

# **The problem of obesity and overweight among children and youth in the world**

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## **Abstract**

Childhood obesity is one of the most difficult public health issues. According to "The Lancet" magazine, there are 124 million obese children in the world. The frequency of this disease in developed countries, including Poland, is constantly increasing. We can already talk about the obesity epidemic. Despite additional diseases, obesity has an economic impact in terms of combating its

complications. Therefore, it is necessary to search for unknown risk factors as well as methods of their treatment. In order to obviate this disease, more and more preventive actions are being organised. However, education is not enough - joint actions undertaken by the authorities, society and representatives of the food industry are needed.

**Keywords:** children obesity, overweight, health education

## **Introduction**

Obesity problem has been known for years. Recently, the increase in prevalence of this disease has been observed among adults, children and adolescents. It has been reported that in 2016, 18% of children and adolescents aged 5-19 were obese or overweight [1].

According to World Health Organisation (WHO) obesity is defined as abnormal or excessive fat accumulation that presents a risk to health [1]. The most commonly used tool that allows doctors to confirm the obesity is the body mass index (BMI). It is calculated by dividing body weight by height squared. People with BMI > 30 are generally considered obese. Overweight and obesity are the main risk factors for many diseases such as hypertension, diabetes and even various types of cancer. It is crucial to diagnose this disease as early as childhood. This would allow to increase the chances of effective treatment.

## **Aim of the study**

The aim of the study is to statistical data the literature and present the current state of knowledge on the problem of obesity among children and youth in the world based on statistical data.

## **Material and method**

The method of study is descriptive epidemiological analysis. Information that has been used is derived from statistical data provided by the WHO. In searching for them on the WHO, PubMed website and Google Scholar, keywords such as: obesity, children obesity, nutrition, BMI.

## **Results**

In 1975, the percentage of obese children and adolescents was the lowest and amounted to 0.7%. Over the years 1975-2016, there was a 13-fold increase in the percentage of obese children and adolescents in Poland and in 2016 it amounted to 9.1% (Figure 1). Every five years, this percentage increases about one and a half times.

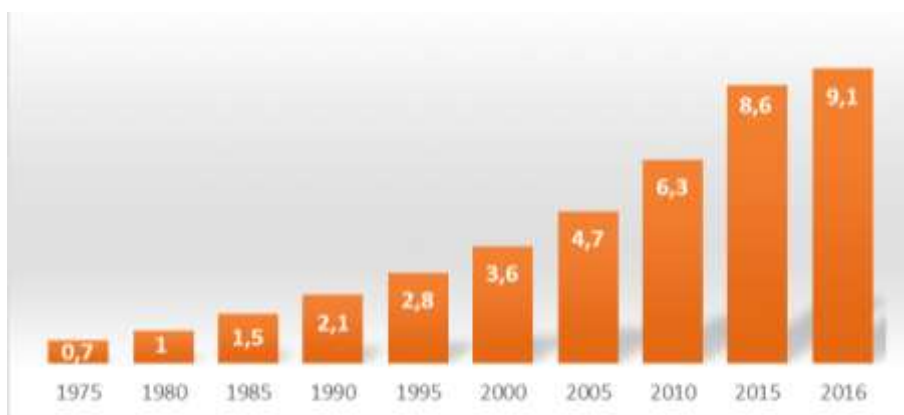


Figure No.1 presents the prevalence of obesity among children and adolescents in Poland

According to research conducted by the WHO, in 1975 there was the lowest incidence of obesity among children living in the USA - it was 5. 5%. The highest frequency can be observed in 2016 - 21. 4%. In 2015 the number was slightly lower - it was 21. 2% (Figure 2).

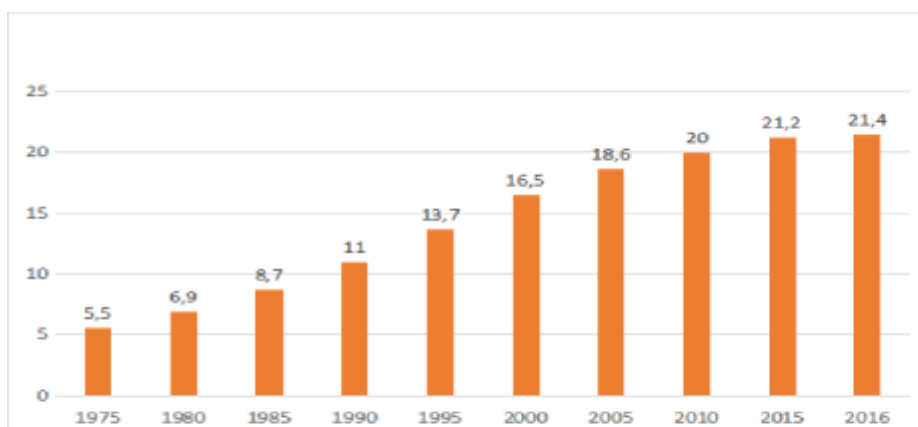


Figure No. 2 presents prevalence of obesity among children and adolescents in USA

The lowest number of obese children and adolescents was in 1975 in Brazil, Thailand and Algeria, while the highest in Samoa, USA, Greece, Italy and Spain (Figure 3).

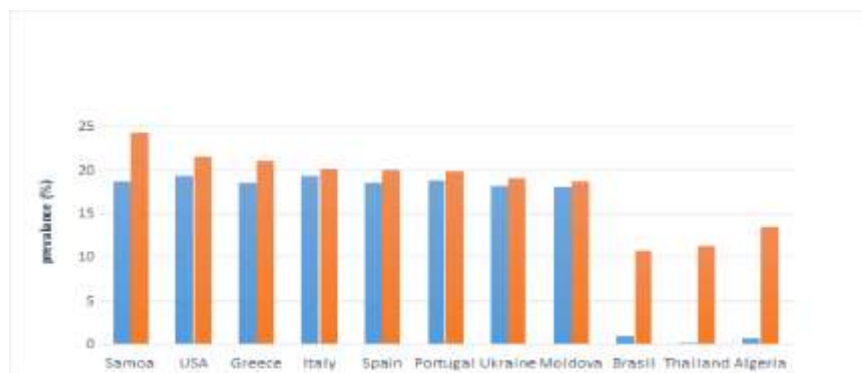


Figure No. 3 presents the percentage of obese children and adolescents aged 5-19 in selected countries

Between the years 1975 and 2016, the percentage of obese children and adolescents increased. It was the largest in Brazil, Thailand and Algeria. In 2016, the majority of obese children and adolescents were in the USA, Greece, Italy, Spain, Portugal, Ukraine and Moldova.

## Discussion

Environment is the main factor affecting children's choices, eating habits and physical activity. The main cause of childhood obesity is an energy imbalance between consumed and expended calories. [2]. The global increase in obesity in adolescents can be attributed to many factors, including: changing the diet towards increased consumption of foods with high energy content, rich in fats and sugars, but with a low content of vitamins and minerals. Launching a high-calorie and low-cost food product is a major health risk [1,2]. Nowadays, there is a tendency to reduce physical activity. The reason for that is a sedentary lifestyle and increased urbanization [1]. The speed and irregularity of eating, as well as stress can affect changes in obesity and BMI [3,4].

Genome-wide association studies (GWAS) have shown the presence of hundreds of genetic loci to be associated with body mass index (BMI) and obesity risk [5]. The gene associated with fat mass and obesity (FTO) is a recently identified genetic factor causing obesity [6]. Single nucleotide polymorphisms (SNPs) that cluster in the first intron of the FTO gene are associated obesity traits in genome-wide association studies. The minor allele increases BMI by 1130 g body weight and 1.20 times the risk of obesity. The largest effect is visible among young adulthood. The impact of FTO SNPs on obesity in African and Asian ancestry is similar or slightly smaller than in European ancestry populations [7]. Recent reports suggest that depression moderate the effect of the FTO on BMI causing weight increase [8]. There is also evidence to suggest that telomer length and obesity are interlinked [9].

On the basis of strong clinical evidence another reason of secondary obesity is attributed to hormone system. Hypothyroidism is the result of low level of thyroid hormone which is responsible for metabolic process. Without medical treatment with levothyroxine, hypothyroidism increases morbidity. Apart from all different syndromes, children with congenital hypothyroidism and eutrophic thyroid gland are more likely to be obese [10].

In the majority of cases with pituitary hormone deficiency, congenital adrenal hyperplasia and pseudohypoparathyroidism the obesity was also noticed [11].

Apart from diseases, some acquired cases of obesity have their origin if pharmacological treatment, for instance steroids and oestrogens. Anabolic steroids taken orally to provide asthma have anti-inflammatory effects. However, a side effect of treating with steroids might be the weight gain [12]. Increase in the prevalence of the obesity becomes a serious health issue in today's society because of the long-term, negative consequences that profoundly affect the youth. Children with obesity are at increased risk of cardiovascular morbidity and mortality in adulthood [13]. There was determined a correlation between obesity and oral health in schoolchildren. A cross-sectional survey conducted in five districts of West Bengal (India), that included 1,227 school-going children of age group 6 to 12 years, allowed to find a positive correlation between BMI and dental caries. Moreover, the studies showed that being overweight is a potential risk factor for developing periodontal disease [14]. No less important are psychological implications of the obesity, associated with decrease of psychosocial activity in the society, including low self-esteem, lack of confidence in body image and being socially isolated. As a result, obesity has a significant impact on an individual's quality of life. Recent research allowed to discover a positive correlation between degree of obesity and severity of depression [15,16].

In the study of the Finnish population, the occurrence of obesity during adolescence predisposed to the appearance of depression in early adulthood. People with this disorder are more at risk of a faster decline in cognitive function in the elderly, which may be the result of cardiovascular failure and also changes in the insulin economy [17].

Prevention and treatment of obesity should focus both on society and on individuals. People can limit their energy intake by maintaining a balanced diet, as well as increasing consumption of fruits and vegetables. Keeping an active lifestyle is also an important element. Nutritional actions in schools are being carried out more and more to make young people aware of the consequences of malnourishment. The food industry also plays a key role by ensuring the availability of healthy dietary options and detailed nutrition information on food labels.

## **Conclusions**

1. The prevalence of obesity is increasing at an alarming rate in many parts of the world. One third of about 2 billion people are obese. Populations in high-income countries: North America, Australia and Europe are the most affected.
2. Childhood obesity is a serious and urgent public health problem. The consequences of severe childhood obesity can be devastating. Children with severe obesity are at greater risk for adult obesity and many early serious diseases.
3. Prevention may be achieved by targeting preschool institutions and schools as natural setting for influencing the diet and physical activity.

## References

1. World Health Organization: Obesity and overweight. <http://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight>; July 2018
2. World Health Organization: New global estimates of child and adolescent obesity released on World Obesity Day; October 2017
3. Hurst Y, Fukuda H. Effects of changes in eating speed on obesity in patients with diabetes: a secondary analysis of longitudinal health check-up data; *BMJ Open*, 8, e019589, 2018.01
4. Sato AF, Fahrenkamp AJ. From Bench to Bedside: Understanding Stress-Obesity Research Within the Context of Translation to Improve Pediatric Behavioral Weight Management; *Pediatr Clin North Am*. 2016 Jun;63(3):xv-xvi
5. Rask-Andersen M, Karlsson T, Ek WE, Johansson Å. Gene-environment interaction study for BMI reveals interactions between genetic factors and physical activity, alcohol consumption and socioeconomic status; *PLoS Genet*. 2017 Sep 5;13(9):e1006977
6. Xu Zhao, Ying Yang, Bao-Fa Sun, Yong-Liang Zhao, Yun-Gui Yang. FTO and Obesity: Mechanisms of Association, *Current Diabetes Reports*, May 2014
7. Loos RJ, Yeo GS. The bigger picture of FTO: the first GWAS-identified obesity gene; *Nat Rev Endocrinol*. 2014 Jan;10(1):51-61.
8. Rivera M, Locke AE, Corre T, Czamara D, Wolf C, Ching-Lopez A, Milaneschi Y, Kloiber S, Cohen-Woods S, Rucker J, Aitchison KJ, Bergmann S, Boomsma DI, Craddock N, Gill M, Holsboer F, Hottenga JJ, Korszun A, Kutalik Z, Lucae S, Maier W, [Mors O](#), Müller-Myhsok B, Owen MJ, Penninx BWJH, Preisig M, Rice J, Rietschel M, Tozzi F, Uher R, Vollenweider P, Waeber G, Willemsen G, Craig IW, Farmer AE, Lewis CM, Breen G, McGuffin P. Interaction between the *FTO* gene, body mass index and depression: meta-analysis of 13701 individuals; *Br J Psychiatry*. 2017 Aug;211(2):70-76
9. Zhou Y, Hambly BD, McLachlan CS. FTO associations with obesity and telomere length; September 2017
10. Nikita Patil, Ishwarlal Jialal. Thyroid, Hypothyroidism; <https://www.statpearls.com/kb/viewarticle/23304/> August 2018
11. Pycińska M., Albrecht P. Otyłość u dzieci; W: *Gastroenterologia dziecięca*, pod red. Piotra Albrechta, Wydawnictwo Czelej, Lublin 2014
12. Stone NJ. Secondary causes of hyperlipidemia; *Med Clin North Am*. 1994 Jan;78(1):117-41
13. Cote AT, Harris KC, Panagiotopoulos C, Sandor GG, Devlin AM. Childhood obesity and cardiovascular dysfunction; *J Am Coll Cardiol*. 2013 Oct 8;62(15):1309-19
14. Sonali Halder, Rahul Kaul, Paras Angrish, Subrata Saha, Bhaswar Bhattacharya, Malay Mitra Association between Obesity and Oral Health Status in Schoolchildren: A Survey in Five Districts of West Bengal, India; *Int J Clin Pediatr Dent*. 2018 May-Jun; 11(3): 233–237
15. Olszanecka-Glinianowicz M. Depression - cause or result of obesity? Depresja - przyczyna czy skutek otyłości?; <https://journals.viamedica.pl/eoizpm/article/viewFile/26040/20850> April 2008
16. Taylor VH, Forhan M, Vigod SN, McIntyre RS, Morrison KM. The impact of obesity on quality of life; *Front Psychol*. 2015; 6: 966
17. Jaracz M., Bieliński M., Junik R., Dąbrowiecki S., Szczesny W., Chojnowski J., Borkowska A. Working memory, executive function and depressive symptoms in pathological obesity; March 2009