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THE RELATIONSHIP BETWEEN UNIVERSITY STUDENTS' NUTRITION, PHYSICAL ACTIVITY HABITS AND BODY MASS INDEX, ACADEMIC ACHIEVEMENT

Üniversite Öğrencilerinin Beslenme ve Fiziksel Aktivite Alışkanlıkları ile Beden Kitle İndeksi ve Akademik Başarıları Arasındaki ilişki

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ABSTRACT

The aim of this study is to determine the nutrition and physical activity habits of university students and to examine the relationship between body mass index (BMI) and academic achievement of these habits. This descriptive and cross-sectional study was conducted with 127 second-year students at a university. A questionnaire consisting of multiple choice questions was used in this study. The data were analyzed using the SPSS (Statistical Package for Social Sciences) for Windows 23.0 program. A total of 81.9% of the participants were female, and their mean age was 20.07±1.4 years. The overall weighted grade average of the students was 2.93±0.47. The mean BMI of the students was 21.5±2. There was a statistically significant difference between the number of daily meals, the consumption of fruit, nuts and legumes, meat, processed food, with grade point average (GPA) among the students participating in the study (p=.003, p=.001, p=.000, p=.032, p=.036, respectively). Moreover there was a statistically significant difference between the amount of physical activity and BMI (p=.008). The results show that the number of meals per day, fruit, meat, legumes, nuts and processed food consumption behaviors of university students can affect GPA, and physical activity can improve BMI scores positively.

Keywords: Academic achievement, Body mass index, Nutrition, Physical activity, University student.

ÖZ

Bu çalışmanın amacı, üniversite öğrencilerinin beslenme ve fiziksel aktivite ile ilgili alışkanlıklarını belirlemek ve bu alışkanlıkların vücut kitle indeksi (VKİ) ve akademik başarı arasındaki ilişkiyi incelemektir. Tanımlayıcı ve kesitsel tipteki bu araştırma, bir üniversitede 127 ikinci sınıf öğrencisi ile yürütüldü. Bu çalışmada çoktan seçmeli sorulardan oluşan bir anket kullanıldı. Veriler SPSS (Statistical Package for Social Sciences) for Windows 23.0 programı kullanılarak analiz edildi. Katılımcıların %81.9'u kadın olup, yaş ortalamaları 20.07±1.4 yıldır. Öğrencilerin genel ağırlıklı not ortalaması 2.93±0.47'dir. Öğrencilerin ortalama VKİ'si 21.5±2 idi. Araştırmaya katılan öğrencilerin günlük öğün sayıları, meyve, kuruyemiş-bakliyat, et, işlenmiş gıda tüketimleri ile genel ağırlıklı not ortalamaları (GANO) arasında istatistiksel olarak anlamlı fark bulundu (p=.003, p=. 001, p=.000, p=.032, p=.036, sırasıyla). Ayrıca fiziksel aktivite yapma ile VKİ arasında istatistiksel olarak anlamlı fark vardı (p=.008). Sonuçlar, üniversite öğrencilerinin günlük öğün sayısı, meyve, et, bakliyat, kuruyemiş ve işlenmiş gıda tüketim davranışlarının GANO'yu etkileyebileceği, fiziksel aktivite yapmanın ise VKİ puanlarını olumlu yönde iyileştirebileceğini göstermektedir.

Anahtar kelimeler: Akademik başarı, Beslenme, Fiziksel aktivite, Üniversite öğrencisi, Vücut kitle indeksi.

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INTRODUCTION

Good nutrition, physical activity and a healthy body weight are the basic components of a person's general health and wellbeing. These ingredients can help to reduce the risk of developing serious health problems such as anxiety, high blood pressure, high cholesterol, diabetes, heart disease, stroke, and cancer. Eating and maintaining a healthy diet, taking regular exercise, and maintaining a healthy body weight are important in the management of existing health conditions and can prevent them from worsening (Pekcan, 2008; U.S. Department of Health and Human Services [HHS], 2014; Elmagd, 2016). The World Health Organization (WHO) states that a poor diet and a sedentary lifestyle is one of the leading health risks worldwide (Keller & Schiebel, 2005).

Over the past two decades, unhealthy lifestyles have been of growing concern. Inadequate physical activity and poor eating habits can cause increased levels of obesity in children and adults. It is well known that obesity can increase the risk of diabetes mellitus and hypertension (Jones, Freudenburg & Mongiello, 2015), and can often be prevented by changing lifestyle behaviors.

Two important determinants of health are regular physical activity and an adequate and balanced diet (Pekcan, 2008). Physical activity is a term used to describe body movements that expend energy (World Health Organization [WHO], 2018) and physical inactivity poses a serious health risk not only for adults but also for children and adolescents (Ministry of Health, 2014). A healthy body leads to a healthy mind. If a person is weak, unhappy, and sick, it means that they cannot perform their duties as efficiently as they could otherwise do. It is particularly important to have a healthy mind before undertaking any work, particularly creative work. People who incorporate physical activity into their daily routine are happier and more productive than others (Elmagd, 2016). In a study conducted by the Turkish Ministry of Health, 65% of women aged 15–24 and 44% of men aged 15–24 were found to not be doing enough physical activity (Unal, Ergor, Horasan, Kalaca & Sozmen, 2013). The situation is similar for university students, unfortunately the majority of university students do not meet the physical activity recommendations (Werner & Betz, 2020).

Eating habits are learned during childhood and continue into adulthood. The period between the ages of 18 and 25, which is considered the final part of adolescence and the beginnings of adulthood often thought of as the university period can be a stressful time for many students (Dyson & Renk, 2006), and can also be influenced by environmental factors

(Neumark-Sztainer, Story, Perry & Casey, 1999). University years are the ideal time to develop good health-related habits during this transition period from adolescence to adulthood, however, studies have shown that university students often develop poor eating habits after leaving home (Deforche, Van Dyck, Deliens & De Bourdeaudhuij, 2015; Mueller, Blondin, Korn, Bakun, Tucker & Economos, 2018; Sogari, Velez-Argumedo, Gómez & Mora 2018).

Poor diet is also a major problem in Turkey, as it is in many other countries around the world, and university students are one of the groups most affected by nutritional problems (Ermis, Dogan, Erilli & Satıcı, 2015). The effect of nutrition and physical activity on academic achievement and BMI is an active and growing area of research. There are few studies that evaluate the dietary habits and physical activity of university students, and those that exists tend to show that adequate nutrition is associated with academic success (Burrows, Whatnall, Patterson & Hutchesson, 2017; Deliens, Clarys, De Bourdeaudhuij & Deforche, 2013; Peltzer & Pengpid, 2014; Valladares et al., 2016).

The aim of this study is to determine the physical activity and dietary habits of university second-year student's and to examine whether there is a relationship between these habits, BMI, and academic achievement. Accordingly, this study aims to address the following research questions through a questionnaire:

1.What were the nutritional and physical activity habits of the students?

2.Was there a relationship between students' eating habits, BMI and academic success?

3.Was there a relationship between students' physical activity, BMI and academic achievement?

MATERIAL AND METHOD

Study Design

This descriptive cross-sectional study was conducted with second-year students at a university.

Participants

In the department where the research is conducted, there are three classes formed by the second year students. A class was designated by drawing lots from among the three classes. The number of students in the designated class was 175 and 127 (72.5%) of these students agreed to participate in the research voluntarily (Figure 1). All of the participants were fully informed about the study and all gave written consent.

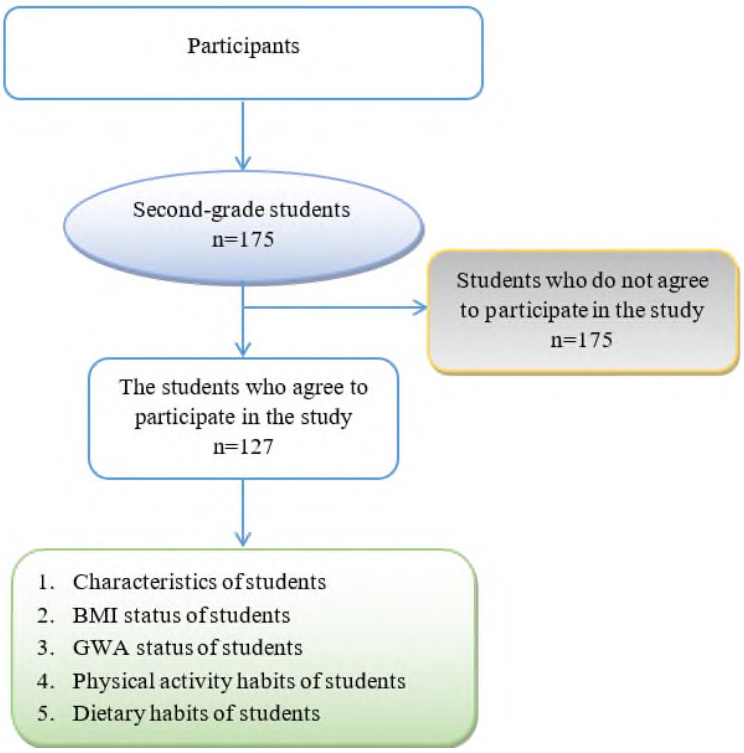

Figure 1. Study Design

Data Collection

A questionnaire, which was developed by researchers based on the literature, was used as the data collection tool in the research (Deliens, Clarys, De Bourdeaudhuij & Deforche, 2014; Deforche et al., 2015; Valladares et al., 2016; Mueller et al., 2018; Sogari et al., 2018;). Before the research was used, 10 people out of the sample were pre-applied and required corrections were made by researchers.

The questionnaire consisted of 25 multiple-choice questions in total, which covered personal information, height and weight, overall weighted grade averages, eating habits, foods consumed and their frequency, water consumption, and physical activity habits. The face-to-face interview method was used to implement the questionnaire. The researcher provided the students to fill out questionnaires within an average of 15 minutes.

Outcomes

BMI was calculated using the formula of weight (kg)/height (m^2) according to information given by the participants. According to the WHO, individuals with a BMI of below 18.50 are considered to be underweight, those with a BMI between 18.50 and 24.99 are of normal weight, those whose BMI is between 25.0 and 29.99 are considered overweight, and those whose BMI score is 30+ are considered to be obese (World Health Organization [WHO], 2020).

When considering the students' GPA scores in the evaluation of academic achievement in relation to the university's course and success assessment directive, a score of ≤1.99 is a fail, 2.00–2.49 is a moderate pass, 2.50–2.99 is a good pass and score of 3.0 or more is an excellent pass. WHO recommends 150 minutes per week of medium-intensity physical activity for adults aged 18–64 (WHO, 2018). In line with this recommendation, data on physical activity was taken as 30 minutes for five times a week.

Statistical Analysis

Continuous data were presented by the mean and standard deviation (SD), and categorical data were given as number and percentage. Fisher's Exact Test was used to determine relationships between categorical data, and significance was evaluated at $p<0.05$. In addition, the Bonferroni test was used to determine which categorical group the difference obtained from the data originated from. The statistical analyses were conducted using the university's licensed SPSS 23.0 package program.

Limitations

Our study does have some limitations. The study does not give information about the entire education period as it is planned cross-sectionally. Therefore, carrying out more longitudinal studies will strengthen the generalization. Moreover some information provided by students may be misleading or inadequate. Supporting this study with qualitative studies can contribute to a cause-and-effect relationship.

Ethics

Before conducting the study, ethical approval from the University Medical Faculty Clinical Research Ethics Committee and institutional permission were obtained on 28.12.2016 with desicion no 2012-KAEK-20/702. Written informed consent was obtained, by providing explanatory information about the study to the participants.

RESULTS

Characteristics of the Participants

Table 1 presents the characteristics of the participants included in this study. In total, 81.9% of the participants in the study were female, and their mean age was 20.07±1.4 years. It was determined that more than half of the mothers of the students (63.8%) were primary school graduates and were unemployed (76.4%), while nearly half of the fathers (48.0%) were primary school graduates and just over one-fifth (20.5%) of them did not work. It was determined that

65.4% of the students had equal income and expenses, 18.1% had inadequate income, and 34.6% stayed in the university dormitories. While the average BMI of the students was 21.5 ± 2.82, 10.2% of the students were underweight and 10.2% were overweight. The average GPA score was 2.93 ± 0.47, with approximately half (49.6) of them having a score of 3 and above. While 39.4% of the students participating in the study did not do any physical activity, 46.5% of the students undertook physical activity between one and four times a week, while 14.2% of them were physically active five or more times a week. In this study, physical activity is defined as working up a sweat for at least 30 minutes.

Table1. Socio-demographic Characteristics of Students

Students	**Number (n)**	**Percent (%)**
Sex		
Female	104	81.9
Male	23	18.1
Age Groups		
18-21	111	87.4
22-25	16	12.6
Mother education status		
Not literate	6	4.7
Literacy	4	3.1
Primary education	81	63.8
High school	24	18.9
University	12	9.5
Mother working status		
Yes	30	23.6
No	97	76.4
Father education status		
Literacy	3	2.4
Primary education	61	48.0
High school	38	29.9
University	25	19.7
Father working status		
Yes	101	79.5
No	26	20.5
Family income situation		
Income less than expenditure	23	18.1
Income-expenditure equivalent	83	65.4
Income more than expenditure	21	16.5
Current living place		
Dormitory	44	34.6
Home	83	65.4
BMI		
≤18.49	13	10.2
18.50 - 24.99	101	79.5
25.00 - 29.99	13	10.2
GPA		
1.00-1.99	4	3.2
2.00-2.49	16	12.6
2.50-2.99	44	34.6
3.00-4.00	63	49.6

Doing enough physical activity for at least 30 minutes to sweat		
No	50	39.4
1-4 times/Week	59	46.5
5 times/Week	18	14.2

GPA: Grade Point Average; BMI: Body Mass Index

Descriptive Statistics

All descriptive statistics for dietary habits of students are presented in Table 2. Almost three-quarters (69.3%) of the students participating in the research had three or more daily meals. In addition, it was also determined that 38.6% of the participants consumed less than 1.5 liters of water per day.

Table 2. Dietary Habits of Students

Habits	Number (n)	Percent (%)
Number of meals per day		
One times	5	3.9
Two times	34	26.8
Three times and above	88	69.3
Consuming meat		
One times	78	61.4
Two times	44	34.6
Three times and above	5	3.9
Consuming fruit		
One times	86	67.7
Two times	39	32.3
Three times and above	2	1.6
Consuming legumes and nuts		
One times	83	65.4
Two times	41	32.3
Three times and above	3	2.4
Consuming milk and products		
One times	84	66.1
Two times	37	29.9
Three times and above	6	4.7
Consuming bakery product		
One times	105	82.7
Two times	20	15.7
Three times and above	2	1.6
Consuming processed food		
One times	40	31.5
Two times	66	52.0
Three times and above	21	16.5
Consuming water		
Less than 1.5 liter	49	38.6
More than 1.5 liter	78	61.4

The Relationship between Dietary Habits, Academic Achievement, and BMI

In order to examine the relationship between the participants' dietary habits, academic achievements, and BMI, the Chi-squared independence test was used, and the results are shown in Table 3. It was observed that there was a statistically significant difference between students'

daily meals, consumption of fruit, nuts and legumes, meat, and processed food, and their GPAs, respectively, (p=.003; p=.001; p=.000; p=.032; p=.036, respectively). Additionally, there was no statistically significant difference between their GPA score and their consumption of dairy or bread products.

When the groups that made a difference in the binary comparisons were examined, it was determined that the GPA scores of those participants who consume at least two meals a day was 2 or more, those who consume legumes and nuts, meat, and fruit was 3 or more, and those who consumed processed food at least twice a week was 2.5 or more. It was determined that there was no statistically significant difference between the participants' BMIs and their nutritional behavior, their number of daily meals, or their consumption of fruits, legumes and nuts, meat, bread, or dairy products (Table 3).

Table 3. Academic Achievement and BMI Status according to Students' Dietary Habits

Dietary Habits		GPA n(%)					BMI n(%)			
		1.00-1.99	**2.00-2.49**	**2.50-2.99**	**3.00-4.00**	**X^2/*p***	**18.50↓**	**18.50 - 24.99**	**25.00-29.99**	**X^2/*p***
Number of Daily Meal	1 times	2(40.0)	1(20.0)	2(40.0)	0(0.0)		0 (0.0)	5(100.0)	0(0.0)	
	2 times*	2(5.9)	4(11.8)	9(26.5)	19(55.9)	17.48 **0.003****	2 (5.9)	28(82.4)	4(11.8)	1.42 0.846
	≥3 times*	0(0.0)	11(12.5)	33(37.5)	44(50.0)		11(12.5)	68(77.3)	9(10.2)	
Consuming Fruit	Everyday*	0(0,0)	8(9.3)	28(32.6)	50(58.1)		9(10.5)	66(76.7)	11(12.8)	
	Several times/ week	3(7.7)	7(17.9)	16(41.0)	13(33.3)	20.34	4(10.3)	33(84.6)	2(5.1)	2.29
	Not consume	1(50.0)	1(50.0)	0(0.0)	0(0.0)	**0.001****	0(0.0)	2(100.0)	0(0.0)	0.726
Consuming Legumes and Nuts	Everyday*	0(0.0)	6(7.2)	26(31.3)	51(61.4)		11(13.3)	62(74.7)	10(12.0)	
	Several times/ week	4(9.8)	8(19.5)	17(41.5)	12(29.3)	24.14 **0.000****	2(4.9)	36(87.8)	3(7.3)	3.13 0.509
	Not consume	0(0.0)	2(66.7)	1(33.3)	0(0.0)		0(0.0)	3(100.0)	0(0.0)	
Consuming Meat	Everyday*	0(0.0)	12(15.4)	29(37.2)	37(47.4)		8(10.3)	59(75.6)	11(14.1)	
	Several times/ week	3(6.8)	3(6.8)	13(29.5)	25(56.8)	12.35	4(9.1)	39(88.6)	1(2.3)	6.60
	Not consume	1(0.20)	1(0.20)	2(0.40)	1(0.20)	**0.032****	1(20.0)	3(60.0)	1(20.0)	0.359
Consuming Milk And product	Everyday	1(1.2)	7(8.3)	29(34.5)	47(56.0)		11(13.1)	63(75.0)	10(11.9)	4.46 0.296
	Several times/ week	3(8.1)	8(21.6)	13(35.1)	13(35.1)	10.01	1(3.8)	33(89.2)	3(8.1)	
	Not consume	0(0.0)	1(16.7)	2(33.3)	3(50.0)	0.089	1(16.7)	5(83.3)	0(0.0)	
Consuming Bakery Product	Everyday	3(2.9)	14(13.3)	36(34.3)	52(49.5)		12(11.4)	81(77.1)	12(11.4)	
	Several times/ week	1(5.0)	1(5.0)	7(35.0)	11(55.0)	6.11	1(5.0)	18(90.0)	1(5.0)	1.79
	Not consume	0(0.0)	1(50.0)	1(50.0)	0(0.0)	0.402	0(0.0)	2(100.0)	0(0.0)	0.756
Consuming Processed Food	Everyday*	1(2.5)	8(20.0)	18(45.0)	13(32.5)		2(5.0)	32(80.0)	6(15.0)	
	Several* times/ week	1(1.5)	7(10.6)	22(33.3)	36(54.5)	12.26	7(10.6)	53(80.3)	6(9.1)	4.02
	Not consume	2(9.5)	1(4.8)	4(19.0)	14(66.7)	**0.036****	4(19.0)	16(76.2)	1(4.8)	0.395

GPA: Grade Point Average; BMI: Body Mass Index
* The difference between groups was determined by Bonferroni correction.
**Fisher's Exact Test, $p<0,05$

The Relationship between Physical Activity, Academic Achievement, and BMI

The Chi-squared independence test was conducted to examine the relationship between BMI and academic achievement status according to the participants' physical activity status and the results are shown in Table 4. The difference between participants who did physical activity that caused sweating for at least 30 minutes and their GPA was not statistically significant. However, the relationship between the physical activities of the participants that caused sweating for at least 30 minutes (p=.008), and their BMI was found to be significant. When the groups that made a difference in the binary comparisons were examined, it was determined that this significant correlation was caused by the participants undertaking physical activity that caused sweating one to four times a week, or five times a week or more for 30 minutes. It has also been determined that almost all of the people with an underweight BMI and those who were overweight, and more than half of those with normal BMI undertook physical activity that caused sweating for 30 minutes at least once a week (Table 4).

Table 4. BMI and Academic Achievement Status according to Students' Physical Activity

Physical Activity		**GPA n(%)**					**BMI n(%)**			
		1.00-1.99	**2.00-2.49**	**2.50-2.99**	**3.00-4.00**	**X^2/p**	**18.50↓**	**18.50 - 24.99**	**25.00-29.99**	**X^2/p**
Doing physical activity that causes sweating for at	5and ↑/week*	0(0.0)	1(5.6)	5(27.8)	12(66.7)	5.699 0.436	2(11.1)	12(66.7)	4(22.2)	12.592 **0.008****
	1-4 times/ week*	1(1.7)	8(13.6)	25(42.4)	25(42.4)		9(15.3)	42(71.2)	8(13.6)	
	No	3(6.0)	7(14.0)	14(28.0)	26(52.0)		2(4.0)	47(94.0)	1(2.0)	

GPA: Grade Point Average; BMI: Body Mass Index
* The difference between groups was determined by Bonferroni correction.
**Fisher's Exact Test, p<0,05

DISCUSSION

In this study, the nutritional and physical activity habits of university students were determined, and the relationship between BMI and grade point averages was examined.

Approximately one-fifth of the students participating in the study stated that their family income is insufficient. In a study, about two-fifths of students, in another study, almost half of the income status was found to be insufficient (Peltzer & Pengpid, 2014; Olatona, Onabanjo, Ugbaja, Nnoaham & Adelekan, 2018). Research have determined that income status affects access to healthy foods (Eyles, Mhurchu, Nghiem & Blakely, 2012; Rao, Afshin, Singh & Mozaffarian 2013). In two qualitative studies, it was stated by the participants that eating fast

food is cheaper and easier than eating healthy food (Deliens et al., 2014; Sogari et al., 2018). It is possible, therefore, that students who come from low-income backgrounds may find it more difficult to obtain healthier foods.

More than half of the students participating in the study stay at home either live alone or with friends. In a qualitative study, students stated that they are exposed to many stimuli that affect their eating habits, especially when they see students who eat lasagna or pizza subsequently gain weight (Deliens et al., 2014). In another qualitative study, students stated that they preferred to make easy-to-prepare meals such as pasta because of time constraints and economic insufficiency at home (Sogari et al., 2018).

Moreover, the students stated that they were influenced by their friends' dietary habits. They said that the taste of the food they ate was important and that they preferred the taste of fast food and ready-meals, which were cheap and easy to obtain (Deliens et al., 2014; Sogari et al., 2018). In our study, it was found that almost all of the students consumed processed food every day or occasionally. Students usually eat by themselves, either at home or in their dormitory, and tend to cook quick and easy meals such as pasta or ready-meals.

Approximately 10% of the students participating in the research had a BMI of ≥25, while 10% had a BMI of <18.5. In other studies conducted with university students, the ratio of those with BMI ≥25 ranged from approximately 9% to 30% (Özdoğan, Yardımcı, Özçelik & Sürücüoğlu, 2012; Yılmaz et al., 2014; Akça & Selen, 2015; Downes, 2015; Abraham, Noriega & Shin 2018). In a health assessment study by the American College Health Association (2011), approximately 20% of university students were determined to be overweight while 10% were obese (American College Health Association World Health Organization [ACHA], 2019). Further studies showed that the ratio of those with a BMI of <18.5 varied considerably between countries. In a study by El Sayed, El-Shafei and Toprak (2015), the percentage of participants with a BMI of <18.5 in three different countries was found to be approximately 9%, 19% (El Sayed, El-Shafei & Toprak, 2015), and 43%, respectively, while in a study by Jankovic et al. (2017), the rate was 6.4% (Janković et al., 2018). In studies carried out in Turkey, the ratio of those with a BMI of <18.5 ranged between approximately 7% and 9% % (Yılmaz et al., 2014; Akça & Selen, 2015; Arslan, Daşkapan & Çakır 2016; Abraham et al., 2018). A study by Deliens et al. (2013) determined that there was a negative correlation between academic achievement and BMI, although our study found no significant correlation between the two (Deliens et al., 2013).

Approximately one-third of the students participating in the research did not do any physical activity. In a study by Downes et al. (2015), one-third of university students did not do any physical activity (Downes, 2015), while in the study conducted by Arslan et al. (2016), two-thirds of the participants did not do any physical activity (Arslan et al., 2016). In another study it was found that students were physically active for two hours a week or less time (Özakar-Akca & Selen, 2015). Reasons for this included lack of motivation, the quality of the fitness centers on campus, intensive weekly lessons or being too busy with their studies (Lacaille, Dauner, Krambeer & Pedersen, 2011).

In our study, we found a positive correlation between the BMI of the students who performed physical activity. University years are the years in which individul's weight and obesity tend to increase and physical activity tend to decrease the most (Bray & Born, 2004; Gordon-Larsen, Adair, Nelson & Popkin, 2004; Serlachius, Hamer & Wardle, 2007). Inadequate physical activity and a high-calorie diet are risk factors for weight gain and obesity (Lacaille et al., 2011). In a qualitative study, students stated that they needed a higher calorie diet while exercising, and some students said that they tended to believe that they could eat anything they wanted after exercising (Deliens et al., 2014). It is appropriate that overweight students should increase their physical activity, but it should also be remembered that doing physical activity can lead to excessive calorie intake. In order to improve quality of life and to manage existing health conditions, regular physical activity, healthy eating, and maintaining a healthy weight are crucial (HHS, 2014).

Almost all of the students participating in the study ate at least two meals a day. In other studies of university students, it was determined that more than half of them had two meals a day or more (Almohanna, Conforti, Eigel & Barbeau, 2015; Olatona et al., 2018; Önay, 2011; Özdogan et al., 2012). This result can be considered positive in terms of adequate nutrition of adolescents.

When considering students' food preferences, more than half of them consumed meat, legumes, dried fruit, dairy products and almost all bakery products every day. In studies analyzing the nutrition of university students, it was determined that the most consumed food group was cereals and grains (Bagordo, Grassi, Serio, Idolo & De Donno, 2013; El Ansari, Suominen & Samtara, 2015; Olatona et al., 2018; Rašeta et al., 2018). While some study results related to daily fruit consumption support our study findings (Yılmaz et al., 2014; El Sayed et al., 2015; Rašeta et al., 2018; Sogari et al., 2018), other studies showed that fruit consumption was found to be lower overall (Downes, 2015; El Sayed et al., 2015; Olatona et al., 2018).

Some study results showed that meat, milk, nuts and legumes were consumed in lower quantities (El Sayed et al., 2015; Olatona et al., 2018). In a study by Rašeta et al. (2018), meat and milk consumption levels were similar to those found in our study (Rašeta et al., 2018). The literature showed that the proportion of students consuming processed foods was quite high and supported our study findings (Bagordo et al., 2013; El Ansari et al., 2015; Abraham et al., 2018).

There have been a few studies in the literature stating that the eating habits and fruit consumption of university students positively affect their academic success, but no study has been found that indicates which particular foods could affect academic success (Deliens et al., 2013; Valladares et al., 2016; Burrows et al., 2017). The most interesting finding of our study is that there is a correlation between the number of meals per day, and the consumption of meat, fruit, legumes-nuts, and processed food with academic success. Our study also found that students who ate at least two meals a day, and who consumed meat, fruits, legumes, dried fruits and processed food every day, or several times a week, was found to have higher GPA scores than those who did not.

Approximately 40% of the students participating in the research consumed one liter or less of water per day. An adult should consume 2–2.5 liters of fluid per day in order to eliminate harmful substances from the body and to maintain the body's fluid balance. Approximately 1500–2000 ml of this liquid should be taken through drinking water and 1000 ml from food and other liquids (Ministry of Health, 2016; European Food Safety Authority [EFSA], 2016).

Students who live a long way from home during their university years will inevitably change their eating habits. Students are also more likely to take their meals in student restaurants and canteens and to gain confidence in preparing quick and easy meals. All these changes in circumstance can lead students to move away from healthy eating habits and to be exposed to the risks of disease caused by poor nutrition (Bagordo et al., 2013). Unfortunately, students aim to resolve their hunger most of the time during their university years. They usually skip meals and only prefer foods that they like the taste of.

CONCLUSION

The results of our study showed that most university students are not physically active, almost all of them eat bread products every day, and their daily water intake is insufficient. Physical activity and keeping hydrated are both essential to a healthy lifestyle. In addition, our study showed that the number of daily meals as well as meat, fruit, legumes, nuts, and processed food consumption positively affected academic success. Consuming meat, fruits, legumes, and

nuts are good dietary practices, but processed foods are known to be harmful to health. For this reason, it is extremely important that universities provide students with greater access to foods such as fruit, legumes and dried fruit instead of processed foods, and should encourage students to increase their daily water consumption and to become more physically active. In order to determine the factors that affect students' nutritional behaviors and their participation in physical activity, further qualitative studies and motivational practices for participating in physical activity and to improve nutritional behavior as well as theoretical knowledge should be undertaken.

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