

PREVALENCE OF OVERWEIGHT AND OBESITY IN CHILDREN: VARIATION IN DIFFERENT ETHNICITIES, AGE, AND SEX IN NORTH MACEDONIA

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ABSTRACT

Childhood obesity is assuredly one of the most important health challenges of the 21st century, particularly regarding long-term metabolic complications. In the last four decades, there has been a tenfold increase in childhood and adolescence obesity.

This cross-sectional study aimed to show the prevalence of overweight and obesity compared by age, sex, and ethnicity in n=1034 healthy male and female children, aged 6-13 years in North Macedonia.

Out of the total 1034 children included in the study, 589 (57.0%) were observed with normal weight, 202 (19.5%) children were obese, 140 (13.5%) children were overweight and, 103 (10.0%) children underweight. The study presents an insight that 33% of primary school children are at >85th percentile overweight; or at ≥95th percentile with increased weight due to obesity. The data show that boys have a higher prevalence of obesity and overweight with 37.1%, compared to girls with 29.1%. Also, all age groups demonstrate an exponential increase of the prevalence of overweight: in 6-7 years (5.8%); 8-9 years (12%); 10-11 years (15%); and, 12-13 years old with 19.5%. A jump of prevalence of overweight and obesity between the age groups of 6-7 years, and 8-9 years was observed (17.9% to 25.4% obese and 5.8% to 12.0% overweight). The onset of puberty may be the possible cause.

According to the Global Atlas of Childhood Obesity, North Macedonia is graded with a risk index of 7/11; i.e. it is expected that in the next decade until 2030 the obesity rate will rise to 52.5% for children aged 5-19 years old.

It is with utmost importance to emphasize that continuous monitoring of children's nutritional status and their risk of obesity is essential, as to further prevent obesity and overweight in the pediatric population.

Keywords: prevalence, childhood obesity, overweight, BMI, North Macedonia

INTRODUCTION

The International Classification of Diseases 11 (ICD-11) defines obesity as "a chronic complex disease with excessive fat that can impair health. In most cases, it is a multifactorial

disease caused by obesogens, psychosocial factors and genetic variants." [1]

One of the most important health challenges today still remains the issue of childhood obe-

sity, in particular, the accompanying long-term metabolic complications. Childhood obesity is associated with a wide range of serious health complications as well as an increased risk of premature disease, including diabetes, heart disease, non-alcoholic fatty liver disease, etc. [2–5]

Studies have shown that childhood obesity is associated with an increased risk of adulthood obesity as well. About 80% of obese children and adolescents remain obese into adulthood. [6,7]

According to data from the Commission on Ending Childhood Obesity (ECHO), the prevalence of overweight, obesity in children and adolescents aged 5–19 has increased dramatically from 4% in 1975 to more than 18% in 2016. Statistically, over 340 million children and adolescents aged 5–19 were overweight or obese in 2016. [8]

In the last four decades there has been a tenfold increase in obese children and adolescents. While obesity was once considered an issue for high-income countries, overweight and obesity have recently been on the rise in low-and middle-income countries. Recent research in high-income countries registers the frequency of weight loss. Specific initiatives by high-income countries are conducted in order to raise public awareness, initiatives which most likely contribute to the reduction of the prevalence of obesity. [9, 10]

The aim of this study was to show the prevalence of overweight and obesity by age, sex, and ethnicity in healthy boys and girls in the northwestern part of the Republic of North Macedonia.

MATERIALS AND METHODS

A cross-sectional study was conducted in the period from March 2019 to March 2020. The study included $n=1034$ healthy children of both sexes, 6–13 years old, from different ethnicities during a systematic school examination in the Children's Prevention PHI - Health Center - Tetovo.

We determined the nutritional status and risk of obesity of the examined children through axiological coverage: by measuring weight, height, calculating body mass index (BMI), while determining the percentile curves, and comparing with children from same age and gender.

Weight and height measurement: The weight and height were measured in accordance with the recommendations of the World Health Organization (WHO). [11]

Body mass index BMI: BMI is considered to be the best anthropological parameter for assessing obesity for public health purposes. [12, 13]

BMI is calculated according to the formula: weight (expressed in kilograms) divided by the square of the height (expressed in meters), or, kg/m^2 .

After calculating the BMI, the values are compared in separate graphs for gender and age in order to determine the percentile curve. The BMI percentile for age and sex shows how a child's weight compares to the weight of other children of the same age and gender. The group of overweight or obese children have a BMI belonging to the ≥ 95 th percentile, from the 85th to < 95 th percentile are children with increased weight, from 5th to < 85 th percentile are children with normal weight, while all children under < 5 th percentile belong to the group of malnourished or underweight children. [12, 14]

The study used references and graphs of percentages and Z-score curves for age and sex from the CDC (Centers for Disease Control and Prevention) for children and adolescents. This included weight (for age and sex), growth (for age and sex), and body mass - BMI (for age and sex). [15–18]

Statistical data processing was performed in the statistical program STATISTICA 8.0 and SPSS Statistics 23.0. The data were presented in tabular and graphical form.

The following statistical methods were conducted:

1. In the series with attributive features (ethnicity, gender, weight, age groups) percentages of the structure are determined (%);

- 1.1 The difference in the relation between weight & ethnicity; weight & age groups; weight & sex, in series with attributive traits was tested using Pearson Chi-Square / (p); Pearson Chi-Square and Fisher's Exact Test / Monte Carlo Sig. (2-sided) / (p);

- 1.2 Descriptive statistics were applied on the height, weight, and BMI of children included in the study (Mean $\pm$ Std. Dev.; ± 95.00 %CI; Minimum; Maximum.

Significance is determined by $p < 0.05$.

RESULTS

The study included $n=1034$ children from four different ethnicities. Macedonian $n=428$, Albanian $n=460$, Turkish $n=80$ and Roma $n=66$. Males and females are approximately equally represented with $n=522$ females and $n=512$ males.

Table 1 and Chart 1 shows descriptive statistics on height, weight, and body mass index (BMI) from the children included in the study.

Of the 1034 children, their height varies between 139.12 ± 15.17 centimeters; $\pm 95.00\%$ CI: 138.19-140.04; minimum height is 102 centimeters and maximum height is 176 centimeters.

Of the 1034 children, the weight varies between $37.10-14.42$ kg; $\pm 95.00\%$ CI: 36.22-37.98; the minimum weight is 12 kg and the maximum weight is 84 kg.

Of the 1034 children, the BMI varies between $18.24-4.33$ kg / m²; $\pm 95.00\%$ CI: 18.24-18.77; minimum value is 7.71 kg / m² and maximum value is 34.52 kg / m².

The data presented in Table 2 and Chart 2 refers to the performed cross-tabulation in rela-

tion to ethnicity & weight of the children included in the study.

Out of a total of 1034 children included in the study, 589 (57.0%) were of normal weight, 202 (19.5%) children were obese, 140 (13.5%) children were overweight, and 103 (10.0%) children were underweight.

Out of a total of 460 children of Albanian origin, 261 (63.3%) were of normal weight, 78 (17.0%) children were obese, 61 (13.3%) children were overweight, and 30 (6.5%) children were underweight.

Out of a total of 428 children of Macedonian origin, 230 (53.7%) were of normal weight, 89 (20.8%) children were obese, 53 (12.4%) children were overweight, and 56 (13.1%) children were underweight.

Out of a total of 66 children of Roma origin, 24 (36.4%) were of normal weight, 16 (24.2%) children were obese, 14 (21.2%) children were overweight, and 12 (18.2%) children were underweight.

Out of a total of 80 children of Turkish origin, 44 (55.0%) were of normal weight, 19 (23.8%) children were obese, 12 (15.0%) chil-

Table 1. Descriptive statistics on height, weight, and body mass index (BMI)

Variable	Valid N	Mean	Confidence -95,00%	Confidence +95,00%	Minimum	Maximum	Std.Dev.
Height	1034	139.12	138.19	140.04	102	176	15.17
Weight	1034	37.10	36.22	37.98	12	84	14.42
BMI	1034	18.50	18.24	18.77	7.71	34.52	4.33

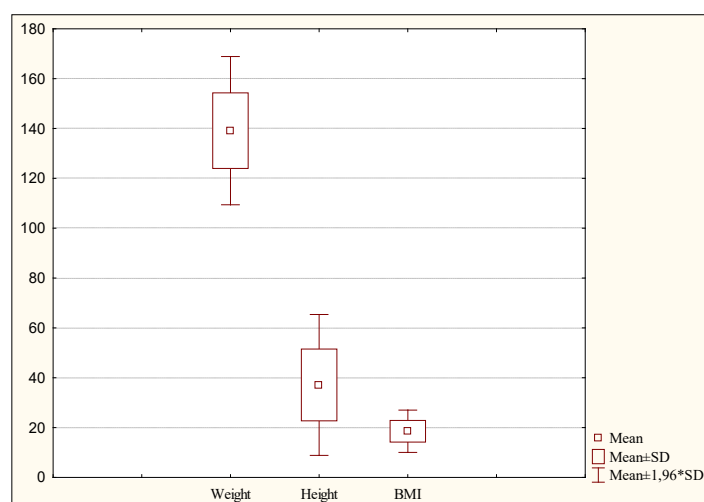


Chart 1. Mean $\pm$ Std. Dev.; $\pm 95,00\%$ CI; Minimum; Maximum. Significance is determined by $p < 0,05$

dren were overweight, and 5 (6.3%) children were underweight.

In the cross-correlation between the ethnicity and weight data of the children included in the study, Pearson Chi-Square = 31.026 and $p < 0.001$ ($p = 0.000$) / Monte Carlo Sig. (2-sided) / 0.000-0.000 / there is a significant difference.

The data shown in Table 3 and Graph 3 refer to the cross-tabulation in relation to age & weight of the children included in the study.

Out of a total of 246 children aged 6-7 years, 130 (58.0%) were of normal weight, 40 (17.9%) children were obese, 13 (5.8%) children were overweight, and 41 (18.3%) children underweight.

Out of a total of 260 children aged 8-9 years, 142 (54.6%) were normal weight, 66 (25.4%) children were obese, 32 (12.0%) children were overweight, and 20 (6.8%) children underweight.

Out of a total of 273 children aged 10-11 years, 156 (57.2%) were of normal weight, 50 (18.3%) children were obese, 41 (15.0%) children were overweight and 26 (9.5%) children underweight.

Out of a total of 277 children aged 12-13 years, 161 (58.1%) were of normal weight, 46 (16.6%) children were obese, 54 (19.5%) children were overweight and 16 (5.8%) children underweight.

In the cross-tabulation between the age and weight data of the children included in the study, the results show: for Fisher's Exact Test = 61.015 and Monte Carlo Sig. (2-sided) / 0.000-0.000 / there is a significant difference.

The data presented in Table 4 and Graph 4 refer to the cross-tabulation in relation to sex and weight of the children included in the study.

Out of a total of 522 female children, 310 (59.4%) were of normal weight, 89 (17.0%) children were obese, 63 (12.1%) children were overweight, and 60 (11.5%) children underweight.

Out of a total of 512 male children, 279 (54.5%) were normal weight, 113 (22.1%) children were obese, 77 (15.0%) children were overweight, and 43 (8.4%) children underweight.

In the cross-tabulation between the sex and weight from the data of the children included in the study, the results show: for Pearson Chi-Square = 8.593 and $p < 0.05$ ($p = 0.035$) there is a significant difference.

Table 2. Cross-tabulation in relation to ethnicity & weight of the children

			Ethnicity				Total
			AL	MK	RM	TR	
Weight	Healthy Weight	Count	291	230	24	44	589
		%	63.3%	53.7%	36.4%	55.0%	57.0%
	Obesity	Count	78	89	16	19	202
		%	17.0%	20.8%	24.2%	23.8%	19.5%
	Over weight	Count	61	53	14	12	140
		%	13.3%	12.4%	21.2%	15.0%	13.5%
	Under weight	Count	30	56	12	5	103
		%	6.5%	13.1%	18.2%	6.3%	10.0%
Total		Count	460	428	66	80	1034
		%	100.0%	100.0%	100.0%	100.0%	100.0%

AL=Albanian, MK=Macedonian, RM=Roma, TR=Turks

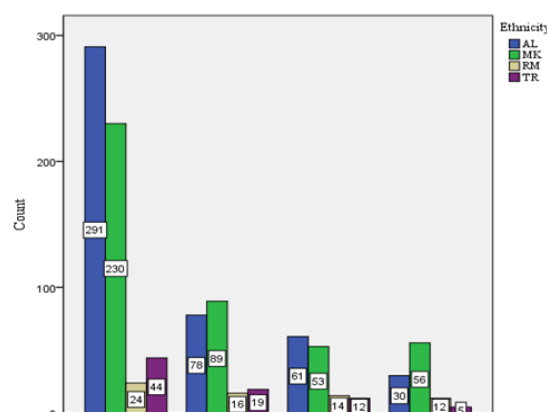
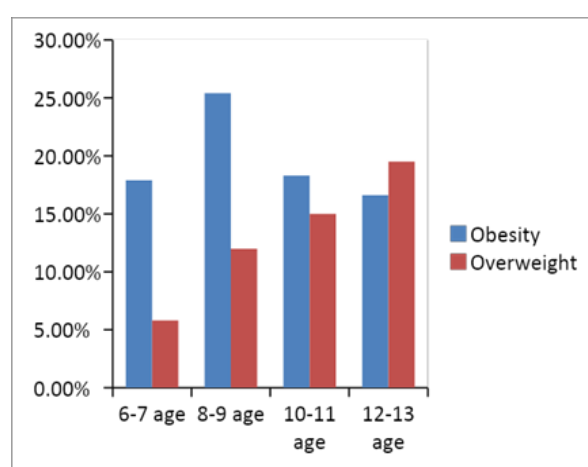


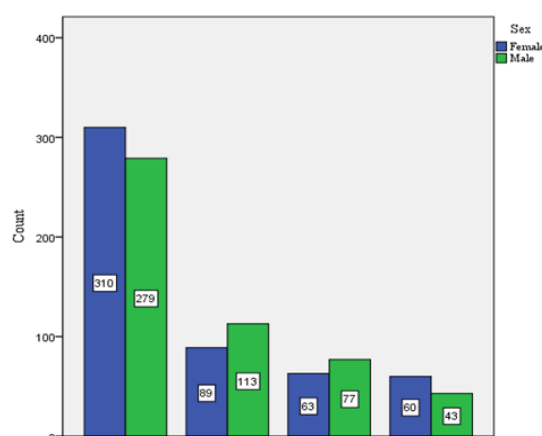
Chart 2. AL=Albanian, MK=Macedonian, RM=Roma, TR=Turks

Table 3. *Cross-tabulation in relation to age & weight of the children*

			6 -7 years	8 -9 years	10-11 years	12-13 years	Total
Weight	Healthy weight	Count	130	142	156	161	589
		%	58.0%	54.6%	57.2%	58.1%	57.0%
	Obesity	Count	40	66	50	46	202
		%	17.9%	25.4%	18.3%	16.6%	19.5%
	Over weight	Count	13	32	41	54	140
		%	5.8%	12.0%	15.0%	19.5%	13.5%
	Under weight	Count	41	20	26	16	103
		%	18.3%	6.8%	9.5%	5.8%	10.0%
Total		Count	224	260	273	277	1034
		%	100.0%	100.0%	100.0%	100.0%	100.0%

**Graph 3.** *Relation to age & weight of the children***Table 4.** *Cross-tabulation in relation to sex & weight of the children*

			Sex		Total
			Female	Male	
Weight	Healthy weight	Count	310	279	589
		%	59.4%	54.5%	57.0%
	Obesity	Count	89	113	202
		%	17.0%	22.1%	19.5%
	Over weight	Count	63	77	140
		%	12.1%	15.0%	13.5%
Under weight	Count	60	43	103	
	%	11.5%	8.4%	10.0%	
Total		Count	522	512	1034
		%	100.0%	100.0%	100.0%

**Figure 4.** *Relation to sex and weight*

DISCUSSION

Trends in childhood obesity and overweight are being followed in more countries around the world. According to a large population study for the worldwide BMI index, the study has come to the conclusion that overweight and obesity have recently plateaued in high income countries in northwestern Europe and in the Asia-Pacific region. By contrast, an increase has been registered in most of East and South Asia. [19]

In some European countries, as well, they have hit a plateau in the growth of overweight and obesity, whereas the lowest rate is found in the Atlantic and Central region. The lowest prevalence is reported in Belgium, Switzerland and Sweden. [20, 21] However, the growth trend persists in most of the Iberian and Mediterranean region - with the highest reported prevalence in Spain, Italy, Malta and Greece. The prevalence trends in these areas are worryingly high. [22–25]

Our research focuses on determining and comparing the prevalence of weight and obesity in both sexes, in different age groups and ethnicities in school children in North Macedonia. The results show us that, 33% of children are overweight and obese, of which 19.5% are obese while 13.5% are overweight. Thus, 1 in 3 school-children already have a BMI that is graduated above the 85th percentile with overweight – and/or above 95th percentile with obesity.

A previous meta-study and systematic review of the prevalence of obesity and overweight among European children outlines that, in the period from 2007 to 2010, children aged 7-13 years, from North Macedonia, had a prevalence of 24.5% when it came to obesity and overweight. [26]

North Macedonia joined the second round of the Childhood Obesity Surveillance Initiative (COSI) in Europe in 2010, which was established by the WHO in 2007. COSI tracks the prevalence of overweight and obesity between the ages of 6-9 years, where each participating country chooses one of the four ages between 6-9 years old. North Macedonia chose 7-year-olds. According to the latest data released by the public health institute, compared to 2010, in 2019 there has been an increase in overweight to 3% and obesity to 2.1%. In the countries participating in the COSI research circle in 2019, the

prevalence of overweight (including obesity) in North Macedonia is at 35%. [27]

The data from our study show that an exponential increase in all age groups for the prevalence of overweight: in 6-7 years (5.8%); 8-9 years (12%); 10-11 years (15%); and, 12-13 years old with 19.5%.

An exponential increase of overweight during growth indicates that children are at risk of crossing from normal weight to overweight, therefore furthering the risk of becoming obese.

Recent studies have observed trends of early onset of puberty. The correlation between body mass index and puberty timing apparently contributes to this trend.

Also, the data from our study show a jump of prevalence of overweight and obesity between the age groups 6-7 years and 8-9 years (with 17.9% to 25.4% obese, and 5.8% to 12.0% overweight, respectively). The onset of puberty may be the possible cause. Throughout our study, we also observed the lack of another more in-depth study that analyze the correlation between overweight/obesity and the timing of puberty in the children in our study.

On total, the male children surveyed had a higher prevalence of obesity and overweight, with 22.1% obese and 15.0% overweight, compared to female children who were 17% obese and 12.5% overweight.

Research on gender differences in childhood obesity has shown that the prevalence of obesity is higher in boys than in girls between the ages of 5-19 years. [28, 29] Despite the observed gender difference in overweight and obesity, there are relatively few studies on the possible causes of the aforementioned variation.

Prevalence and risk of obesity are spread out differently between races, ethnicities, and demographic regions. [30, 31]. There are various hypotheses regarding the differences found in the prevalence and risk of obesity in children. These vary from prenatal, socioeconomic, socio-demographic, to cultural influences. [32]

Compared to the data studies from 2009, where 35% of Macedonian and 5% of Albanian girls were registered as obese [33], our data in 2020 has shown that 33.2% of the children (of both sexes) of Macedonian origin were registered as obese/overweight, while 30.3% of Albanian origin (of both sexes) were registered as obese/overweight. Although the Roma and Turkish eth-

nicities are present in small numbers, the risk of overweight and obesity still remains high. Given the fact that obesity is on rise among different ethnic groups, this could relate to more recent similarities in lifestyle, unhealthy food choices, lack of physical activity and sedentary behavior, and therefore be a possible cause.

As a branch of the World Obesity Federation (WOF), the Global Atlas of Childhood Obesity provides risk assessment data on the prevalence of obesity in children aged 5-19. According to the ATLAS, North Macedonia is ranked with a risk index of 7/11, which is expected to increase the obesity rate up to 52.5% for children aged 5-19 years by 2030. [34]

All recent reviews suggest that multifaceted, comprehensive strategies should be developed to prevent obesity in children and adolescents. From increasing public awareness about the growing risk of obesity among the child population, followed by fostering prevention programs on educating parents and children about eating habits, physical activity, reducing sedentary behavior, and including establishing nationwide policies on the way of organizing healthy food consumption in the community and school.

CONCLUSION

Our data shows that trends of overweight and obesity are present in our school children in North Macedonia.

It is of great importance that we continuously monitor the nutritional status and risk of obesity in the pediatric population. It is essential to promote healthy eating and exercise habits in order to provide a long-term strategic plan for further prevention of obesity and overweight.

REFERENCES

1. ICD-11 for Mortality and Morbidity Statistics. Available from: <https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/292901392>.
2. Bendor CD, Bardugo A, Pinhas-Hamiel O, Afek A, Twig G. Cardiovascular morbidity, diabetes and cancer risk among children and adolescents with severe obesity. *Cardiovasc. Diabetol.* 2020 Jun 13; 19(1): 79.
3. Clemente MG, Mandato C, Poeta M, Vajro P. Pediatric non-alcoholic fatty liver disease: Recent solutions, unresolved issues, and future research directions. *World J Gastroenterol.* 2016 Sep 28; 22(36): 8078–93.
4. Björklund J, Laursen TL, Kazankov K, Thomsen KL, Hamilton-Dutoit S, Stenbøg E, Grønbaek H. [Non-alcoholic fatty liver disease in children and adolescents]. *UgeskrLaeger.* 2017 Jul 3;179(27):V11160796.
5. Blüher S. Obesity prevention in childhood and cardiovascular health later in life: we need to get the ball rolling. *J Adolesc Health.* 2015 Jun; 56(6): 582–3.
6. Singh AS, Mulder C, Twisk JW, van Mechelen W, Chinapaw MJ. Tracking of childhood overweight into adulthood: a systematic review of the literature. *Obes Rev.* 2008 Sep; 9(5): 474–88.
7. Llewellyn A, Simmonds M, Owen CG, Woolcott N. Childhood obesity as a predictor of morbidity in adulthood: a systematic review and meta-analysis. *Obes Rev.* 2016 Jan; 17(1): 56–67.
8. Ending childhood obesity implementation plan: executive summary report of the commission on. <https://apps.who.int/iris/bitstream/handle/10665/259349/WHO-NMH-PND-ECHO-17.1-eng.pdf?sequence=1>
9. Evans CE, Albar SA, Vargas-Garcia EJ, Xu F. School-Based Interventions to Reduce Obesity Risk in Children in High- and Middle-Income Countries. *Adv Food Nutr Res.* 2015; 76: 29–77.
10. Lambrinou, CP., Androustos, O., Karaglani, E. et al. Effective strategies for childhood obesity prevention via school based, family involved interventions: a critical review for the development of the Feel4Diabetes-study school based component. *BMC Endocr Disord.* 2020 May 6;20(Suppl 2): 52.
11. Job-aid-Weighing and Measuring a Child Weighing a child using a taring scale Training Course on Child Growth Assessment WHO Child Growth Standards. Available from: https://www.who.int/childgrowth/training/module_h_directors_guide.pdf.
12. Brannsether B, Eide GE, Roelants M, Bjerknes R, Júlíusson PB. BMI and BMI SDS in childhood: annual increments and conditional change. *Ann Hum Biol.* 2017 Feb; 44(1): 28–33.
13. Hall DM, Cole TJ. What use is the BMI? *Arch Dis Child.* 2006 Apr; 91(4): 283–6.
14. Wang Y, Chen HJ. Use of Percentiles and Z-Scores in Anthropometry. In *Handbook of Anthropometry: Physical Measures of Human Form in Health and Disease*. Springer New York. 2012. p. 29–48
15. Growth Charts – Data Table of Stature-for-age Charts. Available from: https://www.cdc.gov/growthcharts/html_charts/statage.htm#females

16. Growth Charts – Data Table of BMI-for-age Charts Available from: https://www.cdc.gov/growthcharts/html_charts/bmiagerev.htm
17. Growth Charts – Data Table of Weight-for-stat-ure Charts Available from: https://www.cdc.gov/growthcharts/html_charts/wtstat.htm
18. CDC Height for Age Percentiles for Girls (2 - 20 years) Available from: <https://reference.medscape.com/calculator/655/cdc-height-for-age-percentiles-for-boys-2-20-years>
19. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128·9 million children, adolescents, and adults. *Lancet*. 2017 Dec 16; 390(10113): 2627–2642.
20. Jeannot E, Mahler P, Elia N, Cerruti B, Chastonay P. Sociodemographic and Economic Determinants of Overweight and Obesity for Public-school Children in Geneva State, Switzerland: A Cross-sectional Study. *Int J Prev Med*. 2015 May 11; 6: 39.
21. Moraeus L, Lissner L, Sjöberg A. Stable prevalence of obesity in Swedish schoolchildren from 2008 to 2013 but widening socio-economic gap in girls. *ActaPaediatr*. 2014 Dec; 103(12): 1277–84.
22. Sánchez-Cruz JJ, Jiménez-Moleón JJ, Fernández-Quesada F, Sánchez MJ. Prevalence of child and youth obesity in Spain in 2012. *Rev Esp Cardiol (Engl Ed)*. 2013 May; 66(5): 371–6.
23. Gallus S, Lugo A, Murisic B, Bosetti C, Boffetta P, La Vecchia C. Overweight and obesity in 16 European countries. *Eur J Nutr*. 2015 Aug; 54(5): 679–89.
24. Manios Y, Angelopoulos PD, Kourlaba G, Kolo-tourou M, Grammatikaki E, Cook TL, Bouloubasi Z, Kafatos AG. Prevalence of obesity and body mass index correlates in a representative sample of Cretan school children. *Int J PediatrObes*. 2011 Apr;6(2):135–41.
25. Kleanthous K, Dermitzaki E, Papadimitriou DT, Papaevangelou V, Papadimitriou A. Overweight and obesity decreased in Greek schoolchildren from 2009 to 2012 during the early phase of the economic crisis. *ActaPaediatr*. 2016 Feb; 105(2): 200–5.
26. Garrido-Miguel M, Cavero-Redondo I, Álvarez-Bueno C, Rodríguez-Artalejo F, Moreno LA, Ruiz JR, Ahrens W, Martínez-Vizcaíno V. Prevalence and Trends of Overweight and Obesity in European Children From 1999 to 2016: A Systematic Review and Meta-analysis. *JAMA Pediatr*. 2019 Oct 1; 173(10): e192430.
27. WHO European Childhood Obesity Surveillance Initiative (COSI) Report on the fourth round of data collection. 2021 Available from: <http://apps.who.int/bookorders>.
28. Shah B, Tombeau Cost K, Fuller A, Birken CS, Anderson LN. Sex and gender differences in childhood obesity: contributing to the research agenda. *BMJ NutrPrev Health*. 2020 Sep 9; 3(2): 387–390.
29. Sweeting HN. Gendered dimensions of obesity in childhood and adolescence. *Nutr J*. 2008 Jan 14; 7: 1.
30. Isong IA, Rao SR, Bind MA, Avendaño M, Kawachi I, Richmond TK. Racial and Ethnic Disparities in Early Childhood Obesity. *Pediatrics*. 2018 Jan; 141(1).
31. Min J, Goodale H, Xue H, Brey R, Wang Y. Racial-Ethnic Disparities in Obesity and Biological, Behavioral, and Sociocultural Influences in the United States: A Systematic Review. *AdvNutr*. 2021 Jul 30; 12(4): 1137–1148.
32. Weden MM, Brownell P, Rendall MS. Prenatal, Perinatal, Early Life, and Sociodemographic Factors Underlying Racial Differences in the Likelihood of High Body Mass Index in Early Childhood. *Am J Public Health* 2012 Nov; 102(11): 2057.
33. Krstevska-Konstantinova M, Jancevska A, Kicova M, Gucev Z. Weight, height and puberty in a cohort of Macedonian girls. *Med Arh*. 2009; 63(2): 80–1.
34. Lobstein T, Brinsden H. Compiled by. Atlas Child Obesity 2019; Available from: www.worldobesity.org.

Резиме**ПРЕВАЛЕНЦИЈА НА ЗГОЛЕМЕНАТА ТЕЖИНА И ДЕБЕЛИНА КАЈ ДЕЦАТА:
ВАРИЈАЦИИ ВО РАЗЛИЧНИ ЕТНИКУМИ, ВОЗРАСТИ
И ПОЛОВИ ВО СЕВЕРНА МАКЕДОНИЈА****Арјета Рауфи¹ и Марина Крстевска Константинова²**¹ Одделение за детски болести, Клиничка болница Тетово, РС Македонија² Оддел за ендокринологија и генетика, Клиника за детски болести, Медицински факултет, Универзитет „Св. Кирил и Методиј“ во Скопје, РС Македонија

Детската дебелина е несомнено еден од најважните здравствени предизвици на 21 век, со посебен осврт и на придружните долготрајни метаболички компликации. Во последните четири децении имаме десеткратно зголемување на дебелиите деца и адолесценти.

Целата на оваа студија е да се прикаже преваленцијата на зголемената тежина и дебелина според возраста, полот и етничката припадност кај $n = 1034$ здрави машки и женски деца на возраст од 6 до 13 год. во РС Македонија.

Од вкупно 1034 деца вклучени во студијата, 589 (57 %) имале нормална тежина, 202 (19,5 %) деца биле дебели, 140 (13,5 %) деца имале зголемена тежина и 103 (10 %) деца имале ниска телесна тежина. Студијата ни дава увид дека 33 %, или 1 на 3 наши школски деца се градуира над >85 перцентили со зголемена тежина или на ≥ 95 перцентили со дебелина. Податоците покажуваат дека машките деца се со поголема преваленција на дебелина и зголемена тежина со 37,1 % во споредба со женските деца – 29,1 %. Кај сите возрасни групи, со растот на возраста се забележува и експоненцијален пораст на преваленцијата на зголемена тежина од: 6–7 год. (5,8 %), 8–9 год. (12 %), 10–11 год. (15 %), 12–13 год. (19,5 %). Забележен е скок на преваленцијата на дебелината и зголемената тежина меѓу возрасната група меѓу 6–7 год. и 8–9 год. (од 17,9 % на 25,4 % дебели и 5,8 % на 12 % со зголемена тежина). Фактот дека на 8-годишна возраст имаме и отпочнување на пубертетот е можната корелација меѓу двете варијабли.

Според Атласот на детска дебелина, РС Македонија се градуира со индекс на ризик 7/11, односно се очекува во наредната декада до 2030 год. стапката на дебелина да порасне до 52,5 % за детската возраст 5–19 години.

Потребата за континуирано мониторирање на нутритивниот статус и ризикот на дебелина, со цел натамошна превенција на дебелината и на зголемената тежина кај детската популација е неопходна.

Клучни зборови: преваленција, детска дебелина, зголемена тежина, БМИ, Северна Македонија