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ARAŞTIRMA / RESEARCH

Examination of the Relationship Between Nutrition, Exercise Behavior and Internet Addiction in Adolescents

Adölesanlarda Beslenme, Egzersiz Davranışları ile İnternet Bağımlılığı Arasındaki İlişkinin İncelenmesi

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Abstract

Objective: This study aims to determine the relationship between adolescents' nutrition-exercise behaviors and internet addiction, as well as identify the factors affecting their eating-exercise behaviors and internet addiction.

Material and Method: This cross-sectional descriptive correlational study was performed in Fethiye. The sample of the study consisted of 421 students attending 11 secondary schools. Data were collected using a descriptive data form, the Internet Addiction Scale and the Nutrition Exercise Behavior Scale. The data were collected by the researcher after obtaining ethical committee and institutional permissions.

Results: The students' psychological/addictive eating behavior subscale mean score was 38.9±8.8, their healthy eating/exercise subscale mean score was 47.6±9.4, the unhealthy eating/exercise behavior subscale mean score was 49.0±7.0, and the meal pattern subscale mean score was 23.4±4.5. The internet addiction scale mean score was 19.6±7.5. The regression analysis showed that variables pertaining to the students' psychological/addictive eating behavior, meal patterns, unhealthy nutrition/exercise behavior, their use of the internet for social media and other purposes, their class, and their consciousness of eating during the COVID-19 pandemic explained 35.8% of internet addiction, meaning that the model was statistically significant. An inverse correlation was found between the variables of psychological/addictive eating, meal patterns, unhealthy nutrition/exercise and being conscious of what one was eating during the COVID-19 pandemic, while a positive correlation was found between the variables of using the internet for social media and class.

Conclusion: Pediatric nurses play an important role in supporting the healthy development of adolescents by creating programs to instill healthy lifestyle habits.

Keywords: Adolescent, nutrition, exercise, behavior, internet addiction.

Öz

Amaç: Bu çalışma, ergenlerin beslenme-egzersiz davranışları ile internet bağımlılığı arasındaki ilişkiyi, ergenlerin beslenme-egzersiz davranışları ve internet bağımlılığını etkileyen faktörleri belirlemeyi amaçlamaktadır.

Gereç ve Yöntem: Bu kesitsel, tanımlayıcı, korelasyonel çalışma Fethiye'de yürütülmüştür. Araştırmanın örneklemini 11 ortaokulda eğitimine devam eden 421 öğrenci oluşturmuştur. Veriler Tanımlayıcı Veri Formu, İnternet Bağımlılığı Ölçeği ve Beslenme Egzersiz Davranışı Ölçeği kullanılarak toplanmıştır. Veriler etik kurul ve kurum izinleri alındıktan sonra araştırmacı tarafından toplanmıştır.

Bulgular: Öğrencilerin psikolojik/bağımlı yeme davranışı alt boyutu puan ortalamaları 38,9±8,8; sağlıklı beslenme/egzersiz davranışı alt boyutu puan ortalamaları 47,6±9,4; sağlıksız beslenme/egzersiz davranışı alt boyutu puan ortalamaları 49,0±7,0; öğün düzeni alt boyutu puan ortalamaları 23,4±4,5 olarak bulunmuştur. İnternet Bağımlılığı Ölçeği puan ortalamaları 19,6±7,5'tir. Yapılan regresyon analizinde internet bağımlılığını, öğrencilerin psikolojik/bağımlı yeme davranışı, öğün düzeni, sağlıksız beslenme/egzersiz davranışı, interneti sosyal medya ve diğer amaçlı kullanım, sınıf ve Covid-19 pandemisinde beslenme şekline dikkat etme değişkenlerinin %35,8'inin açıkladığı bulunmuştur ve modelin anlamlı olduğu görülmektedir. Psikolojik/bağımlı yeme, öğün düzeni, sağlıksız yeme/egzersiz ve Covid-19 pandemisinde beslenme şekline dikkat etme değişkenleri arasında ters yönde, sosyal medya için internet kullanma ve sınıf değişkenleri arasında pozitif yönde ilişki bulunmuştur.

Sonuç: Adölesanın sağlıklı gelişimine destek vermek için sağlıklı yaşam tarzı alışkanlıklarını geliştirmeye yönelik programların oluşturulması ve öğrencilere ulaştırılması konusunda çocuk sağlığı hemşirelerine önemli roller düşmektedir.

Anahtar Kelimeler: Adolesan, beslenme, egzersiz, davranış, internet bağımlılığı.

1. Introduction

Although internet addiction is referred to by various names in the literature, it is generally defined as excessive use of the internet, being connected to the internet with an excessive desire and desire for more than necessary time. The emergence of excessive agitation, stress, restlessness and other emotional reactions in the absence of the Internet leads to disruption of the person's work, social and family life (1). Internet addiction can impact individuals at any age, but it has been noted that children and adolescents comprise the segments of the population that are most influenced (2). Studies have demonstrated support for the premise that internet addiction can lead to negative heath behaviors, causing significant problems, the main issues among which may be obesity and lack of physical activity (3, 4). One study reported that obesity is more common in children who display high levels of internet addiction (5). In Turkey, the time children spend on the internet tends to increase as they grow older, with body mass index (BMI) figures rising as well in connection with this. An increase in the time spent in front of the screen, the consumption of fast foods, a disruption in healthy eating, decreased physical activity, along with a related drop in the metabolic rate, as well as increased exposure to food advertising are factors that increase the risk of obesity (6).

Adolescence is a period of rapid physiological, psychological, and social development, and a time when behavior patterns are formed that are likely to continue throughout an individual's lifetime. This is the period that is known to be the best time to adopt positive health behaviors but also a period in which the individual is at the greatest risk of developing medical conditions that will carry on into adulthood (6). In order to attain optimal wellness in adulthood, the right health behaviors need to have been adopted during adolescence. Physical activity and balanced nutrition are two of the fundamental and important components of a healthy lifestyle. Healthy lifestyle habits have the potential to ensure that adolescents look upon life from a more positive perspective and elevate their state of wellness. Since psychological and physical wellbeing are interconnected, besides healthy nutrition, regular scheduled exercise has an important impact on developing the body's defense mechanism against many diseases (7). Physical activity enables individuals to live a more comfortable life, both physiologically and psychologically, helps them to build up body resistance to disease, and has an invaluable effect on resolving problems in the social environment (8). Pediatric nurses and other healthcare personnel play an important role in creating programs that promote healthy lifestyle habits and in ensuring that children have access to such programs. As a part of their roles and responsibilities in society, nurses need to make use of their educational, consultancy, and advocacy roles to contribute to improving adolescent health, thereby supporting the development of positive healthy behaviors among individuals in the community. There are a limited number of studies in the literature that evaluate the relationship between adolescents' internet addiction and their eating and exercising behaviors (3,4). It is believed that exploring the internet habits, and the eating and exercising behaviors of adolescents will serve to contribute to the prevention of potential health problems in their future lives.

In this study, we aimed to examine the relationship between internet addiction and nutritional and exercise behaviors among adolescents. Research questions:

- Do sociodemographic characteristics have an impact on nutritional and exercising behavior?
- Do sociodemographic characteristics have an impact on internet addiction?
- Is there a relationship between internet addiction and nutritional and exercising behavior?

2. Material and Method

2.1. Sample and Setting

This cross-sectional and correlational study was conducted in the Aegean city of Turkey. The study universe consisted of 5169 high school students from 11 schools in Fethiye. According to the sample calculation, whose universe is known, the sample size was calculated as 328 adolescents with 5% acceptable error and 95% confidence level. In order to increase the power of the research and to prevent receiving erroneous and incomplete information, the number of samples was increased by 10% to reach 421 adolescents. The inclusion criteria for the adolescents in the study were as follows: being able to read and write Turkish, attending 6th, 7th or 8th grades, having no health problems that would prevent them from exercising, and agreeing to participate in the study.

The mean age of the students participating in the study was 11.8±0.8 (min-max:10-13). The number of siblings the students had, including themselves, was 2.3±08. Of the students, 50.6% were girls and 88.6% lived in the district. Among the students, 35.4% were in the sixth grade, 31.8% were in seventh grade, and 32.8% were in eighth grade. Among them, 81.2% lived in a nuclear family. The family income was greater than expenditure for 48.5% of the students.

2.2. Procedure

The data collection process was carried out in two stages. In the first stage, the students were measured for height and weight; the data collection forms were filled out in the second stage. At an appropriate time designated by the school administration, the students were informed about the aim of the study, and the consent forms for their parents were given to them to take home in closed envelopes. The consent forms were later collected. The first and second stages were carried out at an interval of a week. The students' height and weight measurements were taken at an appropriate time designated by the school administration after the parental consent forms had been collected. The researcher measured and recorded the children's height and weight. A portable sensitive electronic scale was used to measure the children's body weight (± 0.1 kg), and height was measured with a mobile stadiometer (± 0.5 cm). The children were weighed with their shoes and outer clothing removed (with a minimum of clothing) and the reading was rounded off to the nearest 0.1 kg. Height measurements were taken in a standing position without shoes, back resting against

the back of the stadiometer, heels together, shoulders relaxed and arms at the sides. The children's height was measured with the reading rounded to the nearest 0.1 cm. Body mass index (BMI) standard deviation scores were calculated for each child. The auxology program (9) was used for the calculations. The auxology program makes an analysis based on the child's date of birth, gender, weight, height (kilos), date of measurement, height/weight data of parents, and growth SDS (standard deviation score). The program can be accessed at http://www.childmetrics.org/ (10). Children whose BMI SDS (Body mass index standard deviation score) is between +2 and -2 standard deviation were considered of normal weight, those with a BMI SDS of over +2 were considered obese, and those with a BMI SDS of below -2 were considered underweight.

2.3. Measures

A descriptive data form, the Nutrition/Exercise Behavior Scale, and the Internet Addiction Scale were used as data collection instruments.

Descriptive data form: This form, drawn up by the researchers, contained questions on sociodemographic features such as the child's age, gender, the number of family members, the parents' education, their occupations, the family's income status, and also queries that define the child's nutritional habits and internet usage (11-13).

Nutrition/Exercise Behavior Scale (NEBS): This 45-item, 5-point Likert-type of scale was developed by Yurt et al. (14) and has four subscales. The scale is scored on the basis of a range of 1-Doesn't describe me at all, 2-Describes me a little, 3-Describes me somewhat, 4-Is close to describing me, and 5-Describes me completely. However, items 7, 8, 9, 10, 11, 12, 14, 15, 17, 18, 20, 22, 30, 31, 32, 34, 35, 36, 37, 38, 39, 42, and 43, a total of 23 items are scored in reverse. The Psychological/addicted eating behavior subscale consists of 11 items (items 7, 8, 10, 20, 22, 34, 35, 36, 37, 38, 39) with a possible score of 11-55; higher scores indicate a higher risk for psychological eating behavior. The Healthy nutrition/exercise behavior subscale consists of 14 items (items 13, 16, 19, 23, 24, 25, 26, 27, 28, 33,40, 41, 44, 45) with a possible score of 14-70; higher scores indicate a higher adaptation to healthy nutrition and exercising behaviors. The Unhealthy nutrition-exercise behavior subscale consists of 14 items (items 9, 11, 12, 14, 15, 17, 18, 21, 29, 30, 31, 32, 42, 43) with a possible score in the range of 14-70; higher scores indicate higher adaptation to unhealthy eating and exercising habits. The Meal Patterns subscale comprises six items (items 1, 2, 3, 4, 5, 6) with a possible score of 6-30; higher scores point to a healthy meal pattern. Cronbach's alpha coefficient on the original NEBS was 0.85. Cronbach's alpha coefficients for the subscales were as follows: Psychological/addicted eating behavior, 0.61; Healthy Nutrition-Exercise Behavior, 0.62; Unhealthy Nutrition-Exercise Behavior, 0.68, and Meal Patterns, 0.73 (14). In this study, the internal consistency coefficient Cronbach's alpha was calculated to be 0.81.

Internet Addiction Scale (IAS): Taş (15) developed a single-factor internet addiction scale for adolescents on the basis of nine recommended criteria to make a diagnosis of internet game addiction. The scale is a 9-item Likert-type of instrument ("Never," "Rarely," "Sometimes," "Often" and "Always") that has been designed as a short form. The IAS for adolescents consists of 9 items and a single factor. There are no reversely scored items on the scale. Higher scores indicate higher levels of internet addiction. Filling out the responses to the scale takes about 5-10 minutes. The Cronbach's alpha coefficient has been calculated to be 0.85 (15). In this study, the internal consistency coefficient Cronbach's alpha was calculated to be 0.81.

2.4. Data Analysis

The data collected were analyzed using the Statistical Package for the Social Sciences 22.0 (IBM Corp. Released 2013. IBM SPSS22.0. Armonk, NY: IBM Corp.) statistical program. To determine whether the data were normally distributed, a One-Sample Kolmogorov-Smirnov Test was performed and it was seen that the data were not normally distributed. Descriptive statistics were expressed in frequencies, and percentages. The Kruskal-Wallis and the Mann-Whitney U non-parametric tests were used in the analysis of the data. Tamhane's T2 multiple comparison test was performed to understand the source of the significant difference in multiple variables. The Spearman's correlation analysis was employed to evaluate the relationship between the scales. Multiple regression analysis was performed to determine which factors affected the adolescents' nutrition, physical activity, and internet addiction. In all the regression tables, the error histogram to determine the fit of the regression model showed normal distribution. The Durbin-Watson coefficient was examined for autocorrelation. The Variance Inflation Factor (VIF) showed that there was no relation between the independent variables. There is no extreme value. The results were considered significant at $p<0.05$ with a 95% confidence interval.

3. Results

The mean score for the Psychological/Addicted Eating Behavior subscale was 38.9±8.8, the mean score for the Healthy Nutrition/Exercise Behavior subscale was 47.6±9.4, the mean score for the Unhealthy Nutrition/Exercise Behavior subscale was 49.0±7.0, and the mean score on the Meal Patterns subscale was 23.4±4.5. The students' total mean score on the IAS was 19.6±7.5.

A comparison of the NEBS subscales and IAS mean scores according to some socio-demographic characteristics of the students are shown in Table 1. It was observed that the unhealthy nutrition/exercise behavior subscale mean score of 13-year-old students was significantly lower than that of 11-year-olds (p=0.010). The internet addiction mean score of 11-year-olds was lower than that of the 13-year-olds; the difference was statistically significant (p=0.001). It was seen in the comparison of the students' unhealthy nutrition/exercise subscale mean scores by gender that the girls' mean score was higher than that of the boys (p=0.002). In the comparison by family income, it was observed that the students in a family with a higher income had a higher mean score on the healthy nutrition/exercise subscale compared to students in lower-income households (p=0.01). The healthy nutrition/exercise subscale mean score of eighth-grade students was significantly lower than that of sixth-grade students (p=0.035). The IAS mean score of the students in the eighth grade was significantly higher than in the sixth (p=0.000) and seventh grades (p=0.038) (p=0.001).

Table 1. Comparison of NEBS Subscales and IAS Mean Scores According to Sociodemographic Characteristics of Students

Characteristics	Psychological/Addicted Eating Behavior	Healthy Nutrition-Exercise Behavior	Unhealthy Nutrition-Exercise Behavior	Meal Pattern	Internet Addiction Scale
Ages	XX**±Ss**	XX**±Ss**	XX**±Ss**	XX**±Ss**	XX**±Ss**
10 (a)	41.3±9.4	49.5±7.0	46.6±7.6[a]	21.6±6.0	18.1±4.7[a]
11 (b)	40.0±8.6	48.2±9.8	50.1±7.0[b]	23.9±4.1	17.9±6.4[b]
12 (c)	38.5±8.9	47.3±9.1	49.0±7.2[c]	23.0±4.6	20.0±8.2[c]
13 (d)	38.0±8.8	47.1±9.5	47.7±6.6[d]	23.3±4.7	21.4±7.6[d]
Test and p value	x^2=4.680	x^2=1.401	x^2=10.711	x^2=3.071	x^2=14.627
	p=0.197	p=0.705	**p=0.013 d<b**	p=0.381	**p=0.002 b<d**
Gender					
Girl	38.7±8.8	47.3±9.0	50.1±6.2	23.1±4.3	19.0±7.5
Boy	39.1±8.8	47.9±9.9	47.8±7.6	23.7±4.7	20.1±7.4
Test and p value	U=21507.500	U=21605.500	U=18328.500	U=20038.500	U=20235.500
	p=0.605	p=0.691	**p=0.002**	p=0.091	p=0.124
Number of subling					
1	39.5±8.3	47.4±9.7	48.1±6.8	23.1±4.7	19.5±7.3
2	39.1±8.7	46.8±9.5	48.9±7.0	23.5±4.3	19.4±7.3
3	38.5±9.4	48.5±9.6	49.4±7.2	23.3±4.9	20.6±8.0
4 and more	38.6±8.4	49.8±7.7	49.5±7.4	23.6±4.1	17.7±6.7
Test and p value	x^2=0.527	x^2=4.740	x^2=1.497	x^2=230	x^2=3.763
	p=0.913	p=0.192	p=0.683	p=0.973	p=0.288
Location					
Center	36.2±8.8	48.0±10.0	47.2±7.2	22.6±5.6	23.7±17.4
District	39.2±8.6	47.4±9.3	49.3±6.8	23.4±4.4	19.2±7.0
Village	38.3±11.3	51.1±10.2	44.7±10.2	24.7±4.4	21.5±7.9
Test and p value	x^2=3.754	x^2=2.801	x^2=4.881	x^2=2.532	x^2=4.271
	p=0.153	p=0.247	p=0.087	p=0.282	p=0.118
Income					
Income more than expenditure (a)	38.2±9.3	48.9±9.3[a]	48.1±7.6	23.4±4.3	19.5±6.6
Income equal to expenditure (b)	39.9±8.3	46.8±9.4[b]	49.8±6.1	23.6±4.6	19.7±7.9
Income less than expenditure (c)	37.5±8.3	43.2±9.2[c]	49.1±8.0	21.6±4.5	23.1±9.6
Test and p value	x^2=4.834	x^2=9.898	x^2=4.170	x^2=5.555	x^2=3.556
	p=0.089	p=0.007 c<a	p=0.124	p=0.062	p=0.173
Family type					
Nuclear family	38.9±8.9	47.5±9.4	48.9±7.1	23.5±4.3	19.5±7.5
Extended family	39.7±7.7	48.9±10.0	50.1±6.8	23.3±4.8	18.4±7.3
Fragmented family	38.7±9.0	46.9±9.1	48.3±6.5	22.6±6.0	21.3±7.4
Test and p value	x^2=0.468	x^2=1.058	x^2=1.422	x^2=0.095	x^2=3.322
	p=0.792	p=0.589	p=0.491	p=0.953	p=0.190
Grade					
6 (a)	40.0±8.7	48.7±9.8	49.7±7.1[a]	23.5±4.3	17.9±6.4[a]
7 (b)	38.3±8.4	46.8±8.3	49.2±7.1[b]	23.0±4.4	19.3±7.6[b]
8 (c)	38.4±9.2	47.2±10.0	47.9±6.8[c]	23.3±4.8	21.6±7.9[c]
Test and p value	x^2=3.321	x^2=2.967	x^2=6.501	x^2=2.632	x^2=15.633
	p=0.190	p=0.227	**p=0.039**	p=0.268	**p=0.001**
			c<a		**a,b<c**

(x^2): Kruskal Wallis, Mann Whitney U Test.

A comparison of the students' mean score on the nutrition/exercise subscale and the total mean score on the IAS according to their nutrition status and the effect of the COVID-19 pandemic on their nutrition is presented in Table 2. Statistically significant differences were detected between the psychological/addicted eating behaviors (p=0.001), healthy nutrition/exercise (p=0.001), unhealthy nutrition/exercise (p=0.001), meal patterns (p=0.001) subscales and the IAS (p=0.001) mean scores according to whether or not the students believed they were eating healthily. The results of the analysis showed that the difference stemmed from the students who believed they were eating healthily; it was seen that this group had higher mean scores on the psychological/addicted eating behaviors, healthy nutrition/exercise, unhealthy nutrition/exercise, and meal patterns subscales compared to those students that did not believe they were eating a healthy diet. The students who did not think they were eating healthily had a significantly higher mean score on the IAS compared to those believing they were eating a healthy diet (p=0.000) and those who were undecided about this (p=0.037). The undecided students displayed a significantly higher mean score on the IAS compared to those believing they were eating a healthy diet (p=0.000). There was a statistically significant difference between the eating behavior (p=0.017) and unhealthy nutrition/exercise (p=0.009) subscale scores in terms of the changes in the students' eating habits during the COVID-19 pandemic. The students whose eating habits changed during the COVID-19 pandemic had a higher mean score on the psychological/addictive eating and unhealthy nutrition/exercise subscales than those whose habits did not change. The students who believed their eating habits had changed during the COVID-19 pandemic were grouped under categories describing the change, i.e., "being more careful with nutrition," "eating less," and "eating more." There was a statistically significant difference between the mean scores on the psychological/addictive eating behavior (p=0.003), healthy nutrition/exercise (p=0.006), meal patterns (p=0.001) subscales and the internet addiction (p=0.001) mean scores in terms of the changes in the students' eating habits during the COVID-19 pandemic. The psychological/addictive eating behavior of students who said they ate more during the COVID-19 pandemic was at a significantly lower level. The mean score on the healthy nutrition/exercise subscale was significantly higher among the students who said they were careful with their nutrition during the COVID-19 pandemic. The mean score on the meal patterns subscale was significantly lower among the students who said they ate less during the COVID-19 pandemic. The IAS mean score of the students who said they were more careful with nutrition during the COVID-19 pandemic was significantly lower than of those who said they ate more or ate less during the pandemic.

Table 2. Comparison of NEBS Subscales and IAS Mean Scores According to Nutritional Status and the Impact of the Covid-19 Pandemic on the Nutritional Status of Students

Characteristics	Psychological/Addicted Eating Behavior	Healthy Nutrition-Exercise Behavior	Unhealthy Nutrition-Exercise Behavior	Meal Pattern	Internet Addiction Scale
	XX±Ss	XX±Ss	XX±Ss	XX±Ss	XX±Ss
The state of thinking that you are eating healthy					
Yes (a)	41.0±8.0a	50.9±9.5a	50.4±7.2a	25.1±3.9a	16.8±6.6a
No (b)	33.1±10.8b	43.4±7.7b	45.0±7.5b	19.4±5.4b	26.2±9.5b
Undecided (c)	38.0±8.7c	45.4±8.7c	48.2±6.6c	22.4±4.3c	21.0±6.9c
Test and p value	x^2=22.717	x^2=36.770	x^2=19.961	x^2=53.794	x^2=52.453
	p=0.001	**p=0.001**	**p=0.001**	**p=0.001**	**p=0.001**
	b,c<a	**b,c<a**	**b,c<a**	**b,c<a**	**b<c<a**
Change in eating habits in the Covid-19 pandemic					
Yes	40.3±8.3	47.6±9.3	50.0±7.0	23.8±4.2	18.9±7.4
No	38.0±7.0	47.6±9.5	48.3±7.0	23.1±4.7	20.0±7.5
Test and p value	U=18245.500	U=21060.500	U=17965.500	U=19681.000	U=19222.0500
	p=0.017	p=0.932	**p=0.009**	p=0.223	p=0.111
The way eating habits changed in the Covid-19 pandemic					
More mindful eating (a)	40.0±7.7a	50.5±9.4a	49.0±7.3	24.7±7.3a	17.1±6.8a
Eating less (b)	40.4±8.4b	45.9±11.0b	47.8±6.2	20.7±5.6b	22.1±7.1b
Eating more (c)	36.1±9.4c	46.7±8.7c	48.1±7.1	23.2±4.7c	20.8±7.5c
Test and p value	X^2=11.750	X^2=10.133	X^2=1.254	X^2=16.522	X^2=19.401
	p=0.003	**p=0.006**	p=0.537	**p=0.001**	**p=0.001**
	c<a,b	**a>b,c**		**b<c<a**	**a<b,c**

(X^2): Kruskal Wallis, U: Mann Whitney U Test.

A comparison of the overall mean score of the students on the nutrition/exercise subscale and the IAS overall mean score according to their characteristics regarding the use of the internet is presented in Table 3. Statistically significant differences were detected between the psychological/addicted eating behaviors (p=0.013), healthy nutrition/exercise (p=0.001), unhealthy nutrition/exercise (p=0.013), meal patterns (p=0.001) subscale mean scores and the IAS (p=0.001) mean score according to the reasons the students gave for their use of the internet. Further analysis shows that those who used the internet in order to access the social media had a lower mean score on the psychological/addictive eating behavior subscale compared to those who logged into the internet for shopping/entertainment purposes (p=0.005). It was determined that the difference in the mean scores on the healthy nutrition/exercise subscale stemmed from the mean score of those who used the internet for lessons/homework and for spending leisure time (p=0.015) and from those who used the internet to access the social media (p=0.000). The mean score on the unhealthy nutrition/exercise subscale of the students using the internet to access the social media was lower than that of the students using the internet for lessons/homework (p=0.010). The mean score of the students who used the internet for lessons/homework was higher on the meal patterns subscale compared to those who used the internet for social media (p=0.000), shopping/entertainment (0.029), and other purposes (p=0.007). Looking into the students' mean scores on the IAS according to the purposes for which they were using the internet, it was found that the IAS mean score of those who used the internet for lessons/homework was significantly lower than those who used the internet for social media (p=0.000), shopping/entertainment (p=0.027), and other purposes (p=0.000). Students who were in the habit of snacking while on the internet had lower mean scores on the psychological/addictive eating behavior, healthy nutrition/exercise, unhealthy nutrition/exercise, and meal patterns subscales than those who did not have this habit, whereas their IAS mean scores were higher (p=0.001).

Table 3. Comparison of NEBS Subscales and IAS Mean Scores According to Internet Usage of Students

Characteristics	Psychological/Addicted Eating Behavior	Healthy Nutrition-Exercise Behavior	Unhealthy Nutrition-Exercise Behavior	Meal Pattern	Internet Addiction Scale
	XX±Ss	XX±Ss	XX±Ss	XX±Ss	XX±Ss
Internet connection source					
Smartphone	38.4±8.6	47.6±9.5	48.9±7.1	23.4±4.4	19.7±7.6
Computer	39.2±9.4	47.7±9.5	48.0±7.4	23.2±5.0	20.2±7.1
Tablet	40.9±8.7	47.6±9.3	50.3±6.1	23.4±4.6	18.3±7.1
Test and p value	x^2=4.306 p=0.116	^{2}=0.018 p=0.991	x^2=3.418 p=0.181	x^2=0.001 p=1.000	x^2=3.064 p=0.216
Purpose of Internet Usage					
Lecture/homework (a)	40.8±8.0[a]	50.2±9.7[a]	50.1±7.0[a]	24.8±3.8[a]	16.5±6.3[a]
Social media (b)	37.2±9.1[b]	37.2±9.1[b]	47.6±6.7[b]	22.4±4.8[b]	23.0±7.8[b]
Shopping/entertainment (c)	39.0±9.5[c]	48.3±8.5[c]	47.8±7.6[c]	22.7±4.4[c]	19.9±6.9[c]
Others (d)	38.2±8.9[d]	46.4±9.5[d]	49.3±7.1[d]	22.7±4.7[d]	20.1±7.1[d]
Test and p value	x^2=11.978	x^2=20.919	x^2=10.798	x^2=22.473	x^2=53.955
	p=0.013	**p=0.001**	**p=0.013**	**p=0.001**	**p=0.001**
	b<c	**b,d<a**	**b<a**	**b,c,d<a**	**a<b,c,d d<b a<d**
The habit of snacking in front of the screen while on the Internet					
Yes	36.3±8.4	46.1±8.4	47.3±7.2	22.6±4.5	21.3±7.3
No	42.1±8.2	49.5±9.2	51.0±6.3	24.4±4.3	17.5±7.2
Test and p value	U=13274.000	U=17529.500	U=14910.000	U=16713.500	U=14845.0500
	p=0.001	**p=0.001**	**p=0.001**	**p=0.001**	**p=0.001**

(X^2): Kruskal Wallis, U: Mann Whitney U Test

Students who exercised regularly had higher mean scores on the healthy nutrition/exercise (p=0.001) and meal patterns (p=0.019) subscales compared to those who did not engage in sports regularly, while their mean scores on the unhealthy nutrition/exercise (p=0.049) subscale were lower; the difference was statistically significant. The differences between the students' mean scores on the psychological/addictive eating behavior (p=0.253), healthy nutrition/exercise (p=0.745), unhealthy nutrition/exercise (p=0.227), meal patterns (p=0.603) subscales and their mean scores on the IAS (p=0.071) according to their BMI SDS scores was statistically insignificant (Table 4).

A multiple regression analysis of the factors impacting the students' internet addiction is presented in Table 5. The variables pertaining to the students' psychological/addictive eating behavior, meal patterns, unhealthy nutrition/exercise behavior, their use of the internet for social media and other purposes, their class, and their being conscious of their eating during the COVID-19 pandemic were included in the model. The regression analysis showed that these variables explained 35.8% of internet addiction and the model was statistically significant (F=21.233, p<0.001). The variables of healthy eating status, snacking while on the internet, age, healthy nutrition/exercising status and engaging in regular exercise were removed from the model because they were not found to be significant. An inverse correlation was found between the variables of psychological/addictive eating, meal patterns, unhealthy nutrition/exercise and being conscious of what one was eating during the COVID-19 pandemic, while a positive correlation was found between the variables of using the internet for social media and class.

Table 4. Comparison of NEBS Subscales and IAS Mean Scores According to the Physical Activity of Students

Characteristics	Psychological/Addicted Eating Behavior	Healthy Nutrition-Exercise Behavior	Unhealthy Nutrition-Exercise Behavior	Meal Pattern	Internet Addiction Scale
	XX±Ss	XX±Ss	XX±Ss	XX±Ss	XX±Ss
Regular Exercise					
Yes	39.4±8.8	50.0±9.1	48.3±7.3	23.7±4.6	19.1±6.9
No	38.2±8.8	43.9±8.8	49.9±6.5	22.8±4.4	20.4±8.2
Test and p value	U=19547.500	U=13384.000	U=18838.500	U=18400.500	U=19563.500
	p=0.163	**p=0.001**	**p=0.048**	**p=0.019**	p=0.167
BMI SDS Score					
Low	39.6±9.9	45.5±10.3	51.9±6.1	24.3±3.7	17.5±6.8
Normal	39.2±8.6	47.6±9.5	48.9±7.1	23.3±4.5	19.5±7.6
High	35.8±9.9	48.4±7.8	48.4±6.9	23.7±5.1	21.5±6.3
Test and p value	x^2=2.752	x^2=0.589	x^2=2.961	x^2=1.012	x^2=5.278
	p=0.253	p=0.745	p=0.227	p=0.603	p=0.071

(X^2): Kruskal Wallis, U: Mann Whitney U Test.

Table 5. Multiple Regression Analysis of Factors Affecting Students' Internet Addiction

Variables	Unstd. β	Std. β	t	p	VIF
Constant	41.191		11.392	0.001	
Psychological/ Addicted Eating Behavior	-0.196	-0.135	-3.927	0.001	1.421
Meal Pattern	-0.382	-0.240	-4.468	0.001	1.141
Purpose of Internet Usage: Social Media (reference: Lecture/ homework)	3.814	0.234	4.034	0.001	1.327
Purpose of Internet Usage: Other (reference: Lecture/ homework)	2.468	0.148	2.537	0.012	1.243
Unhealthy Nutrition-Exercise Behavior	-0.174	-0.162	-2.758	0.006	1.367
Grade	1.248	0.138	2.653	0.008	1.067
Nutrition on the Covid-19 pandemic: More mindful eating (reference: eat less)	-2.337	-0.139	-2.639	0.009	1.092
		R^2=0.358	F=21.233	p<0.001	Durbin Watson=1.917

4. Discussion

This study, which was conducted for the purpose of examining the relationship between adolescents' internet addiction and their eating and exercising behavior, indicated that the students' psychological/addictive eating behavior, healthy nutrition/exercising behavior, unhealthy nutrition/exercising behavior subscale mean scores were at a moderate level while their meal patterns subscale mean scores were high. The results published in the literature (11,14,16,17) are similar. However, in our study, the fact that the unhealthy nutrition/exercising behavior subscale mean score was higher than the healthy nutrition/exercising behavior subscale mean score suggests that the adolescents in the study were displaying unhealthy eating behavior. Still, consistent with other studies, the high level of the meal patterns mean score suggests that the adolescents were eating regular meals.

A statistically significant difference was found in our study between the unhealthy nutrition/exercising subscale scores of the adolescents by age. It was seen that the unhealthy nutrition/exercising behavior subscale mean score of 13-year-old students was significantly lower than that of the 11-year-olds. In a study by Akan (11), the author reported that the younger the individual, the more was the tendency to display healthy eating behavior. Tümer, Gök and Evren (18) found in a study they conducted with middle school students that the younger the students were, the higher were their healthy nutrition/exercise scores. Erten (13) reported that older adolescent groups displayed a higher level of risk with respect to their nutritional habits compared to young groups. It is striking to see that as students' grow older, they display poorer eating habits. We found in our study that the students' internet addiction mean scores by age revealed an increase the older they were. Other studies support our finding (19,20). This may be because parental control lessens as the child gets older, while there is also increased peer interaction and access to electronic devices such as smartphones, smart bracelets, and computers. The results consequently suggest that internet addiction and unhealthy nutrition may become risk factors as a child gets older.

We noted in our study that girls' unhealthy nutrition/exercise subscale mean score was higher than that of the boys, revealing that the girls were following an unhealthier diet compared to the boys. Both Akan (11) and Tümer et al. (18) reported high scores on the boys' unhealthy nutrition subscale, while Kalay & Turkmen (17) and Hendekci & Avcı (19) noted that girls had more unhealthy eating habits. In another study carried out with adolescents, it was reported that the girls' meal patterns and healthy nutrition/exercise behavior mean scores were higher than the boys' (21). As can be seen, there are varying results published in the

literature regarding the healthy/unhealthy nutritional habits of individuals according to gender. In some studies girls, and in others, boys appear to be better at practicing healthy/unhealthy nutrition. The results of our study suggest that factors such as the preoccupation of female students with body image and the impact of peers may have led them to adopt unhealthy behaviors such as skipping meals, being choosy in their eating habits, and eating low-calorie foods.

The IAS mean score of the male students in our study was higher, but the statistical analysis did not detect a statistically significant difference in terms of gender. In a study by Hendekçi and Avcı (19), the authors found that male adolescents had higher IAS scores and that they were more predisposed to internet addiction than girls.

We found that the students in a family with a high income had higher healthy nutrition/exercise subscale mean scores than students in lower-income households. It has been reported in other studies that adolescents from a low-income household have irregular meal patterns (11) and that students in higher-income families display healthier nutritional behaviors (17). Socioeconomic status is one of the important factors affecting the choice of foods and therefore a family's income level has an impact on an adolescent's choice of foods. This suggests that families of good socioeconomic background will also have a good level of buying power and a higher awareness of healthy eating, and therefore adolescents in a higher income family will be more liable to adhere to healthy eating habits. It was surprising to find in our study that there was no statistically significant difference between the IAS mean scores according to family income. It is believed that income level may be one of the variables influencing internet addiction based on such factors as easy access to the internet, parental control, and awareness about the detrimental effects of the internet. The fact that income level was not one of the variables that made a difference in our study may have been because the participating adolescents displayed similar sociodemographic characteristics.

The students in our study who believed they were eating healthily had higher psychological eating, healthy nutrition/exercise, unhealthy nutrition/exercise and meal patterns subscale mean scores than those who did not believe they were following a healthy diet or were undecided. This suggests that adolescents who believe they are eating healthily will display different nutritional behaviors. In their study, Hendekçi and Avcı (19) found that adolescents who thought themselves healthy had higher unhealthy/exercise behavior subscale mean scores than those who did not think themselves healthy, but no statistically significant difference was found between the IAS mean scores. To the contrary, in the literature, it has been found that students who qualify themselves as healthy display positive health behaviors and engage in regular physical activity (22, 23). The difference in the results according to whether or not individuals think of themselves as healthy may be related to the awareness adolescents have about habits that are considered "healthy eating." Some adolescents believe healthy eating means eating less while others may think that eating a lot is a healthy habit. The type of food eaten, the frequency, as well as other variables such as BMI can shape the self-image of an adolescent in the context of eating a healthy diet.

The students who believed their eating habits changed during the COVID-19 pandemic had higher mean scores on the psychological/addictive eating and unhealthy nutrition/exercise subscales. The intense anxiety, being forced to stay at home, the boredom, and the desire to snack during the pandemic may have forced students to consume unhealthy foods. Çulfa, Yıldırım and Bayram (24) report that staying at home for long periods during the pandemic, along with the resulting inactivity, changes in eating habits, and the consumption of too much food caused people to gain weight. In a study that examined the relationship between healthy eating habits and the pandemic, it was reported that the participants had largely experienced a change in their efforts to eat healthily, and that sitting at home without exercising and a surge of appetite were the factors responsible for this (25). In the study by Çelik Karasu and Öztürk Çopur (26), the authors found that the pandemic restricted the activities of adolescents, and this set the stage for a decline in physical activity.

The authors reported that when asked whether their eating habits changed during the COVID-19 pandemic, students who believed their eating habits had changed as compared to before the pandemic described this change as "eating more carefully," "eating less," and "eating more." The students who said they were eating more carefully were found to have a significantly lower mean score on the IAS than the other groups. These results suggest that students who believed they were eating carefully also had more control over their use of the internet. In the literature, there are reports that nutritional habits changed during the COVID-19 pandemic as a result of staying at home and being inactive and that individuals faced problems with keeping their weight down and spent most of their time on their cell phones, in front of the TV, computer, playing games and surfing the internet (27).

A review of internet addiction levels according to the purpose of internet use showed that using the internet for following the social media, for shopping/entertainment and other purposes had a negative impact on internet addiction and on the nutrition/exercise subscales. Those who were using the internet for entertainment purposes had a high level of internet addiction, while those who used it for information and educational purposes had good levels of healthy eating and meal patterns. Another study conducted with adolescents supports our results, showing that those who use the internet for social media and entertainment have higher IAS scores than those using the medium for information and education (19). Still another study carried out with adolescents indicates that healthy eating habits are influenced by spending too much time on the internet following the social media and entertainment sources. Consistent with the results of our study, a correlation has been found between the use of social networks and unhealthy eating behaviors (3). It was surprising to note that the students' IAS mean score did not indicate any differences according to the mode of connection to the internet. Because students have constant access to their smartphones, it would have been thought that the convenience of logging into the internet by phone would have meant that the addiction levels of students accessing the internet by telephone would be high.

Students who exercised regularly had higher mean scores on the healthy nutrition/exercise and meal patterns subscales

compared to those who did not engage in sports regularly, while their mean score on the unhealthy nutrition/exercise subscale was lower; the difference was statistically significant. It is believed that the meal patterns and healthy eating behaviors of students who exercise regularly will be positively affected, and that psychological and unhealthy eating behaviors will diminish. Yılmaz (16) found positive correlations between students' physical activity levels and the healthy nutrition/exercising behavior, the unhealthy nutrition/exercise behavior subscales, as well as a positive correlation with the overall nutrition/exercise behavior scale. No statistically significant difference was seen between the internet addiction mean scores according to the status of engaging in regular exercise. No correlation was found between internet addiction and physical activity in a similar study where the authors found that most of the participants had low and moderate levels of physical activity (28). In the study by Klavina et al. (29), a negative correlation was found between the use of the internet and physical activity, eating with the family over the weekend, and having a regular sleep pattern. The long and uncontrolled use of the internet is believed to prevent individuals from allotting time to exercise, to disrupt sleep patterns, to cause medical problems, and to deteriorate one's family, work, and social life.

The difference between the NEBS subscale and the IAS overall score by BMI SDS data is not statistically significant. It was found by Akan (11) that the correlation between adolescents' BMI values and their NEBS subscale scores was not statistically significant. In a study exploring the relationship between the eating disorders of university students and the internet and smartphone, it was reported that as time in front of the screen increased, BMI also rose (30).

It has been found that the following variables were 35.8% predictive of a student's internet addiction: psychological/addictive eating behavior, meal patterns, unhealthy nutrition/exercising behavior, the use of the internet for following the social media and for other purposes, and being careful about one's eating behavior during the Covid-19 pandemic. In an examination of the relationship between the mean scores of the students on the nutrition/exercise subscales and on the IAS, it can be seen that as the internet addiction mean score increases, healthy nutrition/exercise behavior, meal patterns, psychological/addictive eating behavior and unhealthy nutrition/exercise mean scores fall. In the study by Hendekçi and Avcı (19), it was determined that there was no correlation between the adolescents' IAS mean scores and their NEBS healthy nutrition/exercise behavior subscale mean score. On the other hand, a significantly negative and weak correlation was found between the IAS mean score and the psychological/addictive eating behavior, unhealthy nutrition/exercising behavior, meal patterns subscales and the NEBS overall mean scores. Dong, Yang, Lu and Hao (31) reported that 2.68% of their participants were internet-dependent and 33.37% were problematic internet users. The authors found that the rate of internet usage increased during the pandemic compared to the period before. A study in Taiwan by Lin (32) revealed the prevalence of internet addiction to be 24.4%. As internet addiction increases, the time spent on the internet increases, and as the time spent increases, this has a negative effect on healthy nutrition and exercise behaviors (3).

5. Conclusion and Recommendations

It was determined that the students' IAS and NEBS scores showed differences according to their sociodemographic characteristics, their nutritional status, internet usage and physical activity levels.

6. Contribution to the Field

In the light of these results, our recommendation is that nurses who play a role in identifying children who are at a potential risk of internet addiction, should provide adolescents and their families with counseling services and training sessions that include education on managing time efficiently and in the right way, practicing controlled internet usage so as to allot time to more physical activity. They should stress the importance of healthy eating and physical exercise, ensuring that they are in communication with parents in a unified effort to motivate adolescents to adopt healthy eating behaviors.

Ethical Aspects of the Research

The required permissions and approvals were obtained from the Muğla Sıtkı Koçman University Health Sciences Ethics Committee (Decision No. 127-Decision Date: 13.06.2021) and the Turkish Ministry of Education Research, Competitions and Social Events Department. Prior to the study, the consent of the adolescents was obtained, and the informed consent forms of the parents were received.

The consent of the parents was obtained prior to the collection of data for the study in order to protect the rights of the participating students and to adhere to the principles of Confidentiality and the Protection of Privacy. The principles of Respect for Autonomy were also upheld with respect to the volunteering participants and in consideration of ethical standards. The study adhered to the stipulations of the Helsinki Declaration of Human Rights.

Conflict of Interest

This article did not receive any financial fund. There is no conflict of interest regarding any person and/or institution.

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Authorship Contribution

Concept: GKM, ÖÇO; **Design:** GKM, ÖÇO; **Supervision:** GKM; **Funding:** GKM, ÖÇO; **Materials:** -; **Data Collection/Processing:** GKM, ÖÇO; **Analysis/Interpretation:** GKM, ÖÇO; **Literature Review:** GKM, ÖÇO; **Manuscript Writing:** GKM, ÖÇO; **Critical Review:** GKM.

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