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UCT study finds that malnutrition and pneumonia are major contributors to infant mortality



Dr Shrish Budree

Photo: Supplied

A University of Cape Town (UCT) study has found that malnutrition and pneumonia are major contributors to under-five mortality, with evidence suggesting the gut microbiome plays an important role in developing these conditions.

In his PhD thesis in Paediatrics and Child Health, Dr Shrish Budree focused on investigating growth in early childhood, and associations of the gut microbiome with growth and pneumonia. His thesis, titled: "The association of early childhood nutrition and growth with the intestinal microbiome and pneumonia", starts by identifying a high prevalence of malnutrition including stunting and overweight/obesity in a South African birth cohort.

Using robust longitudinal growth data and mixed-effects modelling, he shows that maternal factors and birth weight contribute to poor growth during infancy. He reports poor feeding practices during infancy, including low rates of exclusive breastfeeding and high consumption of sugar-sweetened beverages.

"The overall aim of this research was to determine factors that affect the health of infants and young children residing in peri-urban South Africa. This study was a part of the larger birth cohort, the Drakenstein Child Health Study. I specifically investigated the impact of maternal health during pregnancy, the child's health at birth, for example birth weight, feeding practices during the first year of life and the intestinal microbiome on growth during the first five years of life. I additionally investigated the role of the intestinal microbiome in the development of pneumonia during childhood," said Dr Budree.

"This research was an opportunity to identify modifiable risk factors related to child health and to study the role of the intestinal microbiome on child health. The intestinal microbiome refers to the collection of all the microbes and their accompanying genetic material within the gastrointestinal tract. This includes bacteria, viruses, fungi and archaea, that significantly contribute to health and disease. Studying the microbiome opens the opportunity to develop future treatments aimed at restoring a healthy microbial community to improve health," he said.

Budree obtained his MBCHB from UCT. Thereafter, he earned his Diploma in Child Health, specialisation in paediatrics (FCPaeds) and subspecialty training in paediatric gastroenterology (Cert. Paeds. Gastro.) from the Colleges of Medicine, SA. His work has been instrumental in the development of microbiome therapies. He currently resides in Boston, Massachusetts, US, working on new treatments for gastrointestinal diseases.

Budree believes that identifying risk factors that impact growth and the risk of infections in children could lead to the implementation of programs and policies that will address these risk factors to ultimately improve child health.

"The most interesting and novel findings were that there was a specific pattern of intestinal microbiome disruption that correlated with poor growth and the risk for development of childhood pneumonia. Since I had data at multiple time points, I was able to show that children who developed pneumonia had a disrupted intestinal microbiome prior to the onset of their pneumonia. This raises the question of whether a disrupted intestinal microbiome – from antibiotic use, mode of delivery, breast milk exposure etc – predisposes children to the development of malnutrition and childhood pneumonia," said Budree.

Finally, through longitudinal sequencing of the gut microbiome, he shows distinct microbiome compositions in children with stunting and pneumonia compared to healthy children. These findings will help inform preventative and therapeutic strategies for malnutrition and pneumonia, including development of novel microbiome therapies.

Budree graduated on Tuesday, 9 September 2025 at Sarah Baartman Hall.

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