ORIGINAL INVESTIGATION

Investigation of Sleep Quality and Sleep Disorders in Students of Medicine

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Abstract

OBJECTIVES: This study was performed on Suleyman Demirel University medical students to determine the quality of sleep and to investigate factors that affect of sleep quality.

MATERIAL AND METHODS: Suleyman Demirel University Medical students at 1, 2, 3, 4, 5 and 6 classes included to this cross-sectional analytical study (n= 720). Refused to fill to the survey (188), and students were not come to faculty (195), applied survey to 337 students (46.8%). Epworth sleepiness scale (ESS), Pittsburgh (PSQI) and Berlin sleep questionnaires, and 13 pieces closed and open-ended socio-demographic questions were conduct a questionnare under observation. The collected data were analyzed by using descriptive statistics, chi-square, two independent groups t test, Pearson and Spearman's correlation, Mann-Whitney U, Kruskal-Wallis and ANOVA tests.

RESULTS: 337 students participated in the study, 42.1% were male, 57.9% were female, mean age was 21.3 ± 2.1 years. Depending on Body mass index (BMI) 31 were poor, 212 normal, 53 overweight, and 4 obese students. In 118 students (35.3%), and these students have a chronic disease associated with 15.6% used the drug because of illness and 38 percent of students (11.6%) were smokers. 18.1 ± 16.1 min for pupils in times of falling asleep, sleep duration per night. 6.6 ± 1.3h, the mean departure time was 7.7 ± 1.8. Scale with a total score of Pittsburgh class (p= 0.000), age (p= 0.003), BMI (p= 0.015) had a significant correlation between. Pittsburgh PUKI scores and without a significant difference in gender (p= 0.054), the use of stimulant substances (p= 0.032), weight (p= 0.021) and snoring (p= 0.002) with no significant difference were found. ESS total score and gender (p= 0.025), drug use (p= 0.035) and sports activities (p= 0.038). Ten students had snoring (3.0%), 5 students (1.5%) had witnessed apnea. Snoring 17.2% to in ESS > 10 points on it. Pittsburgh, the mean scores of those who witnessed apnea (14.0 ± 5.3), witnessed apnea, according to non-students (10.2 ± 6.4) were higher (p= 0.191).

The effects PSQI and ESS results on the term were statistically significant by the multivariate regression analysis [F(10.602)= 4.56; p< 0.05; Wilkis Lamda 0.864, partial n²= 0.07]. To estimate of the value of PSQI by the stepwise regression analysis was performed; age and fall asleep properties has been included of the model (R2= 89%, p< 0.05). To estimate of the value of PSQI by the stepwise regression analysis was performed; fall asleep property has been included of the model in the the male gender (R2= 80%, p< 0.05). To estimate of the value of ESS by the stepwise regression analysis was performed; term property has been included of the model (R2= 65%, p< 0.05).

CONCLUSION: Medical school students participating in our study, although female-male ratio close to each other, we found that higher ESS and Pittsburgh scores in female more than male. In this case may be related to physiological, genetic, environmental, cultural and psychological differences.

KEYWORDS: Medical students, sleep quality, sleep disorders, Epworth, Pitssburg

Tıp Fakültesi öğrencilerinde uyku kalitesi ve uyku bozuklarının araştırılması.
TÜSAD 33. Ulusal Kongresi, 15-19 Ekim 2011, Sheraton Kongre Merkezi, Çeşme, İzmir, Türkiye

INTRODUCTION

Sleep is the state, in which the organism temporarily, partially and periodically loses its interaction with surroundings at different intensities and which can be reversed with stimuli, comprising approximately one-third of human life [1,2]. Sleep is not only a time frame left out of daily life but it also is a vital necessity for a long and healthy life [3]. In human life, sleeping is an essential necessity as important as breathing, eating and voiding, and it is the basic condition to be healthy either physically or mentally [4,5]. Sufficient sleep is necessary for the healthy functioning of the body. Sleep affects learning and memory. Sleep is a critical factor for health, body weight and energy level. Properties that affect the quality and quantity of sleep are the length of the elapsed time to fall asleep, the number of times awakening from sleep and sleep duration [6]. Diseases related to sleep disorders are diabetes mellitus, hypertension, stroke, and coronary artery disease. Hypertension, stroke, coronary artery disease, and arrhythmia are more frequently encountered in patients with sleep disorders. It is thought that insufficient sleep in childhood and puberty can negatively affect appetite and energy consumption by having an effect on the hypothalamus. It has been reported that depression symptoms decrease with sufficient sleep durations [7]. In a study conducted in 19 countries in Europe, frequency of insomnia has been detected as 17% [8]. Sleep disorder is a clinical condition that manifests itself due to medical, psychological, environmental, and work reasons, and that shows itself with insomnia as a result of restriction, disruption or loss of sleeping pattern [9]. Sleep is necessary to protect the normal functioning of MSS. Natural communication and balance between neuronal centers is protected by sleep. Glycogen storages of the brain is renewed in sleep.The best indicator of the importance of sleep for the central nervous system is the deceleration of mental activity and the manifestation of psychic disorders (hyperactivity, emotional lability, etc.) in insomnia [10].

Obstructive Sleep Apnea Syndrome (OSAS) was defined in 1997 by ASDA (American Sleep Disorders Association) as a syndrome characterized with repetitive upper respiratory tract obstruction,and it is typically seen together with a reduction in blood oxygen saturation. According to a study, OSAS prevelance has been detected as 4% in male and 2% in female patients [11]. According to a study by Köktürk et al., OSAS prevelance has been found as 0.9-1.9% in patients with habitual snoring [12]. Furthermore, OSAS is the most frequently encountered disease among all 85 sleep disorders that have been defined until today [13]. Major signs of OSAS are snoring, witnessed apnea and daytime sleepiness. Daytime sleepiness is the most frequent cause of application to sleep centers. This study aimed at investigating the factors affecting quality and healthy sleep in students of medicine by assessing the sleep states of these students in a long and difficult education period.

MATERIALS and METHOD

After having received necessary oral and written consents from the Suleyman Demirel University Medical Faculty

Advisory Board of Scientific Research Projects (12.01.2011 XIX Meeting, n: 8), informed consent was taken from the students who agreed to participate in the study. The population of across-sectional-analytic study carried out between January and May 2011 was composed of all students of Suleyman Demirel University Medical Faculty (n: 720). Suleyman Demirel University Medical Faculty students attending preparatory school (n: 8) were not included into the study. Sample size was determined as 720 students by having reached all classroom sizes in the faculty. The students who could not participate in the questionnaire for any reason were tried to be reached three times more. As a result, 337 students out of 720 were reached (46.8%) since there were 188 students who did not accept to fill out the questionnaire and 195 students who could not come or were on leave of absence. The students participating in the study were asked a total of 13 open-ended and closed-ended questions oriented at designating their socio-demographic characteristics.

Epworth sleepiness scale, whose validity and reliability has been conducted in Turkey, was used in order to evaluate excessive daytime sleepiness, Pittsburgh sleep quality index (PSQI) was used to evaluate sleep quality and questionnaire forms of Berlin sleep apnea screening tool (BSAST) were performed under supervision.

Items on the Epworth scale comprise a total of 8 likert type questions on a 4-point scale. The measurement is performed separately for each sub-dimension of the scale. The students who receive 10 points and over from a total of 0-24 points are in need to be examined in a sleep laboratory and suffer from excessive daytime sleepiness [14].

Pittsburg Sleep Quality Index is a self-report scale including 19 items. Each item of the scale is equally given 0-3 points. The questions are given 0-3 points and high grades reflect bad sleep quality. The scale consists 7 sub-scales evaluating sleep quality, sleep latency, sleep disorders, sleeping pill use, and loss of functionality during daytime. Total PSQI grade, which ranges between 0-21, is obtained with the addition of sub-scales. A total PSQI grade over 5 indicates, with 89.6% sensitivity and 86.5% specifity, that the individual's sleep quality is insufficient and shows that there is either severe deterioration in two scopes the least or moderate deterioration in three scopes mentioned above [15].

BSAST is comprised of a total of 10 questions in 3 categories, which are as follows: Category I: snoring, witnessed apnea (5 questions); Category II: daytime sleepiness (4 questions); and Category III: hypertension or obesity (1 question). Each category is evaluated in itself, and high risk is established if 2 or more categories are significant. In a study conducted for the reliability of this questionnaire, its sensitivity and specifity have been found as 62% and 43% respectively [16].

Moreover, degree of obesity of the students was found using body mass index (BMI). BMI limit values were calculated as follows: 18.4 kg/m² and below: underweight; 18.5-24.9 kg/m²: normal or healthy weight; 25-29.9 kg/m²: overweight; 30-39.9 kg/m²: obese; 40 kg/m² and over: morbid obese. The

collected data were analyzed on SPSS 15.0 package program by descriptive statistics, Chi-square, independent two-samples t-test, Pearson and Spearman's correlation, independent samples t-test, Mann-Whitney U test, Kruskall-Wallis and ANOVA tests.

RESULTS

Out of the 337 students participating in the study, 141 of the students (42.1%) were male and 194 (57.6%) were female. Mean age of the students was 21.3 ± 2.1 (the youngest: 18 years of age; the oldest: 30 years of age). Mean sleep duration of the students at night was 6.6 ± 1.3 (3 hours the least; 12 hours the most). 6 of the students (1.8%) were using pleasure-inducing substance. An obese individual was present in the families of 55 students (16.6%) participating in the study. 38 of the participating students (11.6%) were smoking. A vast

Table 1. Socio-demographic data of the students

		n (Number)	% (Percentage)
Gender	Female	194	57.6
	Male	141	41.8
Distribution of the students as regards terms	Term I	57	17
	Term II	67	20
	Term III	68	20.3
	Term IV	42	12.5
	Term V	58	17.3
	Term VI	43	12.8
BMI distribution	Underweight	31	10.3
	Normal	212	70.7
	Overweight	53	17.7
	Obese	4	1.3
Cigarette smoking	Non-smoker	27	71.1
	1-2 daily	2	5.3
	3-5 daily	2	5.3
	5-10 daily	3	7.9
	10-20 daily	2	5.3
	20+ daily	2	5.3
Alcohol consumption	Non-consumer	239	70.9
	1-2 annually	40	11.9
	1-2 monthly	43	12.8
	1-2 weekly	12	3.6
	Regularly everyday	3	0.9
Exercise	Do not exercise	107	31.8
	1-2 hours monthly	100	29.7
	1-2 hours weekly	95	28.2
	At least 3 days in a week	27	8.0
	Regularly everyday	8	2.4
Distribution of the students' level of income	101-600 TL	11	3.3
	601-900 TL	32	9.7
	901-1200 TL	53	16
	1201-1500 TL	64	19.3
	Over 1500 TL	171	51.7
Distribution of students' health insurance	State retirement fund	140	47.1
	Social security Institution	100	33.7
	Pension fund for the self-employed	49	16.5
	Private	1	3
	Other	7	2.3
Pleasure-giving substance use	No	328	97.3
	Yes	6	1.8
Cigarette smoking	No	300	89.0
	Yes	37	11.0

majority of the students participating in the questionnaire had social security (Table 1).

Evaluation of the Data Obtained from the Questionnaire

54 (17.9%) of the participating students were detected by the Epworth sleep scale to have excessive daytime sleepiness. Snoring was present in 10 of the participating students (3.0%). Frequency of excessive daytime sleepiness of the snorers was found as 17.2% and as 12.4% in non-snorers. This difference was not detected to be statistically significant (p= 0.494). Mean dozing off duration of the students who suffered from excessive daytime sleepiness (18.3 ± 15.1 min) was found lower when compared to the ones who did not suffer from excessive daytime sleepiness (16.9 ± 21.4 min); however, the difference was not statistically significant (p= 0.584). Mean sleep duration of the students who suffered from excessive daytime sleepiness (6.4 ± 1.7 h) was found lower when compared to the ones who did not suffer from excessive daytime sleepiness (6.6 ± 1.2 h); however, the difference was not statistically significant (p= 0.277) (Tables 2,3).

Mean PSQI grade of the students was found as 9.03 ± 4.21 by the evaluation of Pitssburg sleep quality questionnaire. The rate of the students whose sleep quality was bad (PSQI > 5) was 79.62%. As regards gender, mean PSQI for female and male students were respectively as 9.27 ± 4.36 and 8.69 ± 3.98. Mean sleep duration, mean awakening time and mean dozing off duration were found respectively as 6.6 ± 1.3 h (3 h the least, 12 h the most), 7.7 ± 1.8 (06:00 the earliest, 17:00 the latest), 18.1 ± 16.1 min (0 min the least, 120 min the most) (Tables 4,5).

Five individuals (1.5%) were found to suffer witnessed apnea with the evaluation of BSAST. Out of the 5 individuals with witnessed apnea, 20.0% was found to have excessive daytime sleepiness by the Epworth scale, and the ones with excessive daytime sleepiness without witnessed apnea was found as 15.5%. This difference was not regarded as statistically significant (p= 0.786). Again, mean Pittsburgh grades of the students with witnessed apnea detected by BSAST (14.0 ± 5.3) was found higher when compared with the students without witnessed apnea (10.2 ± 6.4). However,

Table 2. Comparison of students with excessive daytime sleepiness detected by the EPWORTH scale with some variables

Variables		PSG end %	p
Gender	Female	22	0.025*
	Male	12	
Marital status of the family	Divorced/Widower	22.2	0.425*
	Living separately	50	
Pleasure-giving substance use	No	17.9	0.904*
	Yes	20	
Obesity in the family	Present	16.9	0.232*
	None	24	
BMI	Underweight	25.9	0.079**
	Normal	19.7	
	Overweight	12.5	
	Obese	0	
History of chronic disease	Present	15.9	0.225*
	None	21.5	
Drug use	Present	16.3	0.035*
	None	29.2	
Cigarette smoking	Present	18.8	0.317*
	None	11.8	
Social Security	Present	24	0.363*
	None	16.8	

 * Chi-squared test,
** Trend chi-squared test.

Table 3. Comparison of the association between some variables and the scores of the Epworth scale

Epworth cale	Term/Class*	Financial status*	Age**	BMI**	Exercise*	Alcohol consumption*
Tal score	r= -0.072	r= 0.029	r= -0.084	r= -0.110	r= -0.120	r= -0.045
	p= 0.214	p= 0.612	p= 0.146	p= 0.068	p= 0.038	p= 0.440

 * Spearman's correlation,
** Pearson correlation.

Table 4. Comparison of the association between some variables and Pittsburgh scores

Variables		PSQI (mean ± std deviation)	p
Gender	Female	10.8 ± 6.1	0.054*
	Male	9.2 ± 6.1	
Social Security	Yes	10 ± 5.9	0.683**
	No	11.8 ± 8.6	
History of chronic disease	Present	10.9 ± 5.5	0.192*
	None	9.7 ± 6.5	
Drug use	Yes	11.7 ± 5.4	0.057**
	No	9.9 ± 6.3	
Cigarette smoking	Yes	9.7 ± 7.1	0.384**
	No	10.2 ± 6.1	
Pleasure-giving substance use	Yes	2 ± 1.4	0.032*
	No	10.2 ± 6.2	
BMI	Underweight	10.1 ± 6.5	0.021***
	Normal	10.8 ± 6.1	
	Overweight-Obese	8.1 ± 5.9	
Snoring	Present	12.1 ± 5.2	0.002**
	None	8.4 ± 5.7	

  * Independent samples t test,
 ** Mann-Whitney U test,
*** Kruskall-Wallis test.

Table 5. Comparison of the association between some variables and scores of the Pittsburgh scale

Pittsburgh scale	Term*	Financial status*	Age**	BMI**	Exercise*	Alcohol consumption*
Total score	r= -0.255	r= -0.059	r= -0.203	r= -0.174	r= -0.098	r= 0.114
p	p= 0.000	p= 0.396	p= 0.003	p= 0.015	p= 0.157	p= 0.101

 * Spearman's correlation,
** Pea's correlation.

a significant difference was not observed between the two grades (p= 0.191).

Figure 1 and Figure 2 show Epworth, PSQI and BSAST scares as regards the terms.

For BSAST, the number of students with an elevated risk was found high in Term III and Term IV students.

Multivariate regression analysis found the effect of terms or classes of medical faculty students to have a statistical significance on PSQI and ESS results (F(10.602)= 4.56; p< 0.05; Wilkis Lamda 0.864, partial n2= 0.07).

The effect of terms or classes of the students on PSQI and ESS results was statistically significant (PSQI: F(5.302)= 6.5, p< 0.05; partial n2= 0.09) ESS: F(5.302)= 3.0 p< 0.05; partial n2= 0.05).

In terms of PSQI results, there is a statistically significant difference between 1st year and 5th year students (p< 0.05) and 1st year and 6th year students (p< 0.05); and between 2nd year and 5th year students (p< 0.05) and 2nd year and 6th year students (p< 0.05).

In terms of ESS results, there is a statistically significant difference between 3rd and 5th year students (p< 0.05).

The characteristics of age and dozing off were added into the model in the Stepwise regression analysis conducted to predict PSQI value (R2= %89, p< 0.05).

In the male gender; the characteristic of dozing off was added into the model in the Stepwise regression analysis conducted to predict PSQI value (R2= 80%, p< 0.05). The characteristic of term was added into the model in the Stepwise regression analysis conducted to predict ESS value (R2= 65%, p< 0.05).

DISCUSSION

This is the first epidemiological study on sleep disorders in students of Faculty of Medicine in our country. Since the education given in the Faculty of Medicine is long and difficult, the students are required to be active constantly. Responsibilities brought upon students of medicine, including studying, preparation to frequent exam programs, internship preparations, patient organization, and being on call at the emergency service or the clinic, set forth this situation. Within this cycle, the circadian rhythm of normal sleep is naturally broken, and irregular and less sleep is perceived as normal. If this process continues, there will be deterioration in sleep quality and reduction in sleep duration, leading to
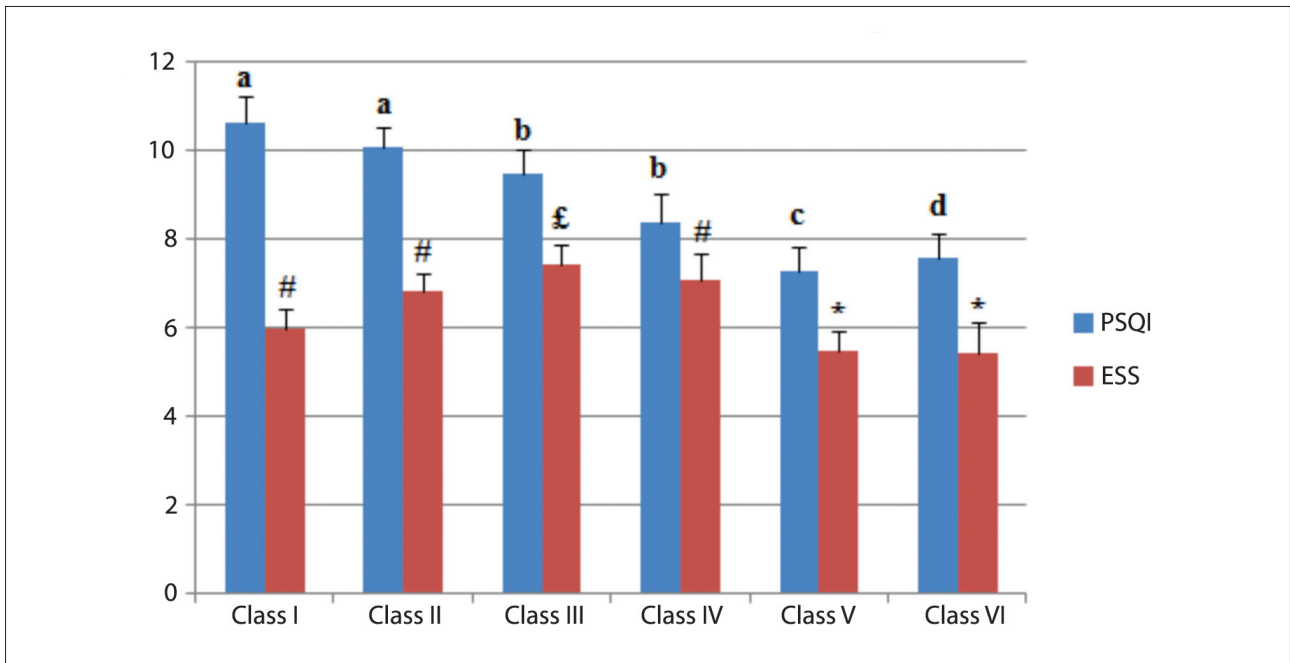
Figure 1. ESS and PSQI scores as regards terms (There is a statistically significant difference between averages carrying different characters (PSQI) and symbols (ESS).
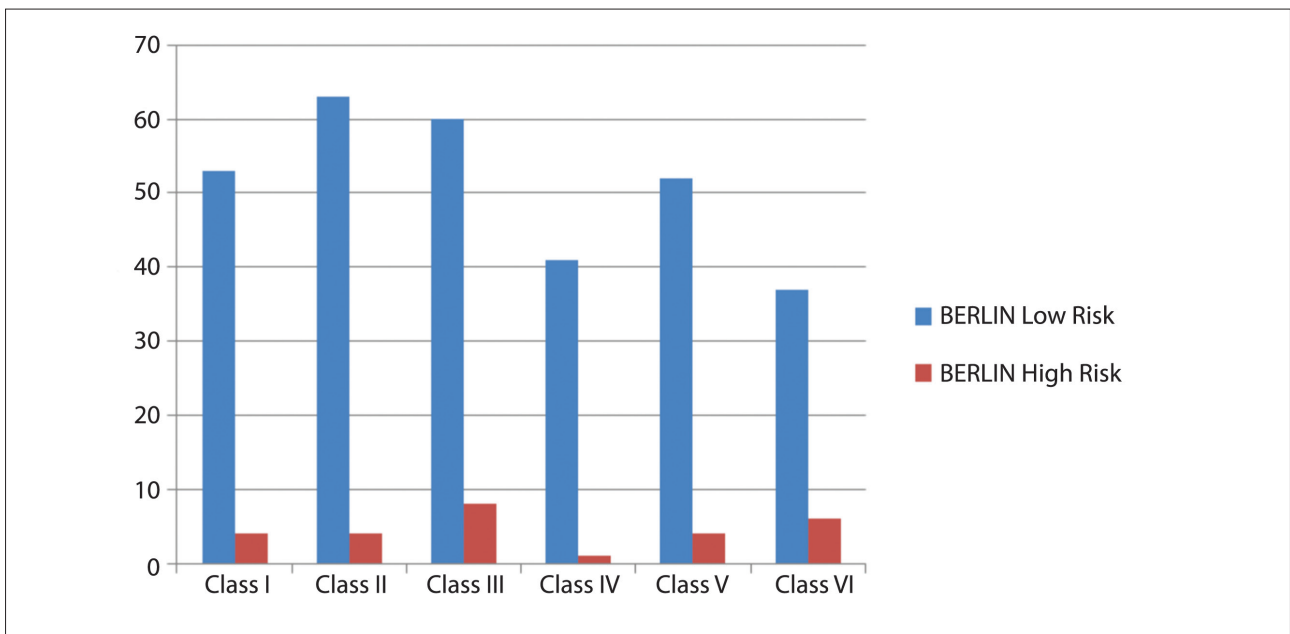

Figure 2. Results of Berlin Sleep Apnea scanning questionnaire as regards terms.

chronic sleep disorders. When long-term effects are considered, this can be related to many systemic chronic diseases.

In this study where we investigated sleep quality and sleep disorders, 54 of the participating students were found by the Epworth scale to suffer from excessive daytime sleepiness (Epworth score > 10 = 17.9%). Epworth scale has been applied to 412 students of medicine (69%) in a study conducted at Gülhane Military Medical Academy (GMMA). It has been determined that 34.5% of the students suffer from excessive daytime sleepiness, and the number of students statingthat they cannot get enough sleep, are tired and not rested (61.8%) are higher than expected [17]. These data

were found higher than ours, which could be associated with the fact that GMMA is a military school. Generally, the frequency of individuals with excessive daytime sleepiness show variability [18,19]. Along with the fact that female:male ratio of the students of the Faculty of Medicine participating in our study was close to one another, it was seen that the age range varied between 18-30 and female students suffered from excessive daytime sleepiness more than male students. It was established by our study that 12% of the males and 22% of the females participating in our study suffered from excessive daytime sleepiness. Even though sleep disorder is generally seen more in females as parallel to our study, this rate can vary as shown by epidemiological studies carried

out in different groups. It was seen that excessive daytime sleepiness was more frequently encountered in individuals using drugs when in aggrement with to the one that do not. This situation shows that sleep hygiene and hence sleep rhythm is deteriorated by drug use. It has been reported in studies that drug and substance use lead to insufficient sleep [20]. Our study also shows in aggrement with to these results since sleep quality deteriorated in drug users in our study. Moreover, it was determined that the scores in Epworth scale decreased with increasing age and class term. While Epworth score was higher in normal weight students when compared to overweight and obese students, it was not statistically significant. It has been demonstrated in a study by Başoğlu et al. that excessive daytime sleepiness is seen more in the morbid obese than the obese and that as BMI increases so does daytime sleepiness. We are of the opinion that this difference could occur due to the fact that there were no obese and morbid obese students in our study group [21]. When terms or class years were compared, excessive daytime sleepiness was found higher in the basic training period and lower in the clinical training period, which can be associated with the intense education period and exam stress in the basic training period.

Along with the low number of students smoking and consuming alcohol, 1.8% of them used pleasure-giving substance. Alongside affecting normal life, these habits can deteriorate sleep, sleep hygiene and circadian rhythm, and thus lead to chronic sleep problems. It was observed that as the frequency of exercising increased, Epworth scores of the students decreased significantly. Excessive daytime sleepiness diminished in students who exercised, and hence, these individuals led more quality lives. It was determined that as the financial situation of the students improved, their Epworth scores increased. Circadian rhythm deteriorates with improvement in welfare level, sedentary life, obesity and night life, and as a result, excessive daytime sleepiness can be seen more frequently in these individuals. This situation demonstrates that prevalence of sleep disorders will increase with environmental and genetic factors unless measure is taken later on.

Pittsburgh sleep quality index was found high in individuals that snored in our study. However, it was found lower in overweight and obese students when compared to normal weight students. Epidemiological studies have reported a relation between short sleep duration and excessive body weight [22,23]. Sleep duration has been defined among risks for being overweight in childhood and adolescent periods. It has been put forth that the reduction in leptin and ghrelin levels in short sleep duration is the mechanism that causes this [24]. In our study group, BMI values were found within normal limits and the frequency of overweight and obese students were very low. Therefore, the relation between obesity and the increase in PSQI is not similar to the literature. When PSQI scores between class terms were taken into consideration, it was seen that the scores decreased from basic training towards clinical training, which suggests the difference between courses and applied training. The students are somewhat better during their internship period.

The frequency of snoring has been found as 3.2-12.1% in various epidemiological studies [25]. Mean Pittsburg score of snorers was found significantly higher when compared to non-snorers. The frequency of snorers in our study was 3.0% (10 students). Preisegolaviciute et al. [26] have evaluated sleep quality and life style of the students in the departments of medicine, law and economy in Lithuania and found that the Pittsburg scores of more than half of the students (59.4%) were over 5. They have emphasized the significant difference between students of medicine and students of law and economy and have associated this with the fact that students of medicine spend more time studying, are more worried and are not satisfied with their results, and hence, they study more frequently before going to bed.In a study by Sweileh et al. [27] conducted on sleep habits and sleep problems among Palestinian students, sleep quality has been found "bad" with 9.8%, and a significant relation was found between sleep latency, the frequency of awakening at night and nightmares regarding academic success. Rocha et al. [28] have investigated sleep disorders in high school and university students and applied the PSQI questionnaire to 529 students (m: 241; f: 288), between the ages of 16 and 19, attending to three state schools, private schools and two university preparation schools, in a middle-class neighborhood in Sao Paolo. They have shown that sleep disorders and weak sleep quality were present in the study group. Suen et al. [29] have investigated factors related to sleep quality and sleep hygiene between university students in Hong Kong and found that age, gender, duration of studentship, and the place they lived in are related when gradual choice relation with regression analysis is compared to sleep hygiene and PSQI. In a study by Kang et al. [30] investigating the effects of daytime sleepiness and irregular sleeping program on sleep quality among university students in Taiwan, PSQI and ESS have been implemented on 160 students by semi-structured interview. It has been found that there is a significant relation between program irregularity before going to bed and daily reduction in sleep duration. In multivariate analysis, a significant relation was found between the frequency of irregular sleep and mean daily sleep duration and Pittsburg score. Mayda et al. [31] have aimed at designating the frequency of sleep disorder and the elements affecting it in 4th, 5th and 6th year students of medicine (84 students) at Düzce University and found that mean PSQI score is 5.2 ± 2.7 and the rate of students with a score over 5 is 46.4%. It has been shown in the study that the Pittsburg score of more than half of the students are over 5. Mean PSQI score has been found as 6.15 ± 1.90 and the rate of the students with bad sleep quality has been determined as 59% in a study by Aysan et al. [32] conducted on 300 students attending the faculties of nursing, medicine and pharmaceutics in Izmir. Saygılı et al. [33] have found mean PSQI score of 558 students attending Kırklareli University as 6.9 + 2.4 and 9.5% of the students received a PSQI score of 5 and below. Assaad et al. [34] have applied PSQI to 735 university students between the ages of 18-25 at 6 universities

in Lebanon. In the study, the rate of the students with a PSQI score of < 5 has been determined as 47.3%. It has been established by bivariate analysis that male students had more sleep difficulty than female students (%57.8, %40.8). In our study, female students were detected to experience sleep disorders more. Giri et al. [35] have applied ESS and PSQI to 150 individuals including students of medicine, interns and graduates. ESS score of the students has been found as 26/150 (17.3%), and female individuals have been found to have better sleep quality when compared to male individuals. PSQI scores have been determined as 5.28 ± 2.39 in students, 4.76 ± 2.36 in interns and 7.88 ± 2.5 in graduates. ESS and PSQI have been applied in a study by Pagnin et al. [36] investigating burnout and sleep disorders in 127 pre-clinic med students. Excessive daytime sleepiness by ESS and bad sleep quality by PSQI have been found respectively as 63% and 65%. It has been shown that academic efficiency diminishes with increased excessive daytime sleepiness (OR= 0.86, 95% CI= 0.75 and 0.98). Kabrita et al. [37] have investigated sleep quality on 540 students in state and private universities in Lebanon. Mean night sleep has been found as 7.95 ± 1.34. They have argued that more than half of the students had bad sleep quality with a PSQI of 6.5 h and going to bed and awakening on the weekends are delayed 1.51 h and 2.43 h respectively, which has also led to deterioration in sleep quality. Cheng et al. [38] have conducted a research on 4318 university students in Taiwan and established that the PSQI scores of 2360 (54.7%) students were ≥ 6 and had bad sleep quality and they have also determined that bad sleep quality in university students is associated with the female gender. The results of this study overlap the results of our study. When the relation between sleep quality and physical and mental health is considered, they have emphasized the importance of sleep disorder intervention programs for this population.

Nojomi et al. [39] have conducted a study regarding sleeping pattern on 400 students of medicine and demonstrated that sleep disorder is an important problem among students of medicine and age, gender, life conditions, exercising, and work load are associated with having sleep disorders.

These studies are generally oriented at designating sleep disorders and sleep quality and most of these studies have been conducted over university students. Generally, PSQI scores have been found high in groups receiving long and intense education, just like medicine. In addition, more than half of the study groups in nearly all studies have been found to have bad sleep quality, which has been associated with academic performance. Moreover, it is seen that the concept of sleep hygiene has become more important. The association between sleep quality and sleep hygiene have been put forth with studies. Besides, sleep hygiene comes to prominence as the uppermost factor in increasing sleep quality.

Mean PSQI scores of students with witnessed apnea put forth by BSAST have been detected higher when compared to students without witnessed apnea. A significant difference was not seen when these mean scores were compared.

When BSAST scores in terms of class terms were considered, high risk groups were the ones at the third term, which is the end of basic training, and the internship period, which is the end of medical education. Both basic and clinical training periods can be argued to have influence over sleep quality. According to these results, most risk factors of OSAS are not present in our study group since our population is made up of young individuals. We could not detect significant differences in our results as regards BSAST. Limitations to our study were as follows: having difficulty in reaching all students in our study, the redundancy of questionnaire data, factors preventing to reach the general.

The interaction between sleep and disease processes should be considered on epidemiological, behavioral, physiological and neurobiological levels. It is important to train healthcare providers regarding healthy sleeping habits and sleep disorders. Advancements and approaches in technology should be implemented systematically in sleep science. The importance of a regular sleep should be specified under the leadership of media organs and particularly institutions giving healthcare services. It is obvious that this matter should be addressed with utmost importance due to the fact that sleep disorder is an important element to improve health in the field of public health and to prevent chronic diseases.

Sleep disorder is an underlying factor of many psychological problems. Therefore, we are of the opinion that studies aimed at increasing awareness in individuals with sleep disorder complaints should be intensified since the provision of sleep hygiene and comfort can prevent many diseases.

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