

Methods

We searched four medical databases to find articles about adolescent development and nutrition. Some of the articles were longitudinal studies. That means they covered a long

period of time, such as months, years or even decades. All the articles were published between January 31, 2020 and March 30, 2021.

Results

The articles showed that nutrition affects the body in many different ways (Fig. 1).

Puberty:

Adolescent growth starts with puberty. Puberty is when the body starts to develop into that of an adult. During this time, the body builds up bone, muscle, and fat mass. We also grow taller and our biological systems mature. Studies showed that nutrition changed the timing of puberty. Puberty began earlier in children who were overweight, but much later in children who were undernourished.

Height:

There are two processes that happen when you grow taller. First, a set of cells extends the bone with protein. Then, a second set of cells covers the protein with minerals, such as calcium. If the body doesn't have enough protein, then bones won't grow longer. If there are not enough minerals to build the bone, the bones won't grow, either. That is why children and adolescents who don't have proper nutrition don't grow as tall as their peers.

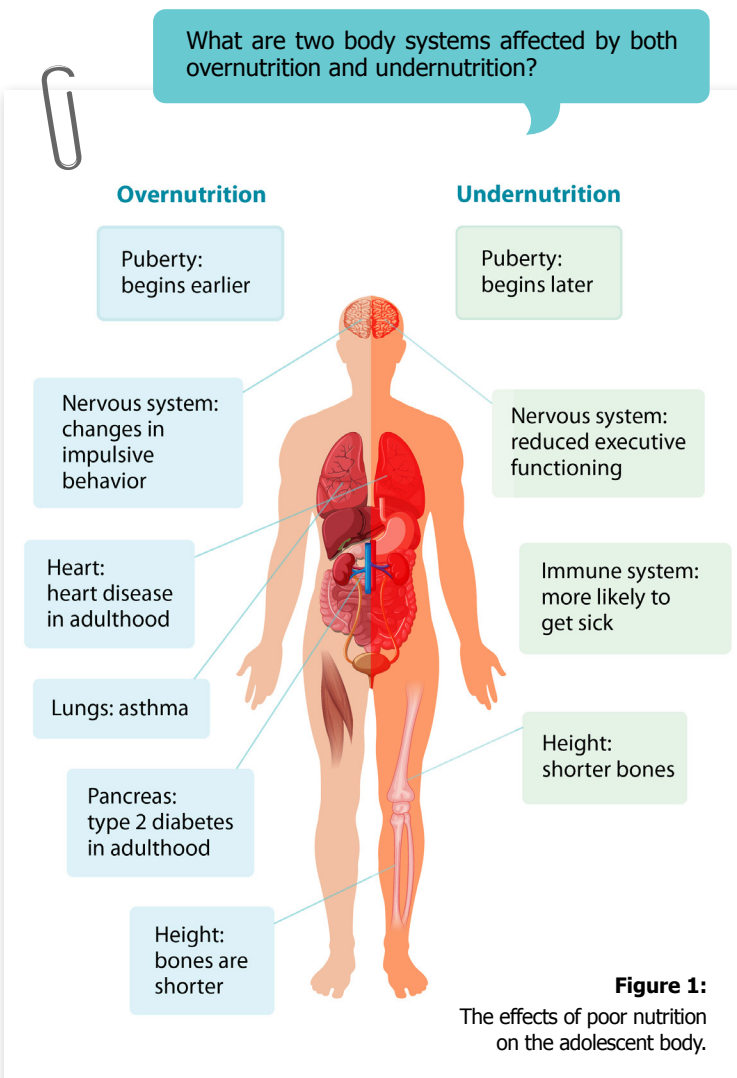
Nervous system:

While the brain almost reaches adult size by the age of six, it continues to change after that. Scientists say that the adolescent brain is neuroplastic. That means it can reorganize, allowing us to learn and adapt to new situations. But it also makes it harder to deal with stressful environments and poor nutrition. Studies showed a reduction in brain matter when a person didn't get enough food for long periods of time. This reduction resulted in a loss of executive functioning. That means it was harder to regulate emotions, follow directions, and stay organized.

High-fat and high-sugar diets also affected the brain. Studies showed that these types of foods can change two signaling systems in the brain. When these systems changed, adolescents struggled to regulate their eating. They also had more impulsive behavior.

Immune System:

The immune system protects our bodies against pathogens, such as viruses and bacteria. The immune system needs both macronutrients and micronutrients to work. The main macronutrient required is protein. The micronutrients include vitamins B12, C, and D. That is why malnutrition can cause the immune system to work incorrectly.



Overnutrition can also be a problem. **Obesity in adolescence** can activate the immune system and cause chronic (long-term) **inflammation**. This inflammation can decrease height growth. It can also lead to diseases in adulthood, such as

type 2 diabetes and various heart diseases. It may also increase the risk of **asthma** in adolescence.

Discussion

Late childhood and early adolescence are an important nutritional time. Our study review proved that poor nutrition affects the development of body systems. There is evidence that it is possible to fix these negative effects. **But families need to make proper diet adjustments by the end of adolescence.** After adolescence, it is more difficult for the body to fix the negative effects.

There is still a lot to learn about adolescent nutrition. The studies we reviewed all focused on single body systems. But our body systems are all connected, so we can tell that poor nutrition will affect more than one system at a time. To know exactly how, we need to investigate how nutrition affects the whole body in the future.

Conclusion

Good nutrition in childhood and adolescence is important. It reduces the risk of diseases. It also promotes healthy lifestyles in adulthood.

Do you eat well? Take a look at the food choices you make throughout the day. Use nutrition guidelines, such as [MyPlate.gov](https://www.myplate.gov), to make sure you are getting the right amount

of food each day. Also check to see that you are getting the correct types of food. If you see ways to improve your diet, talk with a doctor and a trusted adult before making any changes. That way you can make sure you grow and develop to your potential.

Glossary of Key Terms

Asthma - a condition that causes the airways to narrow and swell and sometimes produce extra mucus. Asthma makes breathing difficult and can trigger coughing or wheezing.

Inflammation - the body's natural response to harmful substances, such as toxic chemicals and viruses. When it is chronic, the body initiates this response even when no danger is present.

Macronutrients - nutrients that the body uses in the largest amounts. The three macronutrients are carbohydrates, protein, and fat.

Micronutrients - nutrients that the body needs in small amounts. They include vitamins, such as vitamin C and D, and minerals, such as iron and calcium.

Nutrition - eating food that meets the needs of the body.

Obesity - the result of overnutrition that occurs when the body has excess fat. This can lead to health problems.

Pathogen - a bacteria, virus, or microorganism that causes disease.

Type 2 diabetes - a condition caused by the body's incorrect use of insulin. Insulin is a hormone produced by the pancreas that regulates the amount of sugar in the blood. Too much sugar in the blood can cause heart and kidney problems.

Check your understanding

- 1 According to the article, puberty indicates the beginning of adolescence. How does nutrition influence the start of adolescence?
- 2 How can nutrition help the body prevent illness and disease?
- 3 Why do the authors consider late childhood and early adolescence as an important nutritional time?
- 4 Design your ideal meal. Then analyze your meal to see if it includes all of the major food groups. Make sure to check for high levels of sugar and fat.
- 5 Do you think that children and adolescents in the area you live in are affected by undernutrition, overnutrition, and/or malnutrition? Explain your answer.

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Academy of Nutrition and Dietetics: Kids eat right – how many calories does my teen need?

<https://www.eatright.org/food/nutrition/dietary-guidelines-and-myplate/how-many-calories-does-my-teen-need>

United States Department of Agriculture (USDA): MyPlate.

<https://www.myplate.gov/>

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