

# Obesity frequency and related risk factors in primary school children

Cüneyt Ardiç<sup>ORCID</sup>, Esmâ Omar<sup>ORCID</sup>

Department of Family Medicine, Recep Tayyip Erdoğan University School of Medicine, Rize, Turkey

DOI: 10.18621/eurj.395207

## ABSTRACT

**Objectives:** The aim of this study was to determine the obesity and overweight situations and related factors among the children between the ages of 6-11 studying in Rize, Turkey.

**Methods:** The study included 180 pediatric patients (86 girls and 94 boys) applying to our polyclinic, who born between 2006 and 2010. The age, height, weight and gender of children and their parents, physical activity status of children, frequency of convenience goods consumption, education and income status of parents and duration of children spent on television were evaluated. Body mass indexes of participants were measured and compared with their socio-demographic characteristics.

**Results:** Obesity was found in 12.2% and overweight was found in 15% of all students participating the study. While a relation was found between being obese or overweight with gender, body mass index of parents, staying more than 2 hours a day in front of television, fast-food consumption and low physical activity; no relation could be found between the educational status of parents, time of starting supplementary food during infancy and the duration of total breastfeeding.

**Conclusions:** The increase in frequency of childhood obesity has been particularly important for identifying risk factors associated with obesity and competing with these factors in the early period. Family physicians, the first contact points of the patients, are the most important part of the health system in preventing childhood obesity. A higher prevalence of childhood obesity than other studies in the literature may indicate that obesity will become an increasingly common problem.

**Keywords:** .Obesity, pediatric, body mass index

*Received: February 15, 2018; Accepted: June 5, 2018; Published Online: June 14, 2018*

The World Health Organization (WHO) has characterized obesity as a global epidemic [1]. WHO now estimates that 42 million children under the age of 5 are obese [2]. Obesity is the result of complex interaction of cultural, social, genetic, physiological, behavioral and psychological factors [3].

Childhood obesity is a health problem that should

be taken into consideration due to its progression as adult obesity, serious increase of morbidity and mortality, and most importantly, and being mostly preventable [4, 5]. It is known that the onset of obesity in the majority of adults extends to childhood [6, 7]. Both genetic and environmental factors such as inheritance, gender, ethnicity, sedentary lifestyle and low physical activity are responsible for obesity [8-



Address for correspondence: Cüneyt Ardiç, MD., Recep Tayyip Erdoğan University School of Medicine, Department of Family Medicine, Rize, Turkey  
E-mail: drcuneytardic@hotmail.com

Copyright © 2019 by The Association of Health Research & Strategy  
Available at <http://dergipark.gov.tr/eurj>

11].

Overweight and obesity in childhood can affect by genetic factors, environmental factors and psychological factors. The overweight or genetic predisposition of parents increases the likelihood that the child is obese [12]. Sedentary lifestyle including watching television, spending long time with computer and mobile phone, lack of time for physical activities and games, and consumption of fast food, sugary and fatty food and beverages play an important role in obesity. In addition, problems of the children with their parents and friends, failures in their lessons and other psychological problems during puberty also affect the development of obesity [13, 14].

With this study, it was aimed to determine the level of excess weight and obesity prevalence in primary school students in Rize city center and to determine some factors that may affect this situation.

## METHODS

### Study Group

The study is an epidemiological study aimed at finding cross-sectional prevalence. A total of 180 pediatric patients at primary school born between 2006 and 2010 were included applying to the Family Medicine polyclinic of Recep Tayyip Erdoğan University. The questionnaires given to the study groups were requested to be completed by their parents.

### Measurements

Height measurement was made using a measuring tape mounted on wall. The students were made to take their shoes out and their height was measured from the head to the base in a position where the feet were ready to touch each other, back of the head, hip and heels were touching to a flat wall. The weight was removed by removing students' heavy clothes and feet. Portable bench scale sensitive to 100 grams was used. The weight recorded in kilograms was divided by the square of height (in meters) to calculate body mass index of the students. Body mass index (BMI) values were compared with the reference range of National Center of Health Statistics (NCHS), over the 85th percentile was regarded as overweight and over the 95th percentile was regarded as obesity.

### Collecting data

Questionnaires were filled with students and their parents by talking face to face. Information on students' daytime activity or eating habits was recorded according to their parents' views.

The study was conducted in accordance with the Helsinki Declaration principles. Institutional ethical committee approval was obtained. Verbal approval was obtained from the students and their parents before questionnaire forms were applied.

### Statistical Analysis

SPSS (Statistical Package for Social Sciences) for Windows 20.0 program was used for statistical analysis during the evaluation of findings obtained by the study. Besides descriptive statistical methods (mean, median, standard deviation) while evaluating study data, student t test was used for comparison of parameters with normal distribution and Mann-Whitney U test was used for comparison of parameters without normal distribution. Pearson's correlation was used to investigate the correlations between variables. Statistical significance was defined as a level of 5% ( $p < 0.05$ ).

## RESULTS

Having analyzed BMI values using reference table of the World Health Organization, obesity was found in 12.2% and overweight was found in 15% of all students participating in the study. The proportion of obese girl students was 10.4% and obese boy students was 13.8%. Prevalence of overweight was 12.79% in girls and 17.02% in boys. The prevalence of obesity and overweight in boy students was significantly higher than that of girl students (Table 1).

**Table 1.** Percentage of BMI by sex

BMI (%)	Girl	Boy
< 5	4 (4.65%)	3 (3.19%)
5-84	62 (72.09%)	62 (65.95%)
85-94	11 (12.79%)	16 (17.02%)
≥ 95	9 (10.4%)	13 (13.8%)
Total	86 (100%)	94 (100%)

Data are shown as number (%). BMI = body mass index

**Table 2.** Sociodemographic characteristics of obese or overweight children and normal or thin children

Characteristics		Normal or thin children	Obese or overweight children	p value
<b>Gender</b>	Boy	65 (49.6%)	32 (65.3%)	<b>0.023</b>
	Girl	66 (50.4%)	17 (34.7%)	
<b>Educational status of mother</b>	Primary-secondary	95 (72.5%)	37 (75.5%)	0.698
	High school-university	36 (27.5%)	12 (24.5%)	
Educational status of father	Primary-secondary	71 (54.2%)	30 (61.2%)	0.712
	High school-university	60 (45.8%)	19 (38.8%)	
<b>Time spent for watching tv</b>	More than 2 hours a day	54 (41.2%)	32 (65.3%)	<b>0.022</b>
	Less than 2 hours a day	77 (58.8%)	17 (34.7%)	
<b>Consumption of convenience food</b>	Twice or more in a week	43 (32.8%)	36 (73.4%)	<b>0.015</b>
	Less than twice in a week	88 (67.2%)	13 (26.6%)	
<b>Start of supplementary food</b>	After 6 months	62 (47.3%)	26 (53.1%)	0.778
	Before 6 months	69 (52.7%)	23 (46.9%)	
<b>How many days does s/he exercise regularly</b>	2 days or more	89 (67.3%)	13 (26.6%)	0.041
	Less than 2 days	42 (32.7%)	36 (73.4%)	

Data are shown as number (%).

Of the 180 children included in the study, 47.7% (n = 86) were girls and 52.3% (n = 94) were boys. Students were in the age range of 6-11 and the average age was 10.82 ± 2.49. Fifty-six point one percent of the fathers were graduate of primary school, 22% were graduate of high school and 21.9% were university

graduates. Seventy-three point three percent of the fathers were graduate of primary school, 15% were graduate of high school and 11.7% were university graduates. Students had 2.01 brothers or sisters at average, total 4.9 people were living at home, watching television for 2.2 hours at average; 72% of

**Table 3.** Distribution of parents according to BMI averages

	Obese or overweight n = 49	Non-obese n = 131	t	p value
Mother BMI (kg/m <sup>2</sup> )	28.36 ± 4.29	26.94 ± 4.24	2.66	< <b>0.01</b>
Father BMI (kg/m <sup>2</sup> )	28.02 ± 5.11	25.89 ± 3.39	3.57	< <b>0.001</b>

Data are shown as mean±standard deviation. BMI = body mass index

which had breastfed more than 18 months and 78% started supplementary food after the 6<sup>th</sup> month.

The relation of sociodemographic and socioeconomic variables with obesity and overweight was investigated. There was no relationship between parents' educational level and obesity and overweight. ( $p > 0.05$ ) The percentage of obese or overweight children who spent more than 2 hours per day on television was 65.3%, while this rate was 34.7% in those with normal or less weight. Significant relationship was found between TV watching time and obesity. ( $p < 0.05$ ) (Table 2).

While there was no significant difference between obese and overweight persons and non-obese persons in terms of delivery weight and time to start supplementary food, obesity was more prevalent among the ones who consume more convenience food ( $p < 0.05$ ).

BMI of both mothers and fathers of the overweight and obese students were significantly higher than parents of the students with normal weight (Table 3).

## DISCUSSION

Retrospective studies have shown that adult obesity started in childhood or adolescence in proportion of 1/3. Obesity problem in children should be emphasized. Studies indicated that problem will become serious in the near future if necessary measurements are not taken [15].

Childhood obesity has been increasing at an alarming rate for the last ten years. WHO estimates that 42 million children under the age of 5 are currently obese [16]. Although there is information that obesity is the problem of developed countries until today, there has been an increase in developing countries in recent years [17]. In our country, "Turkey Healthy Nutrition and Active Life Program" which was prepared with the participation of Ministry of Health and various stakeholders and published in 2010 and put into practise in various factors is a program to prevent obesity in Turkey [18]. In comparison with other studies conducted in Turkey, we found a higher prevalence of obesity in our study. For example, in a study conducted in Muğla, of the total 4260 (2040 girls, 2220 boys) of 6-15 year old, 7.6% of the girls

and 9.1% of the boys were found to be obese or overweight [19]. In our study, we found the prevalence of excess weight in the primary school students to be 15% and the obesity rate to be 12.2%. This situation can be explained by the fact that parents of the children included in the study have more weights than the normal population and the obesity frequency increases day by day. We found that overweight and obesity rates were 37.3% and 23.8%, respectively. In the overall health research carried out in Turkey in 2014, overweight rate was found to be 33.7% and obesity rate was 19.9% [20]. Parental obesity is seen as one of the most important risk factors for childhood obesity. Children whose parents are obese are 2.5 times more likely to be obese than those who are thinner [21].

In order to prevent obesity, it is important that children do not spend more than 2 hours per day in front of television and computer in the direction of recommendation stated in the study by Metinoğlu *et al.* [22] and by the American Academy [23-25]. It is stated in the studies that obesity risk increases in the children who watch TV for a long time [23-25]. It is associated with being completely passive-inactive, watching food-related advertisements and increase of energy intake accordingly while watching television [26-29]. In this study, the duration of television watching in the obese group was longer than the control group and was identified as a risk factor increasing the obesity, in accordance with the literature.

In a study carried out in Mexico, it was found that every one hour of moderate physical activity per day reduced the risk of obesity in children by 10% [30]. Increasing rates of obesity in children with low activity are also shown in various studies [31, 32]. We also found in our study that obesity prevalence in children who regularly exercise for at least 2 days a week was significantly less than those who do not exercise ( $p < 0.05$ ).

Eating fastly and chewing less thereby are indicated as another factor facilitating the development of obesity [33]. Fast-food style eating habits is the most important factor. In our study, obesity prevalence was significantly higher in the children of families who responded to the question 'does your child prefer fast food?' as at least twice a week and more.



## Limitations

There are some limitations in our study. Firstly, since there is usually only one parent with children who are admitted to polyclinics, the measurement of height and weight of the other parent could not be made and their statement was accepted. Moreover, parents who have been informed about the study beforehand might have responded to the questions unfairly.

## CONCLUSION

In the light of these results, it can be indicated that primary school children whose parents have obesity, who have less physical activity and serious fast-food eating habits face the risk of obesity. In the fight against obesity, which has become an important issue of the preventive medicine in particular, it is important that lifestyle changes are adopted as the main subject of primary protection before diseases come out and since from the childhood.

It is also a positive step to address obesity as a priority issue and to take measurements for preventing childhood obesity in particular in order to prevent adult obesity and many chronic diseases within the scope of the national health policy.

### Authorship declaration

All authors listed meet the authorship criteria according to the latest guidelines of the International Committee of Medical Journal Editors, and all authors are in agreement with the manuscript.

### Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

### Financing

The authors disclosed that they did not receive any grant during conduction or writing of this study.

## REFERENCES

- [1] WHO: Obesity Preventing And Managing The Global Epidemic. Report of a WHO Conclutation. WHO Technical Report Series 894. Geneva: World Health Organization, 2000.
- [2] World Health Organization. World health statistics 2015. World Health Organization, 2015.
- [3] Williams EP, Mesidor M, Winters K, Dubbert PM, Wyatt SB. Overweight and obesity: prevalence, consequences, and causes of a growing public health problem. *Curr Obes Rep* 2015;4:363-70.
- [4] Eke, Petronilla. Evaluating the impact of evidence-based weight reduction program among the obese at a medical facility in North Central United States. Diss. Walden University, 2017.
- [5] Misra A, Khurana L. Obesity and the metabolic syndrome in developing countries. *J Clin Endocrinol Metab* 2008;93(11 Suppl 1):S9-30.
- [6] Pulkki-Råback L, Elovainio M, Kivimäki M, Raitakari OT, Keltikangas-Järvinen L. Temperament in childhood predicts body mass in adulthood: the Cardiovascular Risk in Young Finns Study. *Health Psychol* 2005;24:307-15.
- [7] Zitsman, JL, Inge TH, Reichard KW, Browne AF, Harmon CM, Michalsky MP. Pediatric and adolescent obesity: management, options for surgery, and outcomes. *J Pediatr Surg* 2014;49:491-4.
- [8] Taveras EM, Gillman MW, Kleinman KP, Rich-Edwards JW, Rifas-Shiman SL. Reducing racial/ethnic disparities in childhood obesity: the role of early life risk factors. *JAMA Pediatr* 2013;167:731-8.
- [9] Liu JH, Jones SJ, Sun H, Probst JC, Merchant AT, Cavicchia P. Diet, physical activity, and sedentary behaviors as risk factors for childhood obesity: an urban and rural comparison. *Child Obes* 2012;8:440-8.
- [10] Güven A, Odaci H, Ozgen IT, Bek Y. Effects of individual factors on adolescent obesity: study in Turkey. *Pediatr Int* 2008;50:356-62.
- [11] Kelishadi R, Poursafa P. A review on the genetic, environmental, and lifestyle aspects of the early-life origins of cardiovascular disease. *Curr Probl Pediatr Adolesc Health Care* 2014;44:54-72.
- [12] Vicente-Rodríguez G, Rey-López JP, Martín-Matillas M, Moreno LA, Wärnberg J, Redondo C, et al. Television watching, videogames, and excess of body fat in Spanish adolescents: the AVENA study. *Nutrition* 2008;24:654-62.
- [13] Larsen L, Mandleco B, Williams M, Tiedeman M. Childhood obesity: prevention practices of nurse practitioners. *J Am Acad Nurse Pract* 2006;18:70-9.
- [14] Giammattei J, Blix G, Marshak HH, Wollitzer AO, Pettitt DJ. Television watching and soft drink consumption: associations with obesity in 11- to 13-year-old schoolchildren. *Arch Pediatr Adolesc Med* 2003;157:882-6.
- [15] Spear BA, Barlow SE, Ervin C, Ludwig DS, Saelens BE, Schetzina KE, Taveras EM. Recommendations for treatment of child and adolescent overweight and obesity. *Pediatrics* 2007;120(Supplement 4):254-88.
- [16] World Health Organization. Obesity and overweight. <http://www.who.int/mediacentre/factsheets/fs311/en/>.
- [17] Delpeuch F, Maire B. Obesity and developing countries of the South. *Med Trop* 1997;57:380-8.
- [18] T.C. Sağlık Bakanlığı, Türkiye sağlıklı beslenme ve hareketli hayat programı [2010-2014], Ankara. [www.beslenme.saglik.gov.tr](http://www.beslenme.saglik.gov.tr)
- [19] Weker H, Baranska M. Models of safe nutrition of children and adolescents as a basis for prevention of obesity. *Med Wieku Rozwoj* 2011;15:288-97.
- [20] TÜİK, Türkiye Sağlık Araştırması, 2014.
- [21] Bice H. Potansiyel bir sağlık sorunu: çocukluk döneminde obezite. *Türkiye Klinikleri J Med Sci* 1989; 9:117-23.
- [22] Metinoğlu İ, Pekol S, Metinoğlu Y. [Factors affecting the prevalence of obesity in students between the ages of 10-12 in Kastamonu]. *Acıbadem Üniversitesi Sağlık Bilimleri Dergisi* 2012;3:117-23. [Article in Turkish]
- [23] Andersen RE, Crespo CJ, Bartlett SJ, Cheskin LJ, Pratt M. Relationship of physical activity and television watching with body weight and level of fatness among children: results from the Third National Health and Nutrition Examination Survey. *JAMA* 1998;279:938-42.

- [24] Andersen RE. The spread of the childhood obesity epidemic. *CMAJ* 2000;163:1461-2.
- [25] The Parliamentary Office of Science and Technology, Childhood obesity. Postnote September 2003 Number 205. [www.parliament.uk/post](http://www.parliament.uk/post).
- [26] Epstein LH, Paluch RA, Consalvi A, Riordan K, Scholl T. Effects of manipulating sedentary behavior on physical activity and food intake. *J Pediatr* 2002;140:334-9.
- [27] Kotz K, Story M. Food advertisements during children's Saturday morning television programming: are they consistent with dietary recommendations? *J Am Diet Assoc* 1994;64:1296-1300.
- [28] Robinson TN. Does television cause childhood obesity? *JAMA* 1998;279:959-60.
- [29] Saelens BE, Daniels SR. Childhood obesity: causes and therapies. *Curr Opin Endocrinol Diabetes Obes* 2003;10:3-8.
- [30] Para-Cabrera S. Association of obesity with physical activity, television programs and other forms of video viewing among children in Mexico City. *Int J Obesity* 1999;23:845-54.
- [31] Amigo H, Bustos P, Erazo M, Cumsille P, Silva C. Determinant factors of excess of weight in school children: a multilevel study. *Rev Med Chil* 2007;135:1510-8.
- [32] Wang Y, Liang H, Tussing L, Braunschweig C, Caballero B, Flay B. Obesity and related risk factors among low socio-economic status minority students in Chicago. *Public Health Nutr* 2007;10:927-38.
- [33] Cinaz P, Bideci A. Obezite. İçinde: Günöz H, Öcal G, Yordam N, Kurtoğlu S. *Pediatric Endocrinoloji*. Ankara. Kalkan Matbaacılık 2003; 487-505.



This is an open access article distributed under the terms of Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.