The effects of media tools on food consumption and obesity in adolescents

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Summary. *Purpose:* The present study was aimed to define the quantities and types of foods consumed by adolescents during use of media tools to evaluate the contribution of energy and nutrient intake during the use of media tools to daily energy and nutrient intake. *Methods:* A total of 73 adolescents who visits an internet cafe, were included in the study. Participants were evaluated when they were using a computer in an internet cafe, food consumptions during the use of media tools and daily consumption and physical activity level were recorded. *Results:* It has been found that consumption of cakes, pastries and cookies during the use of media tools constitute more than half of daily consumption. At the same time, consumption of oily seeds, consumption of sweet foods and saturated fat consumption during the use of media tools were contributed to the daily consumption significantly. It was found that, adolescents consumed less egg, legumes, milk and dairy products, and vegetables in front of the media tools (p<0.05). A significant correlation was observed between the energy and fat content of foods consumed in front of media tools, and obesity. Also, time spend in the internet cafe are increasing as the energy intake during the use of the media tools increases (p<0.05). *Conclusion:* Consequently it is necessary to reduce the time spend in front of media tools and regulate the consumed foods during the use of media tools to live a healthier life and reduce the risks of development chronic disease in the future lives.

Key words: adolescent, media tools, nutritional habits, obesity, physical activity

Introduction

The adolescent period is an important period in the gaining of healthy dietary habits in which more physiological and behavioral changes occur than in other stages of life, apart from infancy, and that encompasses the years extending from the start of puberty until the start of adulthood (1). Updated findings obtained from the general youth population demonstrate that there is an inverse relationship between sedentary behaviors and healthy dietary habits and also that there is a positive relationship between the consumption of snacks and sedentary behaviors (2). Sedentary behaviors like watching television or playing video games independently influence dietary consumption

(3). The nutritious value of the diets of children and adolescents who regularly use media tools for a longer period of time is found to be lower than their peers who whose media tools less (4). Tools of mass communication, radio, television, and advertisements found in print are powerful factors that influence the dietary habits of children and adolescents (5). In the past 30 years, the lifestyles of children and adolescents have changed drastically with the increase in their use of television, video games, and computers. The daily time spent watching television for children and adolescents in the United States (US) increased from 3 hours and 45 minutes in 1999 to 4 hours and 30 minutes in 2009. Rates for computers and video games increased even greater (6). As a result of sedentary activity taking the

place of physical activity and at the same time being exposed to stimulants that encourage unhealthy foods alongside the increase in the use of media tools, the increase in the consumption of high-energy content, low-nutritional content foods like high-fat foods and sugary snacks or beverages has also increased the risk of obesity in children and adolescents (7). The global prevalence of childhood obesity has increased significantly. Childhood obesity rates were 4.2% in 1990 and increased to 6.7% in 2010 (8). Turkey Nutrition and Health Survey 2010: According to the Final Report on the Assessment of the Status and Habits of Nutrition, of children between the ages of 6-18 throughout Turkey, 14.3% and 8.2% are overweight or obese, respectively. This study conducted in Turkey reported that obesity is seen most frequently in the 12-14 age group (9.8%) and least frequently in the 9-11 age group (6.0%) (9). Childhood obesity can have harmful effects in different ways over body composition and health. Obese children are at risk in terms of cardiovascular diseases, impaired glucose tolerance, Type 2 Diabetes, insulin resistance, respiratory problems like sleep apnea and asthma, musculoskeletal system disorders, fatty liver disease, gallbladder stones, acid reflux, psychological stress, low self-esteem, and various health problems like impaired physical, social, and emotional functionality (10). Childhood and adolescent obesity, which is a growing problem in our society, may be slowed down if the causes are addressed and measures are taken against this. The co-implementation of diet and physical activity interventions is very important for the prevention of obesity and being overweight. Focusing on these causes reduces the risk of childhood and adolescent obesity with time and helps to create a healthier society (11). One of the factors that lead to the increase of the prevalence in childhood and adolescent obesity is spending long periods of time in front of media tools. The aim of this study was to determine that the amount and variety of the nutrition that adolescents consume within the period of time they spend each day using computers and other media tools at Internet cafes. Also, to evaluate the contribution this makes in their daily intake of nutrients by determining the amount of energy and other nutrients provided by the consumed foods.

Methods

A total of 73 adolescent individuals (36 females-37 males) between the ages of 11 and 18, who visit the Internet cafe found in the center of the Gümüşhane province were included in this study. The ethics committee permission required for the study was obtained from the Hacettepe University Non-Interventional Clinical Research Ethics Board (GO 16/94). The "Parental Approval Form and Child Approval Form Clarified for Research-Purpose Study" was read to and signed by the adolescents and who agreed to participate in the study and their parents. Information regarding the general characteristics and the status of their use of television and computers were obtained with a face-to-face interview technique in the first section of the survey form. Adolescents were asked about the status of their physical activities.

Anthropometric measurements of body weight, height, and waist circumference measurements were taken in accordance with the method by the researcher (12). 24-hour recall was used to determination of food consumption (13). The consumption amounts of foods were determined using a photographic food catalog (14) and the intake of energy and nutrients were calculated with the Nutritional Information System 7.2 computer program (15). The percentages of meeting the daily energy and nutrients requirements were evaluated using the Nutritional Guide Specific to Turkey (16). The meet of daily requirements of the nutrient intake of >67% was accepted as sufficient intake (12).

Statistical Analysis

The SPSS 11.5 packet program was used in the evaluation of the data. The Single Sampling Kolmogorov Smirnov Test was utilized to determine whether the data were normally distributed. The homogeneity test was conducted with the One-Way Anova. The Mann-Whitney U Test was used to analyze the significant of the difference between the two independent groups. The Spearman Correlation Analysis was used to test whether there was a relationship in the proportional data, and the Pearson Chi-square Test was used in the categorical data (17).

Results

A total of 73 adolescents, which 37 were males and 36 were females, who visit the Internet cafe were included in the study. The average age of the adolescents was 14.7±1.9 years, and it was seen that 53.4% of the individuals attended middle school and 46.6% attended high school. Of the adolescents, 15.1 were overweight (≥85th-<95th percentile) and 9.6% were obese (>95th percentile), and the rate of obesity was found to be 16.2% and 2.8% for the males and females, respectively. The rate of overweight is 10.8% in male adolescents and 19.4% in females. Of the adolescents, 69.9% do not regularly play sports. The average waist circumference was found to be 77.0±13.7cm for the male adolescents and 76.4±9.1cm for the females. The body mass ındex (BMI)average of the adolescents was found to be 21.1±4.5 kg/m² and 21.4±3.3 kg/m² in the males and females, respectively. While the total energy expenditure was 2961.8±821.1 kcal/day in males, it was 2425.5±396.0 kcal/day in females. The average numbers of main meals and snacks for all adolescents was found to be 2.71±0.5 and 2.35±0.9, respectively (Table 1).

It was found that 75.3% of the adolescents exceeded the recommended duration of the use of computers (<2 hours) on weekdays, and that 83.6% exceeded this period on the weekends. The percentages of adolescents who have a personal computer were found to be 35.6%. It was seen that 84.9% of the adolescents enjoy watching television. The adolescents overall have an average of one (1.3±0.5) in their homes. While the rate of male adolescents who have a television in their bedrooms is 5.4%, it is lower than the rate for female adolescents (22.2%) (Table 2).

Male adolescents (75.7%) and 86.1% of the female adolescents watch television for more than the recommended time (<2 hours). The rates of female and male adolescents who watch television on the weekends more than the recommended <2 hours were 91.6% and 89.2%, respectively. While the adolescents use the computer for an average of 3.35±2.0 hours on weekdays, they use the computer for an average of 4.30±2.8 on the weekend. The amount of time passed in to use a computer on the weekends is greater than weekdays, significantly (p<0.05). Similarly, the amount of time

Table 1: General charecteristics of the adolescents

	Male (n=37)	Female (n=36)	Total (n=73)
	($\bar{\text{x}}$±SD)	($\bar{\text{x}}$±SD)	($\bar{\text{x}}$±SD)
Age (year)	14.5±1.7	14.8±2.1	14.7±1.9
Educational status*			
Middle School	21 (56.8)	18 (50.0)	39 (53.4)
High School	16 (43.2)	18 (50.0)	34 (46.6)
Body weight (kg)	57.0±15.0	53.8±9.0	55.4±12.5
Length (cm	163.5±11.0	158.3±7.1	160.9±9.6
Body mass index (kg/m²)	21.1±4.5	21.4±3.3	21.3±3.9
BMI percentile*			
<5	1 (2.7)	1 (2.8)	2 (2.7)
5-15	6 (16.2)	3 (8.3)	9 (12.3)
15-85	20 (54.1)	24 (66.7)	44 (60.3)
85-95	4 (10.8)	7 (19.4)	11 (15.1)
≥95	6 (16.2)	1 (2.8)	7 (9.6)
Waist circumference (cm)	77.0±13.7	76.4±9.1	76.7±11.6
Doing regular sports*	16 (43.2)	6 (16.7)	22 (30.1)
Total energy expenditure (kcal/day)	2961.8±821.1	2425.5±396.0	2697.3±697.3
Number of main meals	2.73±0.5	2.69±0.5	2.71±0.5
Number of snacs	2.25±1.0	2.44±0.8	2.35±0.9

*n (%)

Table 2. The use of media tools in adolescents

	Male n= 37		Female n=36		Total* n=73		
	n	**%**	**n**	**%**	**n**	**%**	**p***
Use of computer (hour)							
Weekdays [§]	3.6±2.1		3.06±2.04		3.35±2.0		
0-2	8	21.6	10	27.8	18	24.7	
≥ 2	29	78.4	26	72.2	55	75.3	0.000**
Weekend [§]	4.7±3.1		3.8±2.3		4.30±2.8		
0-2	4	10.8	8	22.2	12	16.4	
≥ 2	33	89.2	28	77.8	61	83.6	
Do you have a personel computer?							
Yes	14	37.8	12	33.3	26	35.6	
No	23	62.2	24	66.7	47	64.4	
Do you like watching television?							
Yes	33	89.2	29	80.6	62	84.9	
No	4	10.8	7	19.4	11	15.1	
Number of televisions at home [§]	1.3±0.4		1.3±0.5		1.3±0.5		
Do you have a televisions in your bedroom?							
Yes	2	5.4	8	22.2	10	13.7	
Time of watching television (hour)							
Weekdays [§]	3.0±1.8		3.2±1.6		3.14±1.7		
0-2	9	24.3	5	13.9	14	19.1	
≥ 2	28	75.7	31	86.1	59	80.8	0.02*
Weekend [§]	3.8±2.1		3.6±1.8		3.77±2.0		
0-2	4	10.8	3	8.4	7	9.6	
≥ 2	33	89.2	33	91.6	66	90.4	
Time of stay at internet cafe (hour)							
<1	9	24.3	10	27.7	19	26.0	
1-4	22	59.5	20	55.6	42	57.5	
4-6	6	16.2	4	11.1	10	13.7	
≥6	-	-	2	5.6	2	2.7	

[§] ($\bar{x}$±SD); *p<0.05, **p<0.01

the adolescents spent watching television on average on the weekends (3.77±2.0) was significantly greater than the amount they spent watching television on weekdays (3.14±1.7) (p<0.05). While 57.5% of the adolescents spend 1-4 hours at the Internet cafe, 13.7% spend 4-6 hours, and 2.7% spend ≥6 hours (Table 2).

The daily vitamin B_1 intake in male adolescents aged 14-18 years was found to be below the daily requirement. The total folic acid intake was below the daily requirement in male adolescents age 14-18 and in all the female adolescents. Calcium intake was similarly found to be below the requirement in all age groups. When considering the status of the adolescents meeting the requirement for iron intake, it was determined that all of the male adolescents and the 11-13 age group of female adolescents were within the normal limits for the requirement of iron intake but that female adolescents aged 14-18 were under the requirement for iron intake. The percentages of the meet requirement of vitamins B_2, vitamin C and zinc intakes were found to be sufficient in all adolescents. The amount of dietary sodium, except for salt, was above the requirement in all age groups (Table 3).

Tablo 3: Daily energy and nutrient intake and percentage of daily requirements to meet in adolescents (%)

Nutrients	Male				Female			
	11-13 year (n=11)		14-18 year (n=26)		11-13 year (n=9)		14-18 year (n=27)	
	Daily intake x±SD	Percentage of requirements to meet	Daily intake x±SD	Percentage of requirements to meet	Daily intake x±SD	Percentage of requirements to meet	Daily intake x±SD	Percentage of requirements to meet
Energy (kcal/day)	2282.8±875.3	93	2351.4±837	82	2017.9±659.8	93	2037.3±635.9	90
Protein (g/day)	54.8±24	100	71.3±24.6	99	53.8±20.7	118	66.2±23.3	100
Protein (%)	9.8±1.7		12.8±3.1		10.6±2.5		13.4±3.9	
Fat (g)	85.5±33.7		93.3±39.8		77.1±35.4		81.3±34.9	
Fat (%)	34.0±7.0		35.4±6.5		33.4±9.0		34.9±9.8	
Carbohydrate (g)	305.4±123.2		291.3±105.9		273.4±88.5		250.6±96.5	
Carbohydrate (%)	55.9±7.2	101	51.5±6.0	93,6	55.7±9.8	101.2	51.4±11.2	93,4
Saturated fat (g)	27.5±9.0		32.2±14.0		26.2±7.3		28.0±14.0	
Fiber (g)	21.4±9.1	73	20.4±10.3	70	24.8±15.7	95	21.2±10.8	81
Cholesterol	194.7±152.4		305.9±153.7		122.8±103.1		245.6±205.4	
Vitamine A(mcg)	897±325.2	149	1048±589	116	737.3±331.4	122	913.9±468.4	130
Vitamine E (mg)	18.4±9.6	167	16.4±11.6	109	14.1±10.5	128	16.8±10.5	112
Vitamine B$_1$ (mg)	0.87±0.35	96	0.76±0.37	63*	0.77±0.27	85	0.75±0.24	75
Vitamine B$_2$ (mg)	1.0±0.25	111	1.28±0.54	98	1.04±0.33	115	1.21±0.53	134
Vitamine B$_6$ (mg)	1.52±0.6	152	1.79±2.23	137	1.43±0.59	143	1.24±0.37	103
Vitamine B$_{12}$ (mcg)	2.02±1.37	112	4.0±2.3	166	2.72±1.53	151	3.48±3.15	145
Vitamine C (mg)	85.1±39.5	113	69.1±51.4	92	83.9±73.2	111	82.9±50.8	110
Total folic acid (mcg)	258.4±94.4	86	268.3±114.6	66*	210.5±83.2	52*	236.8	59*
Calcium (mg)	553.6±152.5	42*	738.2±340.6	56*	580.0±294.3	44*	642.1±303.5	49*
Iron (mg)	11.3±4.9	113	11.9±5.1	119	11.9±4.8	119	11.5±3.8	63*
Sodium (mg)§	3830.8±1864.3	166	4673.9±1980.2	203	3102.0±1672.0	135	4061.3±2020.9	177

*Values are below the requirement (<67 %). §Does not contain sodium from the salt

The percentages of contribution total consumption of milk and dairy foods across from the media tools is were 11.9±27.3% and 33.9±41.1% of daily consumption in male and female adolescents, respectively. Female adolescents consumed more milk and dairy products than males while using media tools (51.6±81.9 and 26.3±71.2, respectively, p<0.05). Additionally, the contribution to daily consumption of the milk and dairy products that female adolescents consumed while using media tools was found to be significantly greater than males (p<0.05). The total consumption of meat and similar foods during the use of media tools was determined as 21.3±32.6 g in male adolescents and 29.2±46.7 g in females (p>0.05). However, the con-

sumption of red meat during the use of media tools in females (8.1±20.2 g) was found to be significantly more than in males (3.4±18.7 g) (p<0.05). The contribution to bread consumption during the use of media tools to daily consumption was found to be significantly higher in females (38.7±43.8%) than in males (11.7±27.5%) (p<0.05). Similarly, the contribution of saturated fat consumption during the use of media tools to daily consumption was significantly higher in female adolescents than in males (46.2±47.7% and 18.3±37.0%, respectively) (p<0.05). The total amount of sweets consumed during the use of media tools was found to be significantly higher in females than in males (17.6±22.2 g and 7.2±14.2 g, respectively, p<0.05) (Table 4).

Table 4: The average consumption of food groups by adolescents during the use of media tools and contribution of daily consumption (%) (n=73)

Food groups (g)	Consumption of during the use of media tools (x̄±SD)			Percentage of contribution to daily consumption (x̄±SD)		
	Male	Female	p	Male	Famele	p
Milk and dairy products						
Total	26.3±71.2	51.6±81.9	0.038*	11.9±27.3	33.9±41.1	0.009**
Milk, yogurt	19.8±48.7	44.6±79.9	0.192	15.1±30.8	34.9±45.1	0.157
Cheese	6.5±34.5	6.9±13.6	0.093	9.0±26.8	31.2±43.9	0.039*
Meat and egg group						
Total	21.3±32.6	29.2±46.7	0.656	16.2±23.7	35.5±47.3	0.178
Red meat	3.4±18.7	8.1±20.2	0.023*	7.9±29.8	20.4±36.1	0.123
Egg	1.5±3.5	2.1±6.7	0.657	6.5±19.8	19.4±37.9	0.539
Legumes	0.7±4.2	6.5±31.2	0.521	11.1±33.3	20±42.1	0.606
Nuts and oily seeds	15.6±24.0	12.4±22.6	0.592	48.0±51.8	57.4±47.5	0.315
Vegetables and fruits						
Vegetables	19.1±60.9	12.5±44.2	0.522	21.8±29.2	28.6±39.0	0.223
Gren leafy vegetables	2.0±8.7	0.5±1.7	0.954	13.9±34.2	13.5±32.2	0.945
Fruits	91.1±140.9	132.8±264.3	0.595	46.2±46.5	39.7±44.3	0.609
Citrus	4.0±24.6	-	0.324	16.6±40.8	-	0.317
Bread and cereal						
Bread	22.0±57.2	41.4±55.3	0.019*	11.7±27.5	38.7±43.8	0.003**
Rice, pasta, flour	25.8±50.2	44.5±84.7	0.283	16.2±28.2	36.0±44.2	0.131
Cake and biscuits	38.9±54.8	28.1±49.9	0.141	73.5±40.5	50.3±47.2	0.087
Fats and oils	2.5±6.1	5.0±12.3	0.286	11.6±25.7	28.0±40.5	0.093
Fats	1.0±3.3	2.1±3.8	0.2	18.3±37.0	46.2±47.7	0.028*
Oils	1.4±4.9	2.9±10.8	0.935	10.8±28.9	14.0±31.9	0.576
Sweets	7.2±14.2	17.6±22.2	0.040*	36.4±43.1	53.7±44.4	0.143

*p<0.05, **p<0.01
The Mann-Whitney U test

Table 5: The status of correlation with regard to some anthropometric measurements regarding adolescents, dietary habits, and the intake of energy and other nutrients

Variable	BMI	Waist circumference	Duration of stay at internet cafe
Waist circumference (cm)	0.677**		0.206
	p=0.000		p=0.080
Energy intake (kcal/day)	0.368*	0.259*	0.114
	p=0.001	p=0.027	p=0.336
Fat (g/day)	0.398**	0.224	0.049
	p=0.000	p=0.057	p=0.683
Energy intake during the use of media tools (g/day)	0.294*	0.050	0.278
	p=0.011	p=0.673	p=0.024*
Fat intake during the use of media tools (g/day)	0.399**	0.053	0.195
	p=0.000	p=0.654	p=0.099
Number of main meals	-0.066	-0.052	0.219
	p=0.581	p=0.661	p=0.063
Number of snacks	0.032	0.053	0.329*
	p=0.809	p=0.686	p=0.010
Total energy expenditure (kcal/day)	0.194	0.137	0.029
	p=0.099	p=0.248	p=0.810

*p<0.05, **p<0.01 (BMI: body mass index)*

Table 5 is shown that the status of correlation with regard to some anthropometric measurements regarding adolescents, dietary habits, and the intake of energy and other nutrients. There is a positive relationship between the waist circumference and BMI (p<0.05). Also, as BMI and waist circumference increase, the daily consumed energy increases, too (p<0.05). A positive relationship was determined between energy consumed during the use of media tools and the BMI values of the adolescents (p<0.05). A significant, positive correlation was also determined between the amount of fat consumption provided by foods during the use of media tools and the BMI values of adolescents (p<0.05). There was also a significant, positive relationship found between the energy intake during the use of media tools and the duration of stay at the Internet cafe (p<0.05). Although there was no significant relationship between the number of main meals consumed each day and the duration of stay at the Internet cafe, there was a significant, positive relationship between the number of snacks and the duration of stay at the Internet cafe. As the duration of stay at the Internet cafe increased, the number of snacks also increased (p<0.05) (Table 5).

Discussion

The increase in the rates of obesity in adolescence originates from a significant increase in the sedentary behaviors especially including the use of technological tools in the past twenty years (18). With the use of media tools, it's not just the issue of the replacement of sedentary activity with physical activity but the issue of the exposure of youth to stimulants that at the same time encourage unhealthy foods that has been confronted (7). It is known that each additional hour to the total amount of time spent watching television in a day increases the status of being overweight by 20-30% (19). Stroebele et al. (20) demonstrated that watching television is correlated with an increase in the frequency of meals and with the consumption of more energy. They also found that consumption of foods while watching television reduces the time spent on physical activity, that participants who watched more television had greater body weights and a larger BMI compared with those who watched less television and had a greater daily consumption of fat. This study found similarly that as the amount of time spent at the Internet cafe increased, the number of snacks and the energy intake during the use of media tools increased. There is also a positive, significant relationship between

the energy intake during the use of media tools and the BMI values of the adolescents (p<0.05). For this reason, the use of media tools should be considered in the prevention of obesity in children, just like in other sedentary activities. The increase of the number of snacks consumed during the use of media tools and the constitution of foods consumed in snacks with high-energy content, low-nutritional value snacks leads to a significant increase in the intake of energy. For this reason, long-term use of media tools is causally connected with a gradually increasing prevalence of obesity in adolescents because it leads to a greater intake of energy and to the rate of energy from fat being greater and because it affects their nutritional preferences.

The media environment changes as the days pass, and within the past five years, the rate of children and adolescents between the ages of 8-18 who have a computer in their homes rose from 73% to 86%, and the rate of homes with an Internet connection rose from 47% to 74%. Video games have been improved and begun to be made more realistically in order to influence children and adolescents (21). As a result, adolescents spend more than what they spend in school or sleeping using various media tools (22). In this study, it was found that 75.3% and 83.6% of adolescents use the computer more than the recommended time (<2 hours) on weekdays and weekends, respectively, and that 80.8% and 90.4% watch more than the recommended amount of television on weekdays and on the weekends, respectively. The increase today of the number and accessibility of media tools like television, computers and computer games, and the internet also increase the inactive amount of time that children and adolescents spend in front of these tools. Borraccino et al. (23) showed that more than 80% of adolescents aged 15 years have more than 2 hours of sedentary, screen-related activities each day. Watching television for long periods of time contributes to the increasing rates of childhood and adolescent obesity by leading to the exposure of children and adolescents to commercials for unhealthier foods and to their being physically inactive. The American Academy of Pediatrics (24), recommends for this reason that children and adolescents limit their time spent watching television to 2 hours.

The global prevalence of childhood obesity increases with each passing day. While the prevalence of childhood obesity was 4.2% in 1990, it reached 6.7% in 2010.

It is estimated that this increase will continue and that 9.1% of children around the world will be obese in the year 2020. It has also been shown that the prevalence of overweight and obesity in developed countries is twice as great as that in developing countries and that children are largely affected (11.7% overweight, 6.1% obese) (8). The prevalence of overweight and obesity were determined 15.1% and 9.6% in this study, respectively. While the prevalence of obesity has been determined as 16.2% in male adolescents and 2.8% in females, the condition of overweight has been determined as 10.8% in male adolescents and 19.4% in females. Similarly, in the scope of the WHO European Childhood Obesity Surveillance Initiative (COSI) study, the prevalence of overweight and obesity in 7-8year old, school-aged children in Turkey (Childhood (ages 7-8) Obesity Research (COSI-TUR) of Turkey 2013) were found to be 14.2% and 8.3%, respectively (25). Good dietary habits are an important part of a healthy lifestyle (26) and a protective factor in the prevention of obesity (27). Healthy nutrition in the early stages of life like childhood and adolescence is very important and should be encouraged (12). When the daily food consumption of adolescents was asked in this study, it was determined that the consumption of vitamin B_1 (thiamin) was lower than the normal limits (67%-133%) of the percentage to meet the requirement. Problems like nervous and digestive system disorders, reduced appetite, and fatigue may emerge with a deficiency of vitamin B_1. Moreover, the percentage that met the requirement of total folic acid consumption in the female adolescents in the 11-13 and 14-18 age groups was found to be below normal limits. Insufficient folic acid intake and folic acid deficiency can result in an increase of sensitivity to leucopenia, intestinal malabsorption, impaired blood clotting, and infection and in macrocytic anemia, which is the second most common type of nutritional anemia after iron deficiency (28). The percentage that meet the requirements in all age groups for the consumption of calcium by the adolescents in the study was found to be low. Similarly, Assumpçao et al. (29) determined that they conducted over adolescents between the ages of 10 and 19 that 88.6% of the adolescents were unable to meet the recommended intake of calcium in a study. Calcium is a nutrient necessary in the provision of bone mineralization and in the protection of bone health. Bone mass reaches forty times

its size from birth to adulthood and peaks at the end of puberty. For this reason, the sufficient intake of calcium in adolescence is an important factor in the creation of adequate bone mass and in the protection of bone health (29). Together with growth during adolescence, some nutrient requirements also increase. One of these nutrients is iron (12). In this study found that the female adolescents in the 14-18 age group were unable to meet the recommended intake of iron. The risk of anemia is quite high especially in the girls in this age group because of low iron intake and at the same time due to the loss of blood that occurs during the menstrual cycle. Iron deficiency may originate from an insufficient dietary intake of iron or from absorption disorders (30). Foods right in iron should be added to the diets of adolescents for this reason. Micronutrients are quite important for growth and development, and insufficient consumption is associated with various diseases and developmental risks. Therefore, their deficiencies may lead to growth developmental retardation and bone disorders in adolescents (12). Additionally, this study found the consumption of dietary sodium - except for salt - to be greater than necessary in all age groups. This situation is very important in terms of adolescent health. It creates risk for many chronic diseases like sodium hypertension and cardiovascular diseases (31). The sodium content of the diets of adolescents should be carefully examined and initiatives introduced to decrease sodium content.

In this study, the percentage that contribution daily consumption of the total consumption of dairy products during the use of media tools by adolescents was found to be much greater in females than males (p<0.05). The percentage of the contribution daily consumption of the consumption of meat foods during the use of media tools was determined as 35.5±47.3 in females and 16.2±23.7% in males (p>0.05). Additionally, the consumption of fatty seeds during the use of media tools constitutes more than half of daily consumption in females (57.4±47.5%) and almost half in males (48.0±51.8%). Along with this, adolescents do not consume any chicken or fish during the use of media tools. The consumption of eggs and legumes were also found to be quite low during the use of media tools. The percentage of the contribution to the total daily consumption of vegetables by the consumption of vegetables during the use of media tools was found to be 21.8±29.2% in males and 28.6±39.0% in females.

The total consumption of fruit during the use of media tools was greater in contrast to conducted studies, and the consumption of citrus was found to be less. The most consumed foods from the wheat group during the use of media tools were varieties of cakes, pastries, and cookies. The consumption of bread during the use of media tools was found to be greater in females than in males (p<0.05). The contribution to daily consumption of the fat consumption was also found to be greater in females than in males (p<0.05). The contribution to the daily consumption of sweets was again found to be 36.4±43.1% in males and 53.7±44.4% in females. In light of this information, it can say that the consumption of fatty seeds, fruits, and varieties of cakes, pastries, and cookies during the use of media tools by adolescents constitutes a significant portion of daily consumption, that they consume more fat and sugar relating to this, that they consume less eggs, legumes, and less vegetables and citrus, and that they do not consume any chicken and fish. Falbe et al. (32) reported that each increase of an hour in the total use of electronic media is associated with the increase in the consumption of unhealthy foods like sugary drinks, fast-food, and sweet and salty snacks and with a decrease in the consumption of vegetables and fruits. Based on the results of this study, the use of media tools is associated with a greater consumption of snacks and unhealthy foods. The use of media tools may lay the groundwork for the development of obesity in adolescents by leading to a greater consumption of energy, a greater intake of fatty foods, and spending less energy, due to it being associated with either unconscious eating or replacing physical activity and due to it affecting the variety of foods consumed. For this reason, the effect of media tools on childhood and adolescent obesity should be carefully examined, the amount of time spent in front of media tools should be limited, and low-energy content, high-nutrient content foods like fresh fruits and vegetables should be preferred in place of unhealthy foods that are consumed while using media tools.

References

1. Bibiloni M, Pich J, Cordova A, Pons A, Tur A. Association between sedentary behaviour and socioeconomic factors, diet and lifestyle among the Balearic Islands adolescents. BMC Public

Health 2012; 12: 718.

2. Craig LC, McNeill G, Macdiarmid JI, Masson LF, Holmes BA. Dietary patterns of school-age children in Scotland: association with socio-economic indicators, physical activity and obesity. Br J Nutr 2010; 103: 319-34.

3. Chaput JP, Klingenberg L, Astrup A, Sjödin AM. Modern sedentary activities promote overconsumption of food in our current obesogenic environment. Obes Rev 2011; 12: e12-20.

4. Coon KA, Goldberg J, Rogers BL, Tucker KL. Relationships between use of television during meals and children's food consumption patterns. Pediatrics 2001; 107: E7.

5. Von Post-Skagegard M, Samuelson G, Karlström B, Mohsen R, Berglund L, Bratteby LE. Changes in food habits in healthy Swedish adolescents during the transition from adolescence to adulthood. Eur J Clin Nutr 2002; 56: 532-8.

6. Bickham D, Blood EA, Walls CE, Shrier LA, Rich M. Characteristics of screen media use associated with higher BMI in young adolescents. Pediatrics 2013; 131:935-41.

7. Scully M, Wakefield M, Niven P et al. Association between food marketing exposure and adolescents' food choices and eating behaviors. Appetite 2012; 58: 1-5.

8. de Onis M, Blossner M, Borghi E. Global prevalence and trends of overweight and obesity among preschool children. Am J Clin Nutr 2010; 92:1257-64.

9. Sağlık Bakanlığı Sağlık Araştırmaları Genel Müdürlüğü. Hacetepe Üniversitesi Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik Bölümü. Ankara Numune Eğitim ve Araştırma Hastanesi. Türkiye Beslenme ve Sağlık Araştırması 2010: Beslenme Durumu ve Alışkanlıklarının Değerlendirilmesi Sonuç Raporu. Ankara: Sağlık Bakanlığı Sağlık Araştırmaları Genel Müdürlüğü; 2014, Rapor No: 931.

10. Ogden CL, Caroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. Jama 2014; 311: 806-14.

11. Sahoo K, Sahoo B, Choudhury AK, Sofi NY, Kumar R, Bhadoria AS. Childhood obesity: causes and consequences. J Family Med Prim Care, 2015; 4: 187-92.

12. Baysal A, Aksoy M, Bozkurt N et al. Diyet El Kitabı. 5. baskı. Hatipoğlu Yayınevi. Ankara,2008.

13. Watson JT, Gayer M, Connolly MA, Epidemics after Natural Disasters. Emerging Infectious Diseases 2007;13: 1-5.

14. Rakıcıoğlu N, Tek NA, Ayaz A, Pekcan G. Yemek ve Besin Fotoğraf Kataloğu. Ata Ofset Matbaacılık. Ankara, 2006

15. Schmid M, Beslenme Bilgi Sistemi BeBis 7.0 paket programı. Entwickelt an der Universital Hohenheim, Stuttgart, 2011.

16. T.C. Sağlık Bakanlığı T.S.H.G.M. ve Hacetepe Üniversitesi Beslenme ve Diyetetik Bölümü. Türkiye'ye Özgü Beslenme Rehberi. Ankara, 2015.

17. Alpar R. Spor, Sağlık ve Eğitim Bilimlerinden Örneklerle Uygulamalı İstatistik ve Geçerlik-Güvenirlik. 3. Baskı. Detay Yayıncılık. Ankara, 2010.

18. Rennie KL, Johnson L, Jebb SA. Behavioural determinants of obesity. Best Pract Res Clin Endocrinol Metab 2005; 19: 343-58.

19. Steffen LM, Dai S, Fulton JE, Labarthe DR. Overweight in children and adolescents associated with TV viewing and parental weight: Project HeartBeat! Am J Prev Med 2009; 37: 50-5.

20. Stroebele N, de Castro JM. Television viewing is associated with an increase in meal frequency in humans. Appetite 2004; 42: 111-3.

21. Roberts DF, Christenson PG, Strange J. Prime-time teens. Burbank, CA: Mediascope, 2004.

22. Strasburger VC, Jordan AB, Donnerstein E. Children, adolescents, and the media: health effects. Pediatr Clin North Am 2012; 59: 533-87.

23. Borraccino A, Lemma P, Berchiala P et al. Unhealthy food consumption in adolescence: role of sedentary behaviours and modifiers in 11-, 13- and 15-year-old Italians. Eur J Public Health 2016; 26: 650-6.

24. American Academy of Pediatrics: Children, adolescents, and television. Pediatrics, 2001; 107: 423-6.

25. Türkiye Çocukluk Çağı (7-8 yaş) Şişmanlık Araştırması (COSI-TUR) 2013. Available from: http://beslenme.gov.tr/content/files/yayinlar/kitaplar/diger_kitaplar/cosi_temel_bulgular.pdf.

26. Neslisah R, Emine AY. Energy and nutrient intake and food patterns among Turkish university students. Nutr Res Pract 2011; 5: 117-23.

27. Bell MJ, Zeiler M, Herrero R et al. Healthy Teens @ School: Evaluating and disseminating transdiagnostic preventive interventions for eating disorders and obesity for adolescents in school settings. Internet Interventions 2018;16:65-75.

28. Fiorentino M, Landais E, Bastard G, Carriquiry A, Wieringa FT, Berger J. Nutrient Intake Is Insufficient among Senegalese Urban School Children and Adolescents: Results from Two 24 h Recalls in State Primary Schools in Dakar. Nutrients 2016; 8: E650.

29. de Assumpcao D, Dias MR, de Azevedo Barros MB, Fishberg RM, de Azevedo Barros Filho A. Calcium intake by adolescents: a population-based health survey. J Pediatr (Rio J) 2016; 92: 251-9.

30. Broniecka A,Wyka J, Bronkowska M, Piotrowska E, Biernat J. Assessment of intake of iron and nutrients that affect bioavailability of daily food rations of girls. Ann Agric Environ Med 2014; 21: 327-30.

31. Rakicioğlu N, Topçu AA, Javidipour I. Ankara'daki Bazi Fast-Food Restoranlarinda Satilan Hamburgerlerin Besin Öğesi İçeriği ve Beslenme Açisindan Değerlendirmesi. Deneysel Biyoloji Dergisi 2000;57: 7-12.

32. Falbe J, Willett WC, Rosner B, Gortmaker SL, Sonneville KR, Field AE. Longitudinal relations of television, electronic games, and digital versatile discs with changes in diet in adolescents. Am J Clin Nutr 2014; 100:1173-81.

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