditions and parental educational levels; however, it cannot be ruled out that heritable and environmental factors associated with infections might also influence the associations.

The findings have just been published in the prestigious international journal *PLOS ONE*.

More information: *PLOS ONE*, dx.plos.org/10.1371/journal.pone.0124005

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