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Season and region of birth linked to heightened childhood celiac disease risk

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Circulating viral infections may help explain the temporal and geographical patterns associated with the risk of developing childhood coeliac disease, conclude Swedish researchers in the *Archives of Disease in Childhood*.

But the role of vitamin D during pregnancy may also have a part to play, they suggest.

They base their findings on a long term study of almost 2 million children up to the age of 15 who had been born in Sweden between 1991 and 2009.

In all, 6569 of these children from 47 hospitals across the country were diagnosed with coeliac disease—a condition in which the small intestine is excessively sensitive to gluten, making it hard to digest food—before the age of 15.

Overall, the risk of diagnosis was around 10% greater among children born in spring (March-May), summer (June-August), and autumn (September-November) than it was among those born in winter (December-February).

But seasonal patterns differed by region. Risk of coeliac disease was highest among those born in the south of the country, where sunlight in spring and summer is intense, than it was among children born in the north of the country, where springs are colder and summers shorter.

Furthermore, children diagnosed before the age of 2 seemed to be at increased risk of the disease if they were born in spring, while those diagnosed after this age were at increased risk if they were born in summer or autumn.

Year of birth was categorised into three periods to see if there were any differences in trends: 1991-1996, when there was an epidemic of new cases; 1997-2002 which followed the epidemic; and 2003-2009 when the epidemic had abated.

This showed that children born in 1991-6 were at increased risk of being diagnosed with celiac disease if they were born during the spring, while children born in 1997-2002 were at increased risk if born during the summer and autumn. Those born in 2003-09 were at increased risk if born in the autumn.

Risk of coeliac disease was consistently higher among girls than it was among boys for all time periods and seasons.

This is an observational study so no firm conclusions can be drawn about cause and effect, added to which the study authors were unable to glean any information on potentially influential factors, such as infections and vitamin D status.

But they nevertheless speculate about possible explanations for their findings.

"One hypothesis for increased [coeliac disease] risk and spring/summer birth is that those infants are more likely to be weaned and introduced to gluten during autumn/winter, a time characterised by exposure to seasonal viral infections," they write.

Viral infections alter intestinal bacteria and increase the permeability of

cells lining the gut, which could prompt the development of coeliac disease, they suggest.

In Sweden, it is well known that the yearly epidemics of respiratory syncytial virus, rotavirus, and flu start in the south of the country and move northwards, which might also explain the associations seen, they add.

Low levels of vitamin D have also been linked to immune related diseases, such as multiple sclerosis, inflammatory bowel disease, and type 1 diabetes, although every child in Sweden is given state funded vitamin D supplements from 1 week of age up to the age of 2 years.

"A remaining possible link to sunlight and vitamin D is that pregnant women who give birth in spring have the lowest levels of vitamin D during late gestation when important programming and development of the fetal immune system takes place," they suggest.

More information: Season and region of birth as risk factors for coeliac disease a key to the aetiology? *Archives of Disease in Childhood*, DOI: 10.1136/archdischild-2015-310122

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