

Good hygiene may be partially to blame for soaring Alzheimer's

Modern cities and improved hygiene could be behind rising rates of Alzheimer's in Britain and the rest of the developed world, scientists have said.



Countries where everyone has access to clean drinking water, such as the UK and France, have nine per cent higher Alzheimer's rates than average.

By Laura Donnelly and Med Expo

Researchers have linked the "hygiene hypothesis" - the idea that lack of exposure to germs, viruses and parasites harms the immune system - to rising rates of dementia in richer nations.

A new study by Cambridge University compared dementia cases in 192 countries and found it was more common in those with better sanitation and less disease.

Countries where everyone has access to clean drinking water, such as the UK and France, have nine per cent higher Alzheimer's rates than average.

In comparison those where less than half have access, such as Kenya and Cambodia, have a significantly lower incident rate.

Taken together, infection levels, sanitation and urbanisation account for 43 per cent of the variation in rates of Alzheimer's between different countries, the study found.

Dr Molly Fox, from Cambridge University, who led the new research published in the journal *Evolution, Medicine and Public Health*, said: "The 'hygiene hypothesis', which suggests a

relationship between cleaner environments and a higher risk of certain allergies and autoimmune diseases, is well established.

"We believe we can now add Alzheimer's to this list of diseases. There are important implications for forecasting future global disease burden, especially in developing countries as they increase in sanitation."

The charity The Alzheimer's Society said the theory was interesting, but did not demonstrate the cause of the variation.

Dr James Pickett, head of research, said: 'We have known for some time that the numbers of people with Alzheimer's varies between countries. That this discrepancy could be the result of better hygiene is certainly an interesting theory and loosely ties in with the links we know exist between inflammation and the disease. However it is always difficult to pin causality to one factor and this study does not cancel out the role of the many other lifestyle differences such as diet, education and wider health which we know can also have a role to play.'

Experts said that although the study allowed for the fact that people live far longer in Western countries, it did not take account of the fact that such countries had better reporting systems and were more likely to document cases of Alzheimer's disease.

In the Cambridge study, scientists looked at the link between hygiene and Alzheimer's rates in 192 rich and poor countries. They adjusted the findings to take account of differences in birth rate, life expectancy and age structure.

Access to clean drinking water was one area said to have a high impact on Alzheimer's rates. Countries such as the UK and France, where this is universal, had a 9 per cent higher incidence of Alzheimer's than countries such as Kenya and Cambodia where less than half the population can access clean water.

A similar pattern emerged from comparisons between countries with low and high rates of infectious disease.

Switzerland and Iceland, with very low rates, were 12 per cent more affected by Alzheimer's than China and Ghana, whose infection rates are high.

The more urbanised countries also experienced higher rates of Alzheimer's irrespective of life expectancy.

In the UK and Australia, where more than three quarters of the population lived in urban areas, Alzheimer's incidence was 10% higher than in Bangladesh and Nepal, where less than a 10th of people had their homes in towns and cities.

Previous research has shown that Alzheimer's affects fewer people in Latin America, China and India than it does in Europe.

Even within those regions, prevalence is lower in urban than in rural areas, according to the new findings.

The hygiene hypothesis is based on the assumption that lack of contact with "dirt" in the form of bacteria and other infectious agents upsets the development of white blood cells, key elements of the immune system.

In particular, T-cells are said to be affected. T-cells have a variety of functions, including attacking and destroying foreign invaders and marshalling other parts of the immune system.

Some, known as "regulatory" T-cells, reign in the immune system when it starts to get out of control. Dysfunctional regulatory T-cells can lead to inflammation and autoimmune disorders.

Regulatory T-cell deficiency is linked to the type of inflammation commonly found in the brains of people with Alzheimer's disease.

The researchers wrote: "Exposure to micro-organisms is critical for the regulation of the immune system."

Since the turn of the 19th century, such exposure had increasingly diminished in wealthier nations due to lack of contact with "animals, faeces and soil".

"The increase in adult life expectancy and Alzheimer's prevalence in developing countries is perhaps one of the greatest challenges of our time," said Dr Fox.

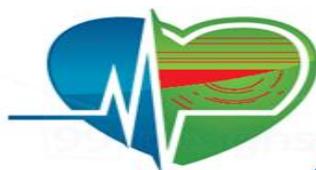
"Today, more than 50 per cent of people with Alzheimer's live in the developing world, and by 2025 it is expected that this figure will rise to more than 70 per cent.

"A better understanding of how environmental sanitation influences Alzheimer's risk could open up avenues for both lifestyle and pharmaceutical strategies to limit Alzheimer's prevalence."

The hygiene hypothesis is normally thought to be most relevant in childhood, when the immune system is still developing. But in the case of Alzheimer's, exposure to microbes across a person's lifetime might be important, say the scientists. This is because regulatory T-cell numbers peak at various points in life, for example at adolescence and middle age.

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