



Determining the Relationship between Obesity and Problematic Internet Use among Adolescents

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Abstract

Background: Obesity has become widespread among adolescents throughout the world. This study aimed to determine the relationship between problematic internet use and obesity among 10-19 yr old adolescents.

Methods: The descriptive study was carried out in a private elementary and high school in Gaziantep Province in the Eastern Turkey in 2016-2017. Overall, 474 adolescents and 938 their parents were enrolled. Data collection form consisted of three parts. The first part included questions about sociodemographic characteristics of the adolescent and his/her parents. The second part included data on anthropometrical measurements, dietary habits and physical activity level. Third part of the data collection form included Problematic Internet Usage Scale. First, anthropometrical measurements of the adolescents were recorded. Then, the data collection forms were applied to adolescents and their parents.

Results: 34.8% of adolescents were overweight and obese. Approximately four out of ten male adolescents and three out of ten female adolescents were overweight or obese ($P<0.05$). Girls had less problematic internet use behaviors ($P<0.05$). There were statistically significant differences between age, sex, socioeconomic status, unhealthy eating habits and problem internet usage ($P<0.05$).

Conclusion: Periodic screening should be done to determine the prevalence of obesity and problematic internet usage. Training programs on regular physical activity and healthy nutrition should be prepared and guidance services should be provided for the reduction of obesity rates and the protection of ideal weight.

Keywords: Adolescent; Health; Obesity; Internet use

Introduction

Today, 10-19 yr old adolescents constitute approximately 20% of the population of the World and Turkey (1,2). Risky health behaviors such as “unhealthy nutrition, substance abuse, sexually transmitted infections, early pregnancies, violence, suicide” are prioritizes and preventable health problems in

adolescents which frequently lead to mortality and morbidity (3,4).

Becoming an epidemic throughout the world, obesity is a preventable public health problem. Obesity is considered as a prioritized matter within the scope of protecting and improving health which directly or indirectly causes various chronic



diseases and which has high costs both individually and socially (5). In recent studies, obesity has become widespread and 20%-30% of adolescents are obese throughout the world. In that respect, combating with obesity in adolescence has a significant place in preventing obesity in adulthood (6). About 80% of world's adolescent population do not make adequate physical activity. Sitting for a long time during school and academic activities and spending too much time with television, computer and mobile phones are the most frequently encountered sedentary behaviors among adolescents. Addition of nutritional habits such as snacks and eating and drinking to the time spent in front of a screen sitting in a fixed position continuously increases obesity risk (4,7).

Resulting in the behaviors of spending a long time in front of a screen, technology addiction is a risky behaviors frequently encountered among adolescents in recent years (4). In studies carries out on children and adolescents in various countries, internet addiction prevalence varies between 1.6% and 14.4% (8,9). The concept of problematic internet use is defined as compulsive use which causes that the individual uses the internet to an extent which will affect his/her social, academic and work life adversely and fails to control himself/herself constantly (10,11).

In addition to the purposes of collecting information (doing homework, making a research), sending e-mails and shopping, internet takes an important place in gaming and social communication. Especially, adolescents use social network sites frequently for having new friends and maintain communication on the internet (12). Adolescents may consider internet as an opportunity to escape from the responsibilities of real life and surrender to the virtual environment. This situation may lead to problematic internet use in the form of prolonged inactivity in front of the screen (10).

In the literature review, studies examining the relationship between problematic internet use and obesity in adolescents are limited in our country and the world. We aimed to determine the relationship between problematic internet use and obesity among 10-19 yr old adolescents.

Methods

This study was designed as a descriptive study.

Setting and sample

The study was carried out in a private elementary and high school in Gaziantep Province in the Eastern Turkey from Oct 2016-Apr 2017. The study population consisted of 756 adolescents in 5th and 12th grades. The sample of the study consisted of 474 (63.53%) adolescents whose parents gave consent for them to participate in the study and who filled in the study data collection forms completely.

Ethical approval

Ethical approval was taken from Hasan Kalyoncu University Health Sciences Institute's Ethical Committee (No: 2016/10). Research application permission was taken from Gaziantep Governorate Provincial Directorate of National Education. Voluntary written consent was taken from the parents of the adolescents who constituted the sample of the study.

Measurements

Data collection forms were developed by the researchers as a result of the literature review. Data collection form consisted of three parts. The first part included questions about socio-demographic characteristics of the adolescent and his/her parents.

Physical activity ratio and anthropometrical measurements

The second part included data on weight and physical activity level, height and weight measurements and dietary habits. Physical activity ratio was a method included in the FAO/WHO/UNU (2004) joint report, the validity and reliability of made by James and Schofield used to determine physical activity level (13). When calculating the activity level of adolescents; they were asked for how many minutes by average they were doing the activities they did in the

last week (sleeping, heavy and light activities and sports activities lying, sitting and standing) within a time period of 24 hours. The time spent for each activity was multiplied with the physical activity coefficient (PAR=Physical Activity Ratio) in the form of multiples of basal metabolic rate, the sum was divided to 1440 and the energy spent in a minute was calculated. For this value; 2.00-2.40 was classified as highly active energetic, 1.70-1.99 as active or moderately active lifestyle and 1.40-1.69 as sedentary or mild activity life-style (13,14).

Anthropometrical measurements are measurements used for classification of growth and development, body fat level and distribution, diagnosis and level of obesity in children and adolescents. In that respect, individuals' height and weight were measured and their BMI values were calculated; 85th and 95th percentiles were considered overweight and above 95th percentile were considered obese (15). Height measurement of adolescents were made in standing position without shoes and socks and any hairpins, bows, hats, etc. which might raise the hair. Weight measurements were done with bare feet on an electronic scale placed on a flat and hard floor, calibrated and had a measurement sensitivity of 0.1 kg and the school uniform of the participants were taken into consideration and the measurements were recorded by deducting 0.5 kg.

Problematic Internet Usage Scale (PIUS)

Third part of the data collection form included Problematic Internet Usage Scale (PIUS). PIUS was a valid and reliable scale for which adolescent form was developed by Ceyhan et al. The scale consisted of 27 items and three subscales. Subscales were listed as excessive internet use, negative outcomes of internet, social benefit/social convenience of internet. PIUS was a five-point Likert scale and each item was scored between 1 and 5. Scoring was as "Not applicable=1", "Seldomly Applicable=2", "Slightly Applicable=3", "Quite Applicable=4" and "Completely Applicable=5". In the scale, 7th and 10th items were reverse coded. Higher scores obtained from the

scale indicated that problematic internet use increases and addiction potential developed (16).

Data collection

For the implementation of the research, the school was visited on the scheduled date and time. The aim of the study and how it would be implemented were explained to the adolescents. They were told that the results of the research would not affect their academic success. Research consent forms were distributed to be delivered to their parents and returned as signed. Second visit was made to the school a week later. The research was carried out with adolescents who have parents' consent. First, the weight and height of the adolescents were measured and recorded. The forms in which their own measurements were recorded were given to the adolescents and it was explained to them how to fill in the rest of the form. After the silence was ensured in the classroom environment, the forms were filled in 20 min on average. Contact information of adolescents' parents was obtained from the consent forms. In the phone conversations with the parents, the data collection form of the parent was filled in by the researcher.

The data obtained within the scope of the research were shown in the form of percentile, mean or standard deviation. For data analysis SPSS (ver.23.0, Chicago, IL, USA) for Windows software package was used. Comparisons between variables were investigated with Chi-Square test, Independent Sample t-test and One Way ANOVA. Results were between 95% confidence interval and significance was evaluated on $P<0.05$, $P\leq 0.001$ level.

Results

The average age of the adolescents was 14.94 ± 2.09 . 38.0% of the adolescents who participated in the study were in 10-14 (n=180) age group, 48.3% (n=229) were female and 38.8% (n=184) were in elementary school and 61.2% (n=290) were in high school. When the education levels of adolescents' parents were examined. 66.5%

(n=315) of the mothers and 78.0% (n=370) of the fathers had high school and higher education (Table 1).

Table 1: Socio-demographic characteristics of adolescents (n=474)

Variables	n	%
Age groups (yr)		
10-14	180	38.0
15-19	294	62.0
Gender		
Female	229	48.3
Male	245	51.7
Number of Children in the Family		
1-3	339	71.5
4 and above	135	28.5
Class		
5. class	44	9.3
6. class	32	6.8
7. class	49	10.3
8. class	59	12.4
9. class	88	18.6
10. class	96	20.3
11. class	58	12.2
12. class	48	10.1
Mother Education Status		
Literate-elementary	159	33.5
High school	141	29.7
University and Above	174	36.8
Father Education Status		
Literate-elementary	104	22.0
High school	125	26.3
University and Above	245	51.7

Approximately four out of ten male adolescents (37.6%) and three out of ten female adolescents (32.9%) were overweight or obese (Table 2). Mean PAR was higher in male adolescents (1.72 ± 0.21), than female adolescents (1.64 ± 0.20) ($t=3.323$; $P=0.01$). When the PAR levels of ado-

lescents who participated in this study were compared according to their genders, female adolescents (61.6%) led a more sedentary life than male adolescents (52.7%) and there was statistical difference between them ($P<0.05$) (Table 3).

Table 2: BMI distributions of adolescents and their parents

BMI		n	%
Mother (n=472)	Weak- Normal	190	40.3
	Overweight-	282	59.7
Father (n=466)	Weak- Normal	119	25.5
	Overweight-	347	74.5
Adolescents (n=474)	Weak- Normal	309	65.2
	Overweight-	165	34.8
Male Adolescents	Weak- Normal	153	61.4
	Overweight- Obese	92	37.6
Female Adolescents	Weak- Normal	156	68.1
	Overweight- Obese	73	32.9

Table 3: Comparison of PAR values according to gender of adolescents

PAR		<i>Ac- tive</i>		χ^2	<i>P</i>
<i>Sedentary</i>					
Gender	n	%	N	%	
Female	141	61.6	88	38.4	3.841
Male	129	52.7	116	47.3	

X²= Chi-Square test

In Table 4, some characteristics of adolescents and PIUS subscales and total scale mean scores were compared. In the comparison with age groups, adolescents in 15-19 age group (16.06 ± 4.43) had higher mean score of excessive internet use than adolescents in 10-14 age group (14.60 ± 4.80) and there was statistical difference between them ($P < 0.05$). "Internet negative results" ($P = 0.004$) and "internet social benefit" subscales ($P = 0.008$) and PIUS total scale mean scores of male adolescents were higher than female adolescents ($P < 0.001$).

There was statistically significant difference between the adolescents' eating and drinking behaviours before sleep and their PIUS total scale and

subscales mean scores ($P < 0.05$). Statistically significant difference was determined between the adolescents' eating-drinking habit during internet use and their PIUS total scale and subscales mean scores ($P < 0.05$). PIUS total score; and subscale mean scores of adolescents who had a habit of "always eating-drinking during internet use" were higher than other adolescents ($P < 0.05$). When income status of adolescents was examined, PIUS total scale mean scores and mean scores of internet negative results and internet social benefit subscales of adolescents who had "more income than expenses" were higher than adolescents who had "income equal to expenses" ($P < 0.05$, $P \leq 0.001$) (Table 4).

Table 4: Comparison of some features of adolescents with PIUS total scale and subscale score average

Variables		<i>Excessive In-</i>	<i>Internet nega-</i>	<i>Internet social</i>	<i>Total PIUS</i>
		<i>ternet use</i>	<i>tive results</i>	<i>benefit</i>	
		$\bar{X}\pm SD$	$\bar{X}\pm SD$	$\bar{X}\pm SD$	$\bar{X}\pm SD$
Age (yr)	10-14 (n= 180)	14.60±4.80	28.85±12.32	15.71±6.64	65.22±22.56
	15-19 (n= 294)	16.06±4.43	30.08±11.97	15.33±6.10	67.73±21.35
	t	3.372	1.073	0.632	1.215
Gender	p	0.001	0.284	0.527	0.225
	Female (n= 229)	15.31±4.83	27.38± 11.31	14.45± 6.02	62.87± 20.82
	Male (n= 245)	15.70±4.43	31.70±12.47	16.44± 6.42	70.43±22.17
PAR	t	0.901	3.943	3.482	3.818
	p	0.368	0.001	0.001	0.001
	Sedentary (n=270)	15.35±4.71	28.89±11.49	15.13±6.16	65.42±21.30
BMI	Active(n=204)	15.71±4.52	30.57±11.84	15.92±6.47	68.56±22.45
	t	0.829	1.495	1.350	1.549
	p	0.407	0.136	0.178	0.122
BMI female	Weak- Normal (n=309)	15.35±4.70	28.97±11.8	15.03±6.13	65.52±21.32
	Overweight-Obese (n=165)	15.82±4.50	30.83±12.5	16.32±6.56	69.13±22.63
	t	1.049	1.595	2.122	1.715
BMI male	p	0.295	0.111	0.034	0.087
	Weak- Normal (n=156)	15.20±4.96	27.19±10.89	14.05±5.71	62.21±20.04
	Overweight-Obese (n=73)	15.56±4.56	27.79±12.22	15.27±6.61	64.28±22.46
Eating- drinking before sleep	t	0.529	0.375	1.426	0.702
	p	0.483	0.598	0.708	0.155
	Weak- Normal (n=153)	15.50±4.42	30.78±12.51	16.01±6.40	68.90±22.11
Eating snacks in front of the screen	Overweight-Obese (n=92)	16.02±4.45	33.23±12.31	17.14±6.43	72.96±22.14
	t	0.885	1.496	1.326	1.393
	p	0.165	0.377	0.135	0.186
Family's socioeco- nomic status	Yes (n=160)	16.69±4.65	32.18±12.28	16.54±6.49	72.04±22.17
	No (n=314)	14.91±4.51	28.31±11.82	14.93±6.14	64.10±21.20
	t	4.004	3.325	2.645	3.795
Family's socioeco- nomic status	p	0.001	0.001	0.008	0.001
	Always (n=74)	18.28±4.10	35.79± 13.08	17.73±6.72	78.47±22.67
	Generally (n=118)	16.00±4.59	30.14±11.25	15.44±5.98	68.16±20.70
Family's socioeco- nomic status	Sometimes (n=241)	14.81±4.35	27.97±11.47	14.68±5.88	63.46±20.61
	Never (n=41)	13.19±4.93	26.60±12.77	16.17±7.85	61.19±21.83
	F	15.858	9.286	4.687	10.586
Family's socioeco- nomic status	p	0.001	0.001	0.003	0.001
	Equivalent to income expense (n=285)	15.24±4.69	28.31±11.12	15.02±5.91	64.71±20.48
	More than income expense (n=189)	15.93±4.51	31.59±13.24	16.17±6.82	69.90±23.43
Family's socioeco- nomic status	t	1.605	2.914	1.952	2.553
	p	0.109	0.004	0.008	0.001

t= student t-test, F=One Way ANOVA

Discussion

According to the studies carried out in our country in the last ten years, the highest obesity ratios were in the southeast region where adult over-

weight and obesity ratios varied between 24% and 53.5% for men and between 29.2% and 64.2% for women (17,18). In this study, 59.7% of the mothers and 71.5% of the fathers were overweight and obese.

Obesity frequency of adolescents who participated in this study was found as 37.6% in boys and 32.9% in girls. In literature review, the rate of being overweight and obese is higher for fathers and male adolescents than the overall country. According to literature, children and adolescents who have obese parents have a higher risk of obesity due to genetic tendency and domestic nutritional habits (19,20). The high rates of being obese and overweight in our research might depend on the nutritional habits in the region and genetic tendency. The nutritional habits of this region were different than the rest of the country. In Gaziantep, included in the “Creative Cities Network” of UNESCO (21) in 2015 and was referred to as the gastronomy city of Turkey, especially eating meat as kebab results in significant fat and red meat intake. Due to this eating habit, the life expectancy of the men living in the city is among five cities which had the lowest life expectancy in our country (22). The tradition of making kebab which descends from father to son manifests itself in the male adolescents of school age compared to female adolescents in the form of being overweight. Addressing the adolescent and his/her family together in the counselling services, activities and health consultancy services will also be quite effective and helpful.

In the literature, adolescents exhibit a sedentary lifestyle and there is a significant relationship between physical activity ratios and gender and boys are more energetic than girls (23,24). Similar to the literature, PAR value of boys was found to be statistically significantly higher than girls in this research. As the school health nurse, it is necessary to organize regular exercise programs or lead the adolescents towards activities such as basketball and volleyball in order to increase physical activity ratio. Habits acquired in this age group affect adulthood.

There was a significant relationship between problematic internet use behavior and age groups in adolescents (4,25). Problematic internet use behavior was lower in 10-14 age group than 15-19 age group in this research. Being able to access mass communication devices such as telephone and internet cafe as he/she gets older, since they

drift apart from the family supervision and the time they spend outside increases, affected the increase in the rates of internet use.

Problematic internet use leads to negative health behaviors on both genders. In many studies carried out in our country and the world, problematic internet behavior is more frequent in male adolescents (26,27). Problematic internet use behaviors of male adolescents were higher in this study. According to this result, especially male adolescents in school age should be considered as risk group in terms of problematic internet use and they should be prioritized in the programs to be carried out.

Problematic internet use is associated with high BMI rates and sedentary lifestyle (28,29). Unlike these studies, no relationship was identified between problematic internet use total mean score and subscale mean scores and BMI and PAR values for both genders in our study. During the study, PIUS mean scores of those who had sedentary lifestyle were higher than those who were active. Although their education life continues, they maintain their activities at school and their PIUS mean scores were higher than those who were active, their internet use habits may increase along with the advancements in technology unless they adopt active lifestyle in adulthood. Problematic internet use behaviors and unhealthy nutritional habits are associated (30,31). In this study, negative behaviors such as eating-drinking before sleep, eating snacks in front of the screen and skipping breakfast which were the unhealthy nutritional habits increase as the problematic internet use habit increases.

Problematic internet use behaviors in adolescents and the family's socioeconomic status are associated and adolescents with a higher socioeconomic level exhibit more sedentary behaviors (32). The reason for that might be the fact that adolescents could access mass communication devices more easily such as a computer or television in their rooms and they had unlimited internet at home as the family's income level increases. Obesity rates of individuals with higher socioeconomic levels are higher. The reason for that might be the fact that individuals with higher socioeco-

conomic levels can easily access any product that they see in television and internet advertisements or it might be the parents' attitude towards the individual.

Conclusion

Problematic internet usage and the damages of obesity affect not only the adolescents but the whole society. Periodic screening and, Training programs should be done to determine the prevalence of obesity and problematic internet usage.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interests.

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