Zika virus could be linked with 'whole spectrum' of disorders

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Study linking virus with severe joint deformities leads experts to say that Zika could be associated with range of problems

A study by scientists in Brazil that suggests a possible link between the [Zika virus](https://www.theguardian.com/world/zika-virus)and rare, but severe, joint deformities in babies has led experts to warn that the virus could be linked to a host of other problems in babies, some of which might only become apparent as they get older.

Experts say the study opens up the possibility that microcephaly, a condition in which babies are born with abnormally small heads, could just be one facet of a congenital Zika virus syndrome.

The Zika virus is primarily spread by mosquitoes and is currently present in more [than 50 countries and territories worldwide](http://www.cdc.gov/zika/geo/active-countries.html), including many in Latin America.

While the implications of Zika virus infection for unborn babies have yet to be fully unravelled, the virus has already been declared to be a cause of the birth defect [microcephaly](https://www.theguardian.com/world/2016/apr/13/zika-virus-confirmed-cause-microcephaly-birth-defect-cdc). But now experts say the virus appears to be linked a severe joint condition seen at birth.

Known as arthrogryposis, the condition is characterised by problems with joint movement and muscle weakness, with joints often fixed in abnormal, curved positions.

The condition is thought to have a number of possible causes, including problems with the movement of the foetus in the womb, which can itself have several origins. But, if the link with Zika is confirmed, it will be the first time the condition has been associated with an infection in the foetus.

“I think this is part of the move from describing microcephaly, which is just really a component of the congenital Zika syndrome, to starting to describe the whole spectrum of the Zika syndrome,” said Laura Rodrigues, professor of infectious disease epidemiology at the London School of Hygiene & Tropical Medicine, who was not involved in the study.

Anthony Fauci, director of the US National Institute of Allergy and Infectious Diseases, said he was not surprised by the findings of the new study and believes many more Zika-linked conditions will be discovered.

“As opposed to linking Zika just to microcephaly there is a whole spectrum which they are now referring to as the [congenital] Zika syndrome, within which is included microcephaly but it is not limited to microcephaly,” he said.

“This [research] is just a very good example of the broadening spectrum of the abnormalities that can occur in children,” he added.

“I can predict to you now that it is likely that the children who look reasonably normal, don’t have any gross formation defects, might later on have issues that relate to subtle things like visual defects, or hearing defects, or intellectual landmarks children get as they develop. So I think the syndrome is going to continue to broaden.”

The research, [published in the BMJ](http://www.bmj.com/content/354/bmj.i3899), followed up on two previous reports that hinted at a link between Zika and arthrogryposis, and involved the study of seven children born during the autumn of 2015, all of whom had the joint condition and displayed a similar pattern of limb abnormalities.

Six of the children had been diagnosed with microcephaly, while all showed brain imaging results consistent with congenital Zika infection, including abnormal brain development, reduced brain volume and a build-up of calcium in certain regions of the brain. Four of the children also showed spinal cord thinning, while some of the children also showed eye or ear abnormalities. For all of the children, other causes of the microcephaly such as HIV, syphilis and rubella were ruled out by tests, suggesting that the likely cause was the Zika virus.

“The pattern of [the] brain images are typical of congenital infections and we excluded other causes of congenital infections,” said Vanessa van der Linden, lead author of the research from the hospital Barão de Lucena in Recife, Brazil. Three of the children have so far been found to have antibodies for the Zika virus, two at the time of writing the study and one since, she adds.

The clustering of the cases in space and time is also suggestive says Rodrigues. “Arthrogryposis is extremely rare, and suddenly there are seven cases and all happened during the [Zika] epidemic,” she said. “I think that it is reasonable to assume that it is part of the [Zika] syndrome.”

When the scientists carried out ultrasound imaging on the children they found that all seven showed no abnormalities in the tissue, cartilage, joint fluid and structures around the joints. That, the authors say, suggests that the arthrogryposis was caused not by a disorder of the tissues, but rather a problem with the nervous system that prevented the foetus from moving around normally in the womb – a mechanism by which foetuses develop their joints and tissues correctly.

“It is damaged nerves that has lead to this rather than muscle damage or joint damage so it links to brain and nervous infection by Zika during pregnancy,” said Jimmy Whitworth, professor of international public health at the London School of Hygiene and Tropical Medicine.

While Whitworth says the evidence for a link between the Zika virus and arthrogryposis is not yet conclusive, he believes that the results of the new study are “compelling”. “It needs to be added to things that doctors think about when they see arthrogryposis – could this be congenital Zika infection that has occurred?” he said.