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The role of the rehabilitation in the prevention and treatment of obesity – an editorial article

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Abstract

Obesity according to the WHO is an epidemic of modern times, because it affects a large number of people in all age groups around the world. This disease itself makes it difficult for the patients suffering from it to function, but above all carries a lot of complications. These include diseases of the cardiovascular system, stroke, osteoarthritis, diseases of the digestive system. Obesity significantly increases the risk of death, which is why it is so important to start treatment as soon as possible.

The most important goal of therapy is the reduction of body weight, which can only be achieved by combining a properly selected diet and physical activity. It is extremely important to choose the optimal training plan, because the fight against obesity will be effective only if patients increase daily energy expenditure.

Introduction

World health organization defines obesity as an abnormal or excessive accumulation of fat in the body, which leads to deterioration of health. The indicator commonly used, which allows to assess the degree of overweight and obesity is BMI (body mass index). BMI value ≥ 25 kg/m² means overweight, whereas obesity is when BMI ≥ 30 kg/m². Other auxiliary indicators that are BMI-mediated to assess the degree of overweight are: WC (waist circumference and WHR (waist to hip ratio)[1, 2]. The aim of the work is to present the scale of the problem of overweight and obesity in Poland and in the world, as well as methods of its prevention and treatment. The main focus during the research was directed at the role of physiotherapy and physical activity.

Epidemiology

Obesity is a common disease that occurs in all age groups. WHO defines this disease as an epidemic of modern times - it is an important social problem. According to estimates of this organization, about 50% of adults are overweight and obese. However, this problem affects people of all ages, regardless of gender and origin. According to available MEDLINE databases, obesity among Europeans concerns 4-28.3% of men and 6.2-35.6% of women, of which the largest proportion of obese people are in Central, Eastern and Southern Europe. According to the WHO data at the turn of 1980 - 2008, the number of obese people in the world has doubled. Recent data show that more than 65% of the world's population lives in countries

where obesity and overweight are associated with a higher risk of death than underweight. Countries where overweight and obesity are relatively rare are France, Sweden, Denmark and Norway. However, in the majority of countries, this disease is a growing problem. Technological progress and associated sedentary lifestyle as well as abandonment of physical activity contribute to this [2, 3]

In Poland, as in most countries, it observes an increase in the tendency to obesity. A study conducted in 2009 by the Central Statistical Office (GUS) showed that in 1996 obesity occurred in 10.3% of men and in 12.4% of women. In subsequent years, this number increased to 16.6% and 15.2% respectively. IASO research (International Association for the Study of Obesity) in Poland in 2003-2007 almost every fourth woman - 23.8% and one in five men - 20.8% were obese. It is also worth adding that the occurrence of obesity increases with age (according to research carried out by the Institute of Food and Nutrition). [3]

Associated complications

Obesity leads to many secondary diseases, especially the cardiovascular system, which in turn causes a shortening of life and increased mortality. In addition, the problem is that obesity in developed and developing countries carries high social costs. [2]

Many studies show that an increase in BMI increases the risk of death. Diseases that correlate with obesity include: hypertension, heart failure, ischemic heart disease, pulmonary heart, arrhythmias, pulmonary embolism, stroke, diabetes, arthritis, gastrointestinal disease (including cholelithiasis and cirrhosis), obstructive sleep apnea syndrome, reproductive system disorders, skin lesions, urological complications and psychosocial problems. WHO reports that overweight and obesity contribute to 80% of cases of type 2 diabetes, 35% of ischemic heart disease and 55% of hypertension. [2, 4]

Pathogenesis

The pathogenesis role of obesity is played by a number of factors amongst which are distinguished: genetic factors, environmental factors, social and cultural factors, and hormonal activity of the body.

Biological conditions are closely related to genetic factors, while inheritance of obesity is most often multigenic. As a result of mutations, there may be changes in the genes responsible for the regulation of food intake, metabolism and maturation of adipocytes. Obesity shows its trend to occur among family members, single twins suffer from obesity twice as often as non-twin siblings. What's more, in adulthood many people show a close correlation of body weight with

the weight of the biological parent, even if the child was brought up in a foster family. The risk of obesity in adult offspring is 4 times higher with one obese parent and reaches up to 13 times with both obese parents.

There is no doubt that obesity is largely the result of environmental factors. This is confirmed by the increased growth of obesity of the inhabitants of Western countries, which is too large to be the work of only biological factors. These factors can be divided into macro (for the whole population) and microenvironment (for a specific unit). The energy balance is the difference between the energy delivered and consumed by the body, and obesity is a positive energy balance. A positive energy balance results from a decrease in physical activity and an increase in the consumption of high-calorie products. The development of civilization (access to cars, mechanization of agriculture and jobs, and limitation of green areas) reduces the physical activity of people, while easier access to food, especially high-processed or high-fat food, increases the amount of energy supplied with a meal. In recent years, attention is also paid to the use of diets that slow down the basic rate of metabolism, thus serving the deposition of fat in the body [12,13].

Another important factor in the development of obesity is the nutritional behaviors, which are modulated to a large extent, among others by socio-cultural factors. Nutritional behaviors are a way of proceedings that aims to get food. The amount of calories delivered to the body depends to a large extent on the pattern of nutritional behavior. In adults, the choice of food is largely determined by the price of the product, knowledge about its nutritional value, family tradition, religion and advertising. Cultural affiliation largely determines the amount of high-energy and low-nutritional foods consumed. It is also worth mentioning the pompous celebration of holidays (i.e. Christmas, Easter, etc.) or the ritual fattening of women in Africa (which is supposed to symbolize their fertility). Cultural affiliation should also include the pace of urbanization of the country, which more and more often limits the time for family food preparation and eating, which increases the popularity of the network of eating out of home in fast food restaurants [13].

Treatment

The treatment of overweight and obesity should begin with the patient's examination.

The interview should provide information on:

- family interview
- eating habits
- nutrition model

- nutritional disorders
- physical activity
- mood disorders
- coexisting diseases
- obesity complications
- patient's expectations and motivation for change [9]

Physical examination includes the measurement of height and weight necessary to calculate the BMI index, waist circumference and blood pressure. Examination of the waist circumference indirectly informs about the content of fat in the abdominal cavity. Body composition testing is particularly useful in planning obesity treatment. [9]

Additional tests to help treat obesity include:

- fasting blood glucose
- lipid profile
- thyroid function (TSH level)
- liver function (liver enzymes)

The goal of obesity treatment is to improve health, reduce risk factors and reduce weight. This goal can be achieved by changing eating habits and increasing physical activity, and thus the patient's physical efficiency and weight reduction. In addition to increased body weight, patients have many problems that should also be considered in the treatment process, i.e. dyslipidemia treatment, normalization of glycogen value in type 2 diabetes, normalization of arterial pressure, treatment of degenerative changes in joints, etc. [9]

Effects of physical activity on weight reduction

Treatment of obesity is a long-term process. At the initial stage of therapy, it is extremely important to find the causes of the disorder in question. Medical treatment is a multidirectional procedure, as it is attended by a doctor, dietitian, psychologist and physiotherapist. The patient is treated with pharmacotherapy, psychotherapy, rehabilitation, and proper diet [5].

Numerous studies conducted over the years indicate that the combination of physical activity and the use of diet is the best way to reduce body weight. Just increasing the duration of physical therapy treatment or just consuming less caloric meals did not bring such effects. During weight loss the most important "medicine" is movement. Medical treatment is based primarily on the arrangement of the training plan, selection of appropriate exercises, practicing various sports [5,6].

There are numerous beneficial changes happening in the body thanks to physical activity.

Amongst them are:

- weight loss
- increase in insulin sensitivity in patients with diabetes
- lowering of high insulin levels, improvement of glucose tolerance and lipid profile
- reduction of body fat
- improving the condition of bones and joints (strengthening their structures)
- reduction of hyperglycemia
- decrease in blood pressure
- increase of fitness and physical fitness
- improvement of appearance, and thus increase of self-esteem
- improvement of mental state [5,6].

To effectively fight obesity, daily energy expenditure should increase. Physical activity in the treatment of obesity can be divided into two types: daily and planned. Everyday activity refers to the movement related to the execution of housework, i.e. cleaning, cooking, vacuuming, etc.

Planned activity is otherwise a training in which general conditioning exercises dominate:

(At the average or even low intensity level determined in practice most often by setting the so-called target training pulse range)

- characterized by effective oxygen consumption by working muscles,
- also heart muscle;
- engaging large muscle groups;
- characterized by cyclicality and the possibility of long-term effort without breaks.

The selection of various forms of activity should depend on the individual condition of the patient, his age, sex, the degree of obesity, and comorbidities. Among the forms of general improvement activities, there are: walking, fartlek, cycling, swimming, aerobics, dancing [6].

Initially, a medium intensity training is recommended, lasting 30-60 minutes, 3-6 times a week.

It is important that the training of older people with excess kilograms is planned in such a way as to increase the overall fitness and lead to a reduction in fat content rather than overall weight loss. Weight loss can increase the age-dependent decrease in muscle and bone mass, eventually leading to sarcopenia and osteopenia, which can result in a decline in the quality of life of the elderly person. Numerous studies show that the most effective method in reducing fat tissue and increasing the general fitness of seniors are aerobic exercises interspersed with resistance exercise all complimented with a calorie-deficient diet [10, 11].

Selected physiotherapeutic techniques

Nordic walking

Nordic walking is one of the fastest growing forms of training, rehabilitation and recreation. The Nordic walking includes elements of general improvement exercises. It is a form of physical activity that combines aerobic and resistive physical efforts. [5,7]

In the treatment of obesity, it is important to use exercises with medium or low intensity levels. In practice, it is determined by the training heart rate. There are three levels of intensity in Nordic walking. The recreation and health level can be used by people with low physical capacity who have mobility limitations. With the increase of fitness you can use Nordic walking at the fitness level, then the heart rate increases by 5-17 strokes compared to the resting heart rate, while energy consumption can increase up to 46%. [7] The oxygen consumption of working muscles and the heart muscle can be higher even about 4.5-5ml/kg/min. [7]

Nordic walking training should be 60 to 90 minutes at a time. The sticks provide alleviation, so it is possible to overcome long distances, while feeling little fatigue. During training, the patient should have a conversation without a shortness of breath.

In people with BMI>30 there is a high burden on the joints of the spine and lower limbs, which is why it is particularly important to relieve them, which is possible due to the use of sticks. Nordic walking reduces the load by approx. 5 kg with each sticking the pole into the ground. It is a safe type of physical activity, because the center of gravity of the body does not move vertically, which allows reducing the load on the lower part of the spine, pelvis, knees, ankles and feet.

The time of training is important in Nordic walking. The most beneficial effects are obtained by exercising an hour before a meal, preferably before breakfast. [7]

The advantages of Nordic walking:

- studies carried out so far show that during walking with sticks there is a much higher calorie consumption than during a traditional walk (nordic walking - 400 kcal per hour, traditional walking - 280 kcal per hour)
- stimulation of a large number of muscle groups (about 90% of the whole body's muscles)
- improvement of the cardiorespiratory system
- increase in strength and muscle mass
- improvement of glucose tolerance and lipid profile
- improvement of balance and coordination of movement
- shaping the correct posture

- beneficial effect on the quality of the movement, based on the correct walking pattern with alternating work of upper limbs
- positive impact on the patient's psyche, reduction of anxiety and depression [5,7]

Fitness

Fitness components are practically all forms of activity that contribute to improving health. Fitness is strictly programmed and controlled activity. It is particularly important in people who are overweight and obese. [8]

Both in the treatment of overweight and obesity, individual training is recommended. Then the program, duration and intensity of the exercises are adjusted to the physical efficiency of the patient and the state of his health.

Fitness classes include: endurance training, both aerobic and anaerobic, flexibility exercises and strength training. In the treatment of obesity, aerobic exercises are the most effective, they are characterized by the dominance of aerobic metabolism, and for the resynthesis of energy mainly fats and, to a lesser extent, sugars are used. Most often, fitness classes are held in the form of group training - aerobics.

Fitness training, mainly includes endurance exercises, among which you can distinguish:

- aerobic exercises using cardio devices that are designed to reduce body fat,
- strength exercises using isotonic equipment.

Forms of fitness activity are an effective and universal tool in preventing overweight and obesity. Exercises are aimed at improving health, increasing physical fitness, as well as preventing dangerous consequences of excessive body mass. [5,6]

Aqua aerobic

Aqua aerobic is a form of physical activity that uses the properties of water and its effects on the human body. Exercises in water, contain elements of aerobic and resistance training, and at the same time create conditions to relieve the joints. Aqua aerobics does not require patients to be physically fit or even swim abilities. It is a form of physical activity that is a safe, effective and enjoyable way of fighting with obesity.

The water temperature during exercise should be around 31-32 °C. Higher values of temperature disturb the heat transfer by the body, which requires reducing the intensity of effort, while a lower temperature increases heat loss, which in turn is associated with the need to intensify the effort.

During aqua aerobics, hydrostatic water pressure affects the cardiovascular and respiratory systems. The greater work of the respiratory muscles makes it difficult to inhale, and also to move the blood from the peripheral veins to the right atrium of the heart, which increases its volume. During exercise in the water, there is an apparent reduction in body weight by about 85%, thanks to which the joints are relieved, the muscle tone is reduced and the static work of the muscles is reduced. Exercises in water provide the possibility of applying higher loads in comparison to exercises outside the water environment, while allowing complete relaxation of the muscles. Aqua aerobics also positively affects the psyche of obese patients. [5]

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