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Prof. Jacob C. Seidell was appointed as full professor (2002–present) and head of the Institute for Health Sciences (2003–2013) at the VU University in Amsterdam. Since 2013 he is appointed as one of the two distinguished ‘university professors’ at the VU University and co-director of Sarphati Amsterdam, a multidisciplinary research institute that focuses on healthy development of children through healthier lifestyles and environments.

He obtained his MSc (1983) and PhD (1986) at the Department of Human Nutrition at the University of Wageningen, the Netherlands. He was awarded a senior research fellowship by the Royal Academy of Arts and Sciences (KNAW) for the period 1988–1992. In this period he worked as a postdoc at Sahlgren’s Hospital, Göteborg, Sweden and the National Institute on Aging in Baltimore, US. From 1992–2002 he was head of the Department for Chronic Diseases Epidemiology at the National Institute for Public Health and the Environment in Bilthoven, The Netherlands

His research focuses on the understanding of determinants of food choice and the effectiveness of (policy) interventions in the context of the prevention and management of non-communicable diseases in general and of obesity in particular.

He (co)–authored well over 500 scientific papers and chapters in books on these topics but he also writes columns for leading national newspapers and, together with psychologist Jutka Halberstadt, published three popular books on obesity (2011) and nutrition (2014, 2018) for the general public.

He chaired numerous committees which produced dietary guidelines for the general population as well as for people with diabetes or obesity and he is a frequent consultant to the World Health Organization on these matters.

He has served as president-elect and as president (1992–2000) of the European Association for the Study of Obesity and was editor-in-chief of the “European Journal of Clinical Nutrition” (1996–2006) and “Public Health Nutrition” (2006–2014). He is a member of the Royal Academy of Arts and Sciences (KNAW).

Lifelong impact of nutrition in the first thousand days after conception

Chronic noncommunicable diseases such as type 2 diabetes, cardiovascular disease and obesity, are reaching epidemic proportions worldwide. These are accompanied by severe impairment of quality of life and huge cost of medical care. Particularly those with a relatively low socio-economic position are at increased risk for these chronic diseases. In addition to treatment, adequate prevention targeted at high risk groups and high risk individuals is a necessity.

Prevention deals with behavioral and environmental determinants of these diseases. Smoking, excessive use of alcohol, lack of physical activity and unhealthy diets are particularly harmful behaviors that are largely blamed for these global epidemics. These in turn are heavily influenced by physical, economic and socio-cultural environments that are related to increased urbanization and globalization of markets. The World Health Organisation has estimated that about 80 percent of these chronic noncommunicable diseases can be prevented by healthier lifestyles.

The World Health Organization also stresses the importance of a lifecourse approach to address the prevention of these diseases. The life course starts at conception. Especially the first thousand days, from conception until the second birthday, are considered to have a crucial and potentially lifelong effect on the growth and development of children. It is increasingly recognized that nutrition already affects the health of the child before conception by influencing the intra-uterine growth and development. For instance, the degree of overweight of the mother and father at conception predict to some extent the likelihood of overweight in their future offspring. This partly reflects genetic susceptibility that is transferred from the parents but studies have shown that weight loss of mothers with obesity before pregnancy also lowers the risk of overweight in their children. The intra-uterine environment of children of mothers with obesity (commonly accompanied by insulin resistance) may affect the metabolic programming in the fetus. Examples of metabolic programming in the fetus are insulin resistance in the fetus, low muscle mass and reduced metabolic rate all of which can predispose the child to future risk of obesity and type 2 diabetes. Some of the effects of intra-uterine nutrition are mediated by epigenetic effects of nutrients. Epigenetics describes the cellular processes that determine whether a certain gene will be transcribed and translated into its corresponding protein. It is a specific kind of metabolic programming. This occurs through DNA methylation. Food containing nutrients that can act as methyl donors such as folic acid and choline may be of particular interest in this regard. These epigenetic changes may have lifelong effects and even may have transgenerational consequences. This means that, for instance, effects of malnutrition during pregnancy not only affects the health of the offspring but also of the grandchildren. An example of epigenetic changes resulting from exposure to malnutrition were recently demonstrated in the Dutch Hungerwinter project. More than 70 years after the second world war children of mothers who were exposed to famine during the final stages of the German occupation still showed epigenetic changes in a number

of genes relating to energy metabolism and glucose regulation. Further research is needed in this fascinating area.

In addition to a high weight of the mother at conception, excessive weight gain of the mother during pregnancy also has adverse effects. It increases the risk of gestational diabetes and hypertension in the mother which may lead to obstetric complications and further exacerbate the future health risks of chronic diseases in the child. On the other hand, lack of nutrients during pregnancy, due to malnutrition of the mother, may lead to intra-uterine growth retardation that may impair organ development with a lasting effect on the metabolism of the child. The changed metabolism in turn, may predispose toward future increased risk for type 2 diabetes and cardiovascular diseases.

After birth, nutrition continues to be important for the mental, physical and social growth and development of the child. Exclusive breastfeeding for at least 4-6 months is considered to provide optimal nutrition and partial breastfeeding is to be encouraged up to one or two years of life. The quality of weaning foods after six months should secure optimal nutrition. This not only relates to optimal supply of nutrients such as essential fatty acids, and adequate intakes of proteins, vitamins and minerals but also to the avoidance of foods rich in free sugars. Particularly sugary drinks seem to contribute to excessive consumption of calories mainly because they are not affecting appetite regulation effectively. Development of taste preferences and lasting attitudes towards certain foods is at a crucial stage in this period. In addition also the texture of foods are important. Learning to chew and swallow fibre rich and hard foods also occurs in this phase. Excessive weight gain of the child in the first year of life may indicate an increased risk of later overweight or obesity. Routine monitoring on linear growth and weight is important to identify high risk patterns of growth and may prompt early interventions to prevent weight problems later. Not only dietary habits are important. Lack of physical activity, chronic sleep deprivation and frequent use of antibiotics may contribute to the risk of obesity. The effect of antibiotics point towards a potential important role of the gut microbiome. The composition of the microbiome is largely determined by nutrition. Fibre rich products are considered to have beneficial effects on the diversity of bacteria in the intestine. Pre- and pro-biotics may turn out to have a positive effect on growth and development of children. This area of research is quickly developing and may lead to effective preventative interventions of chronic diseases in the future.

Joint efforts for a healthy start

Although many details of the underlying mechanisms have still to be unravelled it is already clear that nutrition in the first thousand days is of prime importance for the future health and wellbeing of the child. Assuring optimal nutrition during this critical phase of life should be a priority in public health policy and in the practices of midwifery and youth health care. So that parents are facilitated as much as possible in giving their children a healthy start in life.