

LIFESTYLE

Too much fat can affect brain power

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ANN/THE STAR – Asians with an excess amount of visceral fat tend to have a poorer ability to think, learn and remember, according to research by Singaporean scientists.

This finding is based on an analysis of the health data of 8,769 Singaporeans and permanent residents of Chinese, Malay and South Asian ethnicity collected for the Health for Life in Singapore (Helios) study between 2018 and 2021.

The scientists found that an increase in this type of fat, which is wrapped around the internal organs, is associated with poorer performance in cognitive tests of memory, executive function, processing speed and attention.

When the scientists conducted a deeper dive into the relationship between body fat and cognition, using statistical analysis of genetic data from global databases, they found that a higher body mass index (BMI) and BMI-adjusted waist-to-hip ratio were also linked to a fall in cognitive performance.

These findings, published in the April (2023) edition of the medical journal *The Lancet Regional Health – Western Pacific*, highlight the impact that preventing obesity could have on maintaining cognitive function, said the scientists from the Lee Kong Chian School of Medicine (LKCMedicine) at Nanyang Technological University (NTU).



Study senior author and Helios lead investigator Professor Dr John Chambers said: "With dementia expected to afflict 78 million people in 2030, and 139 million people by 2050, understanding and addressing the determinants of cognitive function is a major public health priority.

"Through our Asian population health study, we observed a link between visceral fat and poorer cognitive performance, which was subsequently confirmed with a statistical analysis of global genetic data.

"These findings raise the possibility that the prevention and control of obesity in Asian populations could play a critical role in maintaining cognitive function and protecting against the future risk of dementia."

While earlier studies have shown that metabolic disorders could be risk factors for cognitive decline, scientists have been less certain that body fat was also a risk factor.

Most of these earlier studies were performed in Western populations of older individuals, leaving out Asians, who make up 60 per cent of the world's population, and whose health and disease are determined by a different combination of factors.

The Helios study is a population-cohort study led by NTU LKCMedicine and carried out in partnership with Singapore's National Healthcare Group and Imperial College London in the United Kingdom.

The participants, aged between 30 and 84, were evaluated through a series of cognitive tests, whole-body scans, and physiological and biochemical assessments, to derive a series of body fat and metabolic parameters.

The data revealed that three parameters are consistently associated with a lower cognitive performance: reduced high-density lipoprotein (or "good" cholesterol), increased visceral fat mass index (a measure of visceral fat mass relative to body mass), and increased waist-to-hip ratio.

In contrast, parameters like triglyceride levels (fat content in blood), blood pressure and glycaemic indices showed no association with cognitive performance.

To form a clearer picture of the link between body fat and cognitive function, the scientists turned to Mendelian randomisation, a statistical approach that makes use of small snippets of genes that vary from person to person.

Through large-scale genetic studies – also known as genome-wide association studies – scientists have associated many of these snippets with specific health behaviours and risks.

Such genetic variants are present in humans at birth at random and are not altered by the environment or a person's upbringing. Any difference observed in the health outcomes can be attributed to the presence or absence of specific genetic variants.

Study lead author and NTU LKCMedicine Dean's Postdoctoral Fellow Dr Theresia Mina explained: "Some people may have more visceral fat than others due to genetic reasons.

"If we can show that these people are more likely to experience reduced cognitive function, that would give us evidence that visceral fat is more directly related to cognitive ageing, and not because of lifestyle or environmental factors."

To carry out their Mendelian randomisation analysis, the scientists used data acquired from a number of genome-wide association studies conducted on various populations, focussing on genetic variants that predict visceral fat and BMI.

They found that genetic variants predicting excess visceral fat, elevated BMI and increased BMI-adjusted waist-to-hip ratio are related to reduced cognitive performance.

Following these findings, the scientists are now looking at how excess visceral fat across Asian ethnicities contributes to traits related to one's metabolism – such as insulin resistance – that are a result of a combination of factors like genes, lifestyle and the environment.