

BEHAVIORAL RISK FACTORS FOR OVERWEIGHT AND OBESITY IN TURKISH ADOLESCENTS

Said Bodur Prof. MD,¹ Meryem Uguz,² Nilay Şahin Assist. Prof. MD³

¹ Selcuk University, Meram Faculty of Medicine, Public Health Department, Meram, Konya

² Numune Hospital, Meram, Konya

³ Selcuk University, Meram Faculty of Medicine, Physical Medicine and Rehabilitation Department, Meram, Konya

ABSTRACT

- **Objective:** This study was carried out to determine behavioral risk factors for overweight and obesity in Turkish adolescents.
- **Material and Method:** A total number of 496 children from two secondary schools selected by random sampling method from Konya city center were included in the survey. For data collection, a survey including the children's physical activities, nutritional attitudes and preferences were carried out. Also, children's body weight and height were measured.
- **Results:** Overweight and obesity ratio among adolescents

was 21.6%. Spending longer time in front of television and computer, having a high-carbohydrate food diet, habits of eating food and nuts, eating at night just before sleeping, and going school by vehicles were determined to have close relations with being overweight or obese.

- **Conclusion:** These findings suggest that overweight or obesity is related with behavioral factors in adolescents. Children showing the risk factors and their families should be informed about proper nutritional behaviors.
- **Key Words:** Adolescent, overweight, obesity, risk factors, behavior *Nobel Med 2010; 6(3): 79-83*

ERGENLİK ÇAĞINDAKİ TÜRK ÇOCUKLARINDA AŞIRI AĞIRLIK VE OBEZİTE İÇİN DAVRANIŞSAL RİSK FAKTÖRLERİ

ÖZET

- **Amaç:** Bu çalışmanın amacı adölesan çağındaki Türk çocuklarda aşırı ağırlık ve obezite için davranışsal risk faktörlerinin saptanmasıdır.
- **Materyal ve Metod:** Konya kent merkezinde rasgele seçilen iki ortaokuldan toplam 496 adölesan değerlendirilmeye alındı. Çocukların fiziksel aktiviteleri, beslenme davranışları ve alışkanlıkları değerlendirildi. Ayrıca çocukların ağırlık ve boy ölçümleri yapıldı.

- **Bulgular:** Adölesanların % 21.6'sı aşırı kilolu/obez idi. Televizyon ve bilgisayar karşısında uzun zaman geçirme, yüksek karbonhidratlı gıda diyeti, çabuk yeme ve kuruyemiş yeme alışkanlığı, gece yatmadan önce yemek yeme, okula taşıtlar aracılığıyla gitme ile aşırı ağırlık veya obezite arasında yakın bir ilişki saptandı.
- **Sonuç:** Bu bulgular bize aşırı kilo veya obezitenin adölesanlarda davranışsal faktörler ile ilişkili olduğunu göstermiştir. Risk faktörü bulunan çocuklar ve ailelerinin uygun beslenme davranışları hakkında bilgilendirilmesi obezitenin azaltılmasına katkı sağlayabilir.
- **Anahtar Kelimeler:** Adölesan, aşırı ağırlık, obezite, risk faktörleri, davranışsal *Nobel Med 2010; 6(3): 79-83*

INTRODUCTION

The overweight and obesity prevalence has increased in adolescent. There are some adverse effects of overweight.¹⁻⁵ One in 7 adolescents in United States are overweight.² The prevalence is 10.7-64% in adolescents in different countries.⁶⁻¹⁴ The relationship between childhood and adult obesity signify the importance of overweight and obesity in adolescent period. The health consequences of overweight and obese adolescents include pulmonary, orthopedic, gastroenterological, neurologic, and endocrine problems as well as cardiovascular problems.¹⁵ The obese adolescent individuals also have psychosocial problems such as self-dislike, decreased self-esteem, increased level of loneliness, sadness, nervousness, tendency to smoke and alcohol.^{15,16}

Obesity increases in pubertal period.^{4,9} It was suggested that obesity is not only affected by the knowledge of nutrition, 50% of children also have obesity genes.^{1,4,5,17,18} Other factors such as such as demographics, health behaviors (such as dietary habits, physical activity and inactivity), environmental factors may contribute in the prevalence of overweight.^{1,3,11,19,20} Dietary habits also depend on attitude of the family.²¹ The topics such as eating speed, the amount of the food, number of meals per day and type of the meal are all related to obesity.^{17,22} Psychological factors play an important role in adolescent eating habits.²³ Because of this, the determination of the behavioral risk factors in the formation of adolescent obesity will be effective for organizing the prevention and the treatment methods.^{6,24}

The aim of this study was to determine the behavioral risk factors for overweight and obesity in Turkish adolescents.

MATERIAL and METHOD

The sample size was calculated using formulas relatively 50% deviated and the power of the hypothesis named as 90% and arranged assuming that the ratio of overweight and obesity in Turkish adolescents was 12% in 95% confidence level ($\alpha=0.05$).^{25,26} The classes were assumed to be clusters. The effect size was taken 2 for cluster sampling. Thus, it was planned reaching 494 adolescents by using a sample size formula and in fact, 496 adolescents with an age range between 12-15 were recruited for the study. The data collected from two secondary schools selected by using simple random selection method in the city based on list of schools. Cases with having severe trauma, additional disease and having severe psychological problems were excluded. After describing the planned procedures to

all cases to families, informed consent and acceptance of ethical committee were obtained. This study was also approved by The Ministry of Education of Turkey. Cases were evaluated with questionnaire form and anthropometric measurements.

Evaluation criteria

1. The questionnaire form consisted of inspecting students' activity levels (according to transport and watching TV), nutrition behaviors, speed of eating (to be perspective), and sleeping periods. Nutrition behaviors included habits of breakfast (regular [5 days per week and over] or irregular), habits of fastfood (regular [2 days per week and over] or irregular), eating at night (regular [daily] or irregular), eating dessert (regular [daily] or irregular), eating dried fruits (regular [daily] or irregular). The questionnaires were answered by the cases during the supervision of co-researcher.
2. The anthropometric measurements used for determining the students' obesity were body height and weight. The measurements were carefully acquired by only one researcher. Body height was measured by a wooden height-meter. The measurement of weight was performed with bare foot and dress by a tare bioelectric impedance analysis (Tanita TBF-410).
3. Study of each child as a result of the survey and measurement data obtained were transferred to computer base. BMI was calculated for each child. Second-degree polynomial using the formula BMI percentile curves by age and gender were removed. This curve was determined according to each child's BMI's persantile. 85-94. persantile between overweight, 95th and over persantile were considered to be obese.²⁷

Statistical analysis

Data was summarized as mean, standard deviation and percentage. Chi-square test, t test and logistic regression were used. $P<0.05$ values were accepted as statistically significant.

RESULTS

The mean age of 62 boys and 45 girls overweight and obese was 13.2 ± 1.3 . The mean age of 209 boys and 180 girls normal weight was 13.1 ± 1.3 . Table 1 shows the demographic features of both groups. There was no statistical significant difference between the groups in relation to sex and age ($P>0.05$).

The ratio of overweight adolescents was 17.8% and the ratio of obesity was 3.8%. There was a significant relationship among eating behaviors, speed of eating and physical activities (irregular breakfast eating, snacks at late night, pizza, chips, sesame bagels and cookie →

like meals) with overweight and obesity (Table 2). There was also a significant relationship between, consuming snacks with overweight and obese (Table 3). The frequency of being overweight and obese was found to be so high in children taking school bus to come to school and watching TV or playing computer games more than three hours a day (Table 4). The outcome was that six factors were found to be more effective factors on overweight and obesity. These factors are watching TV or playing computer games more than three hours a day, eating fast food, chips, sesame bagels and cookie, having meal/nuts just before sleep, not consuming dried fruit daily, eating dessert regularly, having breakfast irregularly (Table 5).

There was a significant difference in irregular breakfast, detailed of fast-food, snacks late at night, desserts eating, habit of eating nuts, eating speed transport to school, watching TV or gaming on PC/daily between the study and control groups ($P < 0.05$).

DISCUSSION

We found that overweight and obese adolescents had irregular breakfast, fast-food, snacks late at night, dessert eating, habit of eating nuts, eating speed transport to school, watching TV or gaming on PC/daily when compared with the normal weight adolescents. There was a relation between these behavioral measures and obesity. On the other hands we found no relation between obesity and number of meal, order of lunch, time and amount of diner, bread consumption, fast food habit, eating speed, sleeping time and sportive activities in school children. The children in overweight group are candidates of obese group and as more sample would let us gather better and more reliable results.

Berkey et al reported²⁰ that 15.8% of girls and 22.6% of boys (aged 10 to 15) were overweight. Also, El-Hazmi and Warsy⁷ showed that 15.6% of female students and 14.5% of males (12 to 18 years of age) were 85 percentile or higher (overweight and obese).

Addor et al²⁸ showed a relation between obesity and age. Another study reported boys were more likely than girls (33% vs 25%).¹ There are also different studies that determined a higher obesity ratio of boys than girls.^{8,25} In this study the ratio of being overweight-obese was 21.6%. On the contrary there are no relations between obesity and gender in this study. Berkey et al²⁰ found that girls spend 2.5, boys spend 3.5 hours a day watching TV or playing computer games. Spending along time on TV/computer may reduce physical activity and eating appetizers. Also, Stovitz et al²⁹ and Coon and Tucker³⁰ found relation between

Table 1: Characteristics of the normal weight and overweight-obese group

	Normal weight group	Overweight-obese group
n (%)	389 (78.4)	107 (21.6)
Age / mean (min-max)	13.1 (12-14)	13.2 (12-15)
Sex (boy : girl)	209 : 180	62 : 45

Table 2: Distribution of the normal and overweight/obese children according to feeding style

Behavioral factors	Normal weight group (n:389)	Overweight-obese group (n:107)	P
Breakfast			0.018
Regular	242	53	
Irregular	147	54	
Detailed of fast-food			0.003
Hamburger-pizza	118	21	
Fried potatoes ect.	111	47	
Nourishment late time at night			0.024
From time to time	287	67	
Daily	102	40	

Table 3: Distribution of the normal and overweight/obese children according to feeding type

Behavioral factors	Normal weight group (n:389)	Overweight-obese group (n:107)	P
Dessert eating			0.015
From time to time	59	6	
Regular	330	101	
Habit of dried fruit			0.023
Yes	99	16	
No	290	91	
Speed of eating			0.031
Normal/slow	335	83	
Quick	54	24	

obesity and more time watching TV. So, television watching is associated with increased obesity risk.³¹ The results of our study are similar to the literature and overweight ratio increase in children parallel to the time spent at watching TV/playing computer game.

Children consume less vegetables and fruits than average.²² The number of times reported that consuming fast food or soda and sweetened drinks in adolescent.¹→

Table 4: Distribution of the normal and overweight/obese children according to physical activity

Behavioral factors	Normal weight group (n:389)	Overweight-obese group (n:107)	p
Transport to school			0.002
By walking	208	39	
By bus/car	181	68	
Watching TV or gaming on PC/daily			0.000
2 to 3 hours	350	57	
4 hours and over	39	50	

Table 5: Results of the logistic regression related with variables of to be overweight

Behavioral factors	β	S.E.	P	OR (95% CI)
Watching TV/gaming on PC more than 4 hours in a day	2.399	0.399	0.000	11.0(5.0-24.1)
Preference of cookies, chips, rich pastry at fast-food	1.067	0.351	0.002	2.9(1.5-5.8)
Having meal or dried fruit before sleeping	1.003	0.375	0.007	2.7(1.3-5.7)
Not consuming dried fruit daily	1.186	0.437	0.007	3.3(1.4-7.7)
Eating dessert regularly	2.636	1.066	0.013	13.9(1.7-112.9)
Having breakfast irregularly	0.688	0.338	0.042	2.0(1.0-3.9)
Constant	-6.550	1.230	0.000	

OR: Odds Ratio

The overweight and obese ratio is higher in children nourished with pastry, grain-based and dessert in our

study. Over consuming of the nutrients which are rich of carbohydrate and fat may cause the energy to be stored as fat. Overweight ratio is higher among people consuming fast-foods like sesame bagel, fried potatoes and pizza.

This consumption style may be associated with economic power. Indeed, the family's economic situation is good for the Turkish adolescents obesity were higher.³²

Also, Turkkahraman et al³³ found that obesity might be related with skipping breakfast and number of regular meals in school children. Obese and overweight statuses are frequently having irregular breakfast. Regular breakfast consumption appears to be protective from obesity.³¹ We found that obese and overweight adolescents had irregular breakfast.

CONCLUSION

As a conclusion, adolescent overweight depends on eating habit and the type of consumed food. So weight increase should be monitored during adolescent period, excessive fast food consumption should be decreased, dinner should be eaten at time. The period for children on watching TV/playing computer should be decreased. Although all of cases lived in same city, they had different behavior in our study. So obesity is related behavior patterning than single risk factors. Obesity etiology is generally multifactorial. Behavioral factors are the higher risks for obesity. All of causes are related eating behaviors, physical activity and sedentary behaviors.

C CORRESPONDING AUTHOR: Nilay Şahin Assist. Prof. MD Selçuk Univ. Meram Faculty of Medicine, Physical Med. and Rehabilitation Dept., Konya/Turkey nilaysahin@gmail.com
 ✓ DELIVERING DATE: 24 / 02 / 2009 • ACCEPTED DATE: 14 / 03 / 2010

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