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**Remarkable increase in the prevalence of overweight and obesity among school age children in Antalya, Turkey, between 2003 and 2015**

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**Abstract**

**Objective:** Because childhood obesity is still a growing problem in the world, we conducted this study aiming to show the trend in obesity (OB) and overweight (OW) prevalence in the last decade, to observe the alteration of OB and OW prevalence according to age groups and to construct the new age and gender specific body mass index (BMI) reference percentile charts for Turkish children living in the **city center of Antalya**.

**Methods:** This cross-sectional study includes 1687 school aged children. International Obesity Task Force (IOTF) references were used to determine the obesity and overweight prevalence. OW was defined as BMI between 85<sup>th</sup> and 95<sup>th</sup> percentile, and OB above the 95<sup>th</sup> percentile. The data obtained were compared with another study carried out by the same unit in the same region in 2003. LMS method, which summarizes terms of three smooth age specific curves called L (lambda), M (mu), and S (sigma), was used to construct the BMI reference percentile charts for Turkish children living in Antalya.

**Results:** The prevalence of OB was 9.8 %, OW was 23.2 % and combined OW/OB was 33 %. Obesity prevalence was higher in boys than girls ( $p < 0.05$ ). The prevalence of combined OW/OB was highest at the age of 9-10 years. The prevalence of obesity has increased 2.9 times during twelve years in Antalya, Turkey.

**Conclusion:** Comparing with the findings of previous decade, childhood obesity in Antalya has reached **alarming level**. Urgent measures should be taken to prevent obesity and more surveillance studies should be planned to show the future trend of obesity prevalence.

#### **What is already known on this topic?**

Increase in the frequency of obesity and overweight among children and adolescents is a major public health problem all over the world in both developed and developing countries.

#### **What this study adds?**

This is a 12-year interval study of our previous study conducted in 2006. Our findings suggest that OW and OB prevalence in the school-age children living in the same geographical region of Turkey have increased dramatically.

#### **Introduction**

**During the last few decades, the number of obese (OB) and overweight (OW) children and adolescents have significantly increased in both developed and developing countries, which poses a major threat to public health all over the world (1). Available evidence shows that combined OW/OB of childhood has increased by 47.1 % in the last three decades, for the sake of comparison, the same figure for adults stands at 27.5 % (2). From 1980 to 2013, the prevalence of combined OW/OB among children and adolescents in developed countries has risen from 16.9 % to 23.8 % in boys and from 16.2 % to 22.6 % in girls. In developing countries, the prevalence at these ages has also increased from 8.1 % in 1980 to 12.9 % in 2013 among**

boys, and 8.4 % to 13.4 % among girls (2). **In 2016, it was estimated that 50 million girls and 74 million boys worldwide were obese (3).**

Although there are many reports from different regions of Turkey, there is no nationwide systematic study investigating obesity trends in Turkish children. Alper et al. (4) reported in a meta-analysis of 58 publications from Turkey that the prevalence of OB increased from **0.7% in 1990-1995 to 7.1% in 2011-2015** (1.2 % to 6.8 % for girls, 0.3 % to 7.4 % for boys). **Bereket et al. (5) signified that OW and OB prevalence was higher in Turkey's western regions in which the population generally has a higher socioeconomic status (6).**

The aims of this study were to determine the prevalence of **OW and OB** among school aged children, to compare our data with the study of Turkkahraman et al (7), **who carried out a similar research in 2003, and to determine OB and OW prevalence in regard to age and sex in Antalya, Turkey. The results of this study will also enable the creation of age- and sex-specific BMI reference percentile charts and BMI curves for Turkish children living in the city center of Antalya.**

## **Method**

**This cross-sectional study, which was performed between March-April 2015, included children from 58 out of the 124 schools throughout the Muratpasa district where has a high socio-economic level, in the city center of Antalya, Turkey. From a total of 61092 school children, 1687 healthy children (873 boys and 814 girls) aged between 6-14 were chosen for the study via a population-based stratified cluster-sampling method.**

**Written permits for the study were obtained from Antalya Provincial Directorate of Health and Antalya Province National Education Directorate. Informed consent was obtained from all students and their parents. The study was approved by the Ethics Committee of Akdeniz University (Decision No: 108, date: 25.02.2015).**

**The ages of all participants were calculated and reported in years according to their date of birth. Weight was measured with light clothes and without shoes, using a digital portable scale and was rolled-up or down to the nearest 100 g. Height was measured using a laser rangefinder (BOSCH, Leinfelden-Echterdingen, Germany) calibrated with Harpenden stadiometer, to the nearest 0.1 cm, with the subjects standing in the Frankfurt plane. BMI was calculated as weight/ height<sup>2</sup> (kg/m<sup>2</sup>). Age and gender specific International Obesity Task Force (IOTF) references, recommended by Cole et al (8) were used to determine the prevalence of OW and OB. Overweight was defined as BMI between 85<sup>th</sup> and 95<sup>th</sup> percentile, and obesity as BMI above the 95<sup>th</sup> percentile. **In order to perform comparisons with the current study, the data of 1775 children were selected from our previous study with adjustments for age and sex (Turkkahraman et al.) (7). Thus, the age groups and gender distributions of children in both studies were equalized.****

## Statistical analysis

Data were analyzed using the Statistical Package for Social Sciences version 22 software. **Differences between categorical variables were tested by the Pearson and Fisher chi-square tests, while BMI values were compared with the z-test.**

We used the LMS method to construct **age and gender specific BMI reference percentile charts and BMI curves for Turkish children living in the city center of Antalya (9).** In this method, L represents the skewness, M represents the median and S represents the coefficient of variation of the data. The BMI centile curves were smoothed by using the distance-weighted least squares procedure.

## Results

The overall prevalence of combined OW/OB in the current study was 33 %, **while the prevalence of OB and OW was 9.8 % and 23.2 %, respectively.** There was no significant difference between boys and girls for OW prevalence. However, OB prevalence was higher in boys (11.3 %) than girls (8.1 %) ( $p < 0.05$ ) (Table 1). The prevalence of combined OW/OB was also higher in boys (35.2 %) than girls (30.6 %). **The distribution of OB and OW prevalence according to age groups is shown on Figure 1.** We observed that the **prevalence of combined OW/OB increased rapidly from 7 years to 9 years ( $p < 0.05$ ), formed a plateau between 9 and 10 years, and decreased after the age of 10.** The prevalence of OB and OW regarding age groups and sex is depicted in Figure 2. The prevalence of combined OW/OB was found to **increase with age between 6 to 10 years among girls ( $p < 0.05$ ), while a rapid increase in prevalence was found from 7 to 9 years in boys ( $p < 0.05$ ).** Our findings indicated that the **peak prevalence of combined OW/OB was at 10 years in girls (38.8 %) and at 9 years in boys (47.1 %).** The prevalence of OB alone was not statistically significant when age groups were compared. The mean BMI ( $\pm$  standard deviation) values and the cutoff points of BMI **obtained through the LMS method for OW and OB (85<sup>th</sup> and 95<sup>th</sup> percentiles) in respect to age groups are shown in Table 2.** The BMI centile curves were also obtained by using LMS method (data not shown). **The prevalence of combined OW/OB was found to increase up to 1.8-fold (from 18% to 33%) from 2003 to 2015, while the OB prevalence shows a 2.9-fold increase during the same period (3.4 % to 9.8 %) (Table 3).**

## Discussion

**Our study is important because it is one of the actual studies in Turkey investigating OW and OB prevalence and its trend among school children with respect to age and sex distributions in the same geographical region.**

**Antalya, the city in which this study was performed, has a population of 2.3 million and is one of the largest cities in Turkey. This study was performed as a sequel to our previous cross-sectional study which was carried out in 2003 and reports that the prevalence of combined OW/OB has increased about two times (from 18% in 2003, to 33% in 2015) and the prevalence of OB alone has increased nearly three times (from 3.4% to 9.8%) during the course of 12 years (2003-2015) in Antalya, Turkey.** Although there are several reports which have shown a plateau or a decreasing trend of **childhood OW and OB** in recent years from some regions of European countries (England (10), Ireland (11), France (12), Sweden (13), Italy (14) and Germany (15), Australia (16) and United States (17)); globally, the prevalence of OW and OB is rising among children and adolescents in both developed and developing countries, **as is the case in Turkey** (2) (4) (18). Alper et al [4] showed in a meta-analysis that the overall prevalence of OB in Turkey is 7.3 % among school aged children (6.8 % in girls, 7.4 % in boys). **However, the prevalence of OW and OB in our study was significantly higher than other regions in Turkey** (4), (5), (19), (20). **The first possible cause for this stark difference may be the fact that the current study is one of the latest in the Turkish literature and reflects the upward trend in obesity. The second possible cause may be the fact that the study was conducted in a region with high socioeconomic status. The ratios we report are very high compared to the literature and even higher than those of developed countries** (2).

**In 2003, in our previous study, we reported that** there was no difference in OB rates between girls and boys, while OW prevalence was higher in girls. **Today, we have found that** obesity has become more common in boys (11.3 %) than girls (8.1 %) ( $p < 0.05$ ) and OW prevalence is **similar in both sexes** (23.9 % in boys, 22.5 % in girls). **Similarly** Alper et al. (4) also showed that the prevalence of OB increased from 1.2 % to 6.8 % in girls and **from 0.3 % to 7.4 % in boys** between 1990-1995 and 2011-2015 in Turkey. **The trend of increase in boys was also higher than girls in this study which suggests that, in recent years, boys have become more likely to be obese than girls on a national scale. A study from the Netherlands also showed a noticeable increase in the OW and OB prevalence among Turkish children living in the Netherlands, a finding which was more pronounced among Turkish boys. The same study also reported a mild increase in OB prevalence in Turkish girls from 1999 through 2007** (21). However, **children from Moroccan, Surinamese, South Asian and Dutch descent** showed no similar trends.

When analyzed according to age groups, we observed that the prevalence of combined OW/OB increased rapidly from 7 to 9 years of age ( $p < 0.05$ ) and **formed a plateau** from 9 to 10 years of age. While the prevalence of **OB gradually decreased** after age 11, the prevalence of **OW did not**. Koca et al. (22) also emphasized that the prevalence of obesity in children under 11 **was**

**higher than that of older children** in Isparta, a city located in the south-west of Turkey. **In this study, we found that** girls reach the highest prevalence of combined OW/OB (38.8 %) at 10 years of age ( $p < 0.05$ ), **while** boys arrive at peak prevalence (47.1 %, nearly half of the boys) at the age of 9 ( $p < 0.05$ ). The distributions of combined OW/OB prevalence and OB prevalence alone by age are compatible with global data in girls (2). Wang et al. (18) also showed that the highest prevalence of OB in the childhood is between **ages 6-11** for girls and boys. **Another** study conducted in the Netherlands among children aged 0-21 years, the prevalence of OB and OW has been shown to peak between 4-7 years of age (23).

All these studies indicate that the prevalence of obesity in children is peaking **during the** primary school years. **So, awareness programs which could increase healthy eating habits and sports activities of primary school children are required on a global scale.** In March 2016, the Ministry of National Education and the Ministry of Health of Turkey published a joint statement including the list of foods suitable or unsuitable for sale in school canteens. **This was a positive step taken towards increasing awareness among children and their parents. However,** surveillance and monitoring of trends in the prevalence of OW and OB **are required to determine whether such actions are beneficial and to determine future direction.**

The LMS method, which depends on the body mass index ( $\text{weight/height}^2$ ) calculation, is mainly used to define OB and OW in the childhood (8). As we have constructed **age- and sex-** specific BMI reference percentile charts among children living in **metropolitan** Antalya, we realized that our cutoffs were higher from **than that of** other studies conducted in different regions of Turkey (Istanbul in 2002 and Kayseri in 2008) (19) (20). Since **the etiology of** childhood obesity is multifactorial, it is difficult to explain the underlying cause of **these differences in BMI cutoff values.**

### **Study Limitations and Strengths**

**There are some limitations to this study. Firstly,** as this was a sequel to a previous study and since the studies were conducted 12 years apart, it is not possible to show the fluctuation in the prevalence of OW and OB during these years. **Secondly,** this was a cross-sectional study performed in the **metropolitan area of a single city and thus cannot reflect the characteristics of the whole Turkish population.** There are also some important strengths in our study, which include the fact that both studies were performed by the same pediatric endocrinology team. Furthermore, all measurements in the study were performed by experienced health personnel, which increases the reliability of results. Another important strength of the study was the reliable comparison of OW and OB prevalence and their trends via two studies with very similar characteristics and two sets of data which were adjusted for age and sex.

## Conclusion

The results of our study **demonstrate the rapid increase** in the prevalence of OW and OB in the city center of Antalya, Turkey. It indicates that effective national and regional obesity prevention strategies are urgently required. For a healthier society, surveillance studies should be continued, and the trend of obesity prevalence **among children** should be monitored.

## References

- 1) Wang Y, Lobstein T. Worldwide trends in childhood overweight and obesity. *Int. J. Pediatr. Obes : IJPO : J. Int. Assoc. Study Obes* 2006;1(1):7-10.
- 2) Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C, Mullany EC, Biryukov S, Abbafati C, Abera SF, Abraham JP, AbuRmeileh NM, Achoki T, AlBuhairan FS, Alemu ZA, Alfonso R, Ali MK, Ali R, Guzman NA, Ammar W, Anwari P, Banerjee A, Barquera S, Basu S, Bennett DA, Bhutta Z, Blore J, Cabral N, Nonato IC, Chang JC, Chowdhury R, Courville KJ, Criqui MH, Cundiff DK, Dabhadkar KC, Dandona L, Davis A, Dayama A, Dharmaratne SD, Ding EL, Durrani AM, Esteghamati A, Farzadfar F, Fay DF, Feigin VL, Flaxman A, Forouzanfar MH, Goto A, Green MA, Gupta R, Hafezi-Nejad N, Hankey GJ, Harewood HC, Havmoeller R, Hay S, Hernandez L, Husseini A, Idrisov BT, Ikeda N, Islami F, Jahangir E, Jassal SK, Jee SH, Jeffreys M, Jonas JB, Kabagambe EK, Khalifa SE, Kengne AP, Khader YS, Khang YH, Kim D, Kimokoti RW, Kinge JM, Kokubo Y, Kosen S, Kwan G, Lai T, Leinsalu M, Li Y, Liang X, Liu S, Logroscino G, Lotufo PA, Lu Y, Ma J, Mainoo NK, Mensah GA, Merriman TR, Mokdad AH, Moschandreas J, Naghavi M, Naheed A, Nand D, Narayan KM, Nelson EL, Neuhouser ML, Nisar MI, Ohkubo T, Oti SO, Pedroza A, Prabhakaran D, Roy N, Sampson U, Seo H, Sepanlou SG, Shibuya K, Shiri R, Shiue. Singh GM, Singh JA, Skirbekk V, Stapelberg NJ, Sturua L, Sykes BL, Tobias M, Tran BX, Trasande L, Toyoshima H, van de Vijver S, Vasankari TJ, Veerman JL, Velasquez-Melendez G, Vlassov VV, Vollset SE, Vos T, Wang C93, Wang X94, Weiderpass E95, Werdecker A96, Wright JL97, Yang YC98, Yatsuya H99, Yoon J100, Yoon SJ, Zhao Y, Zhou M, Zhu S, Lopez AD, Murray CJ, Gakidou E. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: A systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2014; 384:766-781.
- 3) 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; 6736(17):1–16.

- 4) Alper Z, Ercan I, Uncu Y. A Meta-Analysis and the Evaluation of Trends in Obesity Prevalence among Children and Adolescents aged 5-19 in Turkey: 1990 through 2015. *J Clin Res Pediatr Endocrinol* 2018; 10(1): 59–67.
- 5) Bereket A, Atay Z. Current status of childhood obesity and its associated morbidities in Turkey. *J. Clin. Res. Pediatr. Endocrinol* 2012; 4:1–7.
- 6) Sağlam H, Tarım Ö. Prevalence and correlates of obesity in schoolchildren from the city of Bursa, Turkey. *J. Clin. Res. Pediatr. Endocrinol* 2008; 1:80–88.
- 7) Turkkahraman D, Bircan I, Tosun O, Saka O. Prevalence and risk factors of obesity in school children in Antalya, Turkey. *Saudi Med. J.* 2006; 27:1028–1033.
- 8) Cole T.J, Bellizzi M.C, Flegal K.M, Dietz W.H. Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ* 2000; 320:1240–1243.
- 9) Cole T.J. The LMS method for constructing normalized growth standards.,” *Eur. J. Clin. Nutr.* 1990; 44(1):45–60.
- 10) Stamatakis E, Wardle J, Cole T.J. Childhood obesity and overweight prevalence trends in England: evidence for growing socioeconomic disparities. *Int. J. Obes.* 2010; 34(1):41–47.
- 11) Keane E, Kearney P.M, Perry I.J, Kelleher C.C, Harrington J.M. Trends and prevalence of overweight and obesity in primary school aged children in the Republic of Ireland from 2002-2012: a systematic review. *BMC Public Health* 2014; 14: 974.
- 12) Péneau S, Salanave B, Maillard-Teyssier L, Rolland-Cachera M.F, Vergnaud A.C, Méjean C, Czernichow S, Vol S, Tichet J, Castetbon K, Hercberg S. Prevalence of overweight in 6- to 15-year-old children in central/western France from 1996 to 2006: trends toward stabilization. *Int. J. Obes.* 2009; 33(4):401–407.
- 13) Lissner L, Sohlström A, Sundblom E, Sjöberg A. Trends in overweight and obesity in Swedish schoolchildren 1999-2005: has the epidemic reached a plateau? *Obes. Rev. Off. J. Int. Assoc. Study Obes.* 2010; 11:553–559.
- 14) Lazzeri G, Panatto D, Pammolli A, Azzolini E. Trends in overweight and obesity prevalence in Tuscan schoolchildren (2002-2012). *Public Health Nutr.* 2015; 18:3078–3085.
- 15) Keß A, Spielau U, Beger C, Gausche R, Vogel M, Lipek T, Körner A, Pfäffle R, Kiess W. Further stabilization and even decrease in the prevalence rates of overweight and obesity in German children and adolescents from 2005 to 2015: a cross-sectional and trend analysis. *Public Health Nutr.* 2017; 20(17):3075–3083.
- 16) Olds T.S, Tomkinson G.R, Ferrar K.E, Maher C.A. Trends in the prevalence of childhood overweight and obesity in Australia between 1985 and 2008. *Int. J. Obes.* 2010; 34(1):57–66.
- 17) Kamali A, Hameed H, Shih M, Simon P. Turning the Curve on Obesity Prevalence Among Fifth Graders in the Los Angeles Unified School District,

2001-2013. *Prev Chronic Dis.* 2017; 14:E16.

18) Wang Y, Beydoun M.A. The obesity epidemic in the United States--gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a systematic review and meta-regression analysis. *Epidemiol. Rev.* 2007; 29:6–28.

19) Bundak R, Furman A, Gunoz H, Darendeliler F, Bas F, Neyzi O. Body mass index references for Turkish children. *Acta Paediatr.* 2006; 95:194–198.

20) Senol V, Unalan D, Bayat M, Mazicioglu M.M, Ozturk A, Kurtoglu S. Change in reference body mass index percentiles and deviation in overweight and obesity over 3 years in Turkish children and adolescents. *J. Pediatr. Endocrinol. & Metab. JPEM* 2014; 27:1121–1129.

21) de Wilde J.A, van Dommelen P, Middelkoop B.J.C, Verkerk P.H. Trends in overweight and obesity prevalence in Dutch, Turkish, Moroccan and Surinamese South Asian children in the Netherlands. *Arch. Dis. Child.* 2009; 94(10):795–800.

22) Koca T, Dereci S, Pirgon Ö, Akçam M. Evaluation of the Change in the Prevalence of Overweight and Obesity in Schoolchildren in South-west Turkey from 2005 to 2014. *Iranian journal of public health* 2018; 47(1):33–39.

23) Fredriks A.M, Buuren S, Sing H, Remy A.H.S, Wit J.M, Verloove-Vanhorick S.P. Alarming prevalences of overweight and obesity for children of Turkish, Moroccan and Dutch origin in The Netherlands according to international standards. *Acta Pædiatrica* 2005; 94:496-498.

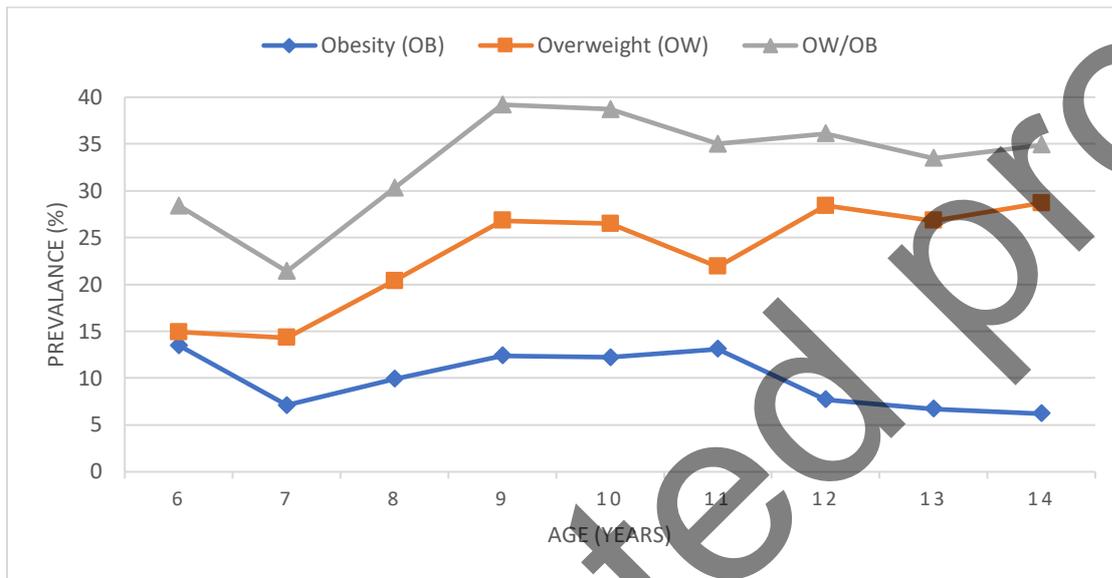
**Table 1.** Percentage of overweight and obese Turkish children, 6-14 years old in Antalya

<b>Gender</b>	<b>Overweight (%)</b>	<b>Obese (%)</b>	<b>OW/OB (%)</b>	<b>Non OW/OB</b>	<b>Total</b>
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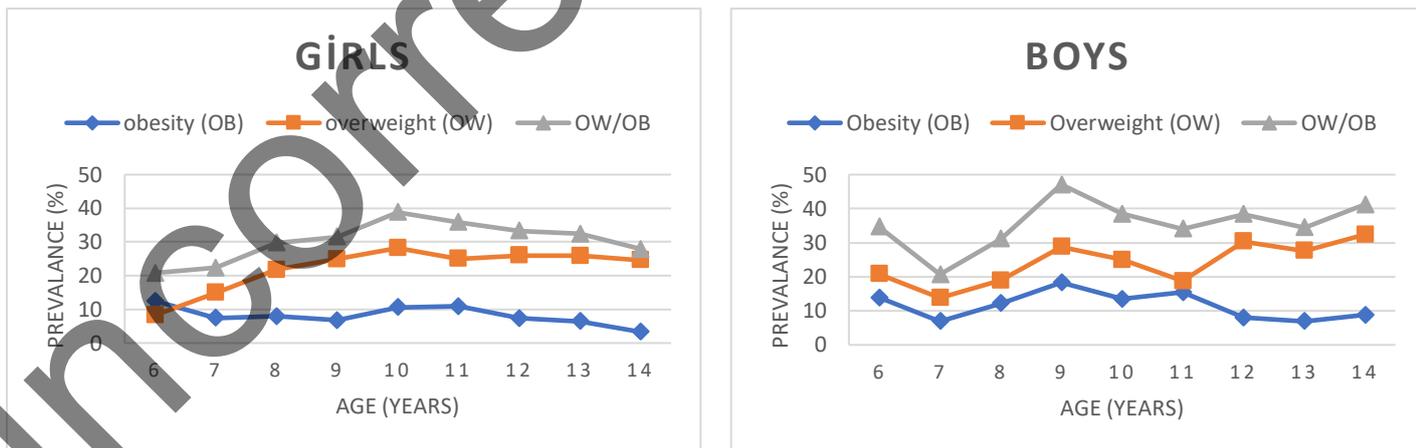
Boys	209 (23.9) *	99 (11.3) **	308 (35.2) **	565	873
Girls	183 (22.5) *	66 (8.1) **	249 (30.6) **	565	814
Total	392 (23.2)	165 (9.8)	557 (33)	1130	1687

\*p>0.05, \*\*p<0.05

OW= overweight, OB= obesity.



**Figure 1.** The prevalence of OB and OW in different age groups, in Antalya, Turkey



**Figure 2.** The prevalence of OB and OW among girls and boys

**Table 2.** Body mass index (BMI) percentiles of Turkish children aged 6-14 years, in Antalya

Age	Girls				Boys			
	N	m BMI ( $\pm$ SD)	Overweight (85 <sup>th</sup> p)	Obese (95 <sup>th</sup> p)	N	m BMI ( $\pm$ SD)	Overweight (85 <sup>th</sup> p)	Obese (95 <sup>th</sup> p)
6	71	17 $\pm$ 2.7	18.9	19.8	72	17.1 $\pm$ 2.9	19.3	20.5
7	94	17.2 $\pm$ 2.4	19.4	20.5	116	17.7 $\pm$ 2.5	20.4	21.8
8	101	17.6 $\pm$ 3.2	20.3	21.8	90	18.3 $\pm$ 3.4	21.4	23.1
9	105	18.2 $\pm$ 3	21.4	23.3	104	18.9 $\pm$ 4	22.4	24.3
10	85	19 $\pm$ 3.7	22.6	24.9	104	19.5 $\pm$ 4	23.2	25.4
11	92	19.8 $\pm$ 4.2	23.8	26.3	91	20.1 $\pm$ 4.1	24	26.4
12	96	20.7 $\pm$ 3.9	24.8	27.3	112	20.7 $\pm$ 3.7	24.7	27.2
13	108	21.6 $\pm$ 3.8	25.4	27.6	116	21.1 $\pm$ 3.6	25.2	27.8
14	61	22.3 $\pm$ 3.9	25.4	27.2	68	21.5 $\pm$ 4.1	25.6	28.2

**Table 3.** The comparison of 6-14 years old school children in Antalya, between 2003- 2015

	2003*	2015	P
<b>Number</b>	1775	1687	-
<b>Age (year)</b>	6-14	6-14	-
<b>Gender (girls/boys)</b>	867/908	814/873	>0.05
<b>Obesity (%)</b>	3.4	9.8	0.0001
<b>Overweight (%)</b>	14.6	23.2	0.0001
<b>OB/OW (%)</b>	18	33	0.0001

\*Reference 7. OW= overweight, OB= obesity.