Original article

An Analysis of Relationship of Sleep Pattern and Sleep Quality with Eating Behaviour among University Students

Merve Gizem Özdişli[1], *Emine Yıldız*[2]

[1]Hasan Kalyoncu University, Faculty of Health Sciences, Nutrition and Dietetics Department; [2]Eastern Mediterranean University, Faculty of Health Sciences, Department of Nutrition and Dietetics

Abstract. This study was carried out to investigate the relationship between sleeping habits and quality of eating habits of students. The study was conducted on 248 (135 female, 113 male) healthy individuals, aged 18-32 years, who were educated at Hasan Kalyoncu University Health Sciences High School between November 2015 and March 2016. Individual characteristics of the individual, food consumption and nutrition habits, anthropometric measurements and physical activities were questioned with a questionnaire. The Pittsburgh Sleep Quality Index was used to determine the duration and quality of sleep of individuals. The mean age of women participating in the study was 20.33 ± 2.16 years, the mean age of male subjects was 21.39 ± 2.31 years, the mean BMI of female subjects was 22.3 ± 3.5 kg / m² and the mean BMI of male subjects was 24.8 ± 3.7 kg / m². The mean duration of sleep of the female subjects was found to be 7.11 ± 1.42 hours and the mean duration of sleep of the male subjects was 7.09 ± 1.42 hours. 38.5% of the female subjects had a Pittsburgh score of less than 5 and 5, good sleep quality, 61.5% had a Pittsburgh score of 6 or more, and poor sleep quality. 42.5% of male subjects had a Pittsburgh score of less than 5 and 5, good sleep quality, 57.5% had a Pittsburgh score of 6 or more, and poor sleep quality. The mean energy intake of female subjects on a one-day diet was 1333.30 ± 524.19 kcal, and the mean energy intake of male subjects on a one-day diet was found to be 2010.1 ± 824.70 kcal. There was a high statistically significant difference in energy consumption among individuals compared to gender (P = 0.001). There was a very weak significant correlation between negative fat saturated fatty acids and sleep duration (r = -0.129, P = 0.042). The mean PAL value of female subjects was 1.87 ± 0.35, and the mean PAL value of male subjects was 1.98 ± 0.18. There was a very high statistically significant difference between PAL values (P = 0.002). As a result, sleep duration and quality are indispensable for healthy nutrition and healthy living. It is seen that shortening the sleeping period and decreasing the sleep quality causes many health problems such as obesity, hypertension and insulin resistance. It is aimed to improve the sleep duration and quality of the students, to live a healthier life with optimal nutrition and thus to minimize the risk of diseases.

Key words: PUKI, Sleep quality, Sleep duration, Food consumption, Physical activity, University students

Introduction

Sleep, what we spend most of our life with, is an indispensable need to have a healthy and quality life. Sleep physiology was explained only recently by the invention of electroencephalography (EEG) in the 20th Century (1). Sleep is made up of two active cycles: rapid eye movements (REM) and of non- rapid eye movements (NREM). REM phase starts 90 minutes after the NREM phase. The average daily sleeping duration of an adult is 6 to 8 hours. A regular and quality sleep is essential to store energy for the following day's mental and physical activities, for the restoration and recovery of vital bodily and mental functions, and for protein synthesis (2).

There are many elements effect the sleep quality. Sleep deprivation and poor sleep quality lead to poor health and productivity loss in daily life (3). Poor health and stress lead to eating disorders. It has been revealed that individuals with less sleep hours consume less vegetables and fruits, but high energy and oily food. As a result, they gain weight. An uncontrolled weight gaining leads to obesity that is the one of the today's health problems, and it should be prevented (4).

It is observed that sleep disorders are more common in women than in men. It has been found that female university students have fewer sleeping hours and more sleeping disorders than male students do. Sleep deficiency has a negative effect on university students' academic performance and health. It causes inability to concentrate, forgetfulness, clumsiness in daily activities, and weak interpersonal relations. Moreover, it causes a vicious circle in which sleep deficiency leads to stress and stress leads to sleep deficiency. It has been stated that sleep disorders and sleep deficiency are pioneer indicatives and are correlated to depression (5,6).

In consequence of alterations in their lifestyles and eating habits, weight gaining, and obesity frequency is increasing among the university students who are one of the risk groups for eating disorders. Obesity leads to many diseases such as cardiovascular diseases, certain cancer types, diabetics, and chronical diseases. It has been revealed that sleep disorder and poor sleep quality are related with metabolic syndromes consisting of central obesity, hypertension and insulin resistance, and even with increased mortality risk. In addition, among obese individuals, visceral adiposity is an important risk factor (7).

Obesity is a health problem, which deteriorates more with acute and chronic diseases. In the developing countries, the energy intake is increasing while the physical activity is decreasing, which leads to an increase in body mass index. An increase in the body fat causes an increase in chronic disease risk, and psychological problems. Similarly, an increase in body weight, leads to tears in the joints; and an increase in the fat storage in the parapharyngeal space leads obstructive sleep apnoea syndrome, which is one of the important sleep disorders. (8).

It has been observed that 30 percent of the individuals have obstructive sleep apnoea syndrome. The rate obstructive sleep apnoea syndrome increases in the individuals with resistant hypertension. Sleep pattern and sleep quality of the individuals with obesity or chronic disease should be checked (9).

There is a relation between sleep deficiency and body weight increase. A long-term sleep deficiency leads to increase in food consumption and body weight. It has been observed that a short sleep duration has an appetize increasing effect by effecting neuroendocrine control. A decrease in the sleep duration causes a decrease in the leptin level, but an increase in the ghrelin level. As the appetite increases, snack consumption especially ones with high sweet, salt, and starch ingredients increases. An increase in the duration of staying awake leads to an increase in energy consumption of the body. Consequently, an increase in consumption to meet the energy needs of the body leads to obesity. Studies showed that sleep duration below 8 hours causes an increase in BMI. Moreover, reduced glycoses intolerance which is a risk factor to obesity is related to sleep loss (10, 11).

The aim of this study is to analyse whether the relation of the university students' sleep patterns and sleep quality with their eating habits, physical activity and body compositions differs according to genders.

Methods

This study was conducted on the students studying in Health Sciences Vocational High School of Hasan Kalyoncu University, Gaziantep Turkey. The participants are consisted of 248 people of 113 men and 135 women who were selected randomly. For this study, 14.03.2016 dated and 2016/23-11 numbered "Ethics Committee Approval" was received from North Cyprus Turkish Republic Eastern Mediterranean University Ethics Committee. A written consent form stating the participant's voluntariness was also received. The students without any chronic diseases are included in the study. Survey conduct and data collection were proceeded out of the times when students had exams.

Data Collection and Analysis

The survey questions were created by utilising the literature and similar studies. In addition, all date were gained by the researcher's asking these questions directly to the participants with interview method. The survey of the study is consisted of 6 parts of general information, eating habits, eating frequency, one day food consumption record, anthropometric measurements, and a 24- hours physical activity record. The participants' heights were measured by stadiometer; waist and hip circumference were measured by tape measure, weight, and body analysis were done through Tanita Body Composition Analyser BC-418 bioelectrical impedance analysis device (26). Body weight (kg) / square meter of height (m^2) was used to calculate the basal metabolic rate (27).

Pittsburgh Sleep Quality Index was applied in order to assess the participants' sleep quality. Validity and reliability of the Index were obtained, and it was shown that PSQI could be used in clinical studies and researches. PSQI is consisted of 24 questions. The first 19 questions of the scale are to be responded by the individuals, themselves. The last 5 questions are responded by the individuals' room or bed partners. The responses to these questions are used for clinical information only, not included to score calculation. While calculating PSQI score, the responds are grouped in 7 components. These components give information on subjective sleep quality (component 1), sleep latency (competent 2), sleep duration (component 3), sleep efficiency (component 4), sleep disorder (component 5), medication (component 6), and daily functions (component 7). Each component is scored between 0-3 according to the responds. All scores calculated to 7 components make the total PSQI score. The result is between 0-21. If the score is 5 and below, the sleep quality is 'good'; if above 5, sleep quality is considered to be 'poor' (12).

Statistical Data Analysis

Collected gained were analysed through IBM SPSS v24.0. Shaphiro Wilk test was applied to control normal distribution of the continuous variables. The Student t test was applied to compare the variables with normal distribution in 2 independent groups. Pearson correlation coefficient was applied to determine the correlation between the numerical variables. Chi-square test was applied to determine the correlation between categorical variables. SPSS for Windows version 24.0 package software was used for statistical analysis. The results $P<0.05$ were found statistically significant.

Findings

In this part of the research, the findings belong to the 248 students between 18-32 ages, without any chronic health problem, and studying at Vocational High School of Health Sciences of Hasan Kalyoncu University were presented. The mean age of the female participants is 21.39±2.31, and the mean age of the male participants is 20.33±2.16. The percentage of the females having quit smoking before is 6.2% , and the percentage of the males is 0.7% . The percentage of the males smoking is 30.1%, and the percentage of the females smoking is 8.1%. The percentage of the males not taking alcohol is 75.2 % while it is 92.6% in the females. However; the percentage of the males taking alcohol is 24.8% , and the percentage of the females is 7.4%. The percentage of the participants who do not have any refreshments is 53.6%. . It was found that another meal that is skipped is morning meal, the rate of which is 25.4%. When reasons for skipping meal is analysed according to genders; 55.4% of the females and 54.0% of the males stated they skipped a meal because of time constraint.

It has been found that the mean energy intake of the males from a one-day diet is 2010.05±824.70 kcal, and the mean energy intake of the females from a one-day diet is 1333.30±524.22 kcal. It has been found that the mean body weight of the males is 77.42±13.29 kg, and the mean body weight of the females is 58.45±9.96 kg. The mean height of the males is 176.33±6.39 cm, and the mean height of the females is 161.58±5.57 cm. The mean BMI of the males is 24.87±3.75 kg/m^2, and the mean BMI of the females is 22.34±3.57 kg/m^2. The mean waist circumference of the males is 89.43±9.79 cm, and the mean waist circumference of the females is 78.91±8.47. (See Table1).

Table 1. Anthropometric Measurements of the Participants according to Genders

	Males n:113				Females n:135			
		SS	Min.	Max.		SS	Min.	Max.
Body weight (kg)	77.42	13.29	48	125	58.45	9.96	39	96
Height (cm)	176.33	6.39	164	192	161.58	5.57	145	176
Waist circumference (cm)	89.43	9.79	70	116	78.91	8.47	62	100
Hip circumference (cm)	102.76	7.58	84	123	98.01	7.42	83	135
BMİ (kg/m²)	24.87	3.75	17	40	22.34	3.57	15	35

Table 2. Parameters Related to Sleep Patterns of the Participants According to Gender

		N		SS	Min.	Max.	t	P
Sleep duration (hour)	Males	113	7.09	1.42	4	11	-0.080	0.936
	Females	135	7.11	1.42	2	11		
	Total	**248**	**7.10**	**1.42**	**2**	**11**		

Table 3. Pittsburgh Score Analysis of the Participants According to Gender

Chi-squared=0.401 P=0.527	Males		Females		Total	
	N	%	N	%	N	%
Score 5≤ (score is 5 and below 5)	48	42.5	52	38.5	100	40.3
Score 6≥ (score is 6 and above 6)	65	57.5	83	61.5	148	59.7
Total	**113**	**100.0**	**135**	**100.0**	**248**	**100.0**

When participants' sleep duration distribution according to gender is analysed, it has been found that the mean sleep duration of the males is 7.09±1.42 hours, and the mean sleep duration of the females is 7.11±1.42 hours. In addition, it has been found that there is not a statistically significant difference between sleep durations (P>0.05) (See. Table2).

It has been found that the mean Pittsburgh score of the males is 6.12±2.802, and the mean Pittsburgh score of the females is 6.53±2.625. In addition, it has been found that there is not a statistically significant difference when the Pittsburgh scores are compared (P=0.235). It has been revealed that 42.5% of the males' (48 participants) Pittsburgh score is 5 and below 5, which means their sleep quality is good, and 57.5% (65 participants) of the males' Pittsburgh score is 6 and above 6, which means their sleep quality is poor. In addition, it has been revealed that 38.5 % of the females' (52 participants) Pittsburgh score is 5 and below 5, which means their sleep quality is good, while 61.5% (83 participants) of the females' Pittsburgh score is 6 and above 6, which means sleep quality is poor (See Table3). The participants stated certain reasons for being unable to sleep; there are 8 (21.6%) males and 4 (7.5%) females stated that the reason is noise.

When the participants' total energy gained from a one-day diet and food consumption are compared with the PSQI scores according to gender, it has been found that the total energy intake from a one-day diet of the males with good sleeping quality is 1957.17±755.12 kcal. In addition, it has been found that the total energy intake from a one-day diet of the males with poor sleeping quality is 2049.12±876.29 kcal. In addition, it has been found that the total energy intake from a one-day diet of the females with good sleeping quality is 1139.55±507.99 kcal, and the total energy intake from a one-day diet of the females with poor sleeping quality is 1329.40±537.12 kcal (See Table4).

Table 4. The Relation of Energy and Nutritional Elements with PSQI scores

	Males (n=113)						Females (n=135)					
	PSQI						PSQI					
	Good Sleeping Quality (n:48)		Poor Sleeping Quality (n:65)				Good Sleeping Quality (n:52)		Poor Sleeping Quality (n:83)			
Energy and Nutrients		**SS**		**SS**	t	**P**		**SS**		**SS**	t	**P**
Energy (kcal)	1957.17	755.12	2049.12	876.29	-0.584	0.560	1139.55	507.99	1329.40	537.12	0.109	0.913
Protein (g)	78.93	35.05	74.68	29.61	0.697	0.487	48.21	18.10	48.26	21.88	-0.013	0.989
Protein(%)	17.08	5.45	15.84	4.02	1.388	0.168	15.46	4.27	15.42	4.96	0.048	0.962
Carbohydrate (g)	222.21	103.54	244.86	133.58	-0.977	0.330	152.35	85.79	150.41	73.69	0.140	0.889
Carbohydrate (%)	45.95	8.71	47.48	11.68	-0.758	0.450	45.21	11.03	46.16	10.79	-0.491	0.624
Fat (g)	80.52	33.84	82.74	37.75	-0.322	0.748	57.75	22.55	57.58	27.71	0.037	0.971
Fat (%)	36.65	7.58	36.81	10.43	-0.095	0.924	39.34	9.04	38.46	9.46	0.540	0.590
Fiber (g)	17.42	8.50	17.15	7.84	0.168	0.867	13.45	7.02	14.23	7.13	-0.632	0.529
Saturated Fat Acid (g)	29.75	13.88	29.65	14.66	0.038	0.970	22.68	9.40	22.32	11.26	0.190	0.849

Table 5. The Correlation of Sleep Duration and Pittsburgh Score with Anthropometric Measurements

		Sleep Duration (Hour)	BMI	Fat %	BMR	Hip circumference	Waist circumference
Score	**r**	-0.374**	-0.033	-0.009	-0.118	-0.106	-0.027
	P	0.001	0.604	0.885	0.063	0.095	0.678
Sleep Duration (Hour)	**r**	1	-0.098	-0.010	0.019	-0.018	-0.096
	P		0.125	0.872	0.765	0.778	0.132
BMI	**r**		1	0.454**	0.355**	0.877**	0.866**
	P			0.001	0.001	0.001	0.001
Fat %	**r**			1	-0.155*	0.452**	0.288**
	P				0.014	0.001	0.001
BMR	**r**				1	0.338**	0.388**
	P					0.001	0.001
Hip circumference	**r**					1	0.834**
	P						0.001

r: Pearson correlation coefficient,
** Correlation coefficient p< 0, 01 significant
* Correlation coefficient p< 0, 05 significant

Table 6. The correlation of Sleep Duration and Pittsburgh Score with Total Energy and Nutrition Elements

		Sleep Duration (min)	Pittsburgh Score
Energy (kcal)	r	-0.059	-0.026
	P	0.352	0.681
Protein (g)	r	-0.077	-0.079
	P	0.224	0.216
Carbohydrate (g)	r	-0.025	0.009
	P	0.695	0.885
Fat (g)	r	-0.073	-0.044
	P	0.250	0.488
Saturated Fat Acid (g)	r	-0.129*	-0.096
	P	0.042	0.132
İron (g)	r	-0.119*	0.043
	P	0.061	0.504
Potassium (mg)	r	-0.100*	-0.063
	P	0.116	0.321
Sodium (mg)	r	-0.080	-0.136*
	P	0.207	0.032
Retinol (μg)	r	-0.100*	-0.043
	P	0.117	0.504
Vitamin B2 (mg)	r	-0.124*	-0.073
	P	0.051	0.251
Vitamin B6 (mg)	r	-0.102*	-0.032
	P	0.111	0.619
	N	**248**	**248**

r: Pearson correlation coefficient,
* Correlation coefficient p< 0, 05 significant

The correlation of the participants' sleep durations and Pittsburgh scores with their anthropometric measurements is tabulated in Table 5. There is a negatively weak significant correlation between score and sleep duration ($r = -0,374$, $P<0.01$). There is no correlation of the score and sleep duration with other variables.

The correlation of the participants' sleep durations and Pittsburgh scores with total energy and nutrition elements is tabulated in Table 6. It has been found that there is a negatively weak significant correlation of saturated fat acids and iron intake with sleep duration (respectively $r =-0.129$, $P=0.042$, $r =-0.119$, $P<0.05$). It has been found that there is a negatively weak significant correlation of Retinol, B2 and B6 intake with sleep duration (respectively $r =-0.100$, $P=0.117$, $r =-0.124$, $P=0.051$, $r =-0.102$, $P=0.111$).

Discussion

This study has been conducted to analyse the relation of the sleep patterns and sleep quality with eating habits of the students studying at Hasan Kalyoncu University. The participants' energy and nutritional elements consumption, physical activities and sleep quality were analysed. In this study, only the individuals without any chronical diseases were included. The study was conducted only on the university students; therefore, the age group does not cover a wide range of ages. The students were asked about their eating habits, and whether they skipped a meal or not, if yes the reasons why they skipped a meal, and where and with whom they had their meals. It has been found that 53.6% of the individual do not have refreshments. The most regular meal is dinner. Vassigh conducted a study on 526 male and 474 female students studying at universities in Ankara with the aim of analysing the relation between physical activity levels and healthy diet. It was found that 29.5% of the males and 23.6% of the females didn't not have any refreshments (13). There is no significant correlation of sleep duration and Pittsburgh score with energy intake (See Table 3). According to the study conducted by Çelik on the individuals who were diagnosed as Obstructive Sleep Apnoea Syndrome (OSA) in Başkent University Ankara Hospital with the aim of analysing metabolic syndrome and eating habits; when their energy intakes and nutritional elements were analysed, there was no statistically significant difference between the nutritional elements and their OSA levels of two genders. Similar findings were revealed in Çelik's results (14).

Body Mass Index (BMI), which is an indirect element having influence on sleep duration and sleep quality, effects life quality negatively (15). In the current study, it has been found that there is no significant correlation of sleep duration and Pittsburgh score with BMI (See Table 2). Öztürk et al. conducted a research on 5358 children aged 6-17 with the aim of analysing relation of sleep and obesity in Turkish children and adults. It was found that as the sleep duration of females' increases, their BMI decreases. The BMI results of the study conducted by Öztürk et al. are parallel to the current study's BMI results (16). In this study, when the BMI results are analysed considering the sleep quality, it has been found that the mean BMI of the males with good sleep quality is 25.10 ± 3.45 kg/m², and the mean BMI of the males with poor sleep quality is 24.72 ± 4.04 kg/m²; and the mean BMI of the females with good sleep quality is 22.19 ± 3.54 kg/m², and the mean BMI of the females with poor sleep quality is 22.49 ± 3.59 kg/m².

According to the study conducted by Öçal with the aim of analysing the relation between sleep quality and eating habits of the individuals consulting Acibadem Maslak Hospital in Istanbul, it was found that the mean BMI of the males with good sleep quality was $25,72\pm2,02$ kg/m², and the mean BMI of the males with poor sleep quality was $24,65\pm4,23$ kg/m². In addition, it was found that mean BMI of the females with good sleep quality was $20,98\pm2,47$ kg/m², and the mean BMI of the females with poor sleep quality was $22,13\pm3,41$ kg/m ². The results are similar when compared to the current study (17).

It has been found that the mean energy intake of the female participants with good sleep quality is 1139.55 ± 507.99 kcal, while the mean energy intakes of the female participants with poor sleep quality is 1329.40 ± 537.12 kcal (See table 1). Similar to **Öçal**'s study, energy intakes were classified according to the sleep quality. It was found that the mean energy intake of the participants with good sleep quality was $1253,88\pm247,92$ kcal, while the mean energy intake of the participants with poor sleep quality was 1271,8±293,41 kcal (17). In the current study, it has been found that the students with poor sleep quality takes more energy than the students with good sleep quality do. However, there was no statistically significant difference.

In the study conducted by Deniz with the aim of analysing the relation of sleep duration with energy expenditure and food consumption, it was found that the mean energy intake gained from a one-day diet of the participants who sleep from 7 to 8 hours in weekdays was 1157.7±414.10 kcal. The mean energy intake gained from a one-day diet of the participants who sleep from 7 to 8 hours in weekends was 1142.2±388.6 kcal (18). In the study conducted by Karadağ on the patients with narcolepsy with the aim of analysing the effect of Omega 3 fatty acids on sleep, Plasma Orexin-A Levels and analysing their nutritional status, it was found that the mean energy intake of the participants was 2170±415.92 kcal. In Deniz's study, the age range was wider and the majority of the participants were female; however, in Karadağ's study, as the participants were males, the mean energy intake was observed differently (19). The nutrients consumed and diet quality may affect the hormonal pathways that regulate the sleep and its duration. In addition, sleep duration may affect a diet content and the total energy intake from that diet (20).

When the Pittsburgh score of the students has been analysed, it has been found that the mean score is 6.34±2.71. In the study conducted by Aysan on 300 students studying at schools of nursing, Medicine and pharmacy of a university in Izmir with the aim of studying sleep quality and the factors that affect students' sleep quality, the Pittsburgh score was found 6.15±1.90 (Aysan and et al., 2014). It was found that students' sleep quality was poor by similar results. Measures should be taken with the aim of preventing health problems resulting from poor sleep quality.

It has been revealed that 42.5% of the males' Pittsburgh score is 5 and below 5, as good sleep quality, and 57.5% of the males' Pittsburgh score is 6 and above 6, as poor sleep quality. It has been revealed that 38.5 % of the females' Pittsburgh score is 5 and below 5, as good sleep quality, and 61.5% of the females' Pittsburgh score is 6 and above 6, as poor sleep quality. In the study conducted by Aysan and et al., it was found that 59% of the students' Pittsburgh score was 6 and above 6 (21). Yaran conducted a study on 378 students studying at Ondokuz Mayis University in Samsun with the aim of analysing the sleep and life quality of the students doing and not doing sport. It was found that the mean PSQI was 6,16 ± 3,174. In addition, it was found that the Pittsburgh score of the 44% of the students doing sport was 6 and above 6 as poor sleep quality, and the Pittsburgh score of the 53.6% of the students not doing sport was 6 and above 6 as poor sleep quality (22). This reflects that the physical activity has positive effect on sleep duration and quality. In the study that Saygılı and et al. conducted on Sleep Quality and Fatigue of University Students, it was found that 69.5% of the students' Pittsburgh score was 5 and below 5, as good sleep quality (23). Similar results have been found in the studies.

The relation between sleep deficiency and obesity is as following; that individuals sleep deficiency with feel exhausted and weak. Consequently, they need more sleep during the day, which causes them to be less active. As they desire for more sleep duration and more energy consumption, they tend to consume more food and drinks with high-energy intake. The exhaustion and weakness feelings lead to less physical activity. In result, low physical activity level leads to weight gain and finally causes obesity (24, 25).

In the current study, the sleep quality scores show similarities with the scores in the other studies. In addition, a significant relation has been found between sleep quality and sleep duration. Especially, that there has been no findings showing any relation between sleep and obesity. However, this might be a result of BMI values' being close to normal values.

Results

As a result of the study, it has been found that the mean BMI of the male participants is 24.87±3.75 kg/m², and the mean BMI of the female participants' is 22.34±3.57 kg/m². The mean Pittsburgh score of females is 6.53±2.625, and the mean Pittsburgh score of the males is 6.12±2.802. The mean night sleep duration of the males is 7.09±1.42hours, and the mean night sleep duration of the females is 7.11±1.42. When the relation of PSQI scores with total energy intake from a one-day diet and nutritional elements consumption are analysed, it has been found that the mean energy intake of the male participants with good sleep quality is 1957.17±755.12 kcal, and the mean energy intake of the male participants with poor sleep quality is 2049.12±876.29. In addition, it has been found that the mean energy intake of the female participants with good sleep quality is 1139.55±507.99 kcal, and the mean energy intake of the female participants with poor sleep quality is 1329.40±537.12 kcal. It has been found that there is a negatively weak significant correlation between Pittsburgh score and sleep duration (r = -0,374, P=0,001). It has been found that there is a negatively very weak significant correlation between saturated fat acids and sleep duration (respectively r =-0.129, P=0.042). It has been found that there is a negatively very weak significant correlation of sleep duration with iron, potassium, sodium, retinol, and vitamins B2 and B6.

There are many studies showing that there is a relation of sleep duration and sleep quality with physical activity, obesity, metabolic diseases, and depression. The increasing obesity problem not only reduces the life quality but also is a leading cause to many diseases. Deterioration in sleep duration can cause obesity and likewise obesity can cause deterioration in sleep duration. Sleep quality and sleep duration should be improved, and optimal nutrition requirements should be met in order to improve sleep quality and sleep duration. People must be informed that sleep duration has influence on nutrition and life quality. When eating disorders are analysed, it should be considered that stress can be a cause for sleep disorders, and it can affect food consumption that creates an obesity risk.

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Correspondence:
Merve Gizem Özdişli
Hasan Kalyoncu University, Faculty of Health Sciences, Nutrition and Dietetics Department
Email: mervegizem_27@hotmail.com