Dyslexia's Brain Changes May Occur Before Kids Learn to Read

Study findings might help identify at-risk children at younger age

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MONDAY, Jan. 23 (HealthDay News) -- New imaging research shows that the reduced brain activity associated with the onset of dys appears to develop before, not after, a child starts to read.

Key parts of the brain's rear left hemisphere critical to language processing do not undergo activity changes as a consequence of dys the study suggests, but may instead be part of the cause.

The finding could ultimately help clinicians screen for at-risk children at an early pre-reading age, when interventions to reduce the se of the condition might be most effective.

"We already knew that children and adults with a diagnosis of dyslexia show brain alterations within the left posterior -- back -- part brain," said study co-author Nadine Gaab, an assistant professor of pediatrics in the neuroscience program at Harvard Medical School Children's Hospital Boston. "However, it was unclear whether these alterations are a result of dyslexia [that] show up after years of r failure or whether they predate the reading onset," she noted.

"[Here] we could show that they predate reading onset," Gaab said. "This suggests that children are either born with it or that it dev within the first few years of life."

The study, published in the Jan. 23 issue of the *Proceedings of the National Academy of Sciences*, focused on 36 healthy kindergarte aged 5 and 6 years who had not begun to read.

Half of the children were at a high risk for developing dyslexia, as at least one of their immediate family members had been previously diagnosed with the disability. None of the children had difficulty with hearing or vision, and none had a history of either neurological o psychological illness.

After completing standard pre-reading language and vocabulary skills assessments, all of the children participated in a couple of audic identification tasks. First, they were asked to listen to a male or female voice uttering a single word twice and then indicate if the tw sounded the same. Next, they listened to a pairing of words and were asked to indicate if the gender of the voice uttering each succ word was the same.

Throughout the testing, the children also underwent functional MRI (fMRI) to monitor their brain activity, with particular focus on two of the rear, left brain: the bilateral occipitotemporal and left temporoparietal areas. Both have previously been shown to have a role i dyslexia.

The results: Children in the at-risk group were found to have reduced brain activity in the two key brain areas, compared to their pee similar age and IQ who did not have family risk factors.

In addition, the research team found that among at-risk pre-reading children there was no evidence of activity *increases* in key front brain regions previously linked to dyslexia. This, they said, suggested that the brain's method for trying to compensate for the proble associated with dyslexia does not appear to be set in motion until after children begin to read.

"Early identification of children at risk in kindergarten or even before then offers a chance to reduce the clinical, psychological and so implications of reading disability/dyslexia," Gaab said. "Identifying early predictors will also help educators, parents and scientists to fi to support the academic and cognitive development of children with reading disability/dyslexia and may also lead to strategies that w reduce the severity of reading disability."

Guinevere Eden, director of the Center for the Study of Learning and a professor of pediatrics at Georgetown University in Washingto expressed enthusiasm for what she deemed to be "the first study of its kind."

"The question has always been, are these physiological changes the result of dyslexia or are they there to begin with?" said Eden, wh also the immediate past-president of the International Dyslexia Association.

"And so what's interesting about this study, is that by using non-invasive tools, they were able to find that the kind of differences th been shown in older people with dyslexia are apparently already present in children at risk for dyslexia before they even begin to read said.

"And that means they have found a physiological signature for a child who is likely at risk for dyslexia, which will be of great help in dc what everyone really wants to do: identifying and treating children with dyslexia as early as possible," Eden added.

More information

Visit the U.S. National Library of Medicine for more on dyslexia.

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