

Predicting the risk of cognitive impairment in children born prematurely via MRI

September 2 2015

School age children who are born prematurely are more likely to have low mathematical achievement, thought to be associated with reduced working memory and number skills, according to a new study published today in the neurology journal *Brain*.

Researchers assessed up to 224 preterm children at age five and age seven to examine the use of [magnetic resonance imaging](#) (MRI) after birth to identify infants at risk of later academic impairment. The study participants are from Melbourne, Australia and are part of a Murdoch Children's Research Institute study. The authors suggest that identifying infants at risk for low mathematical achievement at school age would assist clinicians in directing families to targeted early intervention and surveillance for educational difficulties many years before impairment is detected in school. Neonatal MRI is a useful method of predicting cognitive outcome in preterm children, according to the study.

The researchers were looking for associations between diffusion MRI and local [brain](#) volumes on neonatal MRI with number skills and [working memory](#) in [childhood](#). Neonatal brain microstructure was positively associated with working memory scores in childhood, while increasing tissue volumes in the left insula and putamen regions of the neonatal Jacobian map were positively associated with higher number skills scores in childhood. This meant they were able to identify brain microstructure and regions in the neonatal brain that are associated with childhood mathematical learning, as Henrik Ullman, co-author of the paper, explained:

"Our findings demonstrate that brain microstructure and increased tissue volumes in regions located around the insula and putamen during the neonatal period are associated with better early mathematics in preterm children."

Megan Spencer-Smith, co-author of the paper, went on to say that: "this knowledge could assist in identifying infants at risk of mild academic impairments who would benefit from monitoring and referral to early intervention. Such an approach could assist in reducing the number of [preterm children](#) performing below their peers in mathematics." The study also suggests that identifying these children early could reduce behavioural and emotional problems in childhood, as well as reducing well-being and mental health problems in adulthood.

More information: "Neonatal MRI is associated with future cognition and academic achievement in preterm children", *Brain*: [DOI: 10.1093/brain/awv244](#)

Provided by Oxford University

Citation: Predicting the risk of cognitive impairment in children born prematurely via MRI (2015, September 2) retrieved 20 April 2024 from <https://medicalxpress.com/news/2015-09-cognitive-impairment-children-born-prematurely.html>

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