



The prevalence of insomnia in university students and its relationship with quality of life: A university sample

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Abstract

Aim: The goal of this study was to find out how common sleep disorders are among university students and to see how they relate to depression, anxiety, stress levels, personality factors, and overall quality of life.

Materials and Methods: This study comprised a total of 856 students. Initially, Pittsburgh Sleep Quality Index (PSQI) and a Sociodemographic Data Form were applied. Those with a PSQI score of ≥ 6 were scheduled for a second interview and a psychiatric interview was conducted. The participants were divided into two groups as those diagnosed with insomnia ($n=104$) and control group ($n=95$). Both groups were applied Insomnia Severity Index (ISI), Depression Anxiety Stress Scale (DASS), Eysenck Personality Questionnaire-Revised/Abbreviated Form (EPQR-S), and Short Form-36 (SF-36).

Results: Point prevalence of insomnia among study participants was 12.1%. Insomnia was more common in those who have just started university, were staying in dormitories, had a physical disorder, were smoking, had no regular breakfast habits, and were using electronic media more frequently. When compared to the control group, the ISI scores, DASS depression, anxiety, and stress scores, and EPQR-S neuroticism scores were statistically substantially higher in the insomnia group. Physical function, role limitation (physical), pain, general health, vitality (energy), social function, role limitation (emotional), and mental health were statistically substantially lower in the insomnia group than in the control group on the SF-36 subscales.

Conclusion: Insomnia is a prevalent affliction among college students. In students with insomnia, depression and anxiety disorders are more common. Insomnia is also linked to a low quality of life and certain personality features.



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Introduction

Sleep is a biological need for physical, psychological, and social health [1]. Humans spend about one-third of their lives by sleeping [2]. Insomnia is defined as having any and/or all of the following criteria: persistent difficulty in initiating and maintaining sleep, experiencing early morning awakenings, and having no non-restorative and refreshing sleep. In the general community, it is the most frequent sleep problem. It has become more common in recent years, affecting 33 to 50% of the adult population and 5 to 10% of the general population [3].

Sleep disorders can be seen as a single entity or can be associated with mental and physical illnesses [4]. About 50 to 80% of individuals having a psychiatric disorder suffer from sleep problems, while nearly half of individuals having sleep problems are diagnosed with a psychiatric disorder [5]. In particular, complaints of sleep disturbances

are common in mood disorders. Depression and insomnia are likely to have a complex and bidirectional interaction. Some authors have shown that insomnia is a significant predictor of a depressive episode [6]. One of every five individuals experiences complaints of anxiety disorder at least once during the lifetime. It is well known that insomnia is frequently seen in those having anxiety [7]. Sleep occurs with the transition into the state of low arousal and increased parasympathetic activity. In case of stress, the person is usually in the state of high arousal with increased sympathetic activity, thereby, leading to difficulty in initiating and maintaining sleep and, eventually, sleep disturbances. Previous research has found a link between the severity of insomnia and one's perception of stress, with higher stress levels leading to more severe sleep problems [8]. Although the relationship between personality factors and insomnia has been extensively researched, the precise significance of personality traits in the genesis of insomnia remains unknown. The current evidence indicates that

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neuroticism is the most common personality trait in sleep disorder [9]. Sleep is a vital sign of physical and mental health, and sleep disorders and related issues have a negative impact on one's quality of life. Insomnia exacerbates anxiety, depression, and stress, as well as lowering one's quality of life [10].

Irregular bedtime, erratic sleep/wake schedules, poor sleep quality, the use of alcohol and, even, over-the-counter medications or agents having stimulant properties have been reported among students. Those having a poor sleep quality experience more likely physical and psychosocial health problems, as well as lack of concentration, fatigue, irritability, anxiety, and depression [10]. In a comprehensive analysis involving seven studies, the prevalence of insomnia in university students ranged from 9.4 to 38.2%, with the mean prevalence (18.5%) much higher than the rates (7.4%) reported in the general population [11].

Studies examining sleep problems in university students in our country are generally studies involving one or more faculties and conducted with a relatively small number of participants [12-15]. Study data on insomnia in adolescents and young adults are inconsistent; In addition to studies showing that the rate of insomnia is increasing, there are also studies showing that this rate is decreasing [16-18]. Students from all departments in our university were included in our study and were studied with a larger sample group. In this sense, it is thought that our study can provide clearer data on the prevalence of insomnia in university students and contribute to the literature. From this point of view, in our study, we aimed to find out how common insomnia is among university students and to see how they are related to depression, anxiety, stress levels, personality factors and general quality of life.

Materials and Methods

Procedure

The data used in this study were collected with a sample taken from students who continue their active education at Cumhuriyet University. Considering the distribution of the number of students in the faculties, student selection was made to reflect the population of the entire university. Therefore, a selection method in which stratified sampling and simple random sampling methods are used together was applied. Inclusion criteria of students; accepting to participate in the research, continuing undergraduate education at the relevant university. Students with severe psychiatric disorders such as bipolar affective disorder and schizophrenia spectrum disorders were excluded from the study.

In this study, when the maximum error amount that can be accepted according to the probability of occurrence of the event (d) is 0.025, the probability of occurrence of the event (p) is 0.10, the probability of not being seen (q) is 0.90, and the t value (confidence level of the sample is accepted as 99%) is 2.58; With the help of the formula $n = Nt^2pq / d^2(N-1) + t^2pq$, it was decided to sample 938 individuals out of 43722. The research was carried out in two parts. The researchers administered the Sociodemographic Data Form and the Pittsburgh Sleep Quality Index to 938 students in the first stage of the study (PSQI). A total of 82 forms were incomplete and the study involved

a total of 856 students. The students who completed the first phase of the research and will be included in the second phase were invited for an interview within two weeks after the first interview. In the second stage, 496 students with a PSQI score of ≥ 6 were scheduled for a psychiatric interview. However, 114 students were excluded due to several reasons (unable to reach via phone calls, n=29; no attendance to scheduled appointments, n=38; undergraduate transfer, n=16; and no consent for the study, n=31) and a total of 382 students were evaluated in the final analysis. All participants underwent a detailed interview using the DSM-5 insomnia criteria and a total of 104 students (12.1%) were diagnosed with insomnia disorder, which formed the study group. The control group consisted of 95 students who were randomly selected from among the students who were included in the same sample group but were not eligible to take part in the second phase of the study and who scored 5 or less on the PUKI. The students selected as the control group were recruited from the same faculties as the patient group. Both groups were applied Insomnia Severity Index (ISI), Depression Anxiety Stress Scale (DASS), Eysenck Personality Questionnaire-Revised/Abbreviated Form (EPQR-S), and Short Form-36 (SF-36). All phases of the study were completed in a total of three months. The study was approved by the Cumhuriyet University Ethics Committee (2016-12/04).

Data collection

Tools sociodemographic data form

The researchers created this form to record the individual's sociodemographic characteristics, such as age, gender, education, marital status, type of family, family income, residency, personal or family history of physical or mental illnesses, alcohol/tobacco use, breakfast habit, daytime sleep schedule, use of any sleeping pills within the previous three months, perceived academic performance, daily use of media devices (TV, computer, smartphone), bedtiming.

PSQI

Buysee et al. [19] created this scale in 1988 to produce a standardized measure for people's sleep habits and sleep difficulties. The PSQI has internal consistency and a reliability coefficient (Cronbach's alpha) of 0.83 for its seven components. In 1996, Agargun et al. [20] conducted validity and reliability investigations on the scale in the Turkish population. The Cronbach's alpha internal consistency coefficient of the scale was found to be 0.80. In the form consisting of a total of 24 questions, scores for 7 components are obtained. There are also five questions in the scale filled by the bedmate of the person who took the test. However, these last five questions are not used in scoring. PSQI; It consists of seven sub-items that evaluate subjective sleep quality, sleep delay, sleep duration, sleep efficiency-efficiency, sleep disturbances, use of sleeping pills, and dysfunction during the day. The response of each is scored between 0-3 according to symptom frequency. The sum of the scores of the seven components gives the total PSQI score. Scoring; 0 if it has never happened during the past month, 1 if it is less than once a week, 2 if it is once or twice a week, 3 if it is three or more

times a week. The sleep quality assessment asked in the questionnaire is; It is scored as 0 very good, 1 very good, 2 very badly, and 3 very bad. The total score obtained varies between 0-21, and high values indicate poor sleep quality and high sleep disturbance level. A total score of 6 or above indicates that the quality of sleep is clinically significantly worse.

ISI

This scale is a valid and reliable tool which was developed by Bastien et al. [21] to assess severity of insomnia. Boysan et al. [22] conducted validity and reliability studies on the scale in the Turkish population. The internal consistency coefficient of the scale was found to be 0.79. On a five-point Likert-type scale, it assesses seven dimensions, including sleep onset, sleep maintenance, and early morning awakening problems, sleep dissatisfaction, interference of sleep difficulties with daytime functioning, noticeability of sleep problems by others, and distress caused by sleep difficulties. Each item is scored between 0-4, and the total score varies between 0-28. A higher score indicates a more serious sleep problem. 0-7 points as no insomnia, 8-14 points as mild insomnia, 15-21 points as moderate insomnia, 22-28 points as severe insomnia.

DASS

This scale is a 42-item self-report instrument to assess depression, anxiety, and stress of individuals. It was developed by Lovibond & Lovibond [23] in 1995. The reliability coefficients for DASS-D was 0.95, for DASS-A 0.91 and for DASS-S 0.95. The validity and reliability studies of the scale were conducted by Bilgel & Bayram [24] in the Turkish population in 2010. The researchers, who determined that the Turkish version of the form was compatible in terms of structural validity, determined that the reliability coefficients of the items representing depression, anxiety and stress were (0.92; 0.86; 0.88), respectively. The reliability coefficient of the overall form is 0.88. The scale has a 4-point Likert-type rating of 0 not at all suitable for me, 1 somewhat appropriate for me, 2 generally suitable for me, and 3 completely appropriate for me. Within acceptable limits, 0-9 points are an indicator for normal depression, 0-7 points for normal anxiety, and 0-14 points for normal stress. Scores above this range indicate that the problem is mild to severe.

EPQR-S

It's a self-report questionnaire that's used to examine people's personality traits. Francis et al. are the ones who created it [25]. The validity and reliability studies of the scale were conducted by Karancı et al. [26]. Internal consistency coefficient of the scale; were found to be .78, .65, .42, and .64 for extraversion, neuroticism, psychoticism, and lying dimensions, respectively, and test-retest consistency was found to be .84, .82, .69, and .69. It consists of 24 items using a two-point, dichotomous (Yes/No) Likert-type scale. It has three subscales: extraversion, neuroticism, and psychoticism. Additionally, it has a lie scale, a control scale, to prevent bias and to increase reliability during the administration of the questionnaire. Higher

scores in one dimension indicate a tendency toward that dimension. The extraversion variable symbolizes impulsiveness and sociability. If this dimension is high interest, these individuals are considered as social, entrepreneurial people who like to communicate with people. The neuroticism dimension indicates overreactivity or emotional stability. If this dimension is high, it is suggested that the person may be depressed, anxious, tense, highly emotional and low in self-confidence. The psychoticism variable, on the other hand, indicates aggression, cold, insensitive to other people, insecure, and callous personality traits. The last subscale is 'lie'. It is a control scale in which the validity of the "extraversion, neuroticism, and psychosis" subscales of the other three subscales is tested.

SF-36

It is a validated measure of health status which was originally developed by Ware & Shelbourne [27]. The validity and reliability studies of the scale were conducted by Koçyiğit et al. [28]. Physical functioning (10 items), role-physical (4 items), bodily pain (2 items), general health (6 items), vitality (4 items), social functioning (2 items), role-emotional (3 items), and mental health (5 items) are among the 36 items and eight subscales. Scoring the SF-36 requires detailed guidelines. Scale score calculation = Raw score obtained - Lowest raw score / Possible raw score x100. The scores of these subscales result in scoring on a scale of 0-100, where 0 represents the worst possible health condition and 100 represents the best possible health condition. It is not possible to calculate the total score of the SF-36 scale, only the scores of 8 subscales are calculated.

DSM-5 Diagnostic criteria for insomnia

A. A predominant complaint of dissatisfaction with sleep quantity or quality, associated with one (or more) of the following symptoms:

1. Difficulty initiating sleep. (In children, this may manifest as difficulty initiating sleep without caregiver intervention).
2. Difficulty maintaining sleep, characterized by frequent awakenings or problems returning to sleep after awakenings. (In children, this may manifest as difficulty returning to sleep without caregiver intervention).
3. Early-morning awakening with inability to return to sleep.

B. The sleep disturbance causes clinically significant distress or impairment in social, occupational, educational, academic, behavioral, or other important areas of functioning.

C. The sleep difficulty occurs at least 3 nights per week.

D. The sleep difficulty is present for at least 3 months.

E. The sleep difficulty occurs despite adequate opportunity for sleep.

F. The insomnia is not better explained by and does not occur exclusively during the course of another sleep-wake disorder (e.g., narcolepsy, a breathing-related sleep disorder, a circadian rhythm sleep-wake disorder, a parasomnia).

G. Coexisting mental disorders and medical conditions do not adequately explain the predominant complaint of insomnia.

H. The insomnia is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) [29].

Statistical analysis

The Statistical Package for the Social Sciences (SPSS) for Windows version 26.0 software was used for statistical analysis (IBM Corp., Armonk, NY, USA). Where applicable, descriptive data was expressed as mean \pm standard deviation (SD), median (min-max), or number and frequency. Shapiro-Wilk normality test was applied for continuous data to select the appropriate test. Since these variables were not suitable for normal distribution, it was decided to use non-parametric tests. The Mann-Whitney U test was used because the difference tests for the control and patient groups included the comparison of the two categories. Chi-square test was also used to compare categorical variables. A statistically significant p value of 0.05 was used.

Results

Of a total of 856 students, 338 (39.5%) were males and 518 (60.5%) were females. The mean age was 21.21 ± 3.00 (range, 18 to 27) years. Of all students, 841 (98.2%) were single and 435 (50.8%) had a middle socioeconomic status. A total of 645 students (75.4%) had a nuclear family and 404 (47.2%) were staying in a dormitory. The perceived academic performance was moderate in 542 students (63.3%). Tables 1 and 2 indicate the individuals' baseline sociodemographic characteristics and sleep habits, respectively.

Comparison of the study and control groups revealed a statistically significant difference in the sociodemographic characteristics, department of study, residency, having a physical disorder, perceived academic performance, tobacco use, breakfast habit, bedtime routine on weekdays and weekends, daytime sleep schedule, use of any sleeping pills within the past three months, duration of sleep on weekdays, and daily use of media devices between the groups ($p < 0.05$). Comparison of sociodemographic characteristics and individual habits between the groups is presented in Table 3 and Table 4, respectively.

The control group's median DASS sadness, anxiety, and stress subscale ratings were statistically substantially higher ($p < 0.05$). Similarly, the study group's median EPQR-S neuroticism subscale scores were significantly higher, whereas the control group's median EPQR-S extraversion subscale scores were significantly lower ($p < 0.05$). Similarly, the study group's median SF-36 subscale scores were considerably lower than the control group's ($p < 0.05$). Comparison of the scores of each scale is presented in Table 5.

Discussion

The point prevalence of insomnia among study participants was found to be 12.1% in our study. In a comprehensive analysis involving seven studies, the prevalence of

insomnia in university students ranged from 9.4 to 38.2% [11]. In another systematic review that included seven studies, the prevalence of insomnia in university students ranged from 35.4% to 70% (30). In different studies, the prevalence of insomnia in university students was found to vary between 19.7% and 26% [8, 31, 32]. When we look at the literature, quite different rates are observed for insomnia among university students. It is thought that this difference may be related to the sample size and the methods used.

Sex, age, low socioeconomic status, and getting divorced are risk factors for insomnia disorder [8, 11]. Insomnia is significantly higher in women than in men [33]. In our study, no difference was found in terms of gender. Possible reasons for this are methodological differences and differences in the study population. Furthermore, age did not significantly affect the sleep quality in present study. This can be attributed to the fact that the sample was selected from the same target population and the age of the study participants was comparable. In addition, we found no significant difference in the socioeconomic status and marital status between the study and control groups, which can be explained by the fact that the majority of the participants had a middle socioeconomic status and were single.

In addition environmental factors play a role in sleep quality. Living in dormitories and in crowded rooms adversely affect the sleep quality of the students. Similarly, in our study, the rate of insomnia was significantly higher among the students living in a dormitory. Other environmental factors include room temperature, ventilation, noise, bed comfort, and lightning. Therefore, students should be questioned in detail regarding all these factors. In a study, Foulkes et al. [34] reported that sleep disturbances were more frequent in the first academic year among college students. Similarly, the majority of the students diagnosed with insomnia were in the first academic year in our study, indicating a statistically significant difference between the study and control groups. Inability to cope with stress, difficulty in adapting class schedule, moving away from their families, and difficulty in adapting new social life may contribute to the increased rate of sleep disturbances in the first academic year.

Recent research has discovered a link between sleep, memory, and learning capacity, as well as the fact that students with sleep difficulties perform worse academically [10, 35]. In our research, we discovered a link between poor sleep quality and perceived academic achievement. The insomnia group's perceived academic performance was much poorer than the control groups.

Additionally, several studies have shown the relationship between the tobacco use and sleep quality [36, 37]. Consistent with previous studies, we also found a significant correlation between the tobacco use and poor sleep quality and insomnia. The intake of caffeine and/or alcohol has been also shown to adversely affect the sleep quality [36, 38, 39]. Although the insomnia group consumed more caffeine and alcohol than the control group, there was no statistically significant difference between the two groups in our study. The relatively small sample size is to blame for the lack of statistical significance. Furthermore, past

Table 1. Baseline sociodemographic characteristics of the participants.

		N	%
Sex	Male	338	39.5
	Female	518	60.5
Academic year	First	256	29.9
	Second	230	26.9
	Third	233	27.2
	Fourth and higher (5 th and 6 th)	137	16.0
Marital status	Married	13	1.5
	Single	841	98.2
	Divorced	2	0.002
Family type	Nuclear	645	75.4
	Large	166	19.4
	Divorced parents	22	2.6
	Death of one of the parents	23	2.7
Residency	Homestay	259	30.3
	Student house	167	19.5
	Dormitory	404	47.2
	Other	26	3.0
Family income	Lower than minimum wage	180	21.0
	Double minimum wage	435	50.8
	Higher than the double minimum wage	241	28.2
History of psychiatric disorder	Yes	15	1.8
	No	841	98.2
Physical illness	Yes	74	8.6
	No	782	91.4
Perceived academic performance	Poor	60	7.00
	Moderate	542	63.3
	Good	254	29.7
Cigarette use	Yes	204	23.8
	No	652	76.2
Alcohol consumption	No	759	88.7
	Less than once a week	72	8.4
	Once a week or more often	25	2.9
Breakfast eating habit	Less than three times a week	291	34.0
	Three times a week or more often	565	66.0
Daytime sleep routine	Yes	274	32.1
	No	580	67.9
Use of sleeping pills within the past three months	Yes	23	2.7
	No	833	97.3
Bedtime on weekdays	20:00-22:00	6	0.007
	22:01-24:00	357	41.7
	After 24:00	493	57.6
Bedtime on weekends	20:00-22:00	3	0.003
	22:01-24:00	206	24.1
	After 24:00	647	75.6

Data are given in number and percentage, unless otherwise stated.

research has found a strong link between breakfast eating habits and sleep quality [40]. Breakfast eating habit was characterized in our study as having breakfast three or more days per week, and 66% of the individuals had this

habit. Consistent with the literature, we found a significant difference in the breakfast habit between the insomnia and control groups. Skipping the breakfast may have resulted from laziness for preparing a breakfast, the lack of

Table 2. Sleep habits of the participants.

	Min	Max	Mean±SD
Sleep duration on weekdays (hour)	2.00	12.00	7.13±1.39
Sleep duration on weekends (hour)	3.00	16.00	8.76±1.63
Daily intake of caffeine (number of cups)	0.00	30.00	4.65±3.68
Daily use of media devices (TV, computer, smartphone)	0.00	18.00	5.24±2.82

Data are given in mean ± SD and range (min-max) values, unless otherwise stated. SD: standard deviation; min: minimum; max: maximum.

time and fear of being late to the class, and irregular sleep-wake rhythm. Roth et al. [41] found that in the general population, the rate of daytime sleepiness ranged from 0.5 to 12.0%. In our study, students (32.1%) had a considerably greater proportion of daytime sleep habit and poor sleep quality than the overall population. Moreover, several studies have reported the use of sleeping pills to cope with sleep problems [36]. In our study, similarly, there was a statistically significant difference in the use of sleeping pills within the past three months between the insomnia and control groups. Also, students have poor bedtime routine with inadequate sleep time and poor sleep quality [42]. In this research, consistent with the literature, the majority of the students with insomnia had irregular sleep-wake rhythm and the majority of the students fell asleep after 12.00 A.M. On weekdays and weekends, there is a difference in overall sleep time. There was a statistically significant difference in the bedtime routine on weekdays and weekends, as well as the total sleep time on weekdays between the insomnia and control groups. Excessive usage of electronic media devices, according to some authors, is linked to sleep disorders [43,44]. In our study, the time spent with media devices was higher than five hours and there was a statistically significant difference between the insomnia and control groups. However, it is unclear whether the use of media devices induces insomnia or whether it is used to cope with insomnia. Thus, more research is needed to shed light on this topic.

Sleep disorder is a common physical symptom and is used as a criterion for the diagnosis of depression [29]. In our study, the insomnia group had a higher mean DASS depression score than the control group. The difference was statistically significant, consistent with the literature [10,45,46]. Also, it has been well documented that individuals with anxiety experience more frequent sleep disorders [7, 45, 46]. In our study, the mean DASS anxiety score in the insomnia group was higher than the control group, indicating a statistically significant difference, consistent with previous findings [10]. Review of the literature reveals studies showing the strong link between the severity of insomnia and perceived stress and that increased stress is associated with the increased severity of sleep disorders [9,43,45]. In our study, the mean DASS stress score in the insomnia group was higher than the control group, indicating a statistically significant difference.

Furthermore, we found a statistically significant difference in the EPQR-S extraversion and neuroticism subscale scores between the insomnia and control groups, while there was no significant difference in the psychoti-

cism subscale scores between the groups. The neuroticism subscale scores were significantly higher in the insomnia group, while the extraversion subscale scores were significantly lower in the control group. Although earlier research has looked into the possible relationship between the personality traits and insomnia extensively, it remains to be elucidated which trait most closely relates to insomnia. The current evidence indicates that neuroticism is the most common vulnerability factor of insomnia [9]. Individuals with high neuroticism scores are more likely to be emotionally unstable and suffer anxiety, concern, frustration, depression, and a lack of self-confidence. Neuroticism refers to relatively stable inclinations to respond with unpleasant emotions to threat, frustration, or loss. As expected, these individuals experience sleep disorders more frequently.

Quality of life is a broad notion that is influenced in a variety of ways by an individual's physical condition, psychological state, personal beliefs, social interactions, and how he responds to events in his environment. Insomnia affects the quality of life, reduces the life satisfaction of individuals, and negatively affects their social and physical functionality. In our research, SF-36 was used to evaluate students' quality of life. The insomnia group's SF-36 subscale scores were all statistically significantly lower than the control group's ($p < 0.05$). In our study, it was determined that there was a relationship between quality of life and sleep, similar to the literature, and it was observed that students with insomnia had a lower quality of life [10].

Conclusion

In this study, the point prevalence of insomnia in university students was found to be 12.1%. Insomnia was found to be higher in women, first-year students, and students living in dormitories, those with other diseases, those who smoke, and those who do not have regular exercise and breakfast habits. It was determined that the students had irregular sleeping habits, their sleep durations were shorter than weekends, and this was more evident in people who suffer from insomnia. People who suffer from insomnia issue used electronic media for longer periods of time and took sleeping medicines more frequently. It was determined that the academic performance and course success of the students with insomnia disorder were worse. Depression, anxiety and stress scores of individuals with insomnia were found to be significantly higher than the control group. A relationship was found between insomnia and personality traits. It was determined that the SF-36 subscale scores of individuals with insomnia were significantly lower than the control group.

The strengths of this research are that students from all faculties were included in the study, it had a relatively large sample, and the diagnosis of insomnia was made through clinical interviews. Nonetheless, this research has certain drawbacks. Firstly, we used the PSQI, which is a self-report instrument, in the first stage of the study. This may have led to exaggeration or minimization of the scores by the respondent. Secondly, some of the students who were scheduled for a second interview were excluded, due to several reasons, which may have affected the prevalence

Table 3. Comparison of sociodemographic characteristics between the groups.

	Study group	Control group	Statistical analysis	
	n (%)	n (%)	X ² value	p value
Sex				
Male	36 (34.6)	35 (36.8)	0.10	0.743
Female	68 (65.4)	60 (63.2)		
Academic year				
First	41 (39.4)	19 (20.0)	13.81	0.008**
Second	22 (21.2)	22 (23.2)		
Third	30 (28.8)	30 (31.6)		
Fourth and higher (5 th and 6 th)	11 (10.6)	24 (25.2)		
Residency				
Homestay	23 (22.1)	39 (41.1)	16.15	0.001**
Student house	20 (19.2)	26 (27.3)		
Dormitory	55 (52.9)	29 (30.5)		
Other	6 (5.8)	1 (1.1)		
Family income				
Lower than minimum wage	25 (24.0)	20 (21.0)	0.42	0.811
Double minimum wage	52 (50.0)	47 (49.5)		
Higher than the double minimum wage	27 (26.0)	28 (29.5)		
Physical illness				
Yes	13 (12.5)	-	12.70	0.000***
No	91 (87.5)	95 (100)		
Perceived academic performance				
Poor	14 (13.5)	1 (1.1)	27.87	0.000***
Moderate	75 (72.1)	52 (54.7)		
Good	15 (14.4)	42 (44.2)		
Cigarette use				
Yes	30 (28.8)	14 (14.7)	5.73	0.017*
No	74 (71.2)	81 (85.3)		
Alcohol consumption				
No	90 (86.5)	86 (90.5)	0.87	0.645
Less than once a week	13 (12.5)	8 (8.4)		
Once a week or more often	1 (1.0)	1 (1.1)		
Breakfast eating habit				
Less than three times a week	46 (44.2)	24 (25.3)	7.83	0.005**
Three times a week or more often	58 (55.8)	71 (74.7)		
Daytime sleep routine				
Yes	47 (45.2)	22 (23.2)	10.64	0.001**
No	57 (54.8)	73 (76.8)		
Bedtime on weekdays				
20:00-22:00	1 (10)	2 (2.1)	10.77	0.005**
22:01-24:00	27 (26.0)	45 (47.4)		
After 24:00	76 (73.0)	48 (50.5)		
Bedtime on weekends				
20:00-22:00	-	2 (2.1)	7.40	0.025*
22:01-24:00	18 (17.3)	29 (30.5)		
After 24:00	86 (82.7)	64 (67.4)		

*p<0.05; **p<0.01; ***p<0.001. Data are given in number and percentage, unless otherwise stated.

Table 4. Comparison of individual habits between the groups.

	Group	n	Mean±SD	t ₍₁₉₇₎	p value
Sleep duration on weekdays (hour)	Study	104	6.72±1.46	-4,522	p=0.001**
	Control	95	7.59±1.21		
Sleep duration on weekends (hour)	Study	104	8.72±2.13	-0,334	p=0.739
	Control	95	8.80±1.27		
Daily intake of caffeine (number of cups)	Study	104	4.66±3.15	0,790	p=0.431
	Control	95	4.31±3.04		
Daily use of media devices daily use of media devices (TV, computer, smartphone)	Study	104	5.75±2.74	2,467	p=0.014*
	Control	95	4.82±2.57		

*p<0.05; **p<0.01. Data are given in mean ± SD and number, unless otherwise stated. SD: standard deviation.

Table 5. Comparison of DASS, EPQR-S, SF-36, and ISI scores.

	Subscale	Group	n	Median	Z-score	p value
DASS	Depression	Study	104	18.00	-9,834	p=0.000***
		Control	95	4.00		
	Anxiety	Study	104	15.00	-9,701	p=0.000***
		Control	95	4.00		
	Stress	Study	104	22.00	-9,588	p=0.000***
		Control	95	0.00		
EPQR-S	Neuroticism	Study	104	5.00	-6,774	p=0.000***
		Control	95	3.00		
	Extraversion	Study	104	4.00	-2,165	p=0.030*
		Control	95	5.00		
	Psychoticism	Study	104	2.00	-1,061	p=0.289
		Control	95	1.00		
SF-36	Physical functioning	Study	104	85.00	-3,790	p=0.000***
		Control	95	95.00		
	Role-physical	Study	104	50.00	-4,869	p=0.000***
		Control	95	100.00		
	Bodily pain	Study	104	52.00	-4,549	p=0.000***
		Control	95	74.00		
	General health	Study	104	50.00	-7,081	p=0.000***
		Control	95	72.00		
	Vitality	Study	104	42.50	-8,149	p=0.000***
		Control	95	70.00		
	Social functioning	Study	104	62.50	-6,049	p=0.000***
		Control	95	75.00		
	Role-emotional	Study	104	33.30	-5,961	p=0.000***
		Control	95	100.00		
Mental health	Study	104	52.00	-7,286	p=0.000***	
	Control	95	72.00			
ISI	Study	104	17.50	-12.194	p=0.000***	
	Control	95	4.00			

*p<0.05; ***p<0.001. Data are given in median and number, unless otherwise stated. DASS: Depression Anxiety Stress Scale; EPQR-S: Eysenck Personality Questionnaire-Revised/Abbreviated Form; SF-36: Short Form-36; ISI: Insomnia Severity Inde.

of insomnia. Therefore, to corroborate these findings, more large-scale, prospective investigations are needed.

Ethics approval

The study was approved by the Cumhuriyet University Ethics Committee (2016-12/04).

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