

# Diseases from excess of nutrients

Malnutrition is defined as a **nutritional disorder** resulting from an **absolute** or **relative deficiency** or **excess of nutrients** or an **imbalance of nutrients**. Malnutrition can **be divided** in several aspects:

- **Malnutrition from undernutrition** – nutrient deficiency.
  - **Malnutrition from over-nutrition** – excess nutrients.
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- **General malnutrition** - arise from a lack or excess of energy in the food intake (protein energy malnutrition, obesity).
  - **Specific malnutrition** - arise from a deficiency or excess of particular nutrients.
  - **Primary (exogenous) malnutrition** – caused by insufficient or excessive nutrient supply. Some of the primary malnutrias affect millions of people.
  - **Secondary (endogenous) malnutrition** – arise due to nutrient absorption disorders, nutrient utilization disorders (enzymedefects), inutrient-drug interactions. Compared to some primary malnutrias, they are rare. Environmental factors (xenobiotics, smoking).

*International Classification of Diseases* <sup>[1]</sup> classifies nutrient excess diseases mostly in the group *Endocrine, Nutritional and Metabolic Diseases E65-E68 Obesity and other hyperalimentation (e.g. Vitamin A,D excess)*

## Malnutrition from overnutrition

General malnutrition from excessive energy intake is **Obesity**. Obesity is one of the diseases of civilization and **is the most common metabolic disease** today. It is defined **multiplication of fat in the body**.

Excessive intake of certain vitamins, of minerals or trace elements can lead to specific malnutrition from overnutrition, most often when taking dietary supplements, rarely from food (e.g. hypervitaminosis A after consuming polar bear liver, fluorosis with excess fluoride in drinking water).

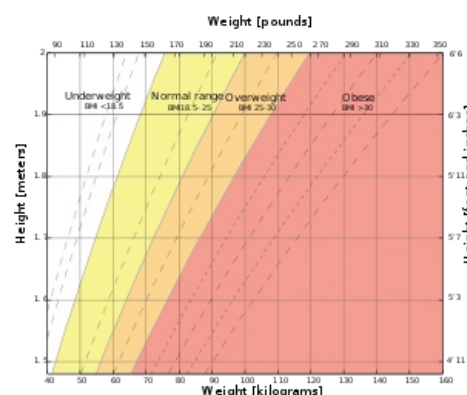
### Definition of degree and types of obesity

The physiological **proportion of fat** in the body is **28-30% in women** and **23-25% in men**. The body mass index, or **BMI**, is the most commonly used measure of overweight. The following formula is used to calculate BMI.  $BMI = \text{váha (kg)} / \text{výška (m)}^2$

According to the BMI value, we distinguish **different stages of overweight**.

- 20,0–24,9 – normal body weight
- 25,0–29,9 – Overweight
- 30,0–39,9 – severe obesity
- 40,0 a více – pathological malignant obesity

The type of obesity is also defined by the **distribution of adipose tissue in the body**. We distinguish the so-called **android type**, which is characterised by the deposition of fat on the abdomen (apple). The *gynoid type* of obesity, with fat located on the buttocks and thighs (pear), which is found mainly in women, is considered to be less risky. It is not associated with a higher risk of cardiovascular and metabolic complications. Body fat distribution can also be assessed by the *waist to hip ratio* (WHR). This index is obtained by dividing the waist circumference by the hip circumference. For **women** this figure should not exceed **0.8** and for **men** **1.0**.



Graph BMI

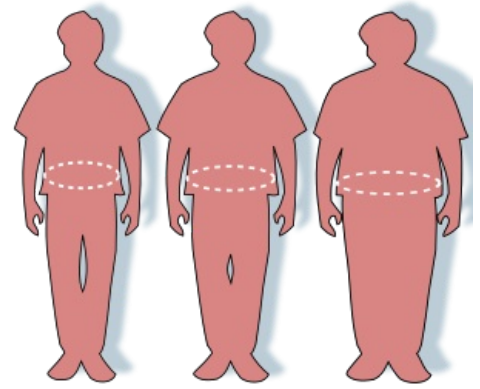
### Prevalence of obesity

The **prevalence** of obesity has **dramatically increased** in recent years in both developed and developing countries. In developing countries, it is mainly associated with economic development and the adoption of Western lifestyles (diet, the development of individual transport and television time). It has been shown that along with an increase in gross domestic product, there is an increase in the prevalence of obesity. The distribution of obesity among the population is also characteristic. In developed countries, especially in North America and Europe, obesity is associated with lower education and economic status. It is more common in rural areas. In developing countries, by contrast, obesity is still an expression of economic prosperity and is more common in urban populations. The prevalence of obesity is low in the long term in Japan and China. In **Europe**, the prevalence of obesity in **men** is **10-20%** and in **women** **10-25%**.

### Pathogenesis of obesity

The **pathogenesis** of obesity is influenced by **excessive energy intake**, **low physical activity** and a number of exogenous and endogenous factors (genetic and metabolic disorders). There are a number of mechanisms in the

body for maintaining a stable body weight. However, these mechanisms are more effective in protecting against energy deficiency and weight loss than against overweight. This is probably because humans have been more likely to experience food deprivation during their evolution. Therefore, it is mainly individuals with a conservative energy balance who have survived. They then passed on their genes to their offspring, who now, in times of energy excess, have to deal with being overweight. Among nutrients, **excessive fat intake** plays the most important role in the pathogenesis of obesity. These have **high energy value** and **low satiating capacity**. Obese individuals are unable to adequately burn fat when fat intake is excessive and the body responds by **storing fat**. They prefer fat mainly for its sensory properties - fullness and texture. Excessive carbohydrate intake does not play much of a role because carbohydrate storage in the form of body stores is limited. However, the consumption of carbohydrates in combination with fat (especially in fatty sweets) is risky. Protein does not play a major role in the pathogenesis of obesity. The **one-sidedness** of the **food** components and poor dietary habits cause patients to have excess fat and, paradoxically, to **lack certain nutrients**.



Waist circumference healthy individual, overweight individual, obese individual.

## Health risks associated with obesity

Obesity is now considered one of the *primary health risks* in developed societies. It is associated with a range of **complications** and **comorbidities**, which are summarised in the following paragraphs:

- Hypertension;
- angina pectoris;
- myocardial infarction;
- stroke;
- varicose veins of the lower limbs and deep vein thrombosis;
- diabetes mellitus;
- sleep apnoea syndrome;
- disorders of lipoprotein metabolism;
- Hyperuricaemia;
- changes in fibrinolytic activity;
- degenerative joint diseases and Spine (coxarthrosis, gonarthrosis);
- higher risk of certain cancers;
- cholelithiasa and cholecystitis;
- edemas;
- worse wound healing;
- higher incidence of injuries and hernias;
- depression, Anxiety;
- low self-esteem, impaired motivation, self-blame;
- social exclusion and discrimination;
- and others.

## Therapy of obesity

Therapy for obesity should be initiated when a BMI greater than 30 is detected. Treatment methods vary according to the patients health status. They include **dietary treatment**, **physical activity**, **cognitive behavioural treatment** and **psychotherapeutic support**, but also **pharmacological** and **surgical treatment**. In particular, *prevention* of obesity through knowledge of the nutritional value of food, correct dietary composition and healthy lifestyle principles and their *application from childhood* is very important.

 For more information see *Tips for treating obesity*.

## Links

### related articles

- Nutrient deficiency diseases

## References

1. WHO. . *International Classification of Diseases and Associated Health Problems, 10th Revision* [online] . 2. edition. Geneva : WHO, 2004. Available from <<https://old.uzis.cz/cz/mkn/index.html>>. ISBN 9241546492.

## References

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