

[MUSIC PLAYING]

TOBIAS ALFVEN: Hello, and welcome to this talk about nutrition and growth. My name is Tobias Alfven, and I'm a pediatrician and researcher in global health at the Karolinska Institutet. I've been working both in high-income countries, such as Sweden, and in low-income countries in Asia and sub-Saharan Africa.

Today we'll discuss something that we all can relate to-- food. You all know the short-term consequences of too much, when you feel all too full after a heavy meal, or too little, when you're hungry, start to have difficulties concentrating, and easily feel angry. Or how do you react when you have eaten too much or too little? However, now we'll focus on the long-term consequences of too much and too little food. Or, in other words, malnutrition.

Malnutrition is a very important aspect of global health. Close to half of all deaths among children that die before turning five years old are associated with malnutrition. Reducing malnutrition is central to reducing under-five mortality. We will learn how to define malnutrition, causes of malnutrition, trends in malnutrition, and also look closer at what we can do to reduce malnutrition around the world.

Nutrition is defined as the process of providing or obtaining the food necessary for health and growth. And malnutrition is lack of proper nutrition caused by not having enough to eat, not eating enough of the right things, or being unable to use the food that one does eat. There are three broad different kinds of malnutrition. Undernutrition-- that is to say, an energy and/or protein deficiency. Micronutrient deficiency-- not enough of essential vitamins or minerals. And overnutrition. That is eating more calories than you consume.

In an earlier session on indicators, you learned that we in global health use health indicators to measure the magnitude of a problem, and if we make progress or not with our interventions. It is the same for nutrition, and we have some important indicators that I will introduce. In adults, we use body mass index, or in short, BMI.

It is calculated as the weight in kilograms divided by the height in meters squared. You do not need to memorize how to calculate it. There are easy calculators to use on a variety of websites. A very low BMI or a very high BMI-- that means either being too thin, or being overweight-- will increase the risks for disease and shorten your life.

In children, we have different ways of measuring malnutrition. Wasting is the weight for height. This is similar to BMI for adults, and answers the question, how thin is the child? If the child's weight for height is low, the child is considered wasted. And wasting is the result of sudden or acute malnutrition, when the child is not getting enough calories from food, and faces an immediate risk of death.

On the other hand, stunting is the height for age, and answers the question, how short is the child for his or her age? If a girl's or boy's height for their age is low, then they are considered stunted. Stunted is the failure to grow both physically but also cognitively, and is the result of chronic or recurrent malnutrition. And its effects often last a lifetime.

Underweight is the weight for age, and is, in a way, combining these two previous mentioned indicators. This makes it a bit more difficult to interpret, as it does not make a difference between the more long-term effects, measured using stunting, and the more acute malnutrition, measured using wasting.

Overweight refers to a child who's too heavy for his or her height. This form of malnutrition results from eating more calories than what he or she consumes. And this increases the risk of non-communicable diseases, like diabetes or problems with the heart, something you will learn more about in a later video.

There are many different micronutrients that we need to live a healthy life. Some of the most important, from a global health perspective, they are-- vitamin A, which is both important to prevent infections and also for the vision. Severe vitamin A deficiency is the most common cause of blindness that could be prevented. Iron is necessary for the production of red blood cells that carry the oxygen to the body's organs, and a deficiency leads to anemia. Anemia leads to tiredness, breathlessness, a weaker immune system, and impaired learning. Iron deficiency is indeed the most frequent micronutrition deficiency in the world today.

Iodine is essential for the body's construction of thyroid hormone, one of the main hormones for controlling the way your body uses energy. And a deficiency can lead to constrained mental development for children. And just adding iodine to the normal table salt, something 70% of households in the world now have access to, can prevent this brain damage in children. And to very low price-- less than \$0.05 US per child and year. And finally, zinc, which is needed for the body to combat infections.

So what causes malnutrition? There is no easy answer to this question. In fact, it is a complex web of factors that contribute to determine the amount of malnutrition in society, from socioeconomic conditions to more immediate causes, such as feeding practices and infectious diseases. All the 12 determinants of health that you heard about previously in this course influence malnutrition.

In contrast to adults, malnutrition among children is only partly due to a lack of appropriate food. Other causes of malnutrition are ignorance about optimal feeding practices-- most important, breastfeeding-- and a lack of access to specific micronutrients, as I just mentioned. However, the most important cause of malnutrition in children is infectious diseases. When a child has an infection, the body needs more nutrients.

At the same time, the body is less capable of eating and absorbing food and these nutrients. And I said in the beginning, malnutrition is an underlying factor for what almost half of all the children worldwide die before reaching their fifth birthday. As you can see, it becomes a vicious circle. Malnutrition leads to an increased risk of infections. Infections, in turn, lead to increased malnutrition. And so the vicious circle is there.

One of the most effective ways of reducing malnutrition is actually vaccinating against measles. And use of hygienic latrines is another way to prevent malnutrition, as it would reduce diarrhea and hookworm incidents. Did you know that toilets could play an important role in preventing malnutrition in children?

So how many children actually suffer from this around the world? In 2014, there were 667 million children under five in the world. Out of these, 7% were wasted, or too skinny for their height, 24% were stunted, so too short for their age, and 6% were overweight. What is happening now is that the global trend in overweightness is then going up. So before, children were too skinny and too short. Now, instead, some of them are becoming more overweight. But all are because of malnutrition.

So what can we do? Hunger and malnutrition were important parts of the Millennium Development Goals, and they're also an important part of the Sustainable Development Goals that are now in place. One of the 17 goals is end hunger, achieve food security, and promote sustainable agriculture, with a specific target for malnutrition. But there is not a magic bullet to eliminate malnutrition. As earlier described, socioeconomic conditions, feeding practices, and infectious diseases in children all play important roles.

However, there are some aspects that I would like to highlight-- education for girls and women, breastfeeding, peace, and a free press. A crucial part of improved nutrition and reducing the rate of death among children younger than five is more years in school for girls. Research has shown that in countries worldwide, when girls go to school 11 years instead of 10 years, or, say, three years instead of two, child mortality declines.

Women with more education tend to have smaller families, in part because of increased employment opportunities and better knowledge about contraception. Fewer children in a family improves the chance that an infant will survive. Further, more education also helps women make better decisions about many health and disease factors, such as prenatal care, basic hygiene, nutrition, and immunization.

For infants in low-income countries, another crucial intervention to reduce malnutrition is exclusive breastfeeding. Breast milk has just the right amount of fat, sugar, water, and protein that is needed for a baby's growth and development. The World Health Organization recommends exclusive breastfeeding for the first six months of life. The positive effects are greatest in younger infants and where hygiene and sanitation are poor, but also in well-off populations. Further, apart from being the safest and healthiest infant feeding method, breastfeeding is also the least expensive. In short, breastfeeding is one of the most effective ways to ensure child health and survival.

Famine may be defined as hunger that has become so severe that it has started to kill. In modern societies, famine is not primarily a matter of lack of food, but rather, the ability to acquire food. Famine is an extreme and severe form of social collapse due to insufficient political leadership. And an interesting and important observation is that a famine has never occurred, in modern times, in a country with a free press in a time of peace.

In this session, we have learned that there are different kinds of malnutrition-- undernutrition, micronutrient deficiency, and overnutrition. All important for global health, and issues we have to deal with if we want to become close to the Sustainable Development Goal number three-- ensure healthy lives and promote well-being for all at all ages.