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Obesogenic Environment?

Personal decisions, and institutional and government responsibility

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There is an obesity epidemic. The high level of confusion, numerous debates and controversial opinions related to the topic make finding guidance and making healthy choices very difficult, if not close to impossible, for non-professionals. Arguments about responsibility are twofold: they either propose that the government, healthcare system, schools, workplaces, etc. (should) have the duty to provide information about the choices involved in creating a healthy lifestyle and healthy diets and the consequences of being overweight, or they claim that decisions about health and diets must be personal.

Through contributions from 37 authors in 35 articles contained in six chapters, the edited volume describes the many facets of obesity, such as its sociopolitical relevance, its causes, clinical considerations and treatments themselves, with a special focus on childhood obesity. Prevention is key to decreasing incidences of obesity[1], and should start with pregnant mothers. By restructuring the physical environment, individuals can be guided throughout their entire lives to pursue more active lifestyles, behave differently, and make healthier food choices. (Art. 1.)

The second chapter deals with the sociopolitical aspects of obesity. More than 33% of US and Mexican adults are obese. Several competing theories - from external influences to epigenetic effects – have attempted to explain the origins of obesity. Progress in preventing obesity is frustratingly slow, and to a certain extent interest[2] is shifting away from the actual obesity epidemic itself to obesity-related diseases and

1 Increases in obesity are correlated to decreases in physical activity. Due to environmental changes, over-nutrition is currently killing more people than malnutrition through the numerous diseases that are the consequences of being overweight or obese, many of which are not only life threatening but also very costly to patients and the healthcare system as well.

2 The food industry has a massive interest in continuing to create genetically modified products that bring higher profits but also contribute significantly to the obesity epidemic.

related commercial interests. (Art. 2.) The societal costs (inactivity, healthcare) of the obesity epidemic would suggest the development of related socio-politics, but in a democratic country, eating habits, diets and (physical) activity are determined at the individual level, and, as such, governments must respect them. Nonetheless, society-level frameworks which are led by national governments in collaboration with other organizations and NGOs do exist. (Art. 3.) The most important players in the "relay" are those researchers who are drawing attention to the problem, along with policy makers and politicians who are not yet fully aware of the severity of the epidemic, and NGOs and the private sector which are looking for opportunities to get involved, yet remain on the periphery compared to the other players. (Art. 4.) Obesity cannot be described using simple formulas. Increases in adult obesity do not follow increases in obesity among children, and there is no clear transition from childhood obesity to adult obesity.[3] Diet and activity changes affect all age groups. There is no scientific evidence that proves that by reducing childhood obesity adult obesity will also decrease. The gene map of obesity shows that only 20-30% of obesity can be explained by genetic factors; the majority of cases of obesity are thus due to environmental issues. Interest in epigenetics (e.g. the environmentally induced genetic triggers which affect mothers during pregnancy and affect a child's weight) is growing and provides an alternative to the behavioral approach. (Art. 5.) The sixth and seventh article discuss obesity in the context of sexuality and social acceptance. The correlation between size/obesity and sexuality, 'feeders' and 'feedees' and the sexual undercurrents that characterize them, along with thin men's attraction to big women, show that there is little difference in the sexual behavior of women of different sizes (Art 6.). While, until recently, obesity was a rarity in some cultures (and a curiosity, something one displayed in a circus), in other cultures acceptance of obesity is high[4] and gives the obese person prestige. Receiving acceptance for being overweight/obese can become a lifestyle support for some, but the health risks should be acknowledged. (Art. 7.)

Chapter 3 deals with the causes of obesity. The very well-known first law of thermodynamics, also known as the "Folk theory of Obesity" is the first item to be challenged. According to the generally accepted theory, obesity is caused through consuming more energy than is expended. However, causality in this direction has not been scientifically proven, and gaining weight may actually assist with the regulation of energy intake and expenditure. Obese people are often leptin resistant[5], but although they do have higher levels of leptin, the signal from this hormone does not act to reduce energy intake. Insulin resistance is considered to be the most significant metabolic disruptor,

3 Obese children of younger than 10 years old are only slightly more likely to be obese adults, but the odds of obese teenagers becoming obese adults is much higher.

4 Force-fed girls in Mauritania or Japanese sumo wrestlers are some examples, but worship of fat can be identified in the Venus of Willendorf sculpture which is 25 000 years old.

5 The hormone leptin, discovered in 1994, operates through a homeostatic mechanism that sends negative feedback to the hypothalamus, and by reducing appetite and increasing satiety regulates energy intake.

and can result in several illnesses that are related to the process of the transformation of energy into fat (which may occur without reference to the energy needs of the body). Acceptance of the fact that obesity is a metabolic and hormonal disorder would help with understanding the reality that exercise is important not because of its calorie-burring impact, but for its ability to improve insulin sensitivity and normalize levels of stress hormones. (Art. 8.) Adv36 is a human adenovirus that has been proven to cause obesity in several animal species and is strongly associated with human obesity as well. (Art. 9.) 'Healthy' gut microflora play a role in energy extraction, strengthening the immune system and fighting pathogens, and also have a major role in the synthesis of amino acids and essential vitamins. The relationship between gut microflora and numerous complex obesity-related metabolic abnormalities has been proven, but the direction of causality has not. (Art. 10.) The second widely accepted theory that is challenged claims that eating fat makes you fat. The blaming of saturated fats for all cases of obesity dates back to a vigorously challenged study from 1970 which was conducted by Ancel Keys (its impact was a massive reduction in fat consumption in both the USA and the UK). What is less often said is that promoting the consumption of low or no-fat foods and products is almost equivalent to promoting the consumption of higher amounts of carbohydrates and sugars. Since the 70s, consensus has formed around the idea that consuming trans fats (or trans-unsaturated fatty acids) has harmful consequences, but there is no agreement about the benefits (or harms) of the saturated fats in unprocessed foods. (Art. 11.) Explaining the worrying increase in infant obesity is the greatest challenge for those who seek to investigate the general causes behind the trend for gaining weight Some of the habits of pregnant women–such as smoking–impact the birth weights of their babies. Chemicals such as Glucocorticoid, sex steroids, thyroid peroxisome proliferator-activated receptors, tributyltin, persistent organic pollutants (DDT, PCB or dioxins) are under investigation and research indicates that, as components of our modern, high calorie, high sugar, low physical activity lifestyles, these chemicals are harmful to public health and diet-related initiatives. (Art.12.) Twin studies and data about Danish adoptees has been used to identify whether obesity is caused by genetics, epigenetic factors, or the environment[6]. The complexity of the question is indicated by the more than 50 genes that regulate eating and appetite. While science is increasing its understanding through gene research, only 5% of the heritability of obesity has yet been explained, and for a clearer understanding more focus on genetics and epigenetic is needed. (Art. 13.) Three main factors are considered to be at the root of the obesity pandemic: physical inactivity, over nutrition and chronic stress–together, they explain the metabolic syndrome. Obesity's rise to prominence from the 1940s (as a disease of indigenous people, who paid the "Price of Civilization") to the current days indicates its potential to endanger people from around the world, regardless of ethnicity, level of education or social-economic or urban-rural background. (Art.14.)

6 No scientific research has proven that having a 'lazy metabolism' is a genetic condition, partly due to the lack of data from molecular-level genetic studies.

Chapter 4 is a collection of articles that focus on obesity-related illnesses and clinical issues. Type 2 diabetes mellitus is an illness that can be asymptomatic for several (typically 4 to 7) years.[7] The National Institute for Health and Clinical Excellence (NICE) in the UK urges the use of risk scores prior to the testing of blood. Studies show that screening helps identify the illness an average of 3.3 years earlier than without it, but screening alone has not been shown to be beneficial. (Art. 15.) Jean Vague was the first (in 1947) to suggest that obesity has more to do with body shape than excess weight. In 1994, the use of the waist circumference unit was proposed, as this is related to the deposition of visceral adipose tissue. A relationship between visceral adiposity and liver fat has also been proven. (Art. 16.) However, both BMI (body mass index) and WC (waist circumference) as units of measurement leave room for significant individual variation, are limited in their clinical use, and are more useful in population studies. The Edmonton Obesity Staging System employs a classification system of 5 stages that reflects physical, mental and functional limitations as well. (Art. 17.) Obstructive sleep apnea, which causes repetitive pauses in breathing, is another condition that at early stages goes unnoticed and neglected. The occurrence of obstructive sleep apnea is influenced by several factors such as changes in lifestyles, diet, increases in weight,, drugs, alcohol and narcotics, etc. (Art. 18.) Obesity significantly increases the likelihood of Type 2 diabetes (80-fold) and a majority (75%) of diabetics die of cardiovascular causes. Adipose tissue, which surrounds 80% of the heart and produces cytokines and adipokines that are regulators of atherosclerosis, is considered to be an endocrine organ. (Art. 19.) Obesity has also been correlated to dental health. Periodontal decay (which, in reaction to the bacteria in plaque affects the supporting structure of the teeth) is a good indicator of poor cardiovascular and renal conditions. Dental erosion can be caused by both internal (acids created by the body) and external factors (diets high in acidic foods and drinks, environment conditions, eating disorders), while caries occur due to decalcification of teeth as a consequence of a diet rich in carbohydrates. (Art. 20.) Following a very low carbohydrate diet[8] has two benefits: it not only ensures rapid weight loss, but it does this while preserving a lean body mass. (Art. 21.) The relationship between obesity and the mind (self-confidence, depression, suicide, etc.) is not surprising. Being overweight or obese can cause psychological problems, but the roots of obesity may be found in psychology. Binge eating is considered to be a mental illness and is now recognized as a public health problem, just as is bulimia nervosa. Increases in dopamine, the negative feedback induced by leptin and the production of endogenous opioids which occur after eating seem to suggest that humans do not just eat to satisfy their hunger, but the addictive character of (certain) foods is yet to be proven. (Art. 22.) Not every obese individual is diabetic, and, correspondingly, weight-loss may not be universally beneficial. Surplus ectopic fat (such as that stored in the liver) can cause insulin resistance, so its reduction could help prevent and treat diabetes. (Art. 23.) The incidence of degenerative joint disease is related to the proportion of obese

7 One estimate suggests that there are currently 183 million undiagnosed cases.

8 In connection with very low carbohydrate diets, it should be made clear that the benign, mild diet-influenced ketosis that occurs when an individual consumes less than 50g of carbohydrate per day is different to the dangerous state of metabolic ketoacidosis.

people, so UK health authorities ration joint replacement surgery for obese patients, arguing that while although exercise (weight-loss) for these people may be impossible due to joint pain, reducing calorie intake remains the primary option for losing weight. (Art. 24.) Obesity is considered to cause or aggravate more than 50 illnesses, several of them life-threatening. Health care today remains preoccupied with treating these diseases (and obesity in general), instead of preventing them. Numerous attempts have been made to reduce the power of the obesogenic environment but this requires thorough planning, resources and will, and success in some cases is questionable. Introduction of a food tax will not solve the obesity problem, but will instead penalize the poor and discriminate against those who are at a healthy weight, Moreover, it may not even affect eating patterns as the need to satisfy food cravings would lead to money being diverted towards food from other purchases. Prevention should start with the addition of classes on health and wellbeing to the school curriculum, but should not stop there. Appropriate management of the obese would prevent the further decline of obese patients into a state of morbid or super-obesity, etc. (Art. 25.)

Chapter 5 focuses on an ever-growing problem in modern societies: childhood obesity. The situation is considered to be so critical that both the USA and the UK are considering whether appropriate state intervention – even foster placement, if needed – may be in the best interests of obese children. (Art. 26.) Childhood obesity damages mental and social health and often leads to poor economic well-being. Numerous community programs are seeking to provide solutions to obesity-related problems by offering training in activity, dieting and lifestyle changes. Compared to community programs, Residential Weight Loss Camps last for a longer period of time and tend to employ a more holistic perspective, addressing obesity-related issues at a broader and deeper level. (Art.27.)

The final chapter reviews potential treatment options and presents details about their benefits, challenges and any false premises which exist. Sibutramine and Rimonabant both help individuals to lose weight (about 5 kg at 12month; medication can be maintained for up to 2 years). (Art. 28.) The use of laparoscopic adjustable gastric banding has shown significant successes when managed correctly, and compared to other weight-loss surgeries is a less complicated procedure associated with shorter hospital stays. With the most commonly used band – the Lap-Band, which is FDA approved – the patient loses weight progressively and sustainably over 2 to 3 years, adapts to the new diet and improves according to numerous other health-related indices.[9] (Art. 29.) While bariatric surgery is very effective at reducing weight, it is not risk-free. In order to ensure the patient's optimal recovery and outcome, a multidisciplinary bariatric team with a variety of health care backgrounds should be employed. A team usually

9 Not only do insulin sensitivity and glycemia improve or normalize as a consequence of placement of the band, but "obesity related dyslipidemia, C-reactive protein (CRP), and other pro-inflammatory cytokine levels, nonalcoholic fatty liver disease, sleep disturbances including obstructive sleep apnea and daytime sleepiness, and ovulatory function and fertility in women with polycystic ovary syndrome" are also positively affected. (Art.29)

contains a physician specialized in obesity, a bariatric surgeon, a specialist dietitian, a specialist clinical bariatric nurse, a psychologist/psychiatrist, a bariatric coordinator and administration staff. (Art. 30.) The Roux-en-Y Gastric Bypass which causes an average weight loss of 25% total body weight is more effective than any non-surgical treatment. However, the procedure is not for everyone, and the BMI can help little with deciding if a patient will benefit or not, as fasting insulin levels only suggest the probable outcome.[10] (Art. 31.) Type 2 diabetes is a chronic condition whose management requires weight reduction if associated with obesity or excessive weight. Glycemic control is indispensable in such cases but traditional diabetes treatments often lead to undesirable weight gains. (Art. 32.) The 'Energy Equation' lacks the human factor: the explanation for why one overeats, the meaning of food and a description of the human relationship with food. Obesity is most often caused by 'emotional eating' which causes more problems than it solves. (Art. 33.) Numerous desirable over-the-counter slimming aids are available which work through increasing satiety, fat oxidation or metabolic rate or/and decreasing absorption and lipogenesis. However, while they may be generally marketed as medicines, they are usually unlicensed and expensive - and scientifically unproven. (Art. 34.) Physical inactivity accounts for 6% of deaths in the UK and globally is the fourth highest risk factor for mortality. The cost of increases in the proportion of obese individuals in the population is high: inactive people spend more time in hospitals (38%) and make more visits to family doctors (5.5%) and specialist services (12%) than physically active individuals. 9.8% of all children in the UK who enter primary school are obese, and 18.7% leave it obese. This trend is clearly worrisome and highlights the need for an effective strategy to tackle the problem. (Art. 35.)

The 35 articles might seem rather overwhelming, but attentive reading shows that the edited volume truly challenges all, or at least the most important controversies related to obesity. As a consequence of genetic, epigenetic and environmental factors, the obesity epidemic which started in the 1970-80s spread rapidly in the 1990s. The societal consequences are significant. The overall health of the population is decreasing, while the costs of health care are steeply increasing. The proportion of individuals who are active and employed is also decreasing, so an ever-smaller number of people are paying for the healthcare of a constantly increasing population. Obesity is a condition that can have numerous and potentially severe behavioral, environmental and psychosocial impacts. It is considered by experts to be associated with more than 50 common illnesses, some of which are life-threatening, and many psychological conditions (body image dysphoria, eating disorders, suicide, etc.) Medical tourism is increasing as people seek out bariatric surgery solutions abroad. Many see bariatric surgery as a quick and final solution, but

10 Whether the procedure truly solves the problem of diabetes remains unanswered; as for it 'curing' patients, a minimum of 5 years should pass (according to the American Diabetes Association) before this can be known, and data that compares long term outcomes with the impacts of non-surgical procedures is nonexistent.

while it may be an effective process for inducing weight-loss, it is neither quick nor final: the psychological and social components of the problem of obesity must also be considered.

While a very detailed and thorough book, there is one component of the debate that is missing from it: details about the psychological, social and economic causes of obesity. The volume suggests that we should focus on handling the causes of obesity instead of trying to treat the consequences, yet the means of doing this is nowhere elaborated on in the book. Why societies/communities get fat (especially if the cause is not genetic) remains to be answered by social scientists and economists. Presumably, psychological issues (trauma, or depression) are often the root causes of obesity, while poverty is also significantly responsible. In the 13th article we can read "Future studies seeking to integrate networks of dynamic, functional data, including epigenetics, will be crucial in understanding the ultimate disease outcomes and their possible treatment".

In the editorial note for the 32nd article we can read that only 6.1% of the total cost of diabetes-related 'treatment' is spent on glucose-lowering agents, while the rest goes on administration, medical visits, hospital admissions, blood tests, etc. It is confusing that the book makes the claim that obesity and diabetes are strongly correlated, as while diabetes can lead to obesity, about half of all diabetic patients do not have problems with their weight.

It would have been interesting to be presented with more evidence about the harmful consequences of low-fat diets, as such diets are well-known and widely practiced. The public belief that "fat makes you fat" is a mantra that – as the current research shows – does more harm than good. Probably the greatest controversy concerning obesity relates to high-fat diets. New research indicates the beneficial impacts of healthy, high fat and low sugar diets, and while their wider acceptance is still awaited, the debate is very much alive, although the discussion between supporters and opponents is very contentious.

The health of Hungarians is worse than that of the populations of other European countries, and Hungary has been in pole position in the obesity ranking of EU countries since 2012. A very recent newspaper article (http://www.mul.hu/index.php/eletmod/143-merlegen-magyarorszag-elhizasban-amerikat-kovetjuk[11] quotes international media in stating that Hungary one of the least healthy European countries due to its problems with obesity and weight-related issues. In Hungary, 28.5% of individuals of over 18 years have a BMI of over 30, while the EU average is 16.6%. While it can be argued that measuring obesity through BMI and identifying the proportion of the population who are obese is adequate for understanding the scale of the problem we face, Hungarian health and social scientists alike must also be made aware of the social changes that are associated with the obesity epidemic.

11 Published on the 22nd of August, 2015