

Key Predictors of Overweight and Obesity in Adult Population

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Abstract:

Introduction: According to experts, overweight and obesity, are the most dangerous civilization diseases of today. World-wide, over 312 million people are obese and another 1.3 billion suffer from obesity. Increased weight is a significant health risk and it means a decrease in quality of life and, especially in life expectancy. Because of this, in our research, we address the problem of current society which is overweight and obesity.

Methods: To verify hypotheses, we used chi-square test of independence. It is a universal statistical test with wide use. It is most

often used to verify the relation between nominal type variables. **Results:** By analyzing the results, we have found that overweight or obesity of the parents, respondents' satisfaction, eating habits and gender are related to overweight and obesity of the respondents. However, we have not found a relation between the physical activity of the respondents and their overweight or obesity. In case our respondents do not exercise and have bad eating habits, their body weight would be likely to increase. **Conclusion:** To prevent the development of overweight and obesity and its complications that have a negative impact on our health, it is necessary to make a targeted and effective intervention that is aimed at a healthy lifestyle.

Introduction

A paradox of modern civilization is that while a 3rd of the population still suffers from food insecurity, the World Health Organization (WHO) has identified obesity as the biggest health problem of current times and warns of a global epidemic. In recent decades, obesity has become a global problem of human kind, which is now becoming pandemic. Obesity has become a national problem in countries around the world. Obesity has become an epidemic worldwide, with a high incidence not only in economically developed countries but also in many less developed countries (1). Current development of the obesity pandemic has its laws. The 1st phase of the epidemic began to spread in the late 1970s in the United States when there was an increase in overweight and obesity throughout the population system. In the 2nd phase, which dates from the new millennium, is characterized by the development of health complications accompanying obesity and overweight. The 3rd phase of the health consequences of the obesity epidemic is expected by the end of the decade of our century. Finally, according to experts, the last 4th phase should flow smoothly from the third phase and it will be characterized by the transmission of phylogenetic obesity to subsequent generations. Catastrophic visions expect that as a result, the average life expectancy of the entire population will be shortened (2). According to WHO global data from 2008, more than 1.4 billion people (≥ 20 years old) were found to be overweight. Of these people, more than 200 million were men and almost 300 million were women. Because of this, experts rightly consider obesity to be the epidemic of the 3rd millennium. The trend of rising prevalence of obesity is particularly worrying in

children as they carry the epidemic into adulthood creating a growing health burden for the next generation. It is estimated that worldwide as many as 155 million children and adolescents are overweight or obese today. Now is the right time to stop further epidemic spread of this plight (3).

Most common diseases accompanied by overweight and obesity

Many people consider obesity to be a cosmetic problem, which is very bad. Obesity is a serious metabolic disorder that significantly affects human life and health. Thus, obesity can be characterized as a metabolic disorder, due to the increase in body fat in the interaction of genetic predispositions with environmental factors. The insidiousness of obesity is that it does not cause any problems at first, it does not hurt and therefore it does not require medical care. Obesity is the third most common chronic disease in developed countries, but in Europe it ranks at the top. The main problem with obesity is that it increases morbidity and mortality (4). 1st degree obesity shortens life by 3 years and 3rd degree obesity even by 10 years. It is reported that with every 5kg weight gain, the overall mortality is increased by 30% (5). In 2002, the WHO even identified overweight and obesity as the 6th most important health risk (6). The risks of the disease and the complications that accompany obesity are diverse and can affect almost every organ, and it is the extent and duration of obesity that affects its accompanying complications and diseases.

Obesity is one of the major medical problems because it is closely linked to a number of other diseases. The most common diseases accompanied by overweight and obesity are:

- 80% of diabetes mellitus cases. It is currently considered a pandemic of mankind. It is one of the diseases that greatly affect life of the patient / client, especially its quality.
- 35% of ischemic heart disease
- 55 % of hypertension among adults in Europe.
- causes more than a million deaths.

Causes of excess weight

There are many causes of obesity, so it has a multifactorial etiology. Table 1 points out the possible causes contributing to obesity.

Genetic factors

Heredity (different ability to burn nutrients) also plays a role in the development of obesity, because according to the latest results of genetic research on human obesity, there is at least one gene on each chromosome related to its development. In the context of genetics, cases of mutations in genes causing monogenic or polygenic obesity have been described as early as in the period of growth.

Prenatal factors

As demonstrated in population studies, children of parents with higher body mass index (BMI) values or obesity are more likely to be overweight or obese; genetic factors are more clearly applied here. It has been found that up to 50% of obesity occurrence is due to heredity. Therefore, if both parents are obese, there is up to 80% chance that their child will also be obese if she/he does not maintain a healthy lifestyle. Other comprehensive studies have demonstrated the combined effect of a number of factors such as: family situation; weight and BMI of parents; lifestyle; nutrition and smoking of the future mother. Later obesity can then be caused mainly by the accumulation of the influence of various factors in the early stages of ontogenesis.

Environmental factors

In general, we can say that excess weight is mainly due to an unhealthy lifestyle. In the long run finding the causes of excess weight; it is free and unrestricted access to food. A characteristic feature of the modern diet is its high energy value; high glycaemic index; also high content of unsaturated fatty acids. Overeating resulting in a positive energy balance for which humans have no adaptive metabolic mechanism ready, has become a reality of today. Experts do not consider excess food intake as the main reason for obesity, but rather a lack of physical activity (2). A sedentary lifestyle is currently considered a growing threat to public health. If a person spends an average of 6 hours a day sitting in front of a TV, their life is shortened by an average of 5 years. For example, in the US and the UK, today less than half of all adults are physically active enough to meet at least the WHO minimum recommendation. On average, adults in these countries spend up to 90% of their free time sitting.

According to a study by researchers at the German University of Regensburg, people who spent most of their time sitting had a 66% higher risk of developing cancer than those who sat for a shorter time. The most common types of cancer were colon, lung or uterine cancer (8). Factors contributing to the development of obesity, its prevention and treatment, should be a priority not only of healthcare, but also of governments and self-governments.

Research objectives

- To inspect overweight or obesity in respondents' parents.
- To detect respondents' satisfaction with their health.
- To inspect the physical activity of the respondents.

Table 1 Factors contributing to the development of obesity (7)

Genetic factors	body weight programming (regulatory mechanisms in the hypothalamus) - disorders or mutations in genes and genetic syndromes
Prenatal factors	obesity or starvation in the mother
Environmental factors	insufficient physical activity, increase in sedentary activities - inappropriate diet, "dietary chaos", increased energy intake - psychosocial and family problems

- To detect the gender-related differences in eating habits of respondents
- To find the level of awareness in the field of overweight and obesity.

Data analysis methods

The sample of our research consisted of deliberately selected clients. In the descriptive part of the research we used the tools of descriptive statistics. We processed the obtained answers using the Microsoft Office 2013 spreadsheet. We verified the hypotheses with inductive statistics tools. To verify the hypotheses, we used the chi-square statistical test. The decision on the significance of the differences is made on the basis of the calculated p value and the significance level of 0.05.

Demographic data

A total of 168 respondents took part in the survey. There were 112 women in the sample group, which accounted for 66.67% of the sample; 56 men, i.e. 33.33% of the sample.

Table 2 Characteristics of the sample group

	n	%
women	112	66.67
men	56	33.33
Total	168	100

Based on the body mass index (BMI), we divided the respondents into 2 groups, namely respondents with optimal body weight and overweight to obese respondents. The research sample consisted of 73 (43.45%) respondents with normal body weight; 95 (56.55%) overweight to obese respondents.

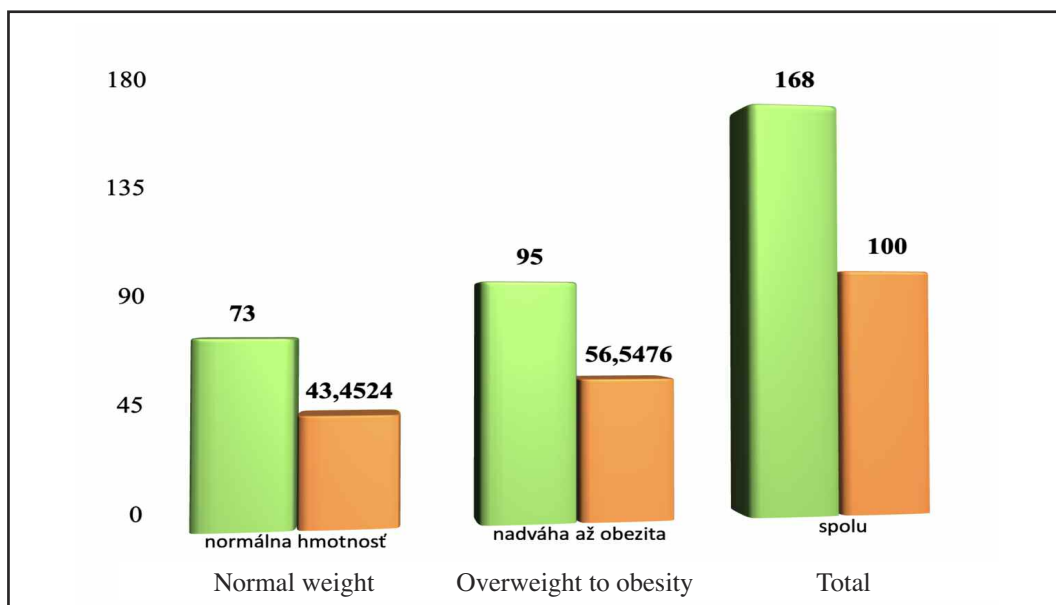
Hypotheses

- H₁ Respondents' overweight is related to their parents being overweight or obese.
 H₂ Respondents' satisfaction with their health is related to their overweight.
 H₃ Respondents' physical activity is related to their overweight or obesity.
 H₄ Respondents' bad eating habits are related to their overweight.
 H₅ Respondents' gender is related to their poor eating habits.

Respondents' overweight is related to their parents being overweight or obese.

When analysing the relationships between overweight respondents and overweight or obese parents, a statistically significant difference was found ($p = 6.56264E-05$, $\chi^2 = 19.26307$, s.v.2). Based on the results, we can say that there is a link between overweight respondents and overweight or obese parents. Based on the test results, we can accept the alternative hypothesis H₁ and reject the null hypothesis. Parental obesity has

Graph 1 Weight of respondents divided by body mass index (BMI)



a statistically significant effect on respondents' overweight. We accept the hypothesis. As many as 36.91% of overweight and obese respondents in our research reported their parents being overweight or obese.

Respondents' satisfaction with their health is related to their overweight.

The 2nd hypothesis was tested on the basis of 2 items at the selected significance level of 0.05; degrees of freedom, where we determined the critical value of Pearson's Chi-square, which is, according to the table, equal to 5.99. We can state that this hypothesis was confirmed on the basis of chi-square 11.86, because based on the statistical processing of Pearson's Chi-square test of independence the value of tested items is higher than the critical table value. Therefore, we can say that there is a relationship between respondents' satisfaction with their health and overweight. The P value of 0.0027 also confirms a connection between the individual items. The value of 23.21% in Table 4 indicates a dissatisfaction with their own health in overweight or obese respondents.

Hypothesis 3

Respondents' physical activity is related to their overweight or obesity.

Given the calculated value of the chi square of 1.583 and the p value of 0.208291, which is higher than the selected level of significance, in

hypothesis 3, we found that there is no relationship between the physical activity of the respondents and their overweight or obesity. Despite performing physical activities, participants in the research were overweight and obese. However, if they did not perform physical activities and still had poor eating habits they would most likely gain weight. Based on the test results, we can reject the alternative hypothesis and accept the null hypothesis, which means that the physical activity of the respondents is not related to their overweight or obesity.

Hypothesis 4

Respondents' bad eating habits are related to their overweight.

To verify the hypothesis of the effect of respondents' bad eating habits on their overweight, we used a chi-square statistical test. We put the variable of eating habits of the respondents into a causal relationship with the questionnaire item with excessive weight. The chi-square value 6,743 is higher than the table value for 1 degree of freedom, which expresses the dependence between the variables. In hypothesis 4, we found a relationship between the individual items. Also, a p value of 0.009409, which is lower than the significance level of 0.05, suggests that there is a relationship between the individual items. Based on the test results, we can reject the null hypothesis and accept the alternative hypothesis,

Table 3 Observed frequency of respondents' excess weight and parental overweight or obesity

Observed frequency O	parental overweight or obesity						
	yes	%	Do not know	%	#	%	total
Normal weight	23	13.69	19	11.31	31	18.45	73
Overweight to obesity	62	36.91	15	8.93	18	10.71	95
Total	85		34		49		168

Table 4 Observed frequency of respondents' excess weight and satisfaction with one's own health

Observed frequency O	satisfaction with one's own health						
	yes	%	Do not know	%	#	%	total
Normal weight	44	26.19	12	7.14	17	10.12	73
Overweight to obesity	32	19.05	24	14.29	39	23.21	95
Total	76		36		56		168

which means that the respondents' bad eating habits are related to their overweight.

Hypothesis 5

Respondents' gender is related to their poor eating habits.

Discussion

Overweight and obesity are key issues that greatly affect people's health. Together with other diseases, overweight and obesity account for 50% of the global burden. Due to this fact, we focused on overweight and obesity in our research. Based on the results of our research, we can conclude that: overweight or obesity of parents; satisfaction of respondents; bad eating habits; gen-

der are related to overweight to obesity. However, we did not find a connection between the physical activity of the respondents and their overweight or obesity in our research. Our research participants performed physical activities and were still overweight and obese. If they followed proper eating habits and continued to exercise, they would certainly get rid of overweight and obesity. Also, the conclusions of the Lifestyle Heart Trial study showed that an intensive lifestyle change (in the form of aerobic exercise, non-smoking, stress management) can, after just one year, lead to reduction in body weight, reduction in blood pressure, change in eating habits and choosing a more beneficial diet, and to developing the habit of regular sports activity (9).

Table 5 Observed frequency of respondents' excess weight and physical activity

Observed frequency O	physical activity				
	yes	%	Do not know	%	#
Normal weight	29	17.26	44	26.19	73
Overweight or obesity	47	27.98	48	28.57	95
Total	76		92		168

Table 6 Observed frequency of respondents' excess weight and bad eating habits

Observed frequency O	bad eating habits				
	bad	%	good	%	total
Normal weight	26	15.48	47	27.98	73
Overweight to obesity	53	31.55	42	25	95
Total	79		89		168

Table 7 Observed frequency of respondents' excess weight and gender

Observed frequency O	bad eating habits				
	bad	%	good	%	total
women	38	22.62	74	44.05	112
men	41	24.41	15	8.92	56
total	79		89		168

df = 1

p = 1,51444E-06

$\chi^2 = 23,1295$

The final value obtained by testing with Pearson's chi-square test is

p = 1.51444E-06, this value is significantly higher than our chosen significance level of 0.05%.

Hypothesis H5 was confirmed, gender of the respondents is related to their bad eating habits.

According to Dr. Ukropcova (2013), who - together with her team - researched physical activity and its impact on health, most of us take 3,000 steps, in better instances 5,000 steps a day. However, some are able to move even less, reducing daily walking to just 1,000 to 2,000 steps. Several clinical studies have shown that in 20-year-olds (students) 2 weeks of physical inactivity leads to insulin resistance, where insulin in tissues acts weaker in processing of sugars and metabolism no longer functions normally (10). Kvicala (2013) states that direct costs themselves make up 2-8% of the total costs of healthcare. No less negligible are also the indirect costs, the loss associated with sick leaves and with loss of performance and subsequently with possible early retirement. He further claims that treating an obese person costs 3 times as much as treating a person with normal weight. At the beginning of this millennium, in the United States, \$177 billion is the cost used to address the consequences of obesity. A 20 kg weight reduction leads to a reduction in pharmacotherapy costs of up to 50% (11). However, the financial consequences also affect the obese people, who spend large sums of money trying to lose weight, and there are many of these people, because according to a US study, 63% of Americans have tried to lose weight at some point of their lives and 29% are trying to lose weight in the current time (12). Because of that, in the fight against overweight and obesity, the most important thing is to focus on prevention. Prevention needs to be done especially in people who have a greater genetic predisposition to obesity. They should pay more attention to the correct composition of their diet and to sufficient regular activity than people who do not have such predispositions. Above all, it is most important to focus on prevention in children, because learning the right eating habits and lifestyle starts at birth.

Conclusion

Even though obesity is a frequently discussed topic and its negative consequences are well known, its prevalence continues to rise. We are used to obesity, we even tolerate it and overlook it in our loved ones even though there is already a lot of evidence of it being one of the most serious health risks ever. Medical science, dealing with the topic of obesity, is constantly evolving

and advancing, but it is still failing to stop the rising incidence of obesity. It is therefore striking that, despite the pressure, the demographic curve of obesity continues to rise steeply; humans are growing in width; the graph is growing in height; obesity is taking on gigantic proportions. And so, today's world is no longer divided only into the poor and the rich, the smokers and the non-smokers, but also into the fat and the skinny ones.

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