

MATERNAL HEALTH FOCUS YIELDS FEWER UNDERWEIGHT INFANTS

Within four years researchers were able to significantly **REDUCED THE INCIDENCE OF LOW BIRTH WEIGHT**, and its lifelong disease implications, in one Japanese city.

In Japan, almost one in ten babies were born underweight in 2018. Very low birth weight is linked to an increased risk of developing disabilities, diabetes and other lifestyle-related diseases in adulthood, explains Masanori Yoshino, a project leader at the Food and Healthcare Master programme at the Center of Innovation (COI) at Hokkaido University.

In 2018, Japan had the second highest percentage of low birth weights in the OECD, just shy of Greece's 9.6%. One of the factors at play are nutritional deficiencies in young Japanese women. One in five Japanese women in their 20s have a body mass index score of less than 18.5, which is considered underweight. The WHO has warned that many people are unaware how important fetus and newborn nutrition is to long-term health.

Yoshino's group has recently had dramatic success in reducing the number of low birth weights in Iwamizawa City, on the island of Hokkaido. In 2019, low birth weight incidence fell from 10.4% in 2015 to 6.3%.

Yoshino attributes the achievement to a programme that highlights risks to mothers through a flagship COI project

that collects data on maternal and child health and a survey called the Survey on Mothers, Infants, and Children's Lives and Environments in Iwamizawa (SMILE Iwamizawa).

NATAL NUMBERS

The SMILE survey was launched in 2017 as part of an initiative aimed at making the town into a great place to raise children, explains Akiko Tamakoshi, a research leader at the COI and a specialist in public health at the Faculty of Medicine at Hokkaido University. Iwamizawa City has a population of 80,000, but its total fertility rate was just 1.26 per couple in 2018, among the lowest of Japan's municipalities.

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The city's officials played a central role in promoting the survey, which continues to be open to all resident mothers and their babies. So far, about 150 pregnant women have participated. "Encouraging behavioural change is a key

objective," explains Yoshino, who is also a senior project manager at the Research and Development Group at Hitachi. Based on the questionnaires, the city's public health nurses provide the women with meticulous advice on how to change their eating habits while explaining the risks of low birth weights in detail. Hitachi has also developed a smartphone app for pregnant and nursing mothers to help provide useful information, including a free consultation from public health nurses about motherhood stressors.

The survey is also collecting samples of stool, blood, urine, breast milk and umbilical blood to find out what affects a mother and child's health. These samples are taken periodically from the mothers through the pregnancy until about a month after birth, while stool samples are collected from the children, along with questionnaires, until they reach school age.

The most innovative approach, Yoshino says, is the stool samples taken from mothers and babies to investigate how food and bacterial flora in a mother's intestine influences their child's development. Mathematicians

and data scientists are also analysing a wide range of data using artificial intelligence to enable predictions about a child's future health.

Although the COI project ends in March 2022, Iwamizawa City and some other COI participants plan to continue the survey to help construct a big data platform in future; they add that the stool and other biological samples can be frozen for roughly 30 years. Information collection on the children, including questionnaires, health data, and stool sampling is expected to continue until puberty.

The initial sample analysis findings are yet to be released, but Yoshino says the research team aims to develop a simple kit that allows the user to easily see testing results to identify dietary problems.

BEFORE BIRTH

A future focus will be to encourage preconception care, says Tamakoshi. "Many women don't know about maintaining their bodies so they can get pregnant safely," she explains.

Led by Hokkaido University and Hitachi, about 30 universities, research institutes, and companies are currently



Semi-rural Iwamizawa City, with a population of 80,000, had a fertility rate of 1.26 per couple in 2018, which is among the lowest in Japan.



Very low birth weights are linked to increased risk of developing diseases in adulthood; an intervention targeting maternal health was able to reduce underweight babies by 4.1%.

participating in the six-year COI programme. A number of research projects are underway to create systems to encourage self-healthcare, develop food and exercise programmes tailored for personal needs and establish new health standards with advanced research and technologies.

The key theme is promoting a nutrition system that takes advantage of Hokkaido's

rich agricultural and marine resources. "We are made from what we eat, so it's important to tackle Japan's health problems by encouraging people to think more seriously about food," says Tamakoshi.

The number of newborn babies in Japan has also more than halved compared to half a century ago, reaching a record low in 2020. The birth weight issue is also a more recent

construct, with the low birth weight figure sitting at a lower 5.2% in 1980. "We need to raise people's awareness that the dwindling and ageing population is not someone else's problem. We will reinvigorate Japanese society faster if women can have children when they wish and parents can enjoy healthy parenting without anxiety," says Yoshino.

Against this backdrop,

participants in the Food and Healthcare Master programme at the COI at Hokkaido University are striving to create a regional model where all citizens, especially mothers and children, can be helped to live a happy, healthy life. ■

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