

# Malnutrition, stunting and the importance of a child's first 1000 days

September 7 2015, by Rihlat Said Mohamed

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A health worker measures an infant's growth. Children who are undernourished in their first 1000 days of life, could suffer from stunting later. 2014 Global Communities, Credit: Photoshare

The first 1000 days of a child's life - from the time they are conceived

until they turn two - is an important period for the development of both the fetus and the infant. It sets up the foundation for the child's growth, brain development and general health.

Poor [fetal growth](#) during pregnancy results in children being born with a lower birth weight and a greater tendency to be stunted. Stunting is the failure to grow optimally and is first picked up in children who are shorter for their age group when they are two.

Stunting has severe consequences on both physical health and [brain development](#) in the short-term. But it also results in persistent poorer learning and educational achievement later in life, according to research.

Using longitudinal data, recent South African [research](#) has added to the literature that stunted children are likely to have poorer cognitive and motor skills than their playmates by the time they turn five.

And an additional South African [study](#) has shown a link between children who are stunted having a higher proportion of body fat, which may increase their risk of metabolic disease, such as diabetes in adulthood.

## **The story of the energy pie**

To understand the link between under-nutrition during the first 1000 days and stunted growth in children, we tried to use the life history theory. Evolutionary biologists have used [this theory](#) to understand the way organisms were shaped by evolution to optimise their chance to survive and reproduce.

A simple explanation of the life history theory is that our bodies each have an "energy pie". The energy pie determines how much energy the body has to allocate to three different priorities:

- growth and development,
- maintenance, and
- [reproduction](#)

Growth refers to the growth of the body and its organs, maintenance to the functions involved in preserving and repairing the body and its functions, and reproduction to all functions involved in development to puberty, pregnancy and reproduction.

The size of each person's energy pie is determined by many factors, including how much and what they eat, their age, lifestyle, how much energy and time is allocated to them by their mothers during pregnancy as a result of their health conditions, among other factors, and how much energy and time they were allocated by their own parents.

The logic of the energy pie is that if too much energy is spent on one of the priorities or life history traits, there is less energy for the other two. The reason the energy pie is important is because it tells us how the body divides the energy pie between growth, maintenance and reproduction at the different stages of our lives. This affects growth, learning and health.

## **The brain takes priority**

[Researchers](#) have used the logic of the energy pie to show how maternal under-nutrition during pregnancy is one of the main causes of poor fetal and infant growth during the first 1000 days of life. They argue that it can have [long term health](#) consequences. When pregnant women suffer from under-nutrition, there are fewer maternal nutritive resources and less energy to ensure the maintenance of their own bodies and the physical growth and development of the fetus, including the fetal brain, which takes priority.

[Additional research](#) suggests the little energy available will be redirected

to the essential organs to make sure the fetus survives at the expense of physical growth. This results in fetal growth delay or stunting. The impact on the infant's growth and development continues to be felt after birth.

During the first two years of life, the infant body's priorities are growth and maintenance, particularly the growth of the human brain. A large chunk of the body's energy is dedicated to brain growth. The brain takes 60% of the energy allocated to [body](#) functions during infancy.

In adulthood, this drops to 20%. Reproduction in the early years is limited to the development of sexual organs. In situation of undernutrition and limited energy, the high demands for the maintenance of the brain could translate into less energy directed to physical growth and ultimately result in stunted growth.

Few studies have integrated an evolutionary perspective into our understanding of child health and [development](#). But public health messages have increasingly placed importance on the first 1000 days of a child's life.

How can the concept of the energy pie be used to improve the pool of energy of an infant, during pregnancy and in those first 1000 days?

Improving an infant's access to health and care, nutrition and its psychosocial care means that each child will start those critical first 1000 days of life with a bigger pie to support the three competing demands of [growth](#), maintenance and reproduction.

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Source: The Conversation

Citation: Malnutrition, stunting and the importance of a child's first 1000 days (2015, September 7) retrieved 23 April 2024 from

<https://medicalxpress.com/news/2015-09-malnutrition-stunting-importance-child-1000days.html>

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