

## Araştırma Makalesi–Research Paper

## THE RELATIONSHIP BETWEEN THE LEVEL OF ACCORDANCE WITH THE MEDITERRANEAN DIET AND THE QUALITY OF SLEEP IN UNIVERSITY STUDENTS

## ÜNİVERSİTE ÖĞRENCİLERİNDE AKDENİZ DİYETİNE UYUM DÜZEYİ İLE UYKU KALİTESİ ARASINDAKİ İLİŞKİ

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## Özet

Öğrencilerin beden ve ruh sağlığı ile toplumda başarılı ve üretken olabilmeleri için beslenme çok önemlidir. Öğrencilerin farklı şehirlerdeki üniversiteleri tercih etmeleri ve alıştikları düzeni bırakmaları yeme ve uyku düzenlerinde değişikliklere neden olabilir. Bu çalışmanın amacı, üniversite öğrencilerinin Akdeniz Diyetine uyumlarının uyku kalitelerine etkisini incelemektir. Çalışmada Akdeniz Diyetine Uyum Ölçeği (MEDAS) ve Pittsburgh Uyku Kalitesi Ölçeği (PUKI) kullanılmıştır. Anket verileri SPSS 22 programında, kategorik değişkenler için frekans dağılımları, sayısal değişkenler için tanımlayıcı istatistikler, iki bağımsız grup arasında fark olup olmadığını belirlemek için bağımsız örneklem t testi ve One Way ANOVA testi kullanılarak belirlenmiştir. Araştırmanın örneklemini Yeni Yüzyıl Üniversitesi'nde öğrenim gören 200 kişi ile oluşturmuştur. Araştırmaya katılan öğrencilerin %55'i kadın, %45'i erkektir. Cinsiyet ile PUKI arasında anlamlı bir fark olmadığı ( $p>0.05$ ), cinsiyet ile MEDAS arasında ise anlamlı bir fark olduğu ( $p=0.000$ ) saptanmıştır. Erkek katılımcıların ( $7.47\pm 2.01$ ) kadın katılımcılardan ( $6.25\pm 2.18$ ) daha yüksek MEDAS skoruna sahip olduğu ( $p=0.000$ ), araştırma sonucunda PUKI ile MEDAS arasında istatistiksel olarak anlamlı ve ters orantılı bir ilişki bulunmuştur ( $r = -0.340$ ;  $p<0.01$ ). Bu çalışmada katılımcıların Akdeniz diyetine uyumu arttıkça uyku kalitelerinin de arttığı sonucuna varılmıştır.

**Anahtar Kelimeler:** Beslenme, Akdeniz Diyeti, Uyku Kalitesi, MEDAS, PUKİ

## Abstract

Nutrition is very important for students to be successful and productive in the society with their physical and mental health. Students' preferring universities in different cities and leaving the routine they are used to may cause changes in their eating and sleeping patterns. The aim of this study is to examine the effect of university students' adherence to the Mediterranean Diet on their sleep quality. The Mediterranean Diet Scale (MEDAS) and Pittsburgh Sleep Quality Scale (PUKI) were used in the study. Survey data were determined using the SPSS 22 program, using frequency distributions for categorical variables, descriptive statistics for numerical variables, independent samples t test and One Way ANOVA test to determine whether there is a difference between two independent groups. The sample of the study consisted of 200 people studying at Yeni Yüzyıl University. 55% of the students participating in the research are female and 45% are male. There was no significant difference between gender and PUKI ( $p>0.05$ ), and there was a significant difference between gender and MEDAS ( $p=0.000$ ). Male participants ( $7.47\pm 2.01$ ) had a higher MEDAS score ( $p=0.000$ ) than female participants ( $6.25\pm 2.18$ ), and a statistically significant and inversely proportional relationship was found between PUKI and MEDAS ( $r = -0.340$ ;  $p<0.01$ ). In this study, it was concluded that as participants' adherence to the Mediterranean Diet increased, their sleep quality also increased.

**Keywords:** Nutrition, Mediterranean Diet, Sleep Quality, MEDAS, PUKI



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## **1. INTRODUCTION**

Nutrition is at the forefront of human needs. Nutrition is essential for sustaining life and maintaining health. As a result of scientific research that has been going on since the beginning of the 20th century, nutrition has become a science. Studies have shown that nutritional differences vary considerably in human health. While it is observed that the living standards are high in societies with adequate and balanced nutrition, they tend to protect and improve health; has been observed that societies with inadequate and unbalanced nutrition experience many health problems (Sofi, et al., 2008, pp. 337-344).

It has been emphasized by the World Health Organization (WHO) (WHO/FAO, 2003) that food and nutrition are very important in the prevention, and treatment of chronic non-communicable diseases, especially cardiovascular diseases, diabetes, cancer, and obesity. Nutrition scientists have always advocated that there should be diversity in nutrition in their research throughout history. The basic idea behind this is that no food alone contains all the nutrients necessary for the body at the same time (Kennedy, 2004, pp. 18-27).

One of the diets that give importance to food diversity is the Mediterranean diet. For this reason, one of the best examples of sustainable diets is the Mediterranean diet. The Mediterranean diet model includes a high intake of olive oil, plant foods, fish, and seafood, and low intake of milk and dairy products, red meat and products, and moderate alcohol intake. But today, it has been observed that the Western-style diet model, which is rich in processed foods and high levels of meat and sugar consumption, has moved the young generation away from the Mediterranean diet model (Naska A, Trichopoulou A., 2014, pp. 216-219).

When the university period is examined, it is seen that the freedom status and responsibility awareness of the individuals increased in this period. In studies on the nutritional habits of university students in our country, it has been reported that there are very serious problems related to nutrition, that students generally do not pay attention to the time and content of their meals, and that they skip meals, especially breakfast (Faydaoğlu et al., 2013, pp. 299-311). But nutrition for university students; physical health, mental health have different importance in terms of being successful and productive in society. Young people's choice of university in different cities and leaving the family environment they are used to cause them to be more easily affected by external influences. In this period, it has been observed that a new process has been entered with nutritional habits, with their own choices in nutrition coming to the fore. The economic difficulties experienced during this period, the efforts to adapt to the new environment, the necessity of communicating with many people of different ages and cultures, make young people more susceptible to external influences. During this period, different nutritional behaviors such as weight gain and loss, constant dieting, smoking and alcohol consumption, doing sports, and an unhealthy diet are observed in young people (Ayhan,



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et al., 2012, pp. 97-104). It has been observed that factors such as less frequency of breakfast, consumption of energy drinks, consumption of sugar-sweetened sodas, long video games, and uncontrolled consumption of food during play result in poor sleep and body weight gain. Studies have also concluded that most university students affect their sleep quality due to these unhealthy eating habits and busy daily schedules (Faris et al., 2021, pp.1365-1376).

This study aims to determine the effect of compliance with the Mediterranean nutrition model, which is one of the sustainable nutrition models, on the sleep quality of university students.

## **2. METHODS**

### **2.1. Time and Place of Research**

This research was conducted at Istanbul Yeni Yüzyıl University. The duration of the research took place between January 2022 and April 2022. The condition of participating in the surveys is stated as being a student at Istanbul Yeni Yüzyıl University. While selecting students for the study, no department or class requirements were sought, and only volunteerism was taken as a basis. Our survey studies were carried out with 200 students. The number of samples was determined using power analysis.

### **2.2 Ethics Committee Aspect of the Research**

Permission was obtained from the Science, Social and Non-Interventional Health Sciences Research Ethics Committee for our study on the relationship between the level of adherence to the Mediterranean diet and sleep quality in university students (No. : 2022/01-70 , dated 10.01.2022 )

### **2.3 Data Collection Tools**

In the study, a questionnaire prepared by the researcher was used as a data collection tool. In this questionnaire, there are general information questions of the participants, the MEDAS score to assess their adherence to the Mediterranean diet, and the Pittsburgh Sleep Quality Index (PUKI) to assess sleep quality. The data of the study was created with the information obtained from the face-to-face survey.

#### **2.3.1 Survey form**

The questionnaire form prepared by the researcher who carried out the study consists of a total of 4 parts. The first part of the questionnaire contains general information questions. In the second part, there are questions about eating habits. The third section includes the Mediterranean Diet Adherence Screener (MEDAS), and the fourth section includes the Sleep Quality Index (PUKI).



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### **2.3.1.1 Mediterranean Diet Adherence Screener (MEDAS)**

The Mediterranean Diet Adherence Screener, consisting of 14 items, was applied to determine the adaptation of individuals to the Mediterranean diet. This scale was developed by Martinez Gonzalez et al. (2012) (Martinez et. al., 2012). In this scale, there are 14 questions in total, 12 of which are about the frequency of food consumption and 2 of which are about food consumption habits. The score given for each question is 0 or 1 point. The criteria for getting 1 point are as follows: More use of olive oil as an oil in the kitchen, Consuming 4 tablespoons or more of olive oil per day, Consuming 2 servings or more of vegetables per day ( $\geq 1$  serving raw or as a salad), Consuming 3 servings or more of fruit per day, Consuming less than 1 portion of red meat, hamburger, meat meal or meat products (salami, sausage, etc.) per day, Consuming less than 1 serving of butter, margarine or cream per day, Consuming less than 1 serving of sugary or carbonated beverages per day, Consuming 7 glasses of wine or more per week, Consuming 3 servings or more of legumes per week, Consuming 3 or more servings of fish or shellfish per week, Consumption of sweets or pastries such as cakes, cookies, biscuits, custard (bread, pastries, etc.) that are not homemade less than 3 times a week, Consuming 3 servings or more of oilseeds (including peanuts) per week, Preferring consumption of white meat (turkey/chicken) instead of red meat (beef/mutton/lamb, sausage, sausage, meatballs, etc.), Consuming 2 servings or more of vegetables, pasta, rice or other meals a week with a sauce prepared by adding olive oil, tomato or tomato paste, onion, garlic/leek. The Mediterranean Diet Adherence Screener scoring range was determined as 0-14 points (Özkan Pehlivanoglu, Balcioglu and Ünlüoglu, 2019, pp. 160-164).

### **2.3.1.2 Pittsburgh Sleep Quality Index (PUKI)**

The Pittsburgh Sleep Quality Index was used to evaluate the sleep quality of the individuals participating in the study. The validity and reliability of the index have been made and the usability of PUKI in clinical studies and research has been demonstrated. The Turkish validity and reliability study of the scale was carried out by Ağargün in 1996. (Ağargün et al., 1996, pp.107-115). PUKI consists of a total of 24 questions. The first 19 questions of the scale are answered by the individual himself. The last 5 questions of the scale are answered by the room or bed partner of the individual and are used only for clinical information and are not included in the score calculation. When calculating the PUKI score, it is grouped into 7 components. These components are; subjective sleep quality (component 1), sleep latency (component 2), sleep duration (component 3), sleep efficiency (component 4), sleep disturbance (component 5), drug use (component 6) and daytime functions (component 7) provides information. Each component gets a score between 0-3 according to the answers to the questions. Each item on the scale scores between 0 (no distress) and 3 (severe distress). The sum of the scores of the seven sub-dimensions gives the total PUKI score (between 0-21). Those with a total score of  $\leq 5$  are considered “good sleep quality”, and those with a total score of  $> 5$  are considered “poor sleep quality” (Buysse et al., 1989, pp. 193-213).



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### **2.4. Statistical Analysis**

The study was carried out with the participation of 200 students studying at Yeni Yüzyıl University. All data recorded on the questionnaire were recorded for analysis using the Statistical Package for the Social Sciences (SPSS) 22 program. While evaluating the study data, frequency distributions for categorical variables and descriptive statistics (mean, standard deviation, median, minimum, maximum) are given for numerical variables. While evaluating the study data; Compliance of numerical variables with normal distribution was tested, parametric tests were used for variables conforming to a normal distribution, and non-parametric tests were used for variables not conforming to normal distribution. The independent-sample t-test was used to determine whether there was a difference between two independent groups, and the ANOVA test was used to compare a numerical variable in at least 3 groups. Chi-square analysis was used to determine whether there was a relationship between two independent categorical variables (Sümbüloğlu K. & Sümbüloğlu V.,2016). Statistical differences with  $p < 0.05$  were considered significant.

## **3. RESULTS**

### **3.1. Descriptive Results**

In this part of the study, the descriptive findings obtained from the survey questions which featured demographic and nutrition habits questions were presented and research indices and scale scores were featured as means and standard deviations. In Table 1 below the gender distribution of the sample and the mean values of the sample's age and BMI.

**Table-1:**Gender and BMI Distribution of the Samples

	<b>Female (N=109,%55)</b>		<b>Male (N=91,%45)</b>	
	<b>M±Std</b>	<b>Min-Max</b>	<b>M±Std</b>	<b>Min-Max</b>
<b>Age</b>	2.3±1.8	18-30	22±2	18-29
<b>BMI*</b>	24.05±4.1	18-51	21.33±3.0	16-33

\*BMI: Body Mass Index

When the accommodation is examined, 76% of female students and 45% of male students are with their families; 41% of male students and 10% of female students are in student housing; 13% of female students and 11% of male students are in dormitories; 1% of female students and 3% of male students live in apartments. When the alcohol consumption status is examined, 66% of female students and 51% of male students do not consume alcohol. 60% of male students and 39% of female students smoke.



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Table 2 below the eating habits and caffeinated food consumption findings of the samples are presented. In addition, all participants (N = 200) participating in the study stated that they consumed caffeinated food.

**Table-2:** Eating Habits and Caffeinated Food Consumption of the Participants

		Female		Male	
		N	%	N	%
<b>Number of Snacks</b>	0	15	14	23	25
	1	42	39	36	40
	2	44	40	24	26
	3	8	7	7	8
	4 and more	0	0	1	1
<b>Number of Main Meals</b>	0	0	0	1	1
	1	2	2	6	7
	2	64	59	58	64
	3	43	39	24	26
	4 and more	0	0	2	2
<b>Skipping Meal</b>	Yes	104	95	81	89
	No	5	5	10	11
<b>Which Meal Skipped</b>	Snack	52	49	45	50
	Main	13	12	1	1
	Both	40	39	40	44
<b>Cause of Skipping</b>	Lack of time	60	55	38	42
	No appetite	9	8	5	6
	Hard to prepare	14	13	34	37
	Weight control	4	4	1	1



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	Not a habit	20	18	8	9
<b>Choice of Snacks</b>	Sweets	30	28	9	10
	Biscuits	33	30	20	22
	Toasts	12	11	47	52
	Nuts	16	15	4	4
	Fruit & juice	11	10	9	10
	Dairy products	7	6	0	0
<b>Most Eaten Meal</b>	Morning	21	19	4	4
	Afternoon	7	6	16	18
	Evening	81	75	71	78
<b>Last Meal Before Bed</b>	0-30 min	11	10	17	19
	1-2 hours	40	37	42	46
	3-4 hours	49	45	32	35
<b>Eating Before Sleep</b>	Yes	78	72	71	78
	No	31	28	20	22
<b>What is Eaten Before Sleep</b>	Nuts	10	9	9	10
	Fruits	26	24	17	19
	Chips	14	13	8	9
	Sweets	11	10	2	2
	Toats	10	9	20	22
	Pasta & rice	6	5	20	22
	Soup and omemade meal	1	1	1	1
	Dairy	6	5	1	1



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<b>Frequency of Training</b>	Everyday	1	1	4	4
	2-3 days a week	12	11	6	7
	Once a week	29	27	22	24
	Biweekly	1	1	18	20
	Once in a month	20	18	16	17
	2 to 3 times a year	46	42	25	28
<b>Training Duration</b>	Less than 1 hour	48	44	38	42
	1 hour	47	43	40	44
	2 hours	11	10	11	12
	3-4 hours	3	3	2	2
<b>Training Time</b>	7:00 - 13.00	19	17	10	11
	13:00 - 19:00	29	27	15	17
	19:00 - 00:00	61	56	66	72
<b>Chocolate</b>	None	2	2	24	26
	Once a week	26	24	30	33
	Once or twice a week	40	37	17	19
	More than three times a week	41	37	20	22
<b>Coffee</b>	None	3	3	7	8
	Once a week	8	7	11	12
	Once or twice a week	24	22	14	15
	More than three times a week	74	68	59	65
<b>Tea</b>	None	6	5	4	4
	Once a week	10	9	1	1
	Once or twice a week	17	16	10	11





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	More than three times a week	76	70	76	84
<b>Coke</b>	None	44	40	27	30
	Once a week	27	25	22	24
	Once or twice a week	20	18	7	8
	More than three times a week	18	17	35	38
<b>Energy drink</b>	None	88	81	42	46
	Once a week	14	13	30	33
	Once or twice a week	1	1	5	6
	More than three times a week	6	5	14	15
<b>Total</b>		109	100	91	100

According to the findings the female participants' mean sleep quality score is  $7.6 \pm 3.7$  with the range of 1-20 while the male participants' mean score is  $8.3 \pm 3.3$  with the range of 2-15. The scores indicate poor quality of sleep. For the MEDAS score female participant's mean score is  $7.4 \pm 2$  which indicates an inadequate commitment to the Mediterranean diet while the male participant's mean score is  $6.2 \pm 2.1$  which indicates a low-level off commitment to the Mediterranean diet.

### **3.2. Hypothesis Tests**

In this part of the chapter the hypotheses treated in line with the research questions the research goals will be tested through the statistical testing methods and evaluated. For the hypothesis testing the parametric test methods used to answer in this context, Independent Samples T-Test, One Way Anova and Pearson Correlation tests were used.

In Table 3, the Independent T-Test results applied to explore statistically significant the relationship between gender and scales (PUKI and MEDAS) are presented. According to the results, while there is no statistically significant difference between the gender and PUKI scores ( $p > 0.05$ ), there is a statistically significant difference between the gender and MEDAS scores ( $p = 0.000$ ). When this statistically significant difference was investigated it could be stated that the male participants ( $7.47 \pm 2.01$ ) have higher MEDAS scores than the female participants ( $6.25 \pm 2.18$ ).



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**Table-3:** The Relationship Between Gender and Scales (PUKI and MEDAS)

	<b>Gender</b>	<b>M</b>	<b>std</b>	<b>t</b>	<b>P</b>
<b>PUKI*</b>	Male	7.70	3.77	-1.375	0.171
	Female	8.40	3.33		
<b>MEDAS**</b>	Male	7.47	2.01	<b>4.096</b>	<b>0.000</b>
	Female	6.25	2.18		

\* Pittsburgh Sleep Quality Index

\*\* Mediterranean Diet Adherence Screener

Distribution of the sleep quality according to the scores obtained from the PUKI. According to this, those with good sleep quality in female individuals (PUKI>5) are 71%, and individuals with good sleep quality in male individuals (PUKI<5) are 77%.

According to the results of the Pearson Correlation tests that were conducted to explore the relationship between the sleep quality and MEDAS scores of the participants there is a statistically significant, average level, inversely proportional relationship between PUKI and MEDAS score ( $r = -0.340$ ;  $p < 0.01$ ). As participants' adherence to the Mediterranean Diet increases, so does their sleep quality.

According to the Pearson correlation analysis between the BMI and PUKI and MEDAS scales, there is a statistically significant, inversely proportional relationship between BMI and MEDAS ( $R = -0.188$ ;  $p < 0.01$ ), but there is no statistically significant between BMI and PUKI ( $p > 0.05$ ).

Table 4 below presents the relationship between accommodation and scales (PUKI and MEDAS). According to the results, there is a statistically significant difference between accommodation and both PUKI and MEDAS scores in the context of gender variable (respectively for female  $p = 0.003$ ,  $p = 0.000$ ; for male  $p = 0.000$ ,  $p = 0.000$ ).



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**Table-4:** The Relationship Between Accommodation and Scales (PUKI and MEDAS).

		Accommodation	M	Std. Dev.	F	p
Female	PUKI*	Family House	7.05	3.43	<b>5.042</b>	<b>0.003</b>
		Student House	11.00	4.86		
		Dormitory	8.57	3.34		
		Apart	13.00			
	MEDAS**	Family House	7.98	1.94	<b>9.326</b>	<b>0.000</b>
		Student House	6.00	1.18		
		Dormitory	5.64	1.34		
		Apart	7.00			
Male	PUKI	Family House	7.15	3.28	<b>6.961</b>	<b>0.000</b>
		Student House	10.14	3.03		
		Dormitory	7.10	2.08		
		Apart	8.33	1.15		
	MEDAS	Family House	7.54	1.83	<b>11.999</b>	<b>0.000</b>
		Student House	5.11	1.94		
		Dormitory	5.60	1.90		
		Apart	5.00	0.00		

\* \*\*Pittsburgh Sleep Quality Index

\*\* Mediterranean Diet Adherence Screener

Table 5 below, shows the results of the independent sample's t-test that was conducted between smoking and sleep quality. According to the results, there is a statistically significant difference between smoking and sleep quality (p=0.000).



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**Table -5:** The Relationship Between Smoking and PUKI

		Smoke	M	Std. Dev.	T	p
Fetale	PUKI*	Yes	8.90	3.98	<b>2.721</b>	<b>0.000</b>
		No	6.94	3.46		
Male	PUKI	Yes	9.53	3.46	<b>4.402</b>	<b>0.000</b>
		No	6.67	2.22		

Table 6 below, shows the results of the Pearson Correlation tests that were conducted to explore the relationship between sleep quality and consumption of caffeinated foods. According to these results when the participants' coffee, coke or energy drink consumption increases their sleep quality decreases.

**Table-6:**Correlation Analysis Results Between PUKI and Caffeinated Food Consumption

			Chocolate	Coffee	Tea	Coke	Energy Drink
Female	PUKI*	r	0.182	0.160	0.127	0.305**	0.320**
Male		r	0.048	0.328**	0.113	0.537**	0.428**

\* Pittsburgh Sleep Quality Index

\*\* =  $p < 0.01$

Table 7 below, shows the result of the ANOVA test that was conducted to explore the statistically significant differences between the meals eaten before sleep and sleep quality. There is a statistically significant difference between the meals eaten before sleep and sleep quality ( $p=0.001$ ). When this result was investigated, it could be said that the participants who eat fruits before sleep have the highest sleep quality. Participants who eat toast before sleep have the lowest sleep quality.

**Table-7:** The Relationship Between The Meals Eaten Before Sleep and PUKI

	Meals Eaten Before Sleep	M	Std. Dev.	F	P
PUKI *	Nuts	7.58	3.72	<b>3.616</b>	<b>0.001</b>
	Fruits	6.37	3.18		
	Chips	8.41	3.03		
	Sweets	7.92	2.50		
	Toast	10.20	3.93		
	Pasta & rice	9.00	3.50		



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	Soup and homemade meal	8.50	3.54		
	Dairy	7.57	3.36		

\* Pittsburgh Sleep Quality Index

### **4. DISCUSSION**

University students are among the risk groups in terms of inadequate and unbalanced nutrition, which is a social problem in our country. In a study conducted at Süleyman Demirel University on the nutritional habits of university students, it was shown that 17.39% of female students were underweight (Saygı et al., 2011, pp. 43-47). In a study on the nutritional habits of Trakya University students, 36.0% of the students believe that they have a healthy diet, while 64.0% do not (Onurlubaş et. Al., 2015, pp. 61-69). In a study conducted to determine the nutritional status of students staying in higher education dormitories in Ankara, 54.1% of the students skip their morning meals, 40.8% at noon and 5.1% in the evening. It was stated that 49.9% of the students did not have time, 22.7% of them did not have a habit, 16.6% of them had insufficient money and 13.8% of them skipped meals for other reasons (Heşeminia et al., 2022, pp. 155-166). It has been observed that diseases and health problems that can be caused by this irregularity occur. Examining the relationship between sleep problems that have occurred in recent years with the diet will also prevent sleep problems. Since the Mediterranean diet is known to be one of the most common nutrition models, this study aimed to examine the relationship between the level of adherence to the Mediterranean diet and sleep quality in university students.

The study was carried out with 200 students studying at Istanbul Yeni Yüzyıl University. Of the students participating in the study, 109 (55%) were female and 91 (45%) were male. When the distribution of the people participating in the study according to their age is examined, it is stated that the youngest individual is 18 years old and the oldest individual is 30 years old. It is predicted that the irregular lifestyle of university students will affect nutrition and sleep quality.

In the study of Wang et al., it was concluded that a low PUKI value was associated with BMI, but Mota and Vale reported that poor sleep quality was not associated with BMI (Wang et al., 2019, pp. 845-850; Mota and Vale, 2010, pp. 473-475). According to the results of our research, a statistically significant and inversely proportional relationship was found between BMI and MEDAS. Considering these studies, Wang et al.'s study concluded that the rate of poor-quality sleep was 36.5% in men and 39% in women. The data found by Mesquita's research on sleep quality in Brazilian university students is much lower than the data of Wang et al. However, it is concluded that the sleep quality of university students is generally poor and comprehensive measures should be taken to improve sleep quality and support the physical and mental development of university students. (Mesquita et al., 2010, pp. 720-725).



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In a study conducted at Uludağ University in 2010, when the nutritional status of the participants with the same age range was examined, significant differences were observed in the diets of the students living in the family house, living in the dormitory, and staying in the student house (Korkmaz, 2010, pp. 399-413). In our study, there was a statistically significant difference between accommodation and both PUKI and MEDAS scores in the context of the gender variable (respectively for female  $p=0.003$ ,  $p=0.000$ ; for male  $p=0.000$ ,  $p=0.000$ ). For female students, it was determined that the students living in the family home had the highest sleep quality, while the students living in the student home had the worst sleep quality. In the MEDAS scores, the highest level is in the family home, while the students living in the dormitory are at the lowest level. In the PUKI results of male students, it was seen that students living in dormitories had the highest sleep quality, while students living in a student house had the lowest sleep quality. In terms of MEDAS scores, it was concluded that the students living in the family home showed adherence to the diet at the highest score, but the students living in the dormitory showed the lowest point of adherence to the diet. Along with this significant difference, the fact that university students reside in different places such as dormitories and friends' houses outside the family creates an important problem in terms of healthy nutrition in hygienic conditions. In addition, the majority of students meet their nutritional needs in these places, except for lunches at schools. It is supported by this study that especially the student houses that live with friends are far from healthy and balanced nutrition culture and habits. Therefore, it is known that in these places where students spend a great deal of time, they pass meals to satisfy their hunger rather than a healthy and balanced diet.

It was found that the difference between the nutritional habit score average of the students who do sports and the average of those who do not do sports is statistically significant (Vançelik et al., 2007, pp. 242-248). In the study of Açıık et al., it was determined that the level of nutrition habits of those who do regular sports is higher (Acık et al., 2003, pp. 74-80). In the study conducted by Vançelik et al., it was determined that 77.1% of the university students do not regularly do sports, and in the study of Korkmaz, 84% of the students do not participate in sports activities. When the answers of the students participating in the survey are examined, it is seen that they do not do sports regularly. In conclusion, the mentioned findings also support our results.

When we look at the effect of smoking, Açıık et al.'s study concluded that smokers have a lower nutritional habit score (Acık et al., 2003, pp. 74-80). According to our results, there is a statistically significant difference between smoking and sleep quality ( $p=0.000$ , Table 5). When these results were investigated; it could be stated that the for the genders non-smokers) have higher sleep quality than the smokers. When the alcohol consumption of the participants was examined, it was observed that 82 (41%) of the participants used alcohol and 118 (59%) did not use alcohol. The low rate of alcohol use among young people is a positive habit in terms of health. This finding in our study is also supported by the study of Vançelik et al. (Vancelik



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et al., 2007, pp. 242-248). Studies show that smokers consume fewer vegetables and fruits, so their eating habits are negatively affected. It is reported that smokers have less appetite than non-smokers, which negatively affects their nutritional status (Korkmaz, 2010, pp. 399-413).

Students do not pay enough attention to healthy nutrition recommendations; They show that they do not have enough time among the barriers to healthy eating, and that the variety of food in school canteens is less (Croll et al. 2001, pp. 193-198). In our study, when the foods consumed as snacks are examined, 30% of the females prefer biscuits and 28% prefer desserts. However, it is observed that 52% of male students prefer toast, and pastry and 22% of them prefer biscuits as snacks. With this result, it was seen that the students did not make healthy choices as a snack.

The increase in the demand for caffeinated beverages has brought with it the examination of the possible effects of caffeine on human health (Deniz et al., 2015, pp. 59-63; Özpapas & Özer, 2017, pp. 297-305). It has been stated in the literature that caffeine can affect human health in both positive and negative ways. It has been reported that caffeine can improve many cognitive and behavioral processes such as exercise level, fatigue and concentration, and reduce fatigue with the stimulating effect of moderate caffeine intake (Zahra et al., 2020, pp. 46-51). On the other hand, depending on the negative effects of caffeine, mood changes, sleep problems and anxiety disorders can be seen; It has been reported that excessive caffeine consumption may disrupt the fluid and electrolyte balance with its diuretic effect, resulting in adverse health conditions such as cardiovascular problems, decrease in bone density and calcium accumulation (de Mejia & Ramirez-Mares, 2014, pp. 489-492; Gaeini et al., 2019, pp. 1-10; Pereira-Morales et al., 2019, pp.225-236). The results of our study partially support this issue. It was concluded that all of the students (N=200) included in the study consumed caffeine-containing foods. The reason for this is that students prefer caffeine as a stimulant to stay awake and focus for a long time during the exam preparation processes, and these preferences are generally in the form of tea, coffee, energy drinks, cold tea, cola and chocolate (Aydın & Eryılmaz, 2019, pp. 19-23). As a result of our study, a directly proportional relationship was found between caffeine and sleep quality. It has been concluded that the quality of sleep decreases in people with high caffeine consumption (Table 6).

Considering the compatibility of the consumed meals with the Mediterranean diet, the food variety is very important in the Mediterranean diet. In the Mediterranean diet, it is recommended to consume predominantly plant-based foods such as fresh vegetables and fruits, whole grains and nuts, and olive oil as edible oil. In our study, it was observed that the consumption of olive oil was 73% in women and 45% in men, and it was determined that the consumption of foods such as margarine and butter was low. The recommended consumption of vegetables more than 2 servings per day resulted in 76% for women and 32% for men. Results in fruit consumption were quite good compared to vegetable consumption. 79% of female students and 14% of male students consume the recommended amount of red meat. In



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our result, 14% of men consume high amounts of red meat. Sugary beverage consumption is quite high in both groups. Wine consumption is less than the recommended amount or not consumed at all by female students. There are only 7 students with the recommended amount of wine consumption among male students. It was concluded that 15% of female students and 16% of males consume more than 3 servings of fish per week. When looking at the frequency of fish consumption in another study involving 90 people, approximately 13% of the students reported that they consume fish 1-2 times a week (Açık and Çakıroğlu, 2017, pp. 305-314). In a study by Garaulet et al., it was seen that people who ate adequate amounts of vegetables, fruits and fish slept 8 hours or more a day and the number of short sleepers decreased (Garaulet et al., 2011, pp. 1308-1317). The higher sleep quality of the students who consumed fruit in the foods eaten before going to sleep in our study also supports the study of Garaulet et al (Table 7). It can be explained by the fact that it is rich in fruits and vegetables rich in plant-based protein and unsaturated fats, which are rich in nutrients and compounds that regulate sleep quality with their antioxidant, anti-inflammatory and metabolic regulatory effects (Scoditti et. al., 2022, Siervo et. al.,2021, pp.105-117).

In the study of Özcan et al., a significant correlation was found between compliance with MEDAS and sleep ( $p < 0.05$ ) (Özcan et al., 2021, pp. 39-44). It was also observed that MEDAS scores decreased as PUKI scores increased ( $p < 0.05$ ). According to our results, there is a statistically significant, average, inversely proportional relationship between sleep quality and MEDAS score ( $r = -0.340$ ;  $p < 0.01$ ). As a result of the data, it is seen that sleep quality increases as people's adherence to the Mediterranean diet increases. In a study, Fernández-Medina et al. aimed to discover the role of therapeutic adherence to the Mediterranean diet and self-efficacy as mediators in the relationship between sleep quality and the average grades of nursing students. Pittsburgh Sleep Quality questionnaires, adherence to the Mediterranean diet and the Baessler and Shwarzer General Self-efficacy Scale were administered. The data confirms that good quality of sleep has a potentially positive effect on the academic performance of nursing students, as well as the mediating role that the Mediterranean diet plays between both variables (Fernandez-Medina, 2020, pp. 3265-3275). In our study, According to our results, there is a statistically significant, average, inversely proportional relationship between sleep quality and MEDAS score ( $r = -0.340$ ;  $p < 0.01$ ). As a result of the data, it is seen that sleep quality increases as people's adherence to the Mediterranean diet increases.

## **5. CONCLUSIONS**

Nutrition is very important for students' physical health and mental health to be successful and productive in society. Also an important point is how the students are fed. The fact that students choose a university in different cities and leave the family environment they are used to may cause them to be more easily affected by external influences (Sofi et al.,2008). As a result of these, dietary patterns are determined. As the most well-known nutrition model,





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the applicability of the Mediterranean Nutrition Model to the lifestyle of the students was wondered. It is a very important point for students to reach the food groups that are important in the Mediterranean diet. According to the data obtained, the adherence of the students living in the family home to the Mediterranean diet is higher than the students living in the student home. It was concluded that there is a relationship between people's adherence to the Mediterranean diet and their sleep quality. In the data, it is seen that as students' adherence to the Mediterranean diet increases, their sleep quality also increases. The lifestyle of the students, the place they live can indirectly affect their nutrition and food choices. The data obtained supports this view. The study shows that male and female students living in the family home have better MEDAS results. In the same way, when the sleep quality is examined, it is seen that female students living in the family home have a better quality of sleep, while male students living in the dormitory and family home have a better quality of sleep. The low MEDAS results of the students living in student houses, dormitories, and apartments create the idea that students have difficulty in providing some food groups that are important in the Mediterranean diet model.

We think that healthy eating habits may lead to improved sleep quality among university students. Because of this it should be recommended to integrate the Mediterranean Diet model with daily life in the university students and to make more efforts to make healthy nutrition sustainable. In addition, for students to adapt to the Mediterranean diet model, students' access to the recommended foods should be facilitated. Raising awareness of individuals about the Mediterranean Diet and increasing the level of physical activity in the society should be supported.

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