

ADOLESANLARDA İNTERNET KULLANIMI İLE OBEZİTE İLİŞKİSİ

THE ASSOCIATION BETWEEN INTERNET USE AND OBESITY AMONG ADOLESCENTS

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ÖZ

Giriş: Günümüzde teknolojiye hızlı gelişmelere paralel olarak internetin kontrolsüz kullanımı beraberinde çeşitli sağlık problemlerinde artışına neden olmaktadır. Bu çalışmanın amacı, adolesanlarda internet kullanımı ile obezite arasında bir ilişki olup olmadığının değerlendirilmesidir.

Gereç ve Yöntem: Yaşları 12-17 arasında obezite tanısı ile izlenen 50 olgu ile obez olmayan 50 olgu çalışmaya alındı. Tüm olguların ağırlık, ağırlık standart deviasyon skoru (SDS), boy, boy SDS, vücut kitle indeksi (VKİ), VKİ SDS kaydedildi. Obez olguların açlık plazma glukozu, açlık insülin ve HOMA-IR düzeyi değerlendirildi. Her iki gruba internet bağımlılığı ölçeği uygulandı.

Bulgular: Obez olguların internet bağımlılığı ölçeği ortalama puanı 32.82 ± 16.43 iken kontrol grubunun 24.94 ± 14.37 idi ($p=0.012$). Obez olgularda internet bağımlılığı ölçeği puanları ile açlık plazma glukozu, açlık insülin ve HOMA-IR arasında pozitif korelasyon saptandı. ($r=0.281$, $p=0.048$; $r=0.540$, $p<0.001$; ve $r=0.567$, $p<0.001$).

Sonuç: Kontrolsüz internet kullanımı adolesanlarda obezite riskini arttırmaktadır.

SUMMARY

Introduction: Recently, due to the rapid developments in technology, the uncontrolled use of the internet leads to an increase in various healthy problems. The aim of this study was to evaluate the association between obesity and internet addiction among adolescents.

Material and Method: Fifty patients aged between 12 and 17 diagnosed with obesity and 50 non-obese patients were included in the study. Anthropometric data- weight, weight standard deviation score (SDS), height, height SDS, body mass index (BMI), and BMI SDS, were recorded for all subjects. Fasting plasma glucose, fasting insulin, and Homeostatic Model Assessment- Insulin Resistance (HOMA-IR) values were determined for all obese cases. Both groups were administered an internet addiction test.

Result: Mean internet addiction scores were 32.82 ± 16.43 in the obese group and 24.94 ± 14.37 in the control group ($p=0.012$). Internet addiction scores in the obese group were positively correlated with plasma glucose, insulin and HOMA-IR ($r=0.281$, $p=0.048$; $r=0.540$, $p<0.001$; and $r=0.567$, $p<0.001$, respectively).

Conclusion: Our findings suggest that uncontrolled internet use increases the risk of obesity.

INTRODUCTION

The World Health Organisation describes obesity as 'abnormal or excessive fat accumulation that presents a risk to health.' It results from an imbalance between energy intake and expenditure (1). Studies show that the prevalence of obesity is increasing. Environmental factors such as an increasingly sedentary lifestyle, decreased physical activity and changes in eating habits are implicated in this rise in the prevalence of obesity. Studies from Turkey have reported varying prevalences in different regions. One large study from Turkey determined that 8.2% of children aged 6-18 are obese and 14.3% are overweight (2). Childhood obesity has been linked to several complications emerging in the early period, including hypertension, non-alcoholic hepatic steatosis, type 2 diabetes, hyperlipidemia, and coronary artery disease (3). Obesity has therefore become a preventable public health problem.

A sedentary lifestyle is a very significant factor in the development of obesity. Use of the internet, a major source of entertainment, communication, and information for children, is also increasing all the time. As technology advances, the time that children spend engaging with technology is increasing, and the time they devote to physical activity is therefore decreasing. The aim of this study was to evaluate the association between obesity and internet addiction among adolescents.

MATERIAL AND METHOD

Fifty patients aged between 12 and 17 diagnosed with obesity and followed-up by the Pediatric Endocrinology Clinic were included in the study. Subjects with chronic drug use, who declined to take part, with underlying chronic disease, or with syndromic obesity were excluded. Fifty healthy children with no obesity or systemic disease were enrolled as the control group. This study was approved by Baskent University Institutional Review Board and Ethics Committee and consent forms were received from children and their families.

Anthropometric data- weight, weight standard deviation score (SDS), height, height SDS, body mass index (BMI), and BMI SDS, were recorded

for all subjects. All anthropometric data were converted to standard deviation scores using Turkish standard data (4). Subjects with BMI SDS>2 were regarded as obese. Fasting plasma glucose, fasting insulin, and Homeostatic Model Assessment- Insulin Resistance (HOMA-IR) values were determined for all obese cases. All blood specimens were collected in the morning between 08:00 and 10:00 after 10-h fasting. Insulin measurement (IRI) was performed using the chemiluminescence method on an Advia Siemens Centaur XP device (Ireland). Fasting plasma glucose was measured using the spectrophotometric method on an Advia Siemens 1800 (Japan) device. HOMA-IR was calculated using the formula $\text{fasting plasma glucose (mmol/l)} \times \text{fasting insulin (mcU/ml)} / 22.5$ (5). Both groups were administered an internet addiction test.

Internet Addiction Test

The internet addiction test consisted of 20 questions developed by applying the 'diagnostic questionnaire' based on DSM-IV 'pathological gambling' criteria developed by Young (6). The participant is asked to select one from 'Never,' 'Rarely,' 'Sometimes,' 'Usually' and 'Continually.' These options are scored 0,1,2,3, 4, and 5, respectively. Scores of 80 or more are defined as 'internet addiction.' Subjects scoring 50-79 were defined as 'exhibiting limited symptoms' and those scoring 50 or less as 'exhibiting no symptoms'. The scale, translated from English into Turkish during Bayraktar's research, was examined by five members of the Ege University Faculty of Letters Psychology Department teaching staff, and was applied in such a way as to be comprehensible to adolescents aged 12-17, without compromising the integrity of the questions. The standardized alpha value of the translated test is .91 in terms of reliability, and .87 in terms of its Spearman-Brown value (7).

Statistical analysis

Statistical analysis was performed on statistical package SPSS version 17 (SPSS Inc., Chicago, IL). Data were expressed as mean±standard deviation. Parameters with normal distribution were compared between the two groups using Student's t-test, whereas parameters with non-normal distribution were compared between the

two groups using the Mann-Whitney U test. Pearson's correlation analysis was used to assess the relationships between parameters that exhibited normal distribution. Chi-square test was used to compare categorical variables. A p value less than 0.05 was considered statistically significant.

RESULTS

Fifty obese and fifty normal weight subjects were included in the study. The mean ages were 14.35 ±1.83 years in the obese group and 14.44±1.74 in the control group. The female to male ratio was 27/23 in the obese group and 25/25 in the control group. No statistically significant difference was determined between the obese and control groups in terms of age or sex (p>0.05). The mean BMI SDS in the obese group was 2.47 ±0.52 whereas it was 0.32±1.03 in the control

group (Table1).The mean insulin level in the obese group was 15.33 ±5.63, and the mean HOMA-IR value was 3.39 ±1.30.

The mean internet addiction test score of the obese cases was significantly higher, at 32.82 ±16.43, than that of the control group at 24.94 ±14.37 (p=0.012). There was no difference between the sexes in terms of internet addiction scores (p=0.620).No internet addicted patient was identified in either the obese or control groups. Ten(20%) subjects in the obese group and two (4%) in the control group exhibited borderline symptoms.

Internet addiction scores in the obese group were positively correlated with plasma glucose, insulin and HOMA-IR. There was no statistically significant correlation between BMI SDS and internet addiction (Table 2).

Table 1. Comparison of demographic characteristics and internet addiction score in obese and control groups

	Obese (n=50)	Control (n=50)	p value
Age (mean+ SD)	14.35±1.83	14.44±1.74	0.806
Girls(%)/boys (%)	27/23	25/25	0.841
BMISDs(mean+ SD)	2.47 ±0.52	0.32±1.03	<0.001
IA score (mean+ SD)	32.82±16.43	24.94±14.37	0.012

BMI SDS: Body mass index standart deviation score, IA: Internet addiction

Table 2. Correlation of internet addiction scores with laboratory parameters and body mass index in the obese group

	BMI SDS		Fasting glucose		Insülin		HOMA-IR	
	Corelation coefficient (r value)	p value	Corelation coefficient (r value)	p value	Corelation coefficient (r value)	p value	Corelation coefficient (r value)	p value
IA score	0.250	0,079	0.281	0.048	0,540	<0.001	0,567	<0.001

IA: Internet addiction, BMI SDS: Body mass index standart deviation score, HOMA-IR: Homeostatic Model Assessment- Insulin Resistance

DISCUSSION

Internet addiction, which is growing in line with technological changes, may be defined as an inability to control one's internet use, resulting in adverse impacts on daily life (8).The number of studies examining the effects of internet addiction in children on eating behaviors and obesity is limited. While some studies have determined a correlation between excessive use of technology and low physical activity levels and a high body

mass index (9,10), others have observed no significant association (11,12). Çam and Nur (13) determined no relation between problematic internet use and obesity in their study of a group of high school and university students aged 12-25. Tao et al (14), in their study that they applied the eating disorders and eating attitudes test inventory and determined significantly higher eating disorder scores in the group with internet addiction. Another study of subjects aged 14-18

reported that BMI was significantly positively correlated with weekly internet use and the internet addiction test (15). A study of 2467 school-age children in Qatar observed that the majority of overweight and obese children spent 3 h a day or more online (16). Internet addiction scores were higher in our obese group than in the control group. Although no cases of internet addiction were identified in either group, the number of cases exhibiting borderline symptoms (subjects with probable addiction or at risk) was higher in our obese group than among the controls. This suggests that uncontrolled internet use increases the risk of obesity.

Although some studies have reported higher internet addiction scores among boys than girls (17,18,19), others do not support this finding (20). We determined no significant difference between boys and girls in terms of internet addiction scores in our study.

Insulin resistance is a metabolic disorder characterized by an impaired physiological response to insulin. Factors such as unhealthy eating, obesity, genetic factors, and a sedentary lifestyle have been reported to contribute to the development of insulin resistance (21,22). Internet addiction scores were positively correlated with fasting blood glucose, insulin and HOMA-IR in this study. Prolonged time spent immobile online and increased unconscious consumption of snack foods online may contribute to insulin resistance. Although positive correlation was determined between BMI SDS and internet addiction scores in the obese group,

this was not statistically significant. We think that the low sample number may have affected this.

The main limitations of this study are the low case and control numbers and the use of self-report scales. At the same time, our study did not investigate other sedentary lifestyle behaviors apart from internet use that might lead to obesity.

CONCLUSION

Childhood obesity is a disease with a growing prevalence that lowers the individual's quality of life. Increased internet use in line with technological developments is an unsurprising phenomenon. Excessive internet use can lead to unbalanced nutrition, and the time set aside for physical activity also decreases with prolonged periods of immobility. Our findings suggest that uncontrolled internet use increases the risk of obesity. The most important step in the treatment of obesity is family education, the basis of education for the child. Families and students must be informed about internet use, public service announcements concerning healthy diet and exercise programs, factors that enhance quality of life, must be increased, and training sessions on effective intrafamilial communication should be provided to enable families to spend quality time with their children. In addition, it is also important for training programs concerning aware and safe internet use to be provided in schools. Further large, prospective studies investigating the relationship between internet use and obesity are needed.

REFERENCES

1. World Health Organization. Obesity and Overweight Fact Sheet No:311, Geneva, WHO(May2012). www.who.int/mediacentre/factsheets/fs311/en/.
2. Türkiye Beslenme ve Sağlık Araştırması. Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik Bölümü ve Ankara Numune Eğitim ve Araştırma Hastanesi, Ankara; 2010.
3. Robinson GA, Geier M, Rizzolo D, Sedrak M. Childhood obesity: complications, prevention strategies, treatment. JAAPA 2011; 24(12):58-63.
4. Bundak R, Furman A, Gunoz H, Darendeliler F, Bas F, Neyzi O. Body mass index references for Turkish children. Acta Paediatr 2006; 95(2): 194–8.
5. Matthews DR, Hosker JP, Rudenski AS, Naylor BA, Treacher DF, Turner RC. Homeostasis model assessment: insulin resistance and beta-cell function from fasting plasma glucose and insulin concentrations in man. Diabetologia 1985; 28(7): 412-9.
6. Young, K.S. Internet addiction: The emergence of a new clinical disorder. Cyberpsychol Behav 1996; 3(1); 237-44.

7. Bayraktar F. İnternet Kullanımının Ergen Gelişimindeki Rolü. [Yüksek Lisans Tezi] , Ege Üniversitesi, Sosyal Bilimler Enstitüsü, İzmir; 2001.
8. Young KS. Internet addiction. *Am Behav Sci* 2004; 48(4): 402-41.
9. Mota J, Ribeiro J, Santos MP, Gomes H. Obesity, physical activity, computer use, and TV viewing in Portuguese adolescents. *Pediatr Exerc Sci* 2006; 18(1): 113-21.
10. Tammelin T, Ekelund U, Remes J, Näyhä S. Physical activity and sedentary behaviors among Finnish youth. *Med Sci Sports Exerc* 2007; 39(7): 1067-74.
11. Feldman DE, Barnett T, Shrier I, Rossignol M, Abenham L. Is physical activity differentially associated with different types of sedentary pursuits? *Arch Pediatr Adolesc Med* 2003; 157(8): 797-802.
12. Kerner MS, Kurrant AB, Kalinski M. Leisure-time physical activity, sedentary behavior, and fitness of high school girls. *Eur J Sport Sci* 2004; 4(2): 1-17.
13. Çam HH, Nur N. A Study on the prevalence of internet addiction and its association with psychopathological symptoms and obesity in adolescents. *TAF Prev Med Bull* 2015; 14(3): 181-8.
14. Tao ZL, Liu Y. Is there a relationship between Internet dependence and eating disorders? A comparison study of Internet dependents and non-Internet dependents. *Eat Weight Disord* 2009; 14(2-3): 77-83.
15. Canan F, Yıldırım O, Ustunel TY, Sinani G, Kaleli AH, Gunes C, et al. The relationship between internet addiction and body mass index in Turkish adolescents. *Cyberpsychol, Behavand Soc Netw* 2014; 17(1): 40-5.
16. Bener A, Al-Mahdi HS, Al-Nufal M, Ali AI, Vachhani PJ, Tewfik I. Association between childhood computer use and risk of obesity and low vision. *Journal of Public Health Frontier* 2012; 1(3): 66-72.
17. Siomos KE, Dafouli ED, Braimiotis DA, Mouzasand OD, Angelopoulos NV. Internet Addiction among Greek Adolescent Students. *Cyberpsychology & Behavior* 2008;11(6): 653-7.
18. Chak K, Leung L. Shyness and Locus of Control as Predictors of Internet Addiction and Internet Use. *Cyberpsychology & Behavior* 2004; 7(5): 559-70.
19. Ha JH, Kim SY, Bae SC, Bae S, Kim H, Sim M. Depression and Internet Addiction in Adolescents. *Psychopathology* 2007; 40(6): 424–30.
20. Kaltiala HR, Lintonene T, Rimpela A. Internet addiction? Potentially problematic use of the internet in a population of 12-18 year-old adolescents. *Addict Res Theory* 2004; 12(1): 89-96.
21. Barnard RJ, Wen SJ. Exercise and diet in the prevention and control of the metabolic syndrome. *Sports Med* 1994; 18(4):218–28.
22. Landsberg L. Body fat distribution and cardiovascular risk: A tale of 2 sites. *Arch Intern Med* 2008;168(15): 1607–8.

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