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OBESITY MANAGEMENT

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Most chronic conditions are related to unhealthy lifestyle (unbalanced diet, lack of regular physical activity, smoking, stress, pollution, alcohol, drug abuse, moral imbalance). Diseases favored by these factors have been called "diseases of comfort", including obesity, cardiovascular disease, some cancers, respiratory diseases, neuropsychiatry, musculoskeletal, etc. Obesity is a complex condition presenting multiple causes (behavioral, environmental and genetic factors, nutrition disorders due to psychopathology, long-term use of certain drugs, metabolic disorders, hormonal dysfunctions, etc.). It is a global problem that involves long-term strategies to ensure effective prevention and management of this chronic disease. Currently, the basis for obesity treatment includes: 1) *Prevention of weight gain* by a) changing lifestyle (diet modification, regular physical activity and behavioral therapy - actually targeting food behavior by identifying food stimuli, self-evaluation, support groups for psychic support and motivation), b) pharmacotherapy and c) surgical approach; 2) *promoting weight maintenance*; 3) *management of associated co-morbidities* (diabetes mellitus, dyslipidemias, hypertension, ischemic heart disease, respiratory diseases, cancer, arthrosis, etc) and 4) *promotion of healthy weight loss*. Obesity imposes a large economic burden for society, both through direct expenditure (prevention, diagnosis and treatment of obesity) and indirect (associated early mortality and morbidity, socio-economic and psychological implications), representing between 2% and 8% of overheads used for health care. Obesity-related health expenditure is estimated to be between 70 and 130 billion euros per year in the EU.

Keywords: obesity, chronic disease, management.

INTRODUCTION

Chronic conditions are the leading cause of mortality and morbidity in Europe. According to some estimates, chronic illness accounts for nearly 60% of the worldwide deaths and is expected to increase to 68% in 2030.

Most chronic conditions are related to unhealthy lifestyle factors (unbalanced diet – excessive intake of foods rich in fat and carbohydrates, lack of regular physical activity, smoking, stress, pollution, alcohol, drug abuse). The diseases favored by these factors have been called "comfort diseases" including obesity, cardiovascular disease, some cancers, respiratory disease, neuropsychiatric, musculoskeletal diseases, etc.[1].

CONTENT

Obesity is a complex chronic illness that presents multiple causes and an increasing global rate, which requires the implementation of long-term intensive and complex therapeutic strategies to ensure effective prevention and management of this disease.

Obesity has become a global epidemic in recent decades as a result of changes in the social, economic, cultural, and physical environment[2]. The predominant etiological factor is the excessive and prolonged intake of food, within the context of disruption of the physiological mechanisms of regulating food intake, often conditioned by poor nutritional habits, negative family and psychosocial environmental factors. Globally, there has been an increase in hypercaloric / hyperlipidemic food consumption and also in physical inactivity due to the increasingly sedentary nature of many types of work, changing modes of transport, and rising urbanization. Changes in food patterns and physical activity are often the result of environmental and social changes associated with economic development and lack of support policies in sectors such as health, agriculture, food processing, distribution,

marketing, transport, urban planning, the environment, and education.

Certain subgroups appear to be more vulnerable. There is a reverse relation between the level of education, income, or the socio-professional category and the prevalence of obesity. Until the 1960s, in the developed countries, obese women were more numerous as we move down the social scale, while their male counterparts were more frequent among the upper class[3]. This situation strongly contrasts with that of developing countries, including Romania, where obesity is more common among the wealthy population. In their case, the transition to a new phase of industrialization has led to the emergence of the so-called "food transition". Dietary shifts that occurred over two hundred years in the industrialized Western nations are now being experienced in the developing countries as a condensed few decades' process.

Today obesity is rather the sign of poverty, sometimes of sadness, lack of education, or lack of will[4].

The overall prevalence of obesity almost tripled between 1975 and 2016. Recent global WHO estimates have shown that 39% of adults ≥ 18 years (over 1.9 billion) were overweight (39% of men and 40% of women). Of these, over 650 million adults were obese[5–8]. In the mid-1990s, 15–20% of the European male population and 15–25% of the female population had a BMI of 30 kg / m^2 [9]. Over the past 15–20 years, the prevalence of obesity has increased, currently estimated at over 26% in the male population and more than 31% in the female population[10; 11].

If the prevalence of obesity continues to rise at the same pace, the number of obese people is expected to increase by 4 million cases per year – that is a worrying prospect[9,12].

According to the reports of the Romanian Federation of Diabetes, Nutrition, and Metabolic Diseases, Romania ranks third in Europe in terms of child obesity and a quarter of its adult population is obese. The rate of obesity has risen steadily over the past 30 years, requiring the development and widespread application of prevention, treatment, and support measures.

Obesity is a condition with a high pathological potential that generates multiple complications (cardiovascular diseases, certain types of cancer, type 2 diabetes, respiratory disorders, endocrine disorders, metabolic disorders (dyslipidemia, metabolic syndrome), arthritic disease, etc.), with life expectancy being significantly reduced[13].

Besides all these problems, obesity dramatically affects the quality of personal and professional life. Obese people are often stigmatized and discriminated, which leads to negative body-esteem among them. On the other hand, productivity, psychosocial performance at work is lower in many cases, leading to problems of adaptation, depression, and low self-esteem. In addition, a vicious circle is created, depression leading to hyperphagia that accentuates obesity, which further aggravates depression[14].

There is no universal model of disease management, but its principles are indispensable for rethinking medical services from the perspective of preventive and primary care[15].

Over time, many strategies for obesity management have been proposed to doctors and patients. Fluctuations in body weight represent the main problem in the treatment of obesity. The initial weight loss, obtained by various means, is relatively easy to acquire, but an important principle in weight reduction is the need to prevent weight regain. This is what is called "secondary" prevention. Weight regain prevention is defined by maintaining <10% weight reduction for 1 year. It has been observed that only 15% of the patients manage to maintain their weight loss.

Currently, the stages of obesity management include:

1) ***preventing weight gain*** by:

a) *changing lifestyle* (diet modification, regular physical activity and behavioral therapy aimed at changing dietary habits by identifying food stimuli, self-evaluation, support groups for mental support and motivation),

b) *pharmacotherapy* and

c) *surgical approach*;

2) ***promoting weight maintenance***;

3) ***management of associated comorbidities*** (diabetes mellitus, dyslipidemias, HTA, ischemic cardiopathy, respiratory diseases, cancer, arthrosis, etc.); and

4) ***promoting weight loss***.

1) ***Preventing weight gain*** by:

a) Non-pharmacological measures (changes of lifestyle)

An effective approach to combating obesity involves: counseling and behavioral therapy, adopting a low-calorie diet and regular physical activity of moderate intensity, at least 30 consecutive minutes for at least 5 days a week (ideally 7 days per week) in order to tip the energy balance

in favor of energy expenditure. Anaerobic isometric exercises have the most important therapeutic value for obese people. To improve cardiometabolic health a study by Bateman et al. concluded that aerobic gymnastics is the most effective type of exercise[16].

Nutrition in obesity should not be seen as a "diet" or as a temporary cure, but as a life change because it is in fact alignment with a physiological diet, appropriate to the functioning of the digestive system and the body in general.

It is highlighted that adopting hypocaloric diets from the literature by the obese patient, without being advised and supervised by a specialist, will lead to undesirable effects such as yo-yo effect and weight fluctuations. The diet is personalized according to age, gender, height, weight, level of physical effort, preferences, local tradition, and educational level. In prescribing a diet, the entire behavior of the patient (emotional, economic, social, work, family, etc.) must be considered. Any prolonged diet may be followed by changes in the personality of the patient, especially in the case of restrictive diets, or cannot be respected due to family, work or economic conditions.

The dietary guidelines of the US National Institutes of Health say that a realistic target is a weight loss of 8–10% in 6 months[17,18]. Reducing calorie intake by 500 calories or increasing physical effort to burn this value means a loss of 0.5–1 kg/week, which means a healthy and balanced slimming rhythm. A faster rate of weight loss does not result in better long-term results. After the first 6 months – the first step focused on losing weight – follows a second step in which the priority should be weight maintenance by combining changes in diet, physical activity, and behavior. After this weight maintenance period, a repeat of the cycle may be considered: greater weight loss and maintenance-focused period. In the weight loss stages, a "diet attack" of more lower calorie is adopted.

The American Association for the Study of Obesity and the National Institutes of Health (NIH) recommend, during the weight-loss process, a diet of 1000–1200 calories for most women and 1200–1600 calories for most men. This means that, compared to a normal diet, we have a calorie intake reduction of 500–1000 calories[17,19].

Low energy diets are recommended[17, 20–22]. Low-carbohydrate diets and high-fat saturated diets are not recommended.

Conventional diets are classified into:

a. Balanced diets:

– low-calorie foods (or reduced portion size)

– low carbohydrate content (*e.g.* Atkins diet)

– no fat.

Balanced diets, based on low-calorie foods or reduced portions of food consumed during a meal, are the most recommended diet type[23]. The necessary daily calorie intake is divided into 3 main meals per day.

Generally, low-calorie diets are rich in carbohydrates (55%–60% of total daily energy consumption), low fat (<30% of energy consumption), and low energy (500–1000 calories / minimum of 1000–1200 calories / day for women and 1200–1400 calories / day for men)[19].

Meals are based on normally consumed foods. Alcohol, fruit juice, carbonated juices, and sweets, which are high in calories and contain few nutrients, are forbidden.

Because the calorie consumption is low, it is important that nutrition is as complex as possible (to include all essential nutrients – 60% carbohydrates, 25% unsaturated fats, 15% protein, along with minerals, vitamins, and antioxidants).[24].

Very low-calorie diets (< 800 calories / day) require replacement of all meals with special formula, commercial preparations that are subject to government regulations (beverages and bars that replace the total food intake for a few weeks (≤ 12 weeks) and contain proteins of high biological value (rich in essential amino acids) and optimal levels of vitamins and micronutrients[25–28].

These diets are intended to produce a rapid weight loss in patients with BMI > 30 kg/m^2 and significant comorbidities[26,27]. Their use by patients with BMI between 27–30 kg/m^2 should be reserved for those with secondary obesity medical conditions such as HTA. Patients must also associate lifestyle changes.

Low Carbohydrate Diet (e.g. Atkins diet) are programs that restrict carbohydrate consumption to 20% of your daily caloric intake. Foods rich in carbohydrates (pasta, bread) are replaced by those containing a higher percentage of proteins and fats (meat, soybeans, vegetables). Their side effects include ketosis and overproduction of insulin. The controversy over this diet was based on the negative effect of increased consumption of saturated fats on the heart and blood vessels, the negative effects of excess insulin on fat storage and weight gain, additional stress on the liver by ketosis, and the promotion of muscular destruction.

The benefits of low-carbohydrate and protein-rich diets (eg Dukan diet), are well documented, and reports of adverse effects are rare in the literature. The effectiveness of these diets is based on the presence of ketosis. Although rare, secondary ketoacidosis in this diet may have serious complications if not treated[29].

Very low-fat diets (eg Ornish diet), containing between 10 and 15 percent total fat, were originally designed to prevent or ameliorate heart disease[19]. It is important to know that some fats are imperative for human physiology: essential fatty acids, fats for energy deposits, fats that help the absorption of some lipid-soluble vitamins: A, D, E, K.

Foster *et al.* have conducted a study of 63 people randomly divided into either a low fat diet (LF diet, calorie-restricted) or a low carbohydrate diet (LC diet) over a 12-month period. For the group that adhered to the low carbohydrate diet, a decrease in triglycerides, an improvement in HDL-cholesterol, and a greater weight loss (7.3%) have been recorded by comparison with the group that adhered to the low-fat diet (4.5%). The difference was statistically significant at 3 and 6 months after the onset of diet[30].

Samaha *et al.* have conducted a randomized clinical trial of 132 severe obesity patients (BMI of 43), many of whom had type 2 diabetes or metabolic syndrome. The duration of the study was 6 months. The mean weight loss of the group that adhered to the low-carbohydrate diet was 3 times that of the low-fat diet group (5.8 kg compared to 1.9 kg); other markers show also an improvement for the first group (a decrease in triglyceride levels and an increase in insulin sensitivity)[31].

A 2-year dietary-intervention study of 322 obese patients randomly divided into 3 diets – LF-diet (low-fat diet), LC-diet (low-carbohydrate diet) and Mediterranean diet (restricted-calorie diet) – led to the following results: the group adopting LC-diet had improvements in HDL-cholesterol and triglyceride levels and a higher weight loss [32].

In most studies, weight loss is higher for LC-diet (about 2, 3 times higher). Mostly LF-diet is calorie-restricted, while LC-diet is not. When both diets have calorie restrictions, the highest weight loss is also recorded for LC-diet. For LF-diet there is a higher decrease in LDL-cholesterol and total cholesterol but only temporarily; after 6, 12 months the difference is statistically insignificant. For LC-diet, HDL-cholesterol and triglyceride levels improve significantly more.

Diets that focus on the percentage composition of macronutrients (low-fat diet, low-carbohydrate diet, or high-protein diet) have not proven to be superior to nutritionally balanced hypocaloric diets.

b. Intermediate diets – those in which the major macronutrients (fats, proteins, carbohydrates) are in equal proportions of 30–40%;

c. Special diets

Nowadays there are countless "special" diets (macrobiotic diet, volumetric diet[33], South Beach diet, Weight Watcher, Whole 30, DASH diet, Mayo diet [34], low-fat plant-based diet[35], Rina diet, "Blood-Type" diet, the dissociated regimen, Paleolithic diet, etc.).

According to a study published in the International Journal of Obesity, dissociated diets do not bring extra benefits to weight loss and body composition during the slimming process. From this point of view, nutritionally balanced hypocaloric diets that allow for concomitant consumption during the meals of all three nutritional principles (proteins, carbohydrates, lipids) are much better suited both for healthy eating and for weight loss[36].

b) *Pharmacological measures / drug therapy* – is established when BMI $\geq$ 30kg / m^2 and aims to reduce body weight by at least 5%. It is always accompanied by a change in lifestyle.

An effective approach to obesity requires the physician or pharmacist advice (for OTC drugs), given the many adverse effects, high price, and moderate action of long-term anti-obesity drugs on weight loss. Abuse of diuretic drugs or laxatives to induce weight loss is contraindicated because it produces hydro-electrolyte imbalances. Depending on the mechanism of action, pharmacologists classify drugs to combat obesity in two categories[37,38]:

A. Anorexigenic drugs with central mechanism *(amphetamine derivatives) that diminish appetite or prolong the feeling of satiety*, administered for a short period:

1. ***Dopaminergic drugs*** *(block the hunger center by dopamine release and activation of dopamine D2 receptors)*, e.g. Amfepramone → common side effects: cardiovascular disorders (HTA, tachycardia, etc.), pulmonary hypertension, neuropsychiatric disorders (depression, anxiety, etc.), abstinence syndrome, etc.[39].

2. ***Serotonergic drugs*** *(prolong the feeling of satiety by inhibiting norepinephrine and serotonin reuptake),* e.g. Sibutramine, Fenfluramine, Dexfenfluramine.

B. Drugs with peripheral mechanism*,* which specifically inhibit gastric and pancreatic lipases,

absorb fats, and are administered over a long period of time, e.g. Orlistat (associated with a hypocaloric diet in obese patients with BMI > 30 kg/m^2 or in overweight patients with BMI > 25 kg/m^2, who present associated risk factors) → frequent side effects: meteorism, high fat stools, abdominal discomfort, flatulence, decreased absorption of lipophilic drugs (e.g. liposoluble vitamins); EMEA (European Medicines Agency) warning on hepatic toxicity[37–39].

Ephedrine and caffeine are second-line therapies in the treatment of obesity. They act by increasing energy consumption but are associated with a risk of tachycardia, hypertension, and palpitations. Weight loss occurs by activating thermogenesis and decreasing appetite.

The hydrogel pill consists of a gelatin-like component having absorbent properties. Administration of the pill with a glass of water causes the hydrogel to expand in the stomach and generate a feeling of satiety. Side effects can occur with excess pills that can cause intestinal blockages.

c) ***Surgery (bariatric surgery)***, which reduces gastric volume, has spectacular results but a high degree of risk. These interventions are always associated with a change of lifestyle. Surgical treatment should be considered after the failure of conventional obesity therapy: modification of diet and behavior, physical activity and pharmacotherapy. In order to benefit from surgical treatment, obesity must be stable or aggravated over the last five years. Obesity surgery should be reserved for patients with BMI > 40 kg/m^2 or BMI > 35 kg/m^2 with associated comorbidities[40].

Three main types of interventions are performed to treat obesity – restrictive, malabsorptive and malabsorptive / restrictive.

Restrictive procedures make a reduction in gastric capacity by making a proximal gastric reservoir of 15–20 ml, limiting the intake of solid foods and inducing a much faster satiety. Two methods are used today: gastric banding (BG) and calibrated vertical gastroplasty (GVC).

Malabsorbtive procedures have been used since the 1950s and dominated obesity surgery for more than 20 years, the prototype being the jejuno-ileal bypass (JIB). Although its results were good, it was abandoned due to the high rate of complications (protein malnutrition, electrolyte imbalances, renal lithiasis, liver failure). The most commonly performed intervention today is the biliopancreatic diversion (BPD) with or without duodenal switch (DS).

Mixed procedures associate gastric restriction with bypassing a portion of the small intestine to induce malabsorption. The most commonly performed intervention is the Roux-en-Y Gastric Bypass (RYGB), which is today considered the "gold standard" surgery for morbid obesity.

Other helpful procedures that can be performed include: *omentectomy* (removal of visceral fat) and *liposuction* (subcutaneous fat removal).

A paradigm shift in how we look at food, physical activity, and health is needed if we want to combat the global epidemic of obesity.

Establishing the plan with all the therapeutic measures needed to combat obesity is made taking into account several factors, including obesity rank, the presence of abdominal adiposity and comorbidity (diabetes, HTA, dyslipidemia, etc.) starting from the understanding that body weight is the result of the balance between caloric food intake and energy consumption through various types of activity.

The programs supervised by physicians combine the change of lifestyle with the hypocaloric diet. Their efficacy and safety were analyzed, resulting in a loss of approximately 20% of the initial weight in the first months. In the absence of a weight-maintenance program, individuals regain their lost weight.

Where appropriate, for the implementation of some drug therapy or surgical treatment, both should always be considered as a component part of a comprehensive program to combat obesity, including other aspects of lifestyle modification – hypocaloric diet and regular physical exercise[15].

CONCLUSIONS

Obesity is an important economic burden for society both through direct expenditure (prevention, diagnosis, and treatment of obesity) and indirect (associated mortality and morbidity, socio-economic and psychological implications), accounting for between 2% and 8% general use for health care[41,42]. Obesity-related health expenditure is estimated to be between 70 and 130 billion euros per year in the EU[43].

Disease management is based on the theory that funds could be used more efficiently if the entire health system was patient-centered. In other words, instead of the functional structure, *i.e.* primary care – hospitals or various clinical specialties, a disease-based structure should be established. For each disease, there will be a single network that

will supervise the prevention, screening, diagnosis, and treatment. The applicability of disease management is of particular interest especially in chronic conditions, as patients will be considered as entities with a distinct clinical evolution of the disease, and not as a series of different clinical episodes.

Further studies need to be conducted to establish the short-term and long-term effects of obesity management programs. Publishing data on the costs and risks associated with these programs is required to attract and retain individuals in the program and make informed decisions about the appropriate weight loss method.

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