

MEDIA RELEASE

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Nutritional supplementation before and during pregnancy reduces early childhood obesity

6 March 2024 – In an important step towards understanding and preventing childhood obesity, researchers from the Yong Loo Lin School of Medicine at the National University of Singapore (NUS Medicine), the Singapore Institute for Clinical Sciences, University of Southampton, and University of Auckland have discovered that the nutrients mums receive before and during pregnancy can make a real difference to how much weight their children put on in their first years of life.

The research study is part of the [NiPPeR study](#), that recruited soon-to-be mothers in three countries – Singapore, New Zealand, and the United Kingdom. Half the mothers in the study received an enriched supplement including vitamins B2, B6, B12, D, probiotics and myoinositol, in addition to ingredients of a standard pregnancy supplementation. The other half were in a control group and received standard pregnancy supplementation. Neither the mothers nor their medical teams knew which group they were in. Over 550 women delivered babies who were followed-up closely during infancy.

When researchers checked in on the children at age two years old, they found half as many children with obesity in the cohort whose mothers were in the enriched supplement group, compared to the control group (nine percent versus 18 percent). In addition, children of the mums in the enriched supplement group were almost 25 percent less likely to have experienced ‘rapid weight gain’ - a condition which often leads to obesity.

Co-author Associate Professor Chan Shiao-Yng from the Department of Obstetrics and Gynaecology at NUS Medicine, explained that the effects of a mother's nutrition during pregnancy might not show in the baby right away.

“As the child grows, the things that happened in the baby's body while in the womb become apparent. These early events, sometimes called ‘foetal programming’, can influence how the child reacts to an unhealthy lifestyle, like eating lots of fatty foods and not getting enough exercise. So these events in the womb can make some children more likely to become overweight.”

Professor Wayne Cutfield, Professor of paediatric endocrinology at the Liggins Institute, and one of the leaders of the research emphasised the significance of these findings as the effects of obesity are more long-lasting than anticipated previously.

“In a world of obesity, our data suggests supplementing mums before and during pregnancy can have benefits way beyond the pregnancy and for the women involved; it can impact their baby into childhood and potentially beyond.”

“The rates of childhood obesity are continuing to rise in many countries, particularly in less advantaged groups. Preventing obesity is critically important, because treating obesity is so much more difficult. The new findings suggest that the period before and during pregnancy may provide a ‘special opportunity’ – a time when supporting better nutritional status for the mother could have lasting benefits for her child,” Professor Keith Godfrey, co-author and chief investigator of the NiPPeR Trial, from the University of Southampton added.

For the next research stage, the team aims to identify which of the various nutrients in the supplement are producing the beneficial impacts in terms of reducing or preventing unhealthy weight gain.

“The supplement contained seven additional micronutrients and any of the seven (or a combination of them) could have impacted the metabolism and development of the children and the likelihood of obesity. We do not yet know the precise mechanism, but there’s evidence some of the micronutrients are associated with body metabolism in pregnancy. We have started analysing the data and we hope to be able to drill down into which component or components are most critical,” Prof Cutfield said.

Associate Professor Chan Shiao-Yng added, “We are also conducting research on how the supplement may have altered the way genes are expressed at the molecular level. These changes occurring when the baby was in the womb may persist as the child grows up.” Professor Keith Godfrey stated, “There is more and more evidence that improving the health and development of the next generation of children requires restructuring of health care in ways that support better nutrition and health behaviours in future mothers and fathers.”

There is also ongoing work to look at the NiPPeR supplement impacts on the children when they are between six and eight years of age. “It is exciting to see that treatment in pregnancy can have a long legacy of benefits into childhood. We will continue to follow these children to see if this impact is maintained,” Prof Cutfield added.

The NiPPeR study is a collaboration between the Liggins Institute at the University of Auckland, the University of Southampton, the NIHR Southampton Biomedical Research Centre, the NUS Yong Loo Lin School of Medicine, and the Agency for Science, Technology and Research (A*STAR) in Singapore.

It involves many different research strands into areas of the health and behaviour of the mothers and children involved. The researchers targeted a cross-section of healthy women representing the general population in the three countries.

The latest findings, on the impacts on obesity, were published in January 2024 in the highly-regarded peer-reviewed medical journal BMC Medicine, titled [*Impact of preconception and antenatal supplementation with myo-inositol, probiotics, and micronutrients on offspring BMI and weight gain over the first 2 years.*](#)

For media enquiries:

Amanda YAP
Assistant Manager, Communications
Yong Loo Lin School of Medicine
National University of Singapore
Email: medajy@nus.edu.sg

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Our multidisciplinary and real-world approach to education, research and entrepreneurship enables us to work closely with industry, governments and academia to address crucial and complex issues relevant to Asia and the world. Researchers in our faculties, research centres of excellence, corporate labs and more than 30 university-level research institutes focus on themes that include energy; environmental and urban sustainability; treatment and prevention of diseases; active ageing; advanced materials; risk management and resilience of financial systems; Asian studies; and Smart Nation capabilities such as artificial intelligence, data science, operations research and cybersecurity.

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About the NUS Yong Loo Lin School of Medicine (NUS Medicine)

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Through a dynamic and future-oriented five-year curriculum that is inter-disciplinary and inter-professional in nature, our students undergo a holistic learning experience that exposes them to multiple facets of healthcare and prepares them to become visionary leaders and compassionate doctors and nurses of tomorrow. Since the School's founding in 1905, more than 12,000 graduates have passed through our doors.

In our pursuit of health for all, our strategic research programmes focus on innovative, cutting-edge biomedical research with collaborators around the world to deliver high impact solutions to benefit human lives. The School is the oldest institution of higher learning in the National University of Singapore and a founding institutional member of the National University Health System. It is one of the leading medical schools in Asia and ranks among the best in the world (Times Higher Education World University Rankings 2024 by subject and the Quacquarelli Symonds (QS) World University Rankings by subject 2023).

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