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Eating Disorders: Problems of Contemporary Civilisation – A Review

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The eating disorders have been reviewed based on state-of-art of contemporary psychology, medicine and nutrition science, with a special emphasis put on different symptoms and forms, origins and testing methods. Among promoting eating disorders, bulimia nervosa, binge eating disorder, night eating disorder, sleep-related eating disorder are among officially approved and investigated. Among disorders resulting from lack of acceptance of own appearance, anorexia nervosa and bigorexia nervosa are the most serious improper ones. Disorders arising from health care include orthorexia nervosa and recently pregorexia. Different origins of eating disorders are considered, divided into three groups: social, psychological and pathological. The desire to possess a slim shapely silhouette and young appearance, usually under pressure of a social group, may result in disorders such as anorexia nervosa, pregorexia, ageorexia, and bigorexia nervosa. On the other hand, the focusing on eating mainly the biologically pure food, being a purely psychological and individual problem, may be a source of orthorexia nervosa. Majority of disorders have a psychological background constituting the escape and an answer to everyday life problems difficult to overcome. Recently, pathology is often considered as an additional and important determinant, which may cause or enhance the appearance of binge eating or night eating disorder. The eating disorders, if not subject to proper therapy and advising, can tend to incline and develop. The further research in order to properly recognise the eating disorders, and find their roots, is necessary at a strict cooperation of psychologists, physicians and nutritionists or dietetics.

INTRODUCTION

Human diet in Western civilization is characterised by an excessive consumption of food in general, especially the highly processed one, improper adjustment of consumption to meet the needs of the organism, as well as improper fractions of nutrients. Typical flaws in the diet include a high intake of saturated fat and cholesterol, and an excessive intake of sugar, salt and alcohol [Diet, nutrition…, 2003; Gronowska-Senger, 2007]. The overconsumption is often accompanied by too low intake of certain nutrients that are important to the human body, causing an impairment of nutritional status and promoting the development of many diseases. The phenomenon is often associated with low physical activity and stress appearance.

Achievements of civilization, including undoubtedly convenient food, provide an opportunity to quickly prepare a meal, which is not always well balanced and often contains a lot of fat and easily digestible sugars, and is low in vitamins. As the fast food or junk food are easily accessible, the problem deepens. The consumption of high energy food was considered as one of the main causes of obesity [Diet, nutrition…, 2003]. Obesity is a chronic non-infectious disease, which significantly deteriorates the quality of life, shortens its length and constitutes a risk factor for many other metabolic diseases such as type 2 diabetes, cancer of uterus, colon and breast cancer, hypertensive disease, degenerative arthritis, stroke and coronary heart disease. The increase in relative body mass index (BMI) by a single unit increases the risk of diabetes by 20–50% and the risk of cancer by 3–10% [Comparative quantification..., 2004].

According to estimates by WHO experts in the world more than 1 billion people have an excessive body weight, *i.e.* more than 300 million are obese and more than 750 million have overweight [World health statistics, 2010]. The overweight affects more men, and obesity more women, therefore women may experience more negative effects of excessive body fat. In Poland, the excessive body weight is observed in 40% to 60% of adults, depending on a survey, including obesity typical of 15% to 20% of adults [Wądołowska, 2009]. The occurrence of excessive weight among children and adolescents does not exceed 15%.

The eating disorders seem to be very likely the social problem, even if the data on the extent of the irregularity is fragmented. The eating disorders have morbidity and mortality rates that are among the highest of any mental disorders [Herpertz-Dahlmann *et al.,* 2012]. It is estimated that in the U.S.

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5–10 million of women and over one million of men suffer from these disorders [Lyn, 2002]. Although not all problems have been diagnosed, most authors indicate their emotional base, such as an excessive stress [Stunkard *et al.,* 2005]. The dominant feature in individuals suffering from eating disorders is perfectionism. For example, anorexics are afraid of the risk of failure in their daily activities [Bulik *et al.*, 2003].

Such disorders may also appear in Poland, even if positive changes have been noted in dietary behaviour in recent years the such as an increased intake of vegetable and poultry, and a decrease in consumption of red meat [Gronowska-Senger, 2007; Poczta & Pawlak, 2005]. The investigations carried out on food preferences among 9,400 Polish subjects with diverse socio-economic profile, allowed to differentiate 6 groups of respondents, characterised by specific nutritional behaviours. None of the identified models of nutritional behaviour had purely healthy character, and the observed advantageous preferences occurred occasionally [Wądołowska *et al.*, 2008]. In the latest Polish study [Kapka-Skrzypczak *et al.,* 2012] on 14,511 adolescents/young adults, more than 87% of school children and students admitted that they snacked in between meals every day, and 1/3 mentioned that they ate meals at night. As many as 41.40% of schoolchildren and 46.70% of students experienced the feeling of overeating at least several times a week. Analysis of their BMI showed that students were considerably more obese and overweight compared to schoolchildren. Fear of gaining weight was mentioned by 9.90% of respondents including 6.90% of those with normal body structure. As many as 54% of the total respondents described their body structure as normal, 23.7% as slim, 13.9% reported being overweight, 6% thin whilst 1.7% considered themselves obese. Approximately 3/4 of obese respondents had undertaken attempts in the past to reduce their body weight. These data prove that the problem of over- or underweight in Poland is as serious as in other countries; however, less is known on its origin, in particular – how much of these improper conditions is related to eating disorders.

The importance of proper weight and BMI, physical activity and healthy eating habits is taken usually into account by obese people and their advisors, if any, but knowledge on eating disorders is uncommon. The reason is that many of them have been discovered or described in the last few years (pregorexia, orthorexia, ageorexia), and their determinants are still uncertain.

The eating disorders originate from keeping to physiologically ill-balanced diet even if it is implemented based on motives looking justified, for example [Babicz-Zielińska, 2009]:

- inclination to maintain good health by eating only "healthy foods" can lead to orthorexia nervosa,
- desire to maintain a slim, fashionable silhouette through the use of restrictive diets can result in anorexia or bigorexia nervosa,
- inclination to maintain a youthful appearance can cause ageorexia,
- even eliminating negative emotions or improvement in mood may bring out bulimia, night eating disorder or emotional eating.

The etiology of eating disorders is complex and appears to include predisposing genetic factors and serotonin dysregulation, as well as psychological factors that include a history of trauma and childhood sexual abuse. Both anorexia nervosa and bulimia nervosa are medical conditions complicated by multiple neuroendocrine dysfunctions, nutritional deficiencies, and psychiatric diagnoses [Patrick, 2002]. A number of studies have indicated that the appearance of eating disorders is determined by physiological, psychological and environmental factors affecting each other [Treasure & Holland, 1991]. The majority of motives affecting the consumers behavior are associated with affiliation to a social group; another may result from desire to preserve good well-being [Babicz-Zielińska, 2006]. More significant role of socio-cultural determinants than physiological factors was postulated [Pilska & Jeżewska-Zychowicz, 2008].

The eating disorders are inextricably linked to internal conflicts. Food is often a form of struggle with many mental health problems, especially among young people. As the disorders are emotional problems, they are especially important for younger generation having problems with their own identity, negative self-image, sexual dysfunction, *etc.* [Stashwick, 1999].

The present paper is a critical review of publications on different forms of eating disorders, based on both scientific journals and books, and in single cases on internet media (ageorexia: no one reviewed paper has been published as the phenomenon is still under consideration). The last 10 years have been mainly taken into account. The paper is aimed at demonstrating all mentioned eating disorders, characterising their symptoms, their determinants and treatment.

OBESITY-RELATED EATING DISORDERS

The most common obesity-related disorders include: bulimia nervosa, binge eating disorder, night eating disorder, sleep-related eating disorder and emotional eating disorder [Bąk-Sosnowska, 2010]. As shown below, the symptoms of these disorders are frequently similar and may be troublesome when examining a subject/patient. In order to find the best therapy, it is necessary to understand the origins of disorder. Even if they all have psychological roots, they may originate from different attitudes and as such may be determined by different factors.

The research on eating disorders such as night eating disorder and binge eating disorder, may seriously contribute to the understanding of the emergence of obesity [Stunkard, 1959]. The disorders are only sources, and the obesity is a dangerous effect. However, not only obesity but invalid behaviour is typical of all eating disorders resulting in obesity.

Bulimia nervosa – BN

Compulsive eating disorder with symptoms such as vomiting or an excessive use of laxatives is called "bulimia nervosa". Unlike compulsive eating, bulimia does not necessarily lead to obesity [Stunkard, 2000], because it is simply excessive overeating. A person with bulimia may even starve from time to time but at a stressful situation the earlier habits return as a rule. When untreated, bulimia can lead to serious complications such as dehydration and electrolyte disturbances, and may result in heart failure, progressive renal failure, hypoglycemia, constipation, and others.

Diagnostic criteria for bulimia nervosa were developed in 1994 by the American Psychiatric Association [Mancini-Cathilho, 2006]. They include:

- repeated episodes of sudden overeating, characterised by eating in a short time (*e.g.* in 2 hrs.) of great amount of food,
- a sense of lack of control over eating during the episode (a feeling that one cannot stop eating),
- recurrent use of compensatory abnormal behaviours to prevent weight gain such as induced vomiting, abuse of laxatives, diuretics, enemas, *etc*.,
- intense physical exercises,
- self-assessment determined mainly by the body shape and weight.

The etiology of bulimia is not fully determined. The pathology may be important in an appearance of bulimia. As shown [Groleau *et al*., 2012], genes acting within the dopamine system may contribute, either directly or indirectly (*i.e.* in interaction with traumatic childhood experiences), to variations in the presentation of comorbid traits and, possibly, of bulimic symptoms. The genetic predisposition for both bulimia and anorexia [Strober & Humphrey, 1987] may be an essential risk factor triggered by cultural or social influences and/or personal adversities.

The importance of psychological determinants may be even prevalent. The interesting evaluation [Schnitzler *et al*., 2012], based on the cognitive-behavioral model of bulimia nervosa and its extension, included two additional maintaining factors – thin-ideal internalization and impulsiveness – in a group of women. Participants completed measures of demographics, self-esteem, concern about shape and weight, dieting, bulimic symptoms, thin-ideal internalization, and impulsiveness. The proposed model and the factors considered in the model may better capture the scope of variables maintaining bulimic symptoms in young women with a range of severity of bulimic symptoms.

The important question is whether the mental abilities can affect the susceptibility to bulimia nervosa. So far research results [Pedersen *et al*., 2012] on the evaluation of reflective functioning (RF) abilities of patients suffering from bulimia nervosa cannot bring out clear conclusions. On average, the sample of patients suffering from BN had close to normal mentalising abilities. However, the distribution of RF scores was significantly different from the distribution of RF in a non-clinical control group, showing a more polarised pattern with more low and high RF scores. The theory of mentalisation may then contribute to understanding BN; on the other hand, bulimic pathology may develop and be maintained despite good mentalising abilities.

In investigations of importance given to self/other standards by with patients eating disorder and healthy controls, three domains were associated with eating disorders, *i.e.* family standards, self-achievement and physical appearance [Gunnard *et al*., 2012]. Higher self-standards, in physical appearance, were more relevant in bulimia nervosa.

Current Polish study on bulimia [Jaworski, 2011] was based on neuropsychological diagnosis of cognitive functions in this group of patients. The Stroop test was used as a neuropsychological test to assess cognitive functions in patients with the clinical form of bulimia nervosa, in standard and modified versions containing words associated with food and body shape. In this group of patients the deficits occur in the sphere of perception, relating principally to the body shape, illness and emotional functioning. Patients with bulimia are characterised by increased selectivity of attention, particularly to stimuli associated with food and weight. They manifest disorders of executive functions, which are observable as increased impulsivity in the behaviour.

According to an early report, the bulimia frequency has not been increasing over the last 30 years [Fombonne, 1996]. The large-scale survey made among Dutch citizens on the prevalence of anorexia nervosa and bulimia nervosa in a large (N = 151781) representative sample [Hoek, 1991] showed the incidence rate for anorexia nervosa as 6.3 and for bulimia nervosa as 9.9 per year per 100,000 population. The prevalence of bulimia nervosa is three times higher in larger cities than in smaller urbanised or rural areas, while anorexia nervosa is found with almost equal frequency in areas with a different degree of urbanisation.

Treatment of bulimia is not easy, because people with this disorder usually have normal body weight. Cognitive-behavioral therapy (CBT) is currently the "gold standard" for the treatment of bulimia nervosa (BN), and is effective for approximately 40–60% of individuals receiving treatment [Bulik *et al*., 2012].

Binge eating disorder – BED

In 1992 the uncontrolled eating has been officially recognized and defined as "binge eating disorder". It is also now called as compulsive eating, still not existing as an official category of the eating disorders [Diagnostics …, 2000]. Even if in the past the BED was assumed by some researchers to be a variation of bulimia nervosa or a symptom of obesity, it was generally claimed as a clinical disorder different from bulimia nervosa, obesity and non-BED obesity [Tuschen-Caffier & Schlüssel, 2005]. The overweight and obesity are not obligatory conditions for BED development among people [Brownley *et al*., 2007].

Binge eating disorder may affect as many as 2% of the general population and 8% with obesity in the United States [De Angelis, 2002] but is was also claimed as the most common eating disorder [Hudson *et al*., 2007]. In another study [Trace *et al*., 2012] the BED was reported by 6.4% of the surveyed women. In Poland, this disorder was observed among 25% of obese persons [Bąk-Sosnowska, 2010], perhaps the figure is more likely for modern societies.

The similarities and differences between BED and BN are still, however, unclear and disputable. The people with this disorder do not stop eating until they feel uncomfortable. In other words, this disorder is characterised by eating in a period of time of a food amount which is definitely larger than the most people would eat under similar circumstances [Diagnostics …, 2000]. The BED may be characterised by a number of features: people eat much more rapidly than normally; they eat till feeling uncomfortably full; they eat large amounts of food even they do not feel hungry; they eat alone as they very critically assess their behaviour. The BED is supposed to occur if such periods appear at least two days

a week during 6 months, according to the most researchers or even less often by others. It involves concern about body shape and weight as it is also characteristic in bulimia nervosa and anorexia nervosa [Wilfley *et al*., 2003; Striegel-Moore *et al*., 2001]. Body image disturbances are more pronounced in obese binge eaters than in obese non-binge eaters [Tuschen-Caffier & Schlüssel, 2005]. The subjects manifesting BED show significantly more depressed mood than others. According to Walsh & Boudreau [2003], the substantial difference between BN and BED may be the behavioral pattern: at BN, the average binge meal is greater, the pattern of food consumption is more disturbed but the amount of calories is smaller. The differences between those two disorders [Wonderlich *et al*., 2009] can include more fields as: recovery rates, diagnostic stability, age of onset, gender distribution, BMI, dietary restraint, *etc*. Sometimes, however, it is claimed that compulsive eating observed in patients with eating disorders may even result in malnutrition [Bellodi *et al*., 2001].

A new study by Sonneville *et al.* [2012] has looked for an answer to a question whether body satisfaction is associated with body mass index change and whether it protects against the development of frequent binge eating among overweight and obese adolescent girls. At baseline, 57.2% of the overweight and obese girls were at least somewhat satisfied with their bodies. During 11 years of follow-up, 9.5% of them started to binge eat frequently. The association between body satisfaction and starting to binge eat frequently was stronger for younger adolescents than for the older ones. Thus, although body dissatisfaction is common among overweight and obese girls, body satisfaction may protect against excessive weight gain and binge eating. Prevention of body dissatisfaction must begin early and should be considered as a component of both obesity and eating disorder prevention programs.

It was shown [Trace & Thornton, 2012] that the BED could be positively associated with not getting enough sleep, sleeping poorly, problems falling asleep, feeling sleepy during work or free time, and disturbed sleep. The association between sleep problems and BED can be affected by many complex psychological, biological, neuroendocrine, and metabolic factors.

The most common assessment methods for eating disorders include semistructured clinical interviews, self-monitoring and self-report measures [Garner, 2002]. In likely the best Eating Disorder Examination (EDE) the responses are organized in four sub-scales: restraint, eating concern, shape concern, weight concern. The EDE assesses, among others: fullness, calorie limits, subjective loss of control, urge to eat, guilt about eating. An adaptation of EDE for children (ChEDE) was also presented [Bryant-Waugh *et al.,* 1996]. Another method, the Yale-Brown-Cornell Eating Disorder Scale [Mazure *et al.*, 1994] includes a measure for the degree of impairment, and a checklist of 21 preoccupations, 44 rituals and 16 symptom categories. Finally, the Children's Binge Eating Disorder Scale was especially designed for the BED among children aged between 5 and 13 yrs. [Shapiro *et al*., 2007]. The self-monitoring measures are not standardized and may include *e.g.* documentation of patients about their thoughts, feelings, *etc*.

The self-report measures are numerous. The Eating Attitudes Test [Garner *et al*., 1982] is based on factor analysis of an original 40 item version. 26 items measure different eating disorder symptoms. The Eating Disorders Inventory [Garner *et al*., 1983] has multiple scales, which asses the attitudes and behaviours with regard to eating, weight and shape. The Eating Disorder Questionnaire [Faiburn & Beglin, 1994] being an adaptation of the EDE scale, Three-Factor Eating Questionnaire [Stunkard & Messick, 1985], Questionnaire on Eating and Weight Patterns-revised [Spitzer *et al*., 1992], and Binge Eating Scale [Gormally *et al*., 1982], specific only of this disorder, are the most frequently applied.

It is important to mention that the majority of measuring instruments for eating disorders were developed many years ago. The newer ones include the self-report questionnaire described in a work by Carter & Jansen [2012] which examines the current (last three months) behaviour of obese patients seeking bariatric surgery.

The treatment of this disorder is difficult. In a research by Brownley *et al*. [2007], the strength of the evidence for medication and behavioral interventions was moderate, and for self-help and other interventions was weak, for treatment-related harms was strong, for factors associated with efficacy of treatment was weak, and for differential outcome by sociodemographic factors was nonexistent. The important role of cognitive-behavioral treatment and inter-personal therapy was found in psychological therapy of this disorder [Wilfley *et al*., 2002].

Night Eating Disorder – NED

The night eating disorder or syndrome (NES) consists of evening hyperphagia and/or nocturnal eating and is associated with depressed mood that worsens in the evening [Nolan & Geliebter, 2012]. It is characterised by the following features: morning anorexia (lack of appetite), excessive evening eating – more than 50% of calories daily intake of calories after 19. at night, insomnia, and emotional disorders [Stunkard *et al*., 1996; Vander Wal *et al*., 2005]. Origins of this disorder may totally be associated with effects of food on brain functions. The NES tends to co-occur with mood, anxiety, eating, sleep, and substance use disorders and may have implications for weight and diabetes management.

Night eating disorder is a significant problem among people with overweight and obesity in the U.S. [Vander Wal *et al*., 2005]. However, it is not consistently related to elevated BMI. The NED is increased among obese people especially in times of stress, and tends to decline after stress disappears. Studies have shown that 74% of people who eat at night associate this habit with excessive stress [Stunkard *et al*., 2005]. The exact relationship between this syndrome and obesity remains unclear [Gallant *et al*., 2012]. The NED does not always lead to weight gain, even if certain individuals may be susceptible to night-eating-related weight gain. The obesity with circadian imbalances strengthens the link between the NES and obesity so that circadian genes may play a role in this syndrome.

Although the habit of eating snacks in the evening is not a good habit, it cannot be assumed as night eating disorder [Vander Wal *et al*., 2005]. There is no specific data about

the range or frequency of this eating disorder as it seems relatively new.

The instruments used to follow NED include *e.g.*: Night Eating Diagnostic Questionnaire (NEDQ), Night Eating Syndrome History and Inventory (NESHI), Sleep Quality Index (SQI), and Dutch Eating Behavior Questionnaire (DEBQ), containing subscales for emotional, external, and restrained eating at evening [Nolan & Geliebter, 2012].

In the newest interesting study performed among students the emotions were proved to be the most important factor determining the appearance of NED at evening [Nolan & Geliebter, 2012]. The students in the full syndrome category had significantly higher emotional eating scores and external eating scores than those in the normal and mild categories. There was no difference in restrained eating between the normal and full syndrome groups. Those with moderate and full NES symptoms were also reporting on a significantly lower sleep quality. The NES is associated then with more eating in response to negative mood and to food cues.

High protein- and high-carbohydrate meals can influence moods, attention and concentration among normal adult subjects with respect to age, gender and meal time. In a survey by Sarrafi-Zadeh *et al*. [2012], women reported greater sleepiness after two hours of carbohydrate meal as opposed to a protein meal, and men reported greater calmness after a carbohydrate as opposed to a protein meal. After a carbohydrate- or protein-rich breakfast, persons older than 40 years felt more tense and less calm with a protein-rich than the carbohydrate-rich meal. In general older subjects preferred carbohydrate than protein meals. Carbohydrate meals are also reported to impair objective performance; carbohydrate-rich foods either in breakfast or lunch have exerted a negative influence on neural response such as impaired objective performance and poor sustained attention. A meal consumed close to bedtime may then cause sleep disturbances, even though it is sometimes taken in order to facilitate the sleep. However, it makes efforts to change the daily diet in order to limit the calorie intake, and such manipulation in the energy content of meals for a single day may cause an increase in markedly different levels of insulin, and in general results in weight gain. On the other hand, the core symptoms of NED include the evening hyperphagia, morning anorexia, nocturnal eating, and insomnia [Godini *et al*., 2011]; thus there is no agreement whether NED is caused by a lack of sleep or by looking for food-enhanced sleep.

Relatively little is known about the successful treatment of NES. Limited evidence suggests that serotonergic-based pharmacological treatments may be beneficial. Psychological interventions, such as psychoeducation, eating modification, relaxation strategies, sleep hygiene, cognitive restructuring, physical activity, and social support facilitation may also yield beneficial results [Vander Wal, 2012]. The intake of selective serotonin re-uptake inhibitors (SSRIs), which reduce the hyperactivity of the serotonin transporter in NES, may be the most effective treatment [Milano *et al*., 2012]. Some results suggest then pharmacological (sertraline and topiramate) or psychotherapeutic (cognitive behavior therapy) interventions [Godini & Castellini *et al.,* 2011]. Ghrelin is a hormone which increases food intake by interacting with hypothalamic and brainstem circuits involved in energy balance, as well as reward-related brain areas. In common obesity, ghrelin levels are lowered, whereas post-meal ghrelin levels remain higher than in lean individuals. Therefore such drugs which interfere with ghrelin signalling have therapeutic potential for eating disorders, including obesity caused by *e.g.* NED [Cardona-Cano *et al*., 2012].

Sleep-Related Eating Disorder

Nocturnal eating is a common symptom of two clinical conditions with different pathogenesis and needing different therapeutic approaches: Sleep Related Eating Disorder (SRED) and Night Eating Syndrome [Vinai *et al*., 2012]. The first is considered a parasomnia while the second is an eating disorder discussed above; however, the distinction between SRED and NES is still a controversial matter. The feeding behavior in SRED is characterised by recurrent episodes of eating after an arousal from nighttime sleep with or without amnesia [Howell *et al*., 2009; Winkelman *et al*., 2011]. SRED is frequently associated with other sleep disorders, in particular parasomnias. The more precise magnitude of this order is unknown.

The distinctive features of SRED are amnesia of night eating episodes and consumption of non-typical food or dangerous articles. SRED is frequently associated with other sleep disorders, *e.g.*, restless leg syndrome, periodic limb movement disorder, obstructive sleep apnea, and somnambulism. It can be also induced by medicines applied by a patient (*e.g.* zolpidem as discussed below). It is hypothesised that the syndrome represents a variation of somnambulism. The treatment involves both non-pharmacological methods (psychotherapy, phototherapy) as well as the pharmacotherapy (aimed to increase serotoninergic neurotransmission in the brain, predominantly by sertraline, a selective serotonin re-uptake inhibitor). SRED can be treated by controlling comorbid sleep disorders and eliminating provocative sedative hypnotics [Zawilska *et al*., 2010].

The increasing prevalence of obesity has led to an increase in the prevalence of sleep disordered breathing in the general population. Weight loss using dietary modification and life style changes is the safest approach to reducing the severity of sleep, but its efficacy is limited on the long run. Obesity has been linked also to narcolepsy. The loss of neuropeptides co-localized in hypocretin neurons is suggested as the potential mechanism. Poor sleep quality, which leads to overall sleep loss and excessive daytime sleepiness has also become a frequent complaint in this population. Identifying abnormal nocturnal eating is critically important for patient care. Both sleep related eating disorder and night eating syndrome are treatable and represent potentially reversible forms of obesity [Akinnusi *et al*., 2012].

It is generally postulated that one of the most important causes of SRED is the use of some drugs, especially of zolpidem, a global market leader in the hypnotic arena [Zawilska *et al*., 2010; Valiensi *et al*., 2010; Wing *et al*., 2010] and novel modifications of this narcoleptic are in clinic trials [Owen, 2009]. The anti-seizure medication topiramate and dopaminergics may be an effective treatment for SRED and antiseizure medication topiramate [Winkelman, 2003; Howell

& Schenck, 2009]. Additional treatments may include methods to release stress and anxiety. Examples of these methods include stress management classes, assertiveness training, counseling, and limiting intake of alcohol and caffeine [Sleep-related eating …, 2012].

Emotional Eating Disorder – EED

Emotional eating disorder occurs among people for whom the eating is the most common reaction to stress or boredom. Food is help in easing tension or improve mood. There are people who react by reduction in appetite and decrease in food intake in all emotions, especially negative, and those who under identical conditions have a greater appetite. The interdependence of mental state and appetite is clearly marked among women [Jeżewska-Zychowicz, 2004].

People eat for a variety of reasons: when they are hungry, under the influence of sensory stimuli, for pleasure, or reaching for food unconsciously, on impulse. In studies of links between the causes of eating and selected emotional states, the anger, joy, fear and sadness have been demonstrated as enhancing the eating. Women more often reach for food impulsively and feel more pleasure in eating than men in state of anger and sadness [Macht, 1999].

It has been shown that a higher food intake occurs during emotional states such as boredom, depression and fatigue, while the lower – in the emotional states such as fear, pain and tension [Babicz-Zielińska, 2010]. In another study the greater tendency to eat healthy food was observed at positive emotions and to eat junk food – at negative emotions [Lyman, 1989]. According to the author it speaks for so-called "body wisdom". Studies of the impact of emotional states on food preferences conducted in a group of girls, demonstrated a reduced consumption during negative emotional states like fear, anger, sadness, fatigue and stress. Boredom is an emotional state in which the quantitative consumption is definitely higher than in the other moods. In the negative emotional states the sweets, alcohol, chips, and food known as a junk food is mostly preferred [Babicz-Zielińska *et al.,* 2006].

The studies of gender and age effects on perception and preference of food, after causing the improvement in mental mood, indicated that for men such food includes dinner dishes (steak, soup), and for women – sweet snacks (ice cream, chocolate). The young people, compared to the older generation, prefer sweet snacks [Wansink *et al*., 2003]. The authors have proposed to call the food which promotes positive mood *comfort food*. The emotional eating is a common disorder accompanying obesity even if its frequency is difficult to assess.

The relationship between emotional states and eating behaviours is complex, and emotional eating has been sometimes identified as not a new eating disorder, but only a possible factor triggering binge eating in bulimia nervosa, binge eating disorder or anorexia nervosa. In the study by Ricca *et al*. [2012], performed in the U.S. with the use of a clinical interview (Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition) and several self-reported questionnaires (Emotional Eating Scale EES), the higher EES scores were observed among subjects with eating disorders. It was concluded that emotional eating and fear of loss of control over eating were significantly associated with specific eating attitudes and behaviours, according to the different diagnoses.

The psychological and social determinants themselves or at least their strength may be different, depending on age or social group. The problem is particularly important, when children population is considered, for which the overweight and obesity rates have dramatically increased in the last years in modern societies. A recent study made among Polish children [Mazur *et al*., 2011], discussed on the influence of some psychosocial factors on selected eating behaviours, such as dietary restrictions, uncontrolled eating and emotional eating. A 13-item Polish version of Three Factor-Eating Questionnaire instrument was applied, representing three factors: Cognitive Restraint (CR), Uncontrolled Eating (UE) and Emotional Eating (EE). Twelve psychosocial factors, gender and body mass index BMI were taken as potential independent variables. The following variables appeared to be independent predictors of eating behaviours: (i) for CR: three risk factors – high BMI, gender (female) and low self-esteem; (ii) for UE: two risk factors – high stress and low emotional support and one protective factor – positive attitude towards school; and (iii) for EE: two risk factors – high stress, low coping and two protective factors – high social acceptance and instrumental support. Psychosocial factors showed the strongest association with emotional eating and the weakest with dietary restrictions. Therefore the treatment of Emotional Eating should include the psychological aid.

Disorders resulting from the lack of acceptance of own appearance

Over the centuries the ideal of beauty feminine silhouette has been drastically changed. Even in the early twentieth century in Western culture, a stout woman was considered a sign of health and prosperity. Beauty icons of 60's of last century, Marilyn Monroe or Ursula Andress, now would be regarded as having a significant overweight.

Currently in the Western culture the ideal of beauty is a woman with very thin, almost emaciated, silhouette. Silhouette has become a determinant of attractiveness, and stouter women are no more accepted by others and are often perceived as neglected. Social pressure on being thin makes the girls and young women strive to achieve a slim silhouette and believing the same to gain social acceptance [Brytek-Matera, 2009].

Achieving and maintaining a slim figure requires proper nutrition, which usually involves the use of restrictive diets and substantial physical activities. More and more fitness clubs for women not only offer a comprehensive set of exhausting exercises, but also slimming diets. Even in the middle school girls the interest in a healthy diet was observed to be linked with weight loss [Babicz-Zielińska *et al.,* 2011]. As a result, young women (anorexia affects more women than men, more younger people than older ones) more often do not accept their body shape, perceive themselves to be stouter than they really are, and their desired silhouette is skinny indeed [Babicz-Zielińska *et al*., 2002]. Lack of acceptance of their body shape, and internal conflicts that occur during adolescence, are often the ground of anorexia nervosa. According

to some authors, dissatisfaction with appearance is often related to negative emotions, especially depression and anxiety [Głębocka, 2009].

To assess the risk of this disorder, the limited-scale consumption of Restricted Eating Scale [Van Strien *et al.,* 1986] was proposed:

1. If you put on weight, will you eat less than normal?
2. Do you limit portions of meals, although you can eat more?
3. How often do you refuse to eat or drink offered because you care about weight?
4. Do you pay attention to what you eat?
5. Do you especially choose low-calorie products?
6. If you ate too much, the next day you will eat less?
7. Do you deliberately eat less in order not to gain weight?
8. How often do you try not to eat between meals, not to gain weight?
9. How often do you try not to eat in the evening because you are afraid to gain weight?

Possible answers are: never (1), seldom (2), sometimes (3), often (4), very often (5).

Anorexia nervosa (AN)

Anorexia is a disease which consists in the deliberate reduction in food intake initially preserved thirst and general well-being. Complications associated with malnutrition due to anorexia are the same as the devastating hunger strike. Anorexia can cause disturbances in the physical and mental development of young girls, in extreme cases leading to death. The incidence of mental anorexia can be viewed in terms of demographic and social factors such as age, gender, social class, ethnicity and sexual orientation. Anorexia nervosa, like bulimia, was diagnosed by the American Society of Psychiatric according to the following criteria:

- weight loss above 15% of the weight corresponding to the age and height, or lack of gain of the weight during development,
- pronounced fear of gaining weight despite persistent real underweight,
- disturbances in the perception of their own body shape,
- for women, the lack of three consecutive periods, if no other reason; disturbances of potency in men.

Along with a significant weight loss there are physical problems such as low blood pressure, irregular heartbeat, hypoglycemia, low body temperature, estrogen deficiency, dehydration and electrolyte disturbances. The dominant feature of patients with anorexia is perfectionism, anorexics are afraid of the risk of failure in the activities, hence their reluctance to undertake them [Bulik *et al*., 2003].

A variation of anorexia is anorexia athletica (AA), which is a disorder common in athletes in disciplines that require low body weight. Reduction of body weight and body fat due to the requirements of competitors, and not low self-esteem is a typical behaviour. Often, nutritional behaviours aimed at reducing food are enforced by coaches [Sudi *et al*., 2004]. Maintaining a healthy body weight is especially important for girls, when practicing ballet, figure skating, long-distance running, and observed in 15% of swimmers, 62% of gymnasts, and 32% of other sportsmen.

The studies in the group of teenagers practicing various sports have shown that the protein intake is inadequate and can cause shortages of muscle mass, and impaired mental and physical development. Physical exercise combined with diet contributed significantly to the reduction of body fat [Nazarewicz & Babicz-Zielińska, 2000].

The origins of tendency to anorexia are unclear. As observed, in Sweden higher maternal education was associated with a higher risk for hospitalization for AN. An increased risk of AN was also found among females who stated that they "often compare their future prospects with others." [Ahrén *et al*., 2012]. In another study [Dellava *et al*., 2012] an attempt was undertaken to assess whether maternal recall of childhood feeding and eating practices differed across anorexia nervosa subtypes. Participants were women whose mothers completed a childhood feeding and eating questionnaire. Results revealed no significant differences in the retrospective maternal report of childhood feeding and eating practices among AN subtypes.

There are different scales to measure eating disorders, including anorexia nervosa, like the Eating Disorder Examination Interview, the Body Attitude Test and the Beck Depression Inventory-II. The Eating Disorder Diagnostic Scale (EDDS) is a new and brief self-report measure for diagnosing anorexia nervosa, bulimia nervosa and binge eating disorder. Research has provided evidence of the reliability and validity of this scale in non-clinical populations [Krabbenborg *et al*., 2012]. The EDDS showed good test-retest reliability, internal consistency, criterion validity and convergent validity with other scales assessing eating and general pathology.

Treatment for anorexia may include psychotherapy, like cognitive-behavioral therapy and family therapy, the less effective antidepressants and estrogen, and hospital treatment when the weight loss is over 15% [Heffner *et al.,* 2002; Fairburn *et al*., 2003; Grohol, 2012]. The important role in therapy of eating disorders is ascribed to nutritional education, which could result in change in attitudes and behaviour of patients and then may increase treatment efficacy and the rate of healing process [Czarnewicz-Kamińska & Gronowska-Senger, 2007].

Pregorexia nervosa (PN)

A new phenomenon is pregorexia, a relatively new concept in the history and classification of eating disorders, introduced to the public in 2005 and for the first time described in a journal as late as in 2009 [Mathieu, 2009]. It is a typical behaviour of some pregnant women, who become preoccupied to gain control during pregnancy period by an use of extremely low calorie diets and exercises. Some 5% of women during and after pregnancy suffer from pregorexia [Eating disorders …, 2012]. All these activities are intended to prevent weight gain with potential threat to the health of the mother and a fetus. This eating disorder may be classified as anorexia but it seems different: the reason is the same, to maintain the slim silhouette, but the psychological origins are different. Therefore the PN was in the past assumed as diabulimia [Mathieu, 2008] and orthorexia [Mathieu, 2005]; it seems that it is close to anorexia in behaviour and similar to orthortexia in taken efforts and an expected final result *i.e.* care of health.

The obesity in pregnancy is much more common than pregorexia. The warning sings include: a documented history of eating disorders, talking about pregnancy as it were not real, focusing on calorie counts instead of general health, eating alone, skipping meals. The pregorexia may originate from signals indicating that about half the pregnant women gained more than suggested in the U.S, in 2007. For some women it may trigger unhealthy practices in care for proper body mass that may be acknowledged as eating disorders. The pregorexia may as well be promoted by thin celebrities [Pregorexia inspired …, 2009].

This new eating disorder has not been generally approved and is still explained by either anorexia or orthorexia. Despite that, the problem is important not only in the U.S., but in Poland as well. The qualitative assessment of this syndrome and its origins are still unknown; it is also still unclear when such care of proper body mass of pregnant women is a proper attitude and when it becomes an eating disorder. All of the above mentioned factors are confusing. It is unknown what is the importance of the recommendations from physicians and the influence of a woman's family and the media in an appearance of this disorder. The treatment of this disorder focuses on psychological care and relaxing the stress [Eating disorders, 2012].

Bigorexia nervosa (Body Dysmorphic Disorder)

Bigorexia is defined as the inverse of anorexia, or a form of distortion of muscle – muscle dysmorphia, this term was introduced in 1997 [Pope *et al*., 1997]. Bigorexia origins are not known, but usually two are involved: (1) it is a form of obsessive compulsory (intrusive) behaviour or (2) it is the result of the impact of media that create the ideal human figure [Ladefoged, 2009]. Bigorexia is estimated to affect more than 100,000 persons worldwide [Leone *et al*., 2005].

Typical bigorexia symptoms include:
- dissatisfaction with appearance,
- intensive training,
- a rigorous diet and strict body mass control,
- sometimes taking anabolic steroids,
- avoiding contact with the environment, problems in interpersonal relations.

The incidence of muscle dysmorphia is increasing, both in the United States and in other regions of the world, perhaps because awareness and recognition of the condition have increased. Although treatment options are limited, therapy and medication do work. The primary issue is identifying the disorder, because it does not manifest itself like other psychobehavioral conditions such as anorexia or bulimia nervosa. Not only do patients see themselves as healthy, but they mostly look very healthy from an outward perspective. The causes of muscle dysmorphia are not well understood, which reinforces the need for continued investigation [Leone *et al*., 2005].

The main characteristics of bigorexia complies on a statement that although the efforts are heavy, the body will always remain not quite muscular. Bigorexia occurs mainly among men. Bigorexia Muscle dysmorphia is linked to a growing concern with body image amongst males. The muscle dysmorphia is then a new expression of a common pathology shared with the eating disorders [Mosley, 2009].

While for those who want to reduce body weight, the exercise for an average of 40 minutes a day is sufficient, the people suffering from bigorexia spend daily 5 or more hours at this occupation. People with bigorexia control their silhouette up to 12 times a day, apply strict diet, eat almost exclusively at home, often use anabolics. It is interesting that if a person is not affected by bigorexia and likes to show their body in public, the people with bigorexia do not. It differs from anorexia and bulimia also in terms of self-esteem: people with bigorexia consider themselves to be healthy and look healthy. Clinical studies of men with Body Dysmorphic Disorder (excessive preoccupation with imagined or slight defects in appearance causing clinically significant depression or weakness that cannot be explained by other causes) have shown that those patients who suffer from bigorexia, are exposed to severe psychological problems. They were more likely to commit suicide, they revealed a worse quality of life, frequently used anabolic steroids and other substances causing disorders [Pope *et al*., 2005]. The other studies have confirmed the bigorexics to suffer from disorders occurring in childhood and resulting from harassment, low self-esteem, depression and nervousness [Wolke & Sapouna, 2008]. To assess the risk of this disorder, the questionnaire containing 15 statements setting out the respondent's attitudes to their appearance, such as "I constantly think about my appearance," "I hate my body", "I'd like to get my arms stouter" *etc*., was proposed.

The bigorexia seems [Molina & Alcón, 2011] to be an independent entity and seems to have comorbidity between certain psychopathologycal characteristics of personality (hypomania, narcissism and compulsivity).

The pressure of a social group may result in taking drugs. The symptoms of bigorexia in males were shown to occur with the use of amphetamines, and legal highs [Pawłowska *et al*., 2011]. There was, however, no correlation between symptoms of eating disorders in men and alcohol abuse.

In a study on the contribution of gender role stress (GRS) and sociocultural appearance on symptoms of muscle dysmorphia in a college, for women, five GRS subscales, sociocultural appearance demands, age, and frequency of aerobic exercise predicted muscle dysmorphia symptoms, and for men, only one GRS subscale, age, and sociocultural appearance demands predicted those symptoms. The muscle dysmorphia may be in conclusion more related to specific perceptions of pressure to attain an attractive body than to global gender role stress [Readdy *et al*., 2011].

Positive addictions (gambling, sex, sport) are often developed in comparison with substance abuse. The real physical and psychical suffering is often observed. High level sportsmen or amateurs practicing intensively a sport activity can often present an excessive practice of physical activity which may reveal a sport addiction, *i.e.* bigorexia, called also an Adonis complex [Véléa, 2002].

DISORDERS ARISING FROM HEALTH CARE

Orthorexia nervosa

The orthorexia (from the Greek: orthos – competent, orexia – appetite) is a disorder resulting from an exaggerated concern for health. The orthorexia was defined for the first time by Bratman as morbid even though it concentrates on the quality

of food [Bratman, 2000]. According to Bratman, orthorexia is caused by search for food that is not only totally safe but also potent to prevent from diseases. Another features of orthorexia, like a desire to fully control own life, "a hidden conformism", and a search for spirituality and identity, may be typical rather for a person who is inclined to orthorexia, than to this eating disorder itself. Otherwise – it is maniac obsession about "healthy food" [Donini *et al*., 2004].

Clear classification criteria of orthorexia have not been developed yet and there has been an on-going discussion whether it belongs to the group of eating disorders or the obsessive-compulsive disorders [Janas-Kozik *et al.,* 2012]. In contrast to eating disorders, people with orthorexia are obsessed with food quality rather than quantity and they do not take excessively care about thin silhouette. People with orthorexia nervosa are obsessive about healthy food. The orthorexia is claimed to be related to anorexia and bulimia nervosa, it is a syndrome closely allied with obsessive-compulsive disorders, and it could be treated as a disturbed eating habit [Brytek-Matera, 2012]. Orthorexia starts when a diet becomes an escape from life – everyday activities are dominated by planning, buying and preparing "proper" meals. Each departure from this regime causes anxiety and guilty conscience and leads to even further tightening of the dietary habits.

Orthorexic patients exclude foods from their diets that they consider to be impure because they might have herbicides, pesticides or artificial substances and they worry in excess about the techniques and materials used in the food elaboration. This obsession leads to a loss of social relationships and affective dissatisfactions which, in turn, favours obsessive concern about food. In orthorexia, patients initially want to improve their health, treat a disease or lose weight. Finally, the diet becomes the most important part of their life [Catalina-Zamora *et al*., 2005].

The frequency of orthorexia may be quite high and increasing, especially in some social or professional groups. Such a high frequency was observed among Brazilian dieticians [Alvarenga *et al*., 2012]. In the Turkish study [Bagci Bosi *et al*., 2007] using the ORTO-15 test, at least about 20% of male and 40% of female resident Turkish doctors were at risk of developing orthorexia nervosa in the future.

The study made among resident medical doctors showed that female medical doctors were more careful than the men when considering their physical appearance and weight control, and consumed less caloric food. Therefore, those with "healthy fanatic" eating habits are at risk of orthorexia development in the future [Bagci Bosi *et al*., 2007].

In an Italian survey made among 404 respondents, 6.9% of subjects were shown to be orthorexics, which is quite a lot. People suffering from this disorder perceived processed foods as "dangerous" for the health and preserved food – as "artificial" [Donini *et al*., 2004].

The causes of this disorder include, among others [Bratman, 2000]:

- the desire to lead healthy lifestyles,
- fashion on health nutrition,
- boredom,
- the attempt to recovery from diseases such as allergy,
- the way to avoid diseases and prevent aging.

To assess the risk of orthorexia, Bratman proposed a questionnaire containing 10 questions [Bratman, 2000]:

1. Do you spend more than three hours for meal planning?
2. Do you plan daily meals in advance?
3. Is the nutritional value of food more important than the pleasure of consuming it?
4. Do you feel that the higher the quality of your diet, the better life quality?
5. Do you become more demanding of yourself?
6. Do you celebrate meals and eat just the right ingredients?
7. Do you feel better than others because you eat better food?
8. Do you feel guilty and frustrated when you keep no terms of diet?
9. Is your diet making you isolate?
10. When you eating meals in the right way do you feel that you can completely control yourself?

In another research on orthorexia risk assessment among subjects exercising in fitness clubs, the Bratman test demonstrated that majority of the respondents did not devote much time to plan their meals, but 80% were using ingredients that would positively affect their health. Women paid more attention to the nutritional and health enhancing food. Additionally, 51% of the subjects avoided foods containing additives. The study did not prove explicitly whether such a risk really appeared in such a group. Thus, the requirements upon the quality of consumed food as well as concern about the appropriate composition of meals cannot be assumed as the eating disorders [Babicz-Zielińska *et al*., 2012].

The risks orthorexia might also be assessed using the scale evaluating attitudes towards natural products [Roininen & Tuorila, 1999], called Natural Product Attitude:

- I do not eat processed products because I do not know what they contain,
- I try to avoid products that contain additives,
- I want to eat only organic food,
- Additives improve palatability and are harmful to health,
- Organic food is better for health than conventional one,
- I do not pay attention to substances added to products that I eat every day.

Possible replies may range on a scale of 1 to 5, from 1 "strongly disagree" to 5 "strongly agree".

Their treatment is not easy and includes a complex psychological aid [Kratina, 2012]. The orthorexic must admit there is a problem, then identify what caused the obsession, become more flexible and less dogmatic with eating. The emotional problems are usually very deep and the goal is to make the transition from this eating disorder to normal eating.

SUMMARY AND CONCLUSIONS

The state-of-art in the field of eating disorders discloses, from the first sight, three important features. At first, there is a huge number of papers on some disorders, like anorexia, bulimia, recently also on binge eating disorder. For example, there are 8,128 papers and reviews on bulimia nervosa from 2000 till today. On the other hand, some other eating disorders were addressed in a significantly lower number of manu-

scripts from 2000 to 2012, *e.g.* the Scopus database shows only 31 papers on orthorexia, and only one on pregorexia. Therefore the authors are of the opinion that themain focus in research should be on less popular eating disorders, for which a lack of knowledge and even data is obvious.

Secondly, and more importantly, the number of recognized and classified eating disorders has grown in last years. Typical examples include the above-mentioned pregorexia, in the past assumed as belonging to another type of eating disorder. Some new disorders are now considered as the ageorexia, defined recently as a pathological obsession with a youthful appearance [Florek-Moskal, 2007]. It affects mostly women aged 35–50 years and manifests itself as not only the use of rejuvenating treatments and body beautifying preparations externally, but also by uncontrolled use of dietary supplements, such as vitamin and mineral supplements to improve the appearance (*e.g.* vitamins for hair, nails, complexion). Dietary supplements are used to improve the appearance also by their implementation into so-called nutricosmetics. Such a behaviour can lead to hyperalimentation and consequently yield the adverse health effects. It is interesting that no such a disorder appears in official scientific papers and databases. However, the problem is whether it is a new eating disorder or a kind of orthorexia?

Another example is permarexia, formally introduced to the public but still not officially appearing in scientific research. It is defined as an eating condition, trying to maintain a weight level that is considered to enhance acceptable body image [Favela, 2012]. Again, it might be classified as a form of orthorexia.

In order to be answered the above questions need a joint work of psychologists, physicians, and nutritionists, to carefully and precisely define all possible eating disorders and classify them either as a type of main disorder or a new symptom. So far even in the U.S. there is no such agreement.

The eating disorders have, as all real processes, their own determinants, mechanisms and can or cannot be modeled. All so far conducted researchers agree that eating disorders mean all diets, behaviours and attitudes which are substantially different from an average. However, what does it mean the average, when the eating behaviours also follow the fashions, knowledge and social expectations? Therefore a real need emerges: to define the proper behaviour; to understand what an eating disorder is; and to agree on how we can classify and call disorders.

There are two different ways for that, taking into account that all eating disorders have roots in psychopathology which itself is a very complex phenomenon or behaviour. The first way is to influence the psychology of a single person, by individual pressure, merchandising, and advising. It may or may not be effective, and it needs further extensive studies. The reports reviewed so far show that environmental factors are also responsible for many eating disorders. Long-term psychical anxiety associated with stress resulting from a slimming diet, often very restrictive, can cause such disorders as BED and NED. The emotional states additionally enhance the magnitude of the improper eating. Those disorders may even be a source of failure when trying to lose weight.

The desire to maintain the slim and attractive silhouette may be a measure of life success under the pressure of social group. This pressure, created or enhanced by mass media, may finally result in bigorexia nervosa, ageorexia nervosa or anorexia nervosa. Another factor can be a pressure from *e.g.* sport coaches (anorexia athletica).

In the modern world there is no price too high for women who want by all means to be slimm. Such an attitude may lead to pregorexia. It is of potential danger especially for pregnant women who fear of getting overweight.

Finally and surprisingly, the need to be in good health, resulting in the selection of only the so-called biologically-pure food, may cause orthorexia nervosa, the disorder associated with substantial limitation of food intake.

The reports only to limited extent give us an estimate of the significance and frequency of all eating disorders. Even taking these reports into account, some 10–20% of citizens of developed countries may suffer from eating disorders. For young generation the figures may be more dramatic, even exceeding 50%. The real reason is that the place of nurturing parents and educating school is nowadays substituted by the mass media and close social environment which may manipulate the attitudes and behaviours of the group members inside the populations.

As stated, the major motives affecting the consumer's behaviour are generated by the pressure of environment, mainly a social group creating its own rules [Babicz-Zielińska, 2006]. Not all persons are susceptible to such social pressure. This behaviour may be typical of those men and especially women who are mentally not strong enough to act against current social demands and needs. The best solution is not to seek for improving their strength or for best medical diagnoses and therapies, but to carry out research on the range of eating disorders and their effects on health by nutritionists and physicians. As the role of the mass media seems to be crucial, the politicians should exert pressure to change the attitudes and aims of journalists and TV-men: from admiration of an imagined perfect silhouette to taking care of a healthy way of life.

However, more and more researchers emphasize that the eating disorders may have roots in pathology of our body, for example of wrong genes or the presence or absence of dopamine. It would be true so that the efforts of nutritionists should be accompanied by thorough medical examinations and likely pharmacology.

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