Prevalence of Obesity Between 6-15 Years Children in Istanbul

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Abstract

Aim: This research aims to evaluate the prevalence of obesity and nutritional habits in children aged 6-15 in a district of Istanbul.

Method: This is a cross-sectional study conducted with 2452 students aged 6-15 in 19 primary schools in Avcılar district of Istanbul. A face-to-face questionnaire was applied about the children's nutrition habits and food consumption frequencies. Children's height, weight, waist and hip circumference measurements were taken. Children were categorized according to Z-scores. Statistics were made using the SPSS 21 program.

Results: A total of 47.8% of students were boys, 52.2% were girls. The mean age of the students was 9.47 ± 2.21 years, average BMI was 18.7 ± 3.73 kg/m^2. Overweight and obesity prevalence was 20.3% and 13.2%, respectively. The obesity prevalence of 9-y-old was at the highest level, and males were more obese than females ($p<0.001$). A significant difference was found between obese and non-obese students in terms of snacking while studying and watching TV, and the frequency of some food consumption ($p<0.05$).

Conclusion: It was found that one out of every three children was overweight. In addition to national and international policies, regional and local follow-ups and taking necessary precautions may be beneficial in controlling childhood obesity.

Keywords: Child, obesity, prevalence, eating habits.

İstanbul'da 6-15 Yaş Arası Çocuklarda Obezite Prevalansı

Öz

Amaç: Bu araştırma, İstanbul'un bir ilçesinde 6-15 yaş arası çocuklarda obezite prevalansını ve beslenme alışkanlıklarını değerlendirmeyi amaçlamaktadır.

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Yöntem: Bu araştırma, İstanbul'un Avcılar ilçesinde 19 ilköğretim okulunda 6-15 yaş arası 2452 öğrenci ile gerçekleştirilen kesitsel tipte bir araştırmadır. Çocukların beslenme alışkanlıkları ve besin tüketim sıklıkları hakkında yüz yüze anket uygulanmıştır. Çocukların boy uzunluğu, vücut ağırlığı, bel ve kalça çevresi ölçümleri alınmıştır. Çocuklar Z-skorlarına göre sınıflandırılmıştır. İstatistikler SPSS 21 programı kullanılarak yapılmıştır.

Bulgular: Öğrencilerin toplam %47.8'i erkek, %52.2'si kızdır. Öğrencilerin yaşlarının ortalaması 9.47±2.21, ortalama BKİ ise 18.7±3.73 kg/m²'dir. Fazla kiloluluk ve obezite prevalansı sırasıyla %20.3 ve %13.2 bulunmuştur. 9 yaşındakilerin obezite prevalansı en yüksek düzeydedir ve erkeklerde kızlara göre daha fazla obezite görülmüştür (p<0,001). Obez olan ve obez olmayan öğrenciler arasında ders çalışırken ve televizyon izlerken atıştırma ve bazı besinleri tüketme sıklığı açısından anlamlı fark bulunmuştur (p<0.05).

Sonuç: Her üç çocuktan birinin normalden fazla kilolu olduğu bulunmuştur. Ulusal ve uluslararası politikaların yanı sıra bölgesel ve yerel takipler ile gerekli önlemlerin alınması çocukluk çağı obezitesinin kontrolünde faydalı olabilir.

Anahtar Sözcükler: Çocuk, obezite, prevalans, beslenme alışkanlıkları.

Introduction

Obesity is one of the most common chronic diseases in childhood. World Health Organization (WHO) states that in 2016, the number of overweight and obese people aged 5-19 was more than 340 million. It is stated that there are 38 million obese children under the age of 5[1]. It is estimated that by 2030, the number of obese school-age children and adolescents worldwide will exceed 250 million[2].

Childhood obesity is a complex and multifactorial chronic disease. Although multifactorial, obesity in children and adolescents often results from a lack of physical activity and unhealthy diet[3,4]. In recent years, it has shown a great increase in the world. It has a great impact on the development of different physical comorbidities such as overweight and obesity, type 2 diabetes (T2DM), metabolic syndrome, cardiovascular diseases, and different types of cancer in children. In addition, these children are also exposed to other psychosocial consequences, such as low self-esteem, body image disorders, and depression[4,5].

Economic development, industrialization, and rapid urbanization in developing countries are driving the adoption of inadequate physical activity, unhealthy diet, and lifestyle behaviors that increase the prevalence of obesity in adults and children. Obesity in Turkey as well as all over the world is a serious public health problem[6]. Studies conducted in Turkey have reported different results for the prevalence of obesity in children and adolescents due to geographical and cultural differences. The prevalence of childhood obesity in Turkey increased 11.6 times between 1990-1995 and 2011-2015, from 0.6% to 7.3%. The prevalence of obesity increased in both sexes.

However, boys were found to be more obese than girls[2]. According to the 2010 report of the Turkey Nutrition and Health Survey, the prevalence of obesity was found to be 8.5% between the ages of 0-5 and 8.2% between the ages of 6-18[3,6].

According to the BMI-Z Score of the 2nd-grade primary school students in Turkey in the study carried out by the WHO in 17 countries; 9.9% were obese, 14.6% were overweight, 74% were normal, and 1.5% were underweight. In the WHO European Childhood Obesity Surveillance Initiative (COSI) 2013 study, it was found that obesity was 8.3% and overweight was 14.2%. When compared with the COSI 2013 study, it is seen that obesity and overweight increase[7].

Studies on the prevalence of childhood obesity in Turkey have gained importance. While a remarkable number of prevalence studies, mostly regional, were conducted between 2005 and 2011, a gradual decline was observed thereafter. There is a need for more national and population-based studies on the prevalence of obesity in children and adolescents in Turkey[5].

This study was carried out to determine the prevalence of obesity in children aged between 6 and 15 years in Avcılar and to examine their nutrition habits.

Material and Method

Avcılar is a district on the European side of Istanbul with a population of 436,897. There are a total of 67,905 students studying in 53 primary schools (49043 students) and 35 secondary schools (18,862) in Avcılar[8]. This study was conducted with children aged 6-15 years studying in 19 primary and secondary schools located in the center of Avcılar.

Before the study, expert opinion was obtained from 5 academicians specializing in nutrition and exercise for the survey questions. Some necessary changes were made in the questions by conducting a pilot study on a group of 20 students. The study was carried out between October and December 2017.

During the data collection phase of the research, the researcher conducted a preliminary interview with the school principals, made an appointment, explained the research aims, and informed them about the survey application. An informed consent form was sent to the parents. Children whose parents gave consent were included in the study. The names of the children were not taken, and the participant numbers were given to the children. Those with syndromic obesity, chronic disease, chronic drug use, and short stature due to endocrine, metabolic, or genetic reasons were determined as exclusion criteria from the study.

A questionnaire including nutritional habits, food consumption frequency and physical activity was applied to students whose families gave consent, and waist, hip, height and weight

measurements of the students were taken. The research was conducted by the Helsinki 2008 Declaration of Human Rights.

Anthropometric measurements (height, weight, waist and hip circumference) of the students were made in a classroom determined by the school administrations. A Stadiometer was used for height measurement. InBody 120 device with 0.1 kg sensitivity was used for weight measurement. Body mass index (BMI) was calculated as weight (kg) divided by height squared (m²). Z scores were calculated using the WHO-AnthroPlus program. According to these values, BMI Z-score; described as very thin, underweight, normal weight, and obese[9]. The waist circumference was measured horizontally at the midpoint between the lowest rib and the iliac crest, and the hip circumference was measured at the widest circumference in the gluteal region.

While evaluating the data obtained; As descriptive statistics; when variables are normally distributed in the analysis of quantitative data; mean, minimum, maximum, standard deviation, and the median in cases where the variables were not normally distributed, quartiles were used. Frequency distribution was used in the analysis of qualitative data. As for inferential statistics; the χ2 test was used to compare the relationship between qualitative data, and the Bonferroni method was used to evaluate the difference between groups. In quantitative data, Student's t-test, which is a parametric test, was used to determine the difference between the means of two independent groups. The data is limited to the answers given by the children to the questions.

Ethics committee approval dated 29/09/2017 and numbered 2017-19 was obtained from the Istanbul Gelişim University Ethics Committee and the permission of the Provincial Directorate of National Education with the number 59090411-44E.18445641 and dated 03.11.2017 was obtained for the study. A total of 2452 students between the ages of 6-15, who were given consent by their families, were included in the study.

While evaluating the nutritional habits and physical activities of the students, normal, thin and very thin children were divided into two groups as 'non-obese' and overweight and obese children were divided into two groups as 'obesity risk' and a comparison was made. between the two groups. For statistical analysis, the SPSS (Statistical Package for Social Sciences) for Windows 21 program was used. The significance level was accepted as p<0.05.

Results

A total of 2452 students participated in the study. 47.8% of students were male and 52.2% were female. The mean age of the students was 9.47±2.21 years, average height was 136.4±14.03 cm, the average weight was 35.9±13.03 kg, average BMI was 18.7±3.73 kg/m², average waist circumference was 64.72±10.38 cm, hip circumference was 76.49±11.85 (Table 1).

Table 1. Height, weight, BMI, waist and hip circumferences for gender and age (mean ±SD)

Age	Height (cm)		Weight (kg)		BMI (kg /m²)		Waist circumference (cm)		Hip circumference (cm)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
6	118.9±4.9	117.8±4.7	23.4±3.7	23.0±4.3	16.5±1.9	16.5±2.2	57.6±5.2	56.6±5.6	65.4±5.3	66.0±5.7
7	123.3±6.2	121.7±6.6	26.2±5.3	25.6±6.5	17.1±2.6	17.1±3.0	59.0±7.2	59.1±7.3	67.7±7.5	68.8±7.8
8	128.5±6.7	128.0±6.6	29.9±8.0	29.6±7.2	17.9±3.4	17.9±3.2	61.8±10.6	60.8±8.8	70.6±11.4	71.6±9.5
9	134.3±6.6	133.4±6.9	34.7±8.7	32.8±7.5	19.0±3.6	18.3±3.2	66.6±10.0	62.7±9.1	76.1±9.3	74.5±10.0
10	138.6±6.9	137.6±7.0	37.2±10.6	35.6±8.9	19.1±4.1	18.6±3.5	66.3±9.9	64.2±8.9	77.8±9.3	76.8±8.9
11	144.7±6.5	146.0±8.8	41.5±9.0	43.5±11.7	19.7±3.4	20.2±3.9	69.4±8.8	68.2±9.5	80.7±8.1	82.4±9.9
12	151.5±8.5	152.2±7.1	45.8±11.3	45.9±11.4	19.7±3.4	19.7±4.0	71.2±8.99	67.9±8.9	84.2±8.6	86.1±9.6
13	156.9±8.8	155.6±6.8	53.4±15.0	51.0±11.3	21.4±4.9	21.0±4.1	75.6±11.4	69.6±8.0	89.9±11.3	89.4±8.4
14	161.2±9.0	157.6±5.8	55.6±14.6	54.3±9.5	21.2±4.3	21.9±3.5	76.0±11.6	73.0±8.3	89.9±9.8	92.1±8.1
15	172.2±6.5	160.5±4.9	70.1±13.0	57.5±11.0	23.6±4.2	22.2±3.6	78.6±13.9	72.5±11.4	97.2±11.7	93.3±8.0

BMI, body mass ındex; SD, standard deviation

According to BMI classification, a total of 323 (13.2%) of 2452 students were obese and 497 (20.3%) were overweight. 60.1% of obese students were male (p<0.001). The highest rate of obesity and overweight were observed in the 9 age group in both genders (p<0.001) (Table 2).

Table 2. BMI classification of students by age and gender

	Very thin		Underweight		Normal		Overweight		Obese		X²p
	n	%	n	%	n	%	n	%	n	%	
% Total	64	2.6	216	8.8	1352	55.1	497	20.3	323	13.2	
Gender											
Male	29	45.3	100	46.3	617	45.6	233	46.9	194	60.1	22.520
Female	35	54.7	116	53.7	735	54.4	264	53.1	129	39.9	0.000*
Male Age											
6	1	3.4	2	2.0	54	8.8	19	8.2	8	4.1	82.061

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7	0	0.0	10	10.0	74	12.0	23	9.9	16	8.2	0.000*
8	2	6.9	19	19.0	123	19.9	38	16.3	36	18.6	
9	5	17.2	11	11.0	110	17.8	55	23.6	57	29.4	
10	6	20.7	15	15.0	70	11.3	24	10.3	30	15.5	
11	1	3.4	5	5.0	56	9.1	18	7.7	14	7.2	
12	5	17.2	13	13.0	60	9.7	19	8.2	11	5.7	
13	6	20.7	12	12.0	37	6.0	21	9.0	13	6.7	
14	3	10.3	13	13.0	23	3.7	13	5.6	5	2.6	
15	0	0.0	0	0.0	10	1.6	3	1.3	4	2.1	
Female Age											
6	0	0.0	5	4.3	56	7.6	20	7.6	7	5.4	57.063
7	4	11.4	9	7.8	102	13.9	33	12.5	18	14.0	0.000*
8	4	11.4	16	13.8	140	19.0	43	16.3	31	24.0	
9	6	17.1	20	17.2	168	22.9	66	25.0	33	25.6	
10	5	14.3	17	14.7	88	12.0	28	10.6	16	12.4	
11	3	8.6	11	9.5	42	5.7	25	9.5	10	7.8	
12	6	17.1	20	17.2	69	9.4	15	5.7	7	5.4	
13	5	14.3	14	12.1	40	5.4	20	7.6	5	3.9	
14	1	2.9	3	2.6	23	3.1	8	3.0	2	1.6	
15	1	2.9	1	0.9	7	1.0	6	2.3	0	0.0	

It was found that 66.6% of the students were in the non-obese group and 33.4% were in the obesity risk group. A statistically significant difference was found between the two groups in terms of breakfast, lunch, and sugary beverage consumption, snacking habits, and portion sizes (Table 3).

Table 3. Obesity prevalence by some categorical variables

Expressions		Never %	Little %	Sometimes%	Usually %	Always %	X²p
I do breakfast.	Non-obese	54.7	58.3	57.6	62.9	68.1	14.030
	Obesity risk	45.3	41.7	42.4	37.1	31.9	0.007
I eat lunch.	Non-obese	52.9	59.1	63.9	61.8	68.0	11.636
	Obesity risk	47.1	40.9	36.1	38.2	32.0	0.020
I eat dinner.	Non-obese	70.3	62.7	63.8	58.5	67.5	7.083
	Obesity risk	29.7	37.3	36.2	41.5	32.5	0.131
I snack while studying.	Non-obese	61.3	64.5	67.9	73.3	74.2	25.222
	Obesity risk	38.7	35.5	32.1	26.7	25.8	0.000
I snack after dinner.	Non-obese	63.3	64.1	67.6	70.8	71.7	10.924
	Obesity risk	36.7	35.9	32.4	29.2	28.3	0.027
I eat my favourite food more than 1 serving	Non-obese	60.9	65.0	70.5	69.8	74.2	29.013
	Obesity risk	39.1	35.0	29.5	30.2	25.8	0.000
I eat my meals at the same time.	Non-obese	61.9	65.4	68.3	68.8	66.8	5.992
	Obesity risk	38.1	34.6	31.7	31.3	33.2	0.200
I snack while watching tv.	Non-obese	64.9	59.5	65.1	73.9	73.0	25.007
	Obesity risk	35.1	40.5	34.9	26.1	27.0	0.000
I eat fast.	Non-obese	65.9	69.4	66.9	64.4	65.0	2.549
	Obesity risk	34.1	30.6	33.1	35.6	35.0	0.637
I consume tea, coffee, drinks with sugar	Non-obese	61.0	67.6	67.7	68.2	70.4	15.815
	Obesity risk	39.0	32.4	32.3	31.8	29.6	0.003
I exercise regularly.	Non-	70.8	67.5	63.8	64.1	65.6	8.328

	obese						
	Obesity risk	29.2	32.5	36.2	35.9	34.4	0.080
Climbing stairs, running is difficult for me.	Non-obese	67.0	68.6	63.0	67.2	66.5	3.023
	Obesity risk	33.0	31.4	37.0	32.8	33.5	0.555
I think myself............moving		Very little	Little	Normal	Active	Too active	
	Non-obese	61.5	62.8	63.2	68.9	71.2	15.483
	Obesity risk	38.5	37.2	36.8	31.1	28.8	0.004
I think my own body...........		Very thin	Underweight	Normal	Overweight	Obese	
	Non-obese	90.5	88.9	66.2	29.1	24.1	417.808
	Obesity risk	9.5	11.1	33.8	70.9	75.9	0.000

In terms of food consumption frequencies; A statistically significant difference was found between the two groups in terms of consumption of feta cheese, meat group, bread group, fresh and ready-made fruit juice, chips-french fries, homemade cake and cookies ($p<0.05$)(Table 4).

Table 4. Frequency of food consumption

Food and Beverages		Never	1-2 times a month	1-3 times a week	4-6 times a week	Everyday	X^2 p
Milk	Non-obese	63.6	61.8	63.4	69.8	67.2	6.555
	Obesity risk	36.4	38.2	36.6	30.2	32.8	0.161
Yogurt, ayran	Non-obese	64.1	67.8	66.5	68.9	65.2	2.818
	Obesity risk	35.9	32.2	33.5	31.1	34.8	0.590
Milk dessert	Non-obese	60.8	65.2	67.4	70.6	69.4	8.869
	Obesity risk	39.2	34.8	32.6	29.4	30.6	0.064
Cheese	Non-obese	76.6	56.3	66.5	61.9	67.2	18.406
	Obesity risk	23.4	43.7	33.5	38.1	32.8	0.001
Meat, chicken, fish	Non-obese	72.7	63.3	64.7	70.0	66.2	9.695
	Obesity risk	27.3	36.7	35.3	30.0	33.8	0.046

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Egg	Non-obese	64.8	68.9	62.5	68.9	66.9	5.307
	Obesity risk	35.2	31.1	37.5	31.1	33.1	0.257
Dry beans	Non-obese	69.0	64.8	65.5	65.4	70.7	4.795
	Obesity risk	31.0	35.2	34.5	34.6	29.3	0.309
Cereal products such as bread, rice	Non-obese	58.9	58.2	61.1	66.7	70.6	20.914
	Obesity risk	41.1	41.8	38.9	33.3	29.4	0.000
Fruit	Non-obese	65.7	63.2	64.2	67.1	67.4	1.908
	Obesity risk	34.3	36.8	35.8	32.9	32.6	0.754
Vegetable food, salad	Non-obese	69.8	68.2	64.5	66.9	67.3	2.261
	Obesity risk	30.2	31.8	35.5	33.1	32.7	0.689
Juice	Non-obese	62.0	59.1	65.4	72.0	72.2	24.378
	Obesity risk	38.0	40.9	34.4	28.0	27.8	0.000
Sugary, carbonated beverage	Non-obese	67.7	63.8	67.3	65.6	67.6	2.786
	Obesity risk	32.3	36.2	32.7	34.4	32.4	0.595
Nuts	Non-obese	67.1	64.1	67.7	68.3	64.1	3.590
	Obesity risk	32.9	35.9	32.3	31.7	35.9	0.465
Chips, french fries	Non-obese	64.0	62.8	67.7	72.1	69.4	10.719
	Obesity risk	36.0	37.2	32.3	27.9	30.6	0.030
Packaged food such as chocolate, wafers, etc.	Non-obese	65.1	65.1	66.2	69.6	68.1	2.773
	Obesity risk	34.9	34.9	33.8	30.4	31.9	0.597
Homemade cake, cookies, pastry	Non-obese	61.0	61.0	67.7	68.9	70.4	13.268
	Obesity risk	39.0	39.0	32.3	31.1	29.6	0.010
Fast food such as pizza, hamburgers	Non-obese	67.2	63.4	68.8	66.5	70.0	6.488
	Obesity risk	32.8	36.6	31.2	33.5	30.0	0.166

There was no significant difference between the groups in terms of the way students go to school, the time they spend sitting and moving on weekdays and weekends (p>0.05) (Table 5).

Table 5. Obesity prevalence according to the way of going to school, active and sitting time

	Category	Non-obese		Obesity risk		Total		X² p
Way of going to school		n	%	n	%	n	%	
	walking/cycling	1053	67.4	510	32.6	1563	100	1.405
	service or car	561	65.2	299	34.8	860	100	0.494
	Both of them	18	62.1	11	37.9	29	100	
Weekday screen time								
	Never	42	61.8	26	38.2	68	100	3.656
	1 hour	906	66.7	452	33.3	1358	100	0.301
	2 hours	482	68.4	223	31.6	705	100	
	3 hours or more	202	62.9	119	37.1	321	100	
Weekend screen time								
	Never	25	64.1	14	35.9	39	100	0.208
	1 hour	471	66.7	235	33.3	706	100	0.976
	2 hours	572	66.9	283	33.1	855	100	
	3 hours or more	564	66.2	288	33.8	852	100	
Weekday running, active time								
	Never	32	66.7	16	33.3	48	100	3.237
	1 hour	637	65.1	341	34.9	978	100	0,357
	2 hours	553	66.1	283	33.9	836	100	
	3 hours or more	410	69.5	180	30.5	590	100	
Weekend running, active time								
	Never	34	65.4	18	34.6	52	100	0.138
	1 hour	389	66.0	200	34.0	589	100	0.987
	2 hours	635	66.7	317	33.3	952	100	
	3 hours or more	574	66.8	285	33.2	859	100	

Discussion

This study is the first study on childhood obesity in the Avcılar district of Istanbul. Childhood obesity is increasing rapidly in Turkey as well as all over the world. Although obesity is defined as a multifactorial disease, it is known that especially wrong eating habits and insufficient physical activity are effective in childhood obesity[5,10,11]. In this study, we focused on the prevalence of obesity in children 6-15 years of age in Avcılar and identifying differences in dietary habits between children at risk and non-obesity.

There are many childhood obesity prevalence studies conducted in different regions of Turkey[11-15]. In our study, the prevalence of 20.3% overweight and 13.2% obesity was found. According to the results of Istanbul in the WHO European Childhood Obesity Surveillance Initiative (COSI) 2013 research, overweight 17.0% and obesity were found as 13.9%. Higher rates are observed in Istanbul, compared to the general obesity (9.9%) and overweight (14.6%) rates in Turkey[16]. The obesity rate in our study is similar to the results of Istanbul, and the overweight rate is higher. The reason for this may be that there are not enough safe environments to play games and spend active time in big cities.

Gender differences in the prevalence of childhood obesity have been observed in many countries. Some studies reported a higher prevalence of overweight and obesity in girls than in boys[17,18], while others reported the opposite[19,20]. Some studies found significant gender differences in obesity prevalence studies conducted in different places in Turkey[14,16,20]. In studies on the prevalence of obesity in children conducted in Turkey between 1990 and 2015, it is stated that obesity has increased significantly and this increase is much more pronounced in males[5]. In our study, the obesity rate was higher in males, and the difference was statistically significant. This may be due to the fact that boys do not have a suitable environment for playing games and do not care about weight gain as much as girls.

In different studies on obesity, the age at which obesity is seen at the highest rate varies[14,15]. Studies are indicating that the prevalence of obesity increases until about 10 years of age and then flattens out[21]. In our study, the highest obesity rate in both genders was found at the age of 9 years. There was a gradual increase in both sexes between the ages of 6 and 9 years. The fact that the obesity rate is not very high when starting school suggests that environmental factors such as the child's peer relationships in the school environment and fast food consumption are more effective than the nutrition habits in the family. The fact that it starts to decrease from the age of 10 may also be due to the transition to adolescence and more bodily image coming to the fore.

The European Society of Pediatric Gastroenterology, Hepatology and Nutrition Nutrition Committee (ESPGHAN) recommended that children eat at least 4 meals a day, including breakfast, and encourage regular family meals. Skipping breakfast has a critical role in energy balance and regulation of diet[17]. Studies are reporting a significant difference between obese and normal children in terms of the frequency and regularity of consumption of morning, lunch, and evening meals[18]. In our study, the majority of those who regularly eat breakfast every day and regularly consume lunch every day are in the non-obese group, and the difference is significant. Our results regarding breakfast and lunch support the studies. There was no difference between the groups in terms of dinner. The reason for this may be that especially dinner is consumed more regularly than other meals in Turkish society.

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It is stated that watching television is one of the strongest modifiable risk factors for childhood obesity[19]. The American Academy of Pediatrics recommends eating at home with the TV turned off and limiting the duration of TV-video games to a maximum of 2 hours per day as a preventative measure for childhood obesity[20]. It is stated that intervention strategies should consider screen time, including total screen time, television time, computer time, and smartphone use, to prevent childhood overweight/obesity[21]. There are also studies stating that unhealthy snacks consumed while watching TV are as effective as screen time in the development of obesity[22]. In our study, no relationship was found between obesity and screen time. However, a relationship was found between snacks while watching TV and obesity. These results suggest that children's screen time is close to each other, but the differences in the type and amount of snacks consumed while watching TV contribute to obesity.

Recent studies are reporting that eating while watching TV was positively associated with overweight and obesity during childhood[23]. In our study, a significant difference was found between the groups in terms of snacking while watching TV, studying and after dinner. It is known that children are associated with weight gain, especially with packaged foods or fast food eaten outside the home[16]. The relationship between snacking and overweight/obesity is not clear, especially for young children. The problem may be caused not only by the frequency of foods consumed during snacking but also by the portion size and type. Some snacks may cause increased energy intake in children[24]. However, some studies that not have a significant relationship with the consumption of junk food and fast food[15,25]. In our study, no significant difference was found between the obese and non-obese groups in terms of fast food consumption, sugary drinks, and nut consumption frequency. This result suggests that the groups consume foods such as junk food and fast food with similar frequency, but there may be a difference in the amounts consumed.

It is stated that portion sizes may also be effective in obesity[24] and regular consumption of fast food and fast-absorbing simple sugars in large portions and high energy density should be avoided[17]. The results show that sweets and sugary drinks increase the risk of obesity[21]. When the food consumption frequencies of obese and non-obese children were compared, a statistically significant difference was found in terms of consumption of fresh and ready-made fruit juice, cheese, bread and cereal groups, chips-french fries, homemade cake and cookies. It is thought that the differences here may be due to the portion sizes, wrong cooking methods, and the energy density of the consumed foods.

Body image dissatisfaction is associated with adolescent obesity and increases the risk of depressed mood and low self-esteem among adolescents. In addition, body image dissatisfaction has a role in inducing binge eating disorders in girls[26,27]. 5.9% of children whose perception of the child's weight status is obese see themselves as obese, 70.9% of overweight children see

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themselves as overweight, and the difference is significant. It may be useful to follow up on eating behavior disorders for children who are of normal weight but see themselves as obese. Considering how active children see themselves, 71.2% of those who consider themselves very active were found in the non-obese group, and the difference is significant. These results show that children mostly analyze their weight and mobility status correctly. Conducting periodic surveys in terms of body image and mobility in children can increase awareness in children and may be useful in the early detection of psychological diseases such as eating disorders.

The WHO Global Plan of Action for Physical Activity 2018-2030 guides recommended for children and adolescents aged 5-17 years recommend at least 60 minutes of moderate/vigorous-intensity physical activity per day to maintain good physical and mental health and well-being[3]. Studies examining the relationship between physical activity and obesity have different results[21,28]. In our study, no significant difference was found between the groups in questions about physical activities. In a study conducted in Turkey, the rate of obesity in students who go to school by shuttle is higher than in those who go to school on foot, but the difference is not statistically significant[15]. Similarly, in our study, the obesity rate was lower in students who went to school on foot, but the difference was not statistically significant. The fact that there was no significant difference between the physical activities of children and the groups can be interpreted as obesity being mostly related to eating habits.

Limitation of the Study

The results of the study are limited to the data of the children who accepted to participate in the study in the Avcılar. It was assumed that the children answered the questionnaire correctly.

Conclusion

Nutritional factors such as eating habits, wrong food choices, consumption of high-energy snacks and "fast-food" type foods in children are seen as important factors in the formation of obesity. In Avcılar, one out of every three children was found to be overweight. In the fight against childhood obesity, it may be beneficial to carry out regional and local follow-ups and to take measures in addition to national and international measures.

To prevent and/or treat obesity in children:

- Providing regular and continuous nutrition education to children and families on issues such as regular main meal consumption, controlling portion sizes, paying attention to the type, amount, and timing of snacks, and increasing their awareness.
- Regular and continuous monitoring of children's height, weight, BMI changes, and body perceptions.

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- It is thought that directing children who are thought to be at risk of obesity to dietitians they can reach in the fastest and easiest way and providing them with free service will contribute positively to the problem.

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