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## The relationships among obesity, physical activity, the knowledge level about obesity, watching food ads on TV with interest, and the number of weekly school canteen usage in adolescents

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### Abstract

This study investigates the effects of physical activity, the knowledge level about obesity, watching food ads on TV and school canteen usage on body mass index (BMI) for male (1227) and female (773) children in the middle and high schools. The results demonstrated that body height and weight, and BMI significantly differentiated with respect to age and gender groups. The mean body weight and BMI in exercise group were lower than sedentary. The mean body weight changed depending on knowledge level about obesity. The group watching food ads on TV has higher averages than sedentary in the body weight and BMI. School canteen usage has no effect on the body weight and BMI.

*Keywords: Obesity and adolescents.*

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### 1. Introduction

Turkey is a developing country with large socioeconomic and educational differences among the citizens. Low family incomes might influence children's physical development; differences in eating behaviours, the duration of watching television, surfing the Internet and playing video games instead of engaging in more physical activity cause differentiation in the children's body weight (Klesges, Shelton & Klesges, 1993). Globally, there is the increasing prevalence of childhood overweight and obesity (World Health Organization, 1997). There are three mechanisms affecting children's obesity depending on inactivity level and nutritional habits. These are decreased energy expenditure, increased caloric consumption while watching television or caused by the effects of advertising, and reduced resting metabolism. The very important implementation to prevent obesity in early ages are reduction in

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sedentary behavior and developing healthy nutritional habits (Klesges et al,1993; Dietz & Gortmaker, 1985). These two strategies make it important to teach the causes of obesity at the beginning of primary school.

It is already known about obesity is increasing among school children and demands preventive strategies in Turkey. So this study aims to understand the relationships among obesity, physical activity, the level of knowledge about obesity, watching food ads on TV with interest, and the number of weekly school canteen usage in adolescents.

## 2. Material and Method

A large study of schoolchildren aged 11–17 years old in boys and girls from Amasya City Center was conducted to assess their knowledge level about obesity, physical activity level, nutritional habits including watching food ads on TV with interest, and the number of weekly school canteen usage factors associated with body mass index (BMI). Data was collected by a questionnaire among 2000 subjects including 773 girls and 1227 boys from randomly selected schools on January 2009. Height and weight were measured.

Descriptive statistics (means, standard deviations, minimums, and maximums) and comparisons were performed by SPSS. Student *t* tests compared the two groups, while comparisons between more than two groups were conducted by a one-way analysis of variance (ANOVA).

## 3. Results and Discussion

The results of this study demonstrated that body height and weight, and BMI significantly differentiated with respect to age and gender groups (Tables 1 and 2). The total (boys plus girls) BMI mean values for this study are higher than reference values of Turkish (Neyzi et al. 2008), Brazilians (Sichieri, Recine & Everhart, 1995) and United States'children (Ogden, Kuczmarski, Flegalt et al. 2002) for girls and boys. The mean BMI of this study was only lower than USA in 17 year old group.

Regular exercising group has lower averages than sedentaries in terms of the means of body weight and BMI (Table 3). The group with higher knowledge level knows the four causes of obesity has significantly lower mean body weight than other groups not in BMI (Table 4). Similarly, Trichesa and Giuglianib (2005) found that there was a strong relationship among children's level of knowledge, unhealthy habits and obesity.

Again, the group watching food ads on TV with interest has higher average values of body weight and BMI than the other group (Table 5). Nicklas and Johnson (2004) reported that inadequate physical activity and poor nutrition due to the consumption of calorie-dense foods are accepted main causes leads to the overweight and obesity. Therefore, physical activity and nutrition are very important factors for preventing or reducing childhood overweight and obesity. Also TV-viewing has been discussed in causing the obesity epidemic. Children are at the risk of becoming obese as they spend a substantial portion of their lives watching television. Similar to these results in the study of Trichesa and Giuglianib (2005), obesity among children was found to be associated with limited nutrition knowledge and unhealthy eating and habits. These children were five times more likely to be obese.

There was no significant change in body weight and BMI of the participants with respect to the number of school canteen usage. This may be due to low family incomes might influence children's purchasing power. So, the amount of money they spent daily in their school canteen was lower than critical daily caloric intake leads to gain extra body weights (Table 6)..

As a result, obese children had an increased risk of developing a number of health problems. Approximately, one-third of obese children become obese adults. The beginning of obesity can be mostly possible in late childhood or adolescence (Antipatis & Gill, 2001). So, it seems important to inform children about the obesity influencing children's health negatively, they should be kept away from TV advertising winning of unhealthy eating habits, and given the opportunity of having the physical activity.

## 4. Tables

**Table 1. Comparison of body height, body weight and BMI depending on age factor.**

Variable	Age	N	M±SD	Min.-Max.	df	F	Sig.
Body Height (cm)	11	92	149.48±8.73	128.00-180.00	6	170.284	.000**
	12	379	152.11±7.99	112.00-174.00			
	13	279	156.94±8.79	128.00-179.00			
	14	369	161.70±7.51	137.00-193.00			
	15	388	163.29±7.78	144.00-190.00			
	16	271	164.42±8.63	136.00-186.00			
	17	222	169.81±8.60	153.00-188.00			
	Total	2000	160.23±10.04	112.00-193.00			
Body Weight (kg)	11	92	41.49±10.37	25.50-85.10	6	108.774	.000**
	12	379	43.73±10.48	25.00-86.90			
	13	279	47.60±10.99	25.00-95.40			
	14	369	52.91±9.96	30.00-93.60			
	15	388	55.81±10.01	33.10-110.00			
	16	271	56.82±10.59	31.40-94.00			
	17	222	61.06±11.46	33.80-102.00			
	Total	2000	51.90±12.08	25.00-110.00			
Body Mass Index (BMI)	11	92	18.39±3.28	13.20-29.80	6	27.653	.000**
	12	379	18.78±3.72	13.10-36.20			
	13	279	19.19±3.48	13.40-35.00			
	14	369	20.15±3.02	13.90-31.30			
	15	388	20.90±3.28	14.80-36.40			
	16	271	20.97±3.35	13.90-33.00			
	17	222	21.08±2.89	14.40-29.40			
	Total	2000	20.04±3.45	13.10-36.40			

\* Significant difference between groups at 0.05 level, \*\* Significant difference between groups at 0.01 level.

**Table 2. Comparison of body height, body weight and BMI depending on gender factor.**

Variable	Gender	N	M±SD	Min.-Max.	df	F	Sig.
Body Height (cm)	Boys	773	162.16±12.59	112.00-193.00	1	47.747	.000**
	Girls	1227	159.02±7.78	119.00-180.00			
	Total	2000	160.23±10.04	112.00-193.00			
Body Weight (kg)	Boys	773	52.44±13.93	25.00-110.00	1	2.514	.113
	Girls	1227	51.57±10.73	25.00-95.40			
	Total	2000	51.90±12.08	25.00-110.00			
Body Mass Index (BMI)	Boys	773	19.65±3.39	13.10-36.20	1	16.038	.000**
	Girls	1227	20.28±3.46	13.10-36.40			
	Total	2000	20.04±3.45	13.10-36.40			

\* Significant difference between groups at 0.05 level, \*\* Significant difference between groups at 0.01 level.

**Table 3. Comparison of body height, body weight and BMI depending on physical activity level factor.**

Variable	Gender	N	M±SD	Min.-Max.	df	F	Sig.
Body Height (cm)	Exercised	738	160.64±8.41	128.00-187.00	1	1.395	.163
	Sedantary	1262	159.99±10.87	112.00-193.00			
	Total	2000	160.23±10.04	112.00-193.00			
Body Weight (kg)	Exercised	738	53.05±11.14	25.50-95.40	1	3.266	.001**
	Sedantary	1262	51.23±12.55	25.00-110.00			
	Total	2000	51.90±12.08	25.00-110.00			
Body Mass Index (BMI)	Exercised	738	20.44±3.43	13.40-36.20	1	4.029	.000**
	Sedantary	1262	19.80±3.44	13.10-36.40			
	Total	2000	20.04±3.45	13.10-36.40			

\* Significant difference between groups at 0.05 level, \*\* Significant difference between groups at 0.01 level.

**Table 4. Comparison of body height, body weight and BMI depending on knowledge level about obesity.**

Variable	Knowing the obesity causes	N	M±SD	Min.-Max.	df	F	Sig.
Body Weight (kg)	None	144	54.34±13.07	28.70-101.00	4	2.602	.034**
	one	698	51.24±12.19	25.00-98.50			
	two	988	52.03±11.60	26.00-110.00			
	three	133	52.57±12.54	26.00-90.80			
	Four	36	49.14±15.41	30.00-86.00			
	Total	2000	51.90±12.08	25.00-110.00			
Body Mass Index (BMI)	None	144	20.42±3.57	13.20-32.00	4	1.256	.285
	one	699	20.00±3.48	13.10-35.30			
	two	988	20.00±3.32	13.10-36.20			
	three	133	20.30±4.05	14.10-36.40			
	Four	36	19.16±3.54	14.20-25.10			
	Total	2000	20.04±3.45	13.10-36.40			

\* Significant difference between groups at 0.05 level, \*\* Significant difference between groups at 0.01 level.

**Table 5. Comparison of body height, body weight and BMI depending on watching food ads on TV with interest.**

Variable	Gender	N	M±SD	Min.-Max.	df	F	Sig.
Body Weight (kg)	No	1207	50.70±11.54	25.00-110.00	1	-5.528	.000**
	Yes	793	53.73±12.64	26.00-101.00			
	Total	2000	51.90±12.08	25.00-110.00			
Body Mass Index (BMI)	No	1207	19.75±3.35	13.10-36.40	1	-4.685	.000**
	Yes	793	20.48±3.55	13.10-36.20			
	Total	2000	20.04±3.45	13.10-36.40			

\* Significant difference between groups at 0.05 level, \*\* Significant difference between groups at 0.01 level.

**Table 6. Comparison of body weight and BMI depending on the number of weekly canteen usage.**

Variable	Weekly Canteen Usage	N	M±SD	Min.-Max.	df	F	Sig.
Body Weight (kg)	None	253	52.79±12.84	27.10-101.00	5	.772	.570
	1	218	52.06±12.05	28.70-95.40			
	2	349	50.98±12.92	25.00-110.00			
	3	449	52.20±12.51	25.00-102.00			
	4	160	51.54±12.04	26.00-94.00			
	5	571	51.89±10.81	25.50-98.00			
Body Mass Index (BMI)	None	253	20.08±3.34	13.70-29.90	5	1.883	.094
	1	218	20.54±3.92	13.90-36.20			
	2	349	20.05±3.62	13.20-36.40			
	3	449	20.17±3.43	13.10-35.30			
	4	160	19.85±3.76	13.10-33.00			
	5	571	19.76±3.10	13.30-32.50			
Total	2000	20.04±3.45	13.10-36.40				

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