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KKH partners Lien Foundation and AMILI in first interventional study on metabolic and psychological health in women

Healthy Early Life Moments in Singapore (HELMS) study adopts a life course model to optimise health outcomes in mother and child

1 April 2022, Singapore – KK Women's and Children's Hospital (KKH) has partnered Lien Foundation and AMILI to launch Singapore's first interventional study on women's psychological well-being and metabolic health – two aspects that are fast evolving as health threats for both mother and child from preconception to long after the baby is born.

The Healthy Early Life Moments in Singapore (HELMS) study looks into a new model of care that offers early intervention to improve mental and metabolic health in women even before they become pregnant.

Mental and metabolic health challenges have been brought about by rapid economic progress, lifestyle changes and societal expectations.

Professor Fabian Yap, Head of Endocrinology Service, Department of Paediatrics, KKH said, "HELMS aims to prevent metabolic disease from developing or progressing in families. It adopts a life course approach to optimise health outcomes in women and their children during a crucial stage of life.

"With early intervention to establish the right habits and conditions prior to conception, we can improve the chances of women getting pregnant and minimise the risk of pregnancy complications. There is also growing evidence that exposure to metabolic disease risk factors can happen during prenatal, intrauterine or postnatal life and this can shape the offspring's health, increasing disease risks across generations. HELMS presents an opportunity to break the vicious cycle of disease and chronic conditions in future generations."



With a multidisciplinary team, HELMS will support women and their families with reliable information and evidence-based care, from preconception, through pregnancy and the postnatal phase.

Early intervention to optimise mother and child health

HELMS is a direct response to findings from two earlier studies - Singapore PREconception Study of Long-Term maternal and child Outcomes (S-PRESTO) and Growing Up in Singapore Towards healthy Outcomes (GUSTO). These studies found that for the pregnant women who were overweight and obese, there was a clear link between the mother's health before and during pregnancy, and the long-term impact on her child's health.

Another KKH study¹ also showed the adverse impact of an unhealthy metabolic status on the chances of getting pregnant. Metabolically unhealthy women cannot properly control blood sugar levels resulting in insulin resistance, higher blood lipid levels and blood pressure – conditions that are barriers to the family planning process. This was more pronounced in the women who were overweight or obese.

In the area of mental health, it was found that depression and anxiety that exist in preconception, continue to be present for women during and after pregnancy, thereby predisposing them to pregnancy complications². There was also strong correlation between maternal anxiety and the risk of childhood psychological and cognitive difficulties, that can persist through preschooling age and beyond³.

These findings reinforce the need for early, preventive intervention of metabolic and mental health disorders from preconception, to optimise both maternal and child health.

¹ Metabolic health status and fecundability in a Singapore preconception cohort study, *American Journal of Obstetrics and Gynaecology*, 16 December 2021.

² Preconception origins of perinatal maternal mental health, *Springer*, 23 January 2021.

³ Maternal antenatal anxiety and electrophysiological functioning amongst a sub-set of preschoolers participating in the GUSTO cohort, *BMC Psychiatry*, 12 February 2020.



Industry support for HELMS

Over the next four years, the Lien Foundation will inject \$4 million into the HELMS study of 500 overweight women. The study will chart the participants' course from preconception readiness, through two years of postnatal care of the mother and child.

Lee Poh Wah, CEO, Lien Foundation said, "Singapore has been grappling with fertility rates below replacement levels, a demographic challenge of national priority. With human capital being our most valuable resource, the quality of birth is no less a priority than boosting birth numbers alone.

"We see HELMS as transforming the current paradigm of how we care for mothers and their children. Leveraging on the latest bioscience and behavioural science, HELMS has the potential to improve the quality of birth by hacking preconception, through birth and postnatally, to optimise child and maternal outcomes. Given KKH's national share of childbirths, there is potential to eventually scale this pilot across different care settings, enabled by a digital platform for future mothers to track their journey. We are optimistic this will contribute to the efforts of the government's Taskforce on Child & Maternal Health and Well-being."

The HELMS study is also supported by AMILI in Singapore, a pioneer for gut microbiome innovation and therapy in Southeast Asia, to examine the role of maternal and infant dietary intakes and effects on metabolism and immune function through the gut microbiome.

Associate Professor Jeremy Lim, CEO and Founder, AMILI Pte Ltd said, "AMILI is pleased to partner KKH in this very meaningful initiative. Hippocrates said 'All diseases begin in the gut'. It is crucial that we in Singapore optimise diet and nutrition in mothers and their children to enable their fullest potential to be realised."



Sustainable changes toward optimal health outcomes

HELMS study participants will focus on mental and metabolic health through nutrition and lifestyle habits, and be empowered to make sustainable changes to improve the six Ps for better health⁴: **P**ortion, **P**roportion, **P**leasure, **P**eriod, **P**hysical activity and **P**sychology. [see **Annex 1**]

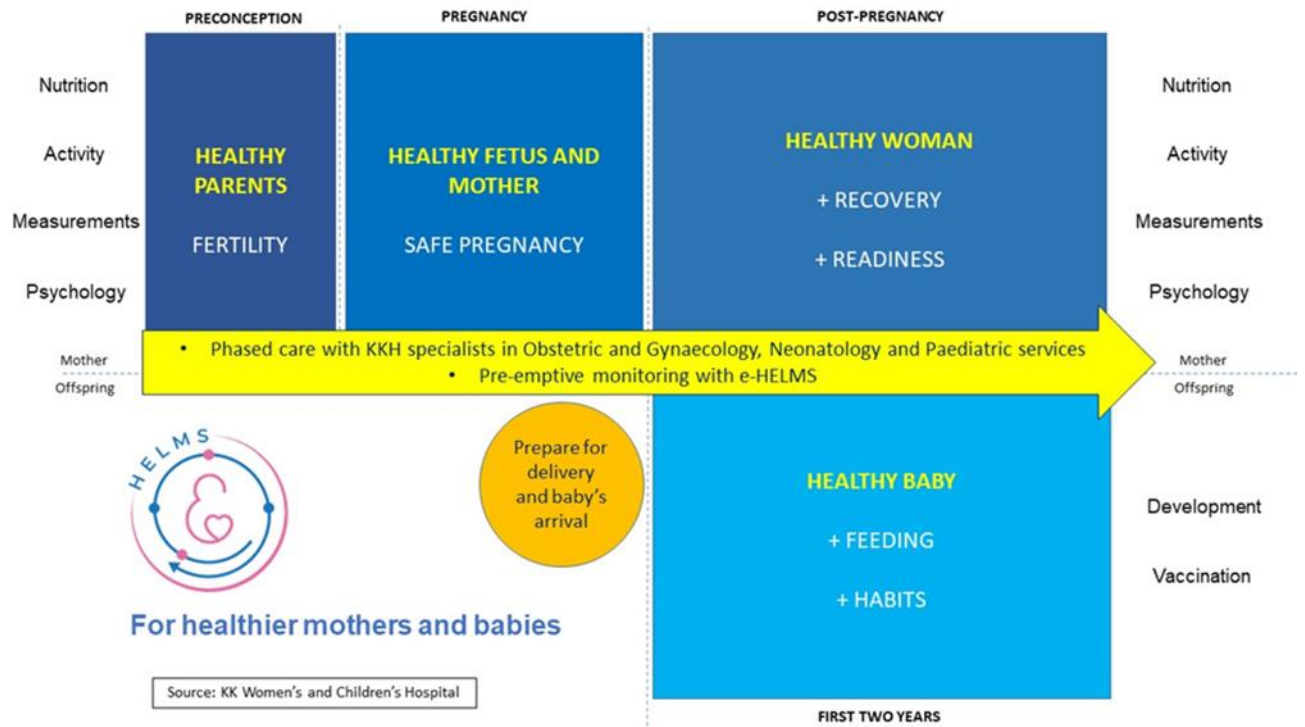
Using a digital platform, e-HELMS, which is accessible via the participants' mobile device, and a wearable accessory, women will keep track and learn the impact of their daily sleep patterns, activity levels, dietary choices, and readiness for the next day. Women with e-HELMS will also benefit from remote healthcare support and join a community to make sustainable lifestyle and behavioural changes toward optimal long-term health for themselves and future generations.

Professor Jerry Chan, Director, SingHealth Duke-NUS Maternal and Child Health Research Institute said, "Care for the mother has previously been geared to start after the woman gets pregnant. However, interventions targeted at this stage of pregnancy have failed to improve outcomes such as gestational diabetes and preterm births among others. Early intervention in the preconception phase has shown promise in some overseas trials, and HELMS has been designed to intervene as early as possible to maximise benefits in the mother and her child. This augurs well to improve the health of our population from the very beginning of life."

For couples planning to conceive, the KKH Preconception Clinic continues to offer an assessment of a couple's reproductive health, give timely lifestyle advice and optimise their fertility.

HELMS is one of the main programmes under the SingHealth Duke-NUS Maternal and Child Health Research Institute (MCHRI) at KKH. Those interested in participating in the study can email lai.lan.tian@kkh.com.sg or call 6394-3991 for more information.

⁴ Developing a lifestyle intervention program for overweight or obese preconception, pregnant and postpartum women using qualitative methods, *Nature Research*, 15 February 2022.



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About KK Women's and Children's Hospital

KK Women's and Children's Hospital (KKH) is Singapore's largest tertiary referral centre for obstetrics, gynaecology, paediatrics and neonatology. The academic medical centre specialises in the management of high-risk conditions in women and children.

Driven by a commitment to deliver compassionate, multidisciplinary care to patients, KKH leverages innovation to advance care. In 2021, the hospital launched the SingHealth Duke-NUS Maternal and Child Health Research Institute (MCHRI). This centre of excellence aims to support the growth of every woman and child to their fullest potential through research and innovation, to transform national health in Singapore and the region.



Some of the hospital's recent breakthroughs include uSINE®, a landmark identification system for the administration of spinal epidural, the discovery of new genetic diseases like Jamuar Syndrome, and a series of guidelines for women and children to improve metabolic health.

The Academic Medical Centre is also a major teaching hospital for Duke-NUS Medical School, Yong Loo Lin School of Medicine and Lee Kong Chian School of Medicine. In addition, KKH runs the largest specialist training programme for Obstetrics and Gynaecology, and Paediatrics in Singapore. The programmes are recognised by the Accreditation Council for Graduate Medical Education International (ACGME-I), and are highly rated for the quality of clinical teaching and translational research.

KKH was founded in 1858. For more information, visit <https://www.kkh.com.sg/>

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About Lien Foundation

The Lien Foundation is a Singapore philanthropic house noted for its model of radical philanthropy. It breaks new ground by investing in innovative solutions, convening strategic partnerships and catalysing action at the intersection of health and social care. In the area of early childhood development, a key tenet of the Foundation's work is grounded in the belief of providing all children with a more equitable start. [Circle of Care \(CoC\)](#), in partnership with Care Corner and NUH's Child Development Unit, aims to support children from low-income backgrounds for their transition to primary school through an integrated care model helmed by social workers partnering an interdisciplinary team of educators, therapists, health specialists and community partners. CoC now works across more than 20 preschools including MOE Kindergartens, and is a consultant to the national KidSTART programme. The [Canossian CoC](#) model uses an in-house Child Development Unit to integrate services across the preschool, primary, special education and after-school sector within the compound of Canossaville Children and Community Services. [Kindle Garden](#), Singapore's first purpose-built inclusive preschool, was established in partnership with AWWA. [Mission I'mPossible 2](#) is a joint programme with PCF and KKH that will screen children for developmental issues from as young as 2 months old. It builds on an earlier pilot, which was adapted by the government as the Development Support and Learning Support programmes. The Foundation also established the [Centre for Holistic Initiatives for Learning and Development \(CHILD\)](#) together with NUS Medicine to provide a multi-disciplinary approach to translating critical research to intervention, with the aim of improving the health and developmental outcomes of children in Singapore and beyond.

For more information, visit <https://www.lienfoundation.org/>

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About AMILI

Singapore-based AMILI is Southeast Asia's first and only precision health company focused on gut microbiome innovation. It applies advanced analytics to its database, the world's largest multi-ethnic, Asia-centric gut microbiome database to support fundamental discovery in microbiome science and application of the gut microbiome towards human health in Asia. AMILI founders pioneered microbiome transplant in the region and continue to advance microbiome modifying interventions to treat diseases and improve health.

For more information, visit <https://www.amili.asia/>



Annex 1 6Ps for better health

6P is a newly developed nutrition concept in promoting metabolic health, and is applied in Healthy Early Life Moments in Singapore (HELMS) intervention. HELMS is a programme initiated by KKH, designed to take care of a woman's health before, during and after her pregnancy, and incorporate a care plan that involves both mother and child during the first 18 months of life.

The 6P nutrition recommendations are designed based on mental models for nutrition, with an overview to the underlying knowledge structure of how diet and nutrition are related to metabolic health.

Portion: Control the overall amount of food on a plate per meal. Avoid double portions. The same portion on a smaller plate is aplenty.

Proportion: Emphasise leafy and non-starchy vegetables intake of at least half a plate per meal. These have the lowest energy density (calorie amount) yet are abundant in nutrients.

Pleasure: Control intake of total snacks and sugary drinks to less than thrice a day -- ideally not more than once a day. Consider to swap calorie dense snacks with fruits, yoghurt, and a handful of nuts/seeds.

Phase: Control food intake after 8pm to less than half of total calorie intake in a day. Practise predominantly daytime eating.

Physical activity: Healthy nutrition is about balance between calorie input and output. Engage in at least 150 minutes of physical activity each week.

Psychology: Switch the focus by listening to your body and how you feel. Ask yourself, 'Am I ready to make a lifestyle change for my own well-being and the good of my loved ones?' Do not focus on weight.



Glossary of some/useful terms in Chinese

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| Healthy Early Life Moments in Singapore (HELMS) | 新康母健幼之旅 |
| e-HELMS and wearable accessory | 电子版—新康母健幼之旅与可佩戴物 |
| KK Women's and Children's Hospital (KKH) | 竹脚妇幼医院 |
| <ul style="list-style-type: none"> Professor Fabian Yap, Head of Endocrinology Service, Department of Paediatrics, KKH Professor Jerry Chan, Director, SingHealth Duke-NUS Maternal and Child Health Research Institute | <ul style="list-style-type: none"> 叶国平教授，内分泌科主任兼资深顾问医生，竹脚妇幼医院 陈国贤教授，处长，新保集团杜克--国大妇幼保健研究所 |
| Lien Foundation | 连氏基金会 |
| <ul style="list-style-type: none"> Lee Poh Wah, CEO, Lien Foundation | <ul style="list-style-type: none"> 李宝华，总裁，连氏基金会 |
| AMILI Pte Ltd | 爱美力私人有限公司 |
| <ul style="list-style-type: none"> Associate Professor Jeremy Lim, CEO and Founder, AMILI | <ul style="list-style-type: none"> 林方源副教授，总裁兼创办人，爱美力 |
| SingHealth Duke-NUS Maternal and Child Health Research Institute | 新保集团杜克--国大妇幼保健研究所 |
| Reproductive, metabolic and mental health, neurocognitive development | 生殖、代谢和心理健康, 神经认知发展 |
| Gut microbiome | 肠道微生物 |
| KKH Preconception clinic | 竹脚妇幼医院孕前健康诊所 |
| 6Ps for better health: <ul style="list-style-type: none"> Portion, Proportion, Pleasure, Phase, Physical Activity, Psychology | 六 P 促进健康: (份)量 · (比)例 · (欢)愉 · 时(间) · (运)动 · 心(态) |

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