

Kids with chronic kidney disease have lower IQs and poorer educational outcomes

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Chronic kidney disease causes irreversible deterioration in renal function, often requiring dialysis or transplant surgery.

In children, genetic causes account for the greatest number of cases.

Published today in the *Clinical Journal of the American Society of Nephrology* the research shows children with CKD are at greater risk of deficits in academic skills, visual and verbal memory, and [executive function](#).

The analysis included 34 studies of over 3000 children and adolescents under the age of 21 years.

Key findings

"The IQ of children with CKD is low to average," says the study's lead author, Dr Kerry Chen of the University of Sydney's Centre for Kidney Research.

Compared to healthy children, children with CKD were on average 10 IQ points lower regardless of their stage of [kidney disease](#).

The IQs of children who received a [kidney transplant](#) were 11 points lower than their healthy counterparts and for those on dialysis, their IQs were 16 points lower.

What can be done?

"Educational support programs should specifically aim to minimise deficits in attention, memory, and executive function as a preventative measure," said Dr Chen.

"Families, educators and health teams also need to work together to ensure that CKD treatments for children do not disrupt their schooling too much or too often. Developing a comprehensive dialysis and post-transplant rehabilitation program would help these children."

How might chronic kidney disease and dialysis affect IQ and educational outcomes

While the evidence is not conclusive, experts have some hunches about how [chronic kidney disease](#) might affect IQ and educational outcomes in children and young adults.

"Firstly, increased plasma levels of uremic solutes arising from [kidney](#) disease may impair synaptic development," says Chen. "Dialysis may also lead to cognitive impairment through rapid changes in blood pressure. Also, the pathological effects associated with end-stage kidney disease, such as anaemia, hypertension and malnutrition, may reduce cognitive function among children on dialysis compared to other CKD stages.

"On top of that, treatments for CKD may compromise academic achievement. Firstly, the frequency of sleep disturbances in children with CKD may result in poor concentration, excessive daytime sleepiness and lower academic performance.

"Secondly, the interactions of complex medication routines and strict

dialysis cycles may decrease attentional control, working memory, and executive function-cognitive domains that are important to [children's](#) ability to acquire, understand, and retain information in social and educational environments.

"Finally, ongoing [dialysis](#) sessions and recovery from transplant surgeries may reduce the amount and regularity of time spent in the classroom, with chronic absenteeism potentially preceding loss of interest, withdrawal, and poor school progression."

Dr Kerry Chen holds appointments at the University of Sydney's School of Public Health, The Kids Research Institute and Westmead Hospital.

More information: "Neurocognitive and Educational Outcomes in Children and Adolescents with Chronic Kidney Disease," [DOI: 10.2215/CJN.09650917](#)

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