

Nutritional programming: Mother's diet and baby's health

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Pregnancy is a time of constant change as the new baby develops in the mother's womb. However, have you considered that the food the mother eats during pregnancy can affect her child's health even decades later? Understanding such 'nutritional programming' may help prevent diet-related diseases early on.

Programming health before birth

For some time scientists have suggested that the nutritional conditions that exist while a baby is developing in the mother's womb, and the nutrition it receives during infancy, affect a person's development and future health.¹ This seems to be especially true for some chronic diseases such as heart disease and diabetes. It is thought that there are critical periods during pregnancy and infancy where 'nutritional programming' occurs.

Research into nutritional programming

The research into nutritional programming (or the 'foetal origins of disease' as it is sometimes known) is growing rapidly.²⁻⁵ In particular, a study of survivors of the Dutch famine of 1944-1945 showed that when pregnant women were exposed to famine conditions, their children were more likely to develop type 2 diabetes, obesity, hypertension and cardiovascular disease.²

The people of the Dutch Famine cohort are still being followed and interesting findings continue to be revealed. For example, it was recently shown that those who were exposed early prenatally – during the first 16 weeks of gestation – to the famine prefer eating fatty foods, which could increase the risk of developing high blood cholesterol if high in certain saturated fatty acids or trans fatty acids. But also, those people tended to be less physically active.²

It is clear from this research that changes in nutrition at specific stages of pregnancy can result in very different outcomes for the child's health. Currently two EU-funded projects, EDEN (Study of pre- and early postnatal determinants of the child's development and health) and EARNEST (Early Nutrition Programming Project) are looking in detail at these issues.^{3,4}

What aspects of development and health are affected by nutritional programming?

Many aspects of a newborn's health and wellbeing seem to be affected by the mother's nutritional status, her weight before pregnancy and how much weight she gains during pregnancy. This in turn affects the size of the baby at birth and also has an influence on whether the baby is born prematurely. It is known, for example, from several population studies that small size at birth is associated with greater risk of developing cardiovascular disease.

One study from the EARNEST project found that eating a healthy diet during pregnancy, including some good sources of omega-3 fats (e.g. oily fish such as salmon, herring and mackerel) may give some protection against chronic diseases such as asthma, possibly by having a beneficial effect on the immune system.⁴

Other studies have shown that a high intake of omega-3 fats during pregnancy benefits the growth of the baby before birth and also reduces risk of preterm delivery, but these did not take the mother's body mass index (BMI) into account. The EDEN project has examined in detail the type of fat a woman eats just before and during pregnancy and the growth of the unborn child. In particular, it would seem that in overweight women, a higher pre-pregnancy intake of omega-3 fats (relative to total polyunsaturated fat intake) is associated with improved (closer to normal) foetal growth.³

Beyond birth

Health in adulthood may also be determined to some extent by nutrition during infancy. Breastfeeding is optimal for the baby for a number of psychological and physiological reasons. Studies have found that breastfed infants are less likely to become obese as adults, and 5-7 months of breastfeeding seem to produce the most favourable outcome.⁵ This is in line with the World Health Organization's recommendations advocating exclusive breastfeeding for the first 6 months of life.⁶

Clearly, more research is needed to understand what could be the optimal diet during pregnancy and infancy, but currently, there appears to be strong evidence that a balanced diet and a healthy weight during pregnancy programmes many aspects of good health in infancy and beyond.

Further information:

[EARNEST website](#)

[EDEN publications](#)

References

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