



## Association Between Internet Use and Sleep Problems in Adolescents Ergenlerde İnternet Kullanımı ile Uyku Problemleri Arasındaki İlişki

Özalp EKİNCİ<sup>1</sup>, Tanju ÇELİK<sup>2</sup>, Nazan SAVAŞ<sup>3</sup>, Fevziye TOROS<sup>1</sup>

<sup>1</sup>Mersin University Faculty of Medicine, Department of Child Psychiatry, Mersin, Turkey

<sup>2</sup>Mustafa Kemal University Faculty of Medicine, Department of Pediatrics, Hatay, Turkey

<sup>3</sup>Mustafa Kemal University Faculty of Medicine, Department of Public Health, Hatay, Turkey

### ABSTRACT

**Introduction:** Sleep problems are commonly encountered in adolescents. It has been shown that electronic media have a negative influence on the sleep quality and daytime functioning in adolescents. This study aims to investigate the association between internet use and sleep problems in adolescents.

**Method:** A total of 1212 adolescents were recruited to the study. Self-report study questionnaire included two main parts: Young's Internet Addiction Scale (IAS) and a semi-structured inquiry on sleep habits/problems.

**Results:** Of the study sample, 16% (n=198) reported their sleep quality as bad or very bad. One-fourth of the sample reported using internet everyday and 27% of them reported spending more than one hour when online. The mean IAS total score was 35.56±13.87. Adolescents with a higher IAS score reported getting to bed later in the night, needing more time to fall asleep and having an increased number of awakenings in the night than the adolescents with lower IAS score (p=0.001). They were also found to have higher frequencies of several sleep problems including difficulty in initiating and sustaining sleep, difficulty in waking up and feelings of sleepiness in day. In addition, sleep quality of them was worse when compared to the adolescents with a lower IAS score (p=0.001).

**Conclusion:** Problematic sleep habits and sleep problems were found to be more frequent in adolescents with a higher IAS total score. Health care providers must be aware of the possible negative impact of excessive and uncontrolled internet use on adolescents' sleep habits. (Archives of Neuropsychiatry 2014; 51: 122-128)

**Key words:** Sleep problems, adolescent, internet

**Conflict of interest:** The authors reported no conflict of interest related to this article.

### ÖZET

**Giriş:** Uyku sorunları ergenlerde sık olarak görülmektedir. Elektronik medyanın ergenlerin uyku kalitelerini ve günlük işlevselliklerini olumsuz etkilediği gösterilmiştir. Bu çalışma ergenlerde internet kullanımı ile uyku problemleri arasındaki ilişkiyi incelemeyi amaçlamaktadır.

**Yöntem:** Toplam 1212 ergen çalışmaya dahil edildi. Kendi bildirim çalışma anketi iki ana bölüm içeriyordu: Young'ın İnternet Bağımlılık Ölçeği (İBÖ) ve uyku alışkanlıkları/uyku problemleri üzerine yapılandırılmış bir ölçek.

**Bulgular:** Çalışma örnekleminin %16'sı uyku kalitelerini kötü ya da çok kötü değerlendirdi. Örneklemin dörtte biri interneti hergün kullandığını bildirirken, %27'si online olduğunda bir saatten fazla zaman geçirdiğini bildirdi. Ortalama İBÖ total skoru 35,56±13,87 idi. Yüksek İBÖ skoru olan ergenlerin düşük İBÖ skoru olanlara göre gece yatağa daha geç gittiği, uykuya dalmak için daha uzun süreye ihtiyaç duyduğu ve gece daha sık uyandığı bildirildi (p=0,001). Yüksek İBÖ skoru olan ergenlerde içlerinde uykuya dalma ve sürdürme güçlükleri, uyanma güçlüğü ve gün içinde uykulu hissetmeyi içeren çok sayıda uyku probleminin daha sık olduğu bulundu. Ayrıca, uyku kaliteleri düşük İBÖ skoru olan ergenlere göre daha kötü idi (p=0,001).

**Sonuç:** Problemlı uyku alışkanlıkları ve uyku sorunlarının yüksek İBÖ skoru olan ergenlerde daha sık olduğu bulundu. Sağlık çalışanları, aşırı ve kontrolsüz internet kullanımının ergenlerin uyku alışkanlıkları üzerine yaptığı muhtemel olumsuz etkiler konusunda farkında olmalıdırlar. (Nöropsikiyatri Arşivi 2014; 51: 122-128)

**Anahtar kelimeler:** Uyku sorunları, ergen, internet

**Çıkar çatışması:** Yazarlar bu makale ile ilgili olarak herhangi bir çıkar çatışması bildirmemişlerdir.

### Correspondence Address/Yazışma Adresi

Özalp Ekinci MD, Mersin University Faculty of Medicine, Department of Child Psychiatry, Mersin, Turkey  
Gsm: +90 506 611 15 00 E-mail: dozalpekinci@yahoo.com Received/Geliş tarihi: 11.07.2012 Accepted/Kabul tarihi: 17.09.2012  
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## Introduction

Sleep has an important role in humans' lives not only for general health but also for mental health and quality of life. Because of the ongoing growth of body systems, the importance of sleep is even much greater for children and adolescents. Adolescents' sleep habits vary with age, lifestyle issues and sociocultural influences. Sleep problems are commonly reported in adolescents with an estimated prevalence between 27% and 40% (1,2,3,4). Among the reported problems, difficulties in falling asleep and daytime sleepiness appear to be more prominent (1,5,6,7). Sleep problems in adolescence have been suggested to impair multiple domains of functioning including school, social and family functioning (2,6,7,8,9).

The computer and the internet are becoming major influences in adolescents' lives. Because of the dramatic increase in internet use among adolescents in recent years, some warning voices have been raised on the possible negative impacts of excessive internet use on mental health (10,11,12). The most important concern appears to be the risk of "internet addiction". Internet addiction may be defined as internet use which is excessive, out of control, and severely disrupting individuals' lives (13,14,15). National Sleep Foundation's 2006 Sleep in America Poll have reported that almost one-third of U.S. adolescents had a computer and one-fifth of them had internet access in their bedroom (16). Therefore, the possible association between internet use and sleep habits may not be surprising. A handful of recent studies have found a relationship between excessive computer and internet use and sleep problems in adolescents (17,18,19,20).

In Turkey, the internet was used for the first time in 1993. Similar to the Western countries' rates, the prevalence of internet use markedly increased in Turkey, from 3.1% in 2000 to 22.5% by 2007 (21,22). Canbaz et al. (15) reported the prevalence of internet use as 80% in their sample of Turkish adolescents. Despite the available research in the US and Europe, the association between internet use and sleep problems in adolescents has not been studied comprehensively in non-Western countries. This community-based study aims to investigate the association between internet use and sleep problems in a sample of Turkish adolescents.

## Method

### Sample

Five high schools were chosen from Antakya, Hatay: Two general government high schools, two Anatolian high schools where English is taught as a foreign language, and a vocational high school. All of the schools in our sample may be broadly classified as representing the middle-class socioeconomic status.

### Study Design

Before the study procedure, permission was obtained from the Hatay Governor's office and the Governors' ethics board. The study questionnaires and the study plan for the research were discussed with the principals of the five schools. The principals granted consent. A study schedule was planned for each school. Four classes of year 10 (15 years of age), year 11 (16 years of age) and year 12 (17 years of age) students were randomly chosen

from each school to create a total of 12 classes per school and 60 classes overall. Every school was visited for at least two times during the study. On the study days, a brief introduction was made to each class by a member of the research team. In the introductory talk, a member of the research team clearly stated that all of the information in the questionnaires would be confidential and would not be shared with the participants' families, the principal of the school and the teachers. Only the age and gender of the adolescents were used in the questionnaires. Informed consent was obtained from every student. Students from each of the classes completed the confidential questionnaire during one teaching period (approximately 45 minutes) with no discussion. During the procedure, one member of the research team and one teacher were present in the classroom as silent observers. The member of the research team was available to answer any questions from the students about the questionnaire to minimize the number of missing or incorrectly answered items.

### Measures

The study questionnaire included two parts: Questions on internet use and questions on sleep habits/sleep problems. The questionnaire on the internet use included the Young's Internet Addiction Scale (IAS) and a brief semi-structured inquiry designed by the research team. The questionnaire on sleep habits/sleep problems included a detailed semi-structured inquiry on sleep habits/sleep problems of adolescents designed by the research team.

### Brief Semi-Structured Inquiry on the Weekly Internet Use of Adolescents

Adolescents were asked how often they use the internet in a week (for the last week) and asked to choose one of these following four answers: "Once in a week", "2-3 times a week", "4-5 times a week", "almost everyday". Adolescents were also asked how much time they usually spend when they are online. The four answers of this question were as following: "Less than 30 minutes", "between 30 and 60 minutes", "more than 1 hour", "more than 2 hours".

### Young's Internet Addiction Scale

Young's Internet Addiction Scale (IAS) examines the degree of preoccupation, compulsive use, behavioural problems, emotional changes, and the impact on life related to internet use (10). It is comprised of 20 multiple-choice questions written at a 5-point Likert scale, classified as rarely, occasionally, frequently, often, and always; given a total score ranging from 20 to 100 points, with higher scores reflecting a greater tendency toward addiction. Three types of internet user groups were identified in accordance with the original scheme of Young: Internet addicts (IAs), possible internet addicts (Pas) and nonaddicts (NAs), whose scores on the IAS were higher than 80, 50-79, and below 50, respectively (10). The validity and reliability of the Turkish version of the IAS has been demonstrated in Turkish adolescents (15).

In the present study, the above mentioned classification of the IAS could not be used. The reason for this approach was that there was an accumulation of the subjects with IAS scores below 50 in the group (n=1023, 84.4%), which limited the comparison of groups. Instead of the original criteria, our sample was divided into three groups: subjects with a total score higher than 70, between 40-69 and below 40. The percentages of both the original criteria

and the criteria used in the study are presented in the results. The Cronbach’s alpha value of the IAS was calculated as 0.92 in our study sample.

**Semi-structured Inquiry on Sleep Habits/problems**

The inquiry included 17 questions on the sleep habits/problems of the adolescents. The first 8 questions of the inquiry investigated the sleep habits of adolescents: (for the last month in weekdays) “When do you usually get to bed”, “How long does it take you to fall asleep in the nights”, “After falling asleep, how many times a night do you get awake (staying awake more than 10 minutes)”, “How often do you sleep after coming from school”, “How often do you drink coffee in the night”, “How often do you smoke in the night”, “How often do you drink alcohol in the night” and “How do you grade your

sleep quality”. The last 9 questions of the inquiry was designed as a 5-point Likert scale (never, rarely, occasionally, frequently, always) and focused on sleep problems of the sample. Some examples of the inquiry are as follows: “How often do you fall asleep in the classroom”, “How often do you feel sleepy during lessons”, “How often do you have difficulty to fall asleep in the night”, “How often do you have trouble to wake up in the morning” (the complete inquiry is in the tables). Cronbach’s alpha for the scale was calculated as 0.73. The nonadditivity value of these 17 questions was 437.35 ( $p < 0.001$ ) and the total score was not used in the study.

**Statistical Analyses**

The collected data were analyzed by using the SPSS version 15.0 (SPSS Inc., Chicago, IL). For the comparison of categorical

**Table 1. General characteristics of adolescents’ sleep habits and sleep quality**

Sleep habits and sleep quality of adolescents					
When do you usually get to bed? (In hours, n %)	20:00-21:00	22:00	23:00	24:00	After 24:00
	80 (66)	272 (22.4)	519 (42.8)	209 (17.2)	132 (10.9)
How much time does it take to fall asleep in the nights? (In minutes, n %)	5-10	15-20	30	30-45	At least 1 hour
	497 (41)	443 (36.6)	138 (11.4)	81 (6.7)	53 (4.4)
After falling asleep, how many times a night do you get awake? (n %)	Never	1-2	3-4	5-7	8-10
	600 (49.5)	500 (41.3)	89 (7.3)	15 (1.3)	8 (0.7)
How often do you sleep after coming from school? (n %)	Never	Rarely	Occasionally	Frequently	Always
	297 (24.5)	453 (37.4)	294 (24.3)	122 (9.2)	56 (4.6)
How often do you drink coffee in the night? (n %)	Never	Rarely	Occasionally	Frequently	Always
	504 (41.6)	370 (30.5)	208 (17.2)	95 (7.8)	39 (2.9)
How often do you smoke in the night? (n %)	Never	Rarely	Occasionally	Frequently	Always
	1135 (93.6)	43 (3.5)	17 (1.4)	10 (0.8)	7 (0.6)
How often do you drink alcohol in the night? (n %)	Never	Rarely	Occasionally	Frequently	Always
	887 (73.2)	189 (15.6)	111 (9.2)	14 (1.2)	10 (0.8)
How do you grade your sleep quality? (n %)	Very good	Good	Moderate	Bad	Very Bad
	215 (17.7)	415 (34.2)	384 (31.7)	145 (12)	53 (4.4)

**Table 2. Characteristics of adolescents’ sleep problems**

	Never n (%)	Rarely n (%)	Occasionally n (%)	Frequently n (%)
How often do you fall asleep in class ?	551 (45.4)	372 (40.7)	219 (18.1)	41 (3.4)
How often do you feel sleepy during lessons ?	98 (8.1)	432 (35.6)	461 (38)	164 (13.5)
How often do you have difficulty to fall asleep in the night ?	371 (30.6)	344 (28.4)	308 (25.4)	122 (10.1)
How often do you feel sleepy and tired in the day ?	49 (4)	248 (20.5)	462 (38.1)	345 (28.5)
How often do you have difficulty to wake up in the morning?	141 (11.6)	290 (23.9)	289 (23.8)	257 (21.2)
How often do you have nightmares ?	438 (36.1)	483 (39.9)	197 (16.3)	62 (5.1)
How often do you talk in sleep (your or your families’ statement) ?	749 (61.8)	252 (20.8)	128 (10.6)	47 (3.9)
How often do you have teeth grinding (your or your families’ statement) ?	1069 (88.2)	70 (5.8)	36 (3)	27 (2.2)
How often do you need medication or alcohol to fall asleep ?	1153 (95.1)	27 (2.2)	20 (1.7)	8 (0.7)

variables, Pearson's chi-square test and the linear-by-linear association test were used. Parametric variables were compared between the groups by using Student's t-test when the distribution of the compared variable was normal. The Mann-Whitney U-test was used for the comparison of continuous variables where they were not normally distributed. A p value of less than 0.05 was accepted to be statistically significant.

## Results

A total of 1212 adolescents were included in the study. Of the study sample, 637 (52.6%) were girls. The mean age of the sample was  $16 \pm 0.98$  years (range 14-19 years). The general characteristics of the adolescents' sleep habits and their ratings about their sleep quality are shown in Table 1.

Table 2 shows the frequencies of adolescents' sleep problems. As seen in the table, 122 (10.1%) adolescents reported that they frequently had difficulty to fall asleep in the night. 257 (21.2%) adolescents reported that they had difficulty to wake up in the morning (Table 2). Some gender differences were also found regarding these variables. The frequency of drinking coffee in the night was higher in girls, while the frequencies of smoking and drinking alcohol were higher in boys ( $p=0.001$  for each).

Table 3 shows the internet habits and IAS total scores of the sample. As seen in the table, 25% ( $n=304$ ) of the sample reported using internet almost everyday. 451 (37.2%) adolescents reported to spend between 30 and 60 minutes when they were online. The mean IAS total score in the sample was  $35.56 \pm 13.87$ . 376 (31.1%)

adolescents had a IAS total score higher than 40 (Table 3). There were also some gender differences in terms of internet use. Girls reported a higher frequency of weekly internet use and an increased time spent online ( $p=0.001$  for both).

The comparison of the adolescents's sleep habits according to their IAS total scores is shown in Table 4. As seen in the table, those who had an IAS score between 40 and 69 and higher than 70 had significant differences than the adolescents with a IAS score below 40 ( $p=0.001$ ). While 36% of adolescents with a IAS total score below 40 rated their sleep quality as "good", 29% of subjects a IAS score between 40 and 69 and 25% of those with a IAS score higher than 70, did the same evaluation. Of note, 41% of the adolescents with a IAS score higher than 70 rated their sleep quality as "very bad". In addition to the findings in the table, the frequencies of drinking coffee and alcohol in the night were different in the groups. Higher frequencies were found in those with a IAS score between 40 and 69, and in ones with a IAS score higher than 70 ( $p=0.001$  and  $p=0.001$ ).

Table 5 shows the comparison of IAS groups according to their frequencies of sleep problems. Only the significant findings are presented in the table. As seen in the table, the adolescents with IAS scores between 40 and 69 and higher than 70 reported higher frequencies of sleep problems when compared to those with a IAS score below 40 (Table 5).

## Discussion

Electronic media have often been considered to have a negative impact on the sleep quality and daytime functioning in adolescents. In the present study, the association of excessive internet use with sleep habits/problems was investigated in Turkish high school students. To the best of our knowledge, this study is the first that focused on the issue in Turkish youth. Our findings revealed that problematic sleep habits and reported sleep problems were more frequent in adolescents with a higher IAS score.

In our sample, the prevalence of problematic sleep habits and sleep problems were observed to be similar to that of Western population studies. More than one-fourth of the adolescents reported that they got to bed at 24:00 or later and, approximately 10% of the adolescents reported that they spent more than 30 minutes to fall asleep in the night. A finding which deserves special attention is that 15% of the sample rated their sleep quality as bad or very bad. These findings are generally consistent with the previous studies on problematic sleep habits from different countries. In a study by Liu et al. (3), 18% of adolescents reported their sleep quality as poor. A number of studies have shown late bed times and delayed sleeping in adolescents (1,2,3,6,7,8). Regarding the specific sleep problems reported, almost one-third of our sample stated that they frequently felt tired and sleepy during the day and one-fifth stated that they frequently had difficulty to wake up in the morning. Previous studies have shown similar findings on adolescents' sleep problems (2,3,6,7,8,9).

In this study, approximately one-fourth of the adolescents stated that they used the internet almost everyday and spent more than one hour online. In a previous study from Turkey, Tahiroglu et al. (23) found that 7.6% of their cohort, which consisted of 3975

**Table 3. Internet habits and IAS total scores of the sample**

	n	%
How often do you use internet in a week?		
Once in a week	342	28
2-3 times a week	327	27
Almost everyday	304	25
How much time do you usually spend when you are online?		
Less than 30 minutes	246	20.3
Between 30 and 60 minutes	451	37.2
More than 1 hour	327	27
<b>IAS total Score</b>	<b>n</b>	<b>%</b>
*Below 50	1023	84.4
*50-79	176	14.5
*Higher than 80	13	1.1
**Below 40	836	69
**40-69	345	28.5
**Higher than 70	31	2.6
*Percentages according to the original classification criteria of IAS by Young		
**Percentages according to the IAS classification criteria used in the study (Details in the methods section)		

undergraduate students, used the internet more than 12 hours weekly. Another study by the same group, which investigated the characteristics of problematic internet use in adolescents with and without psychiatric disorders, reported that frequency of using the internet more than 8 hours weekly was 23% and 10% in psychopathology and normal control groups, respectively (24). Although the frequency of high risk IAS score (IAs) was low in our study sample, when adding the moderate risk (PAs) to the high risk group, almost one-third of the adolescents may be considered to be at risk for pathologic internet use. One study from Turkey, which used IAS, reported the same frequency (IAs +PAs) as 22% (15). Previous studies from Western and the Far East countries found the frequency of pathological internet use between 1.5 and 27% (12,15,25,26,27).

In the present study, adolescents with a higher IAS score reported significantly higher frequencies of problematic sleep habits. They reported getting to bed later in the night, needing more time to fall asleep, having an increased number of awakenings in the night and being more likely to sleep after coming from school. Overall, they also rated their sleep quality worse than the adolescents with lower IAS score. In correlation with these findings, those with a higher IAS score also reported higher frequencies of several sleep problems. These sleep problems mainly centered on difficulty in initiating and sustaining sleep, difficulty in waking up and feelings of sleepiness in day. Taken together, our findings may be interpreted that high IAS scores were

associated with broadly disturbed sleeping habits and related sleep problems. Most of the previous studies reported similar findings despite the differences on the evaluation of pathological internet use. Van den Bulck (17) and Oka et al. (28) used the method of examining total time spent on internet and reported that excessive internet use was related with delayed bed times, delayed wake-up times and tiredness in weekdays. Yen et al. (29) used a self-report questionnaire to assess symptoms of internet addiction and found pathological internet use related with shorter total sleep times and insomnia symptoms. Mesquita and Reimao (30) focused on the nighttime use of computer by adolescents and demonstrated that excessive internet use, "surfing the web", was a predictor of poor sleep quality and daytime sleepiness.

With the dramatic increase in its availability and popularity, internet has greatly impeded in adolescent's lives. Typical adolescents spend a significant proportion of their free time in the internet. Especially in the night, many adolescents are online and surfing the web for hours before going to bed. Unavoidably, some of these adolescents have a disabling difficulty to limit their internet use and have the risk of becoming an internet addict. The findings of the present study, replicating and extending the previous literature, strongly indicate that excessive internet use is associated with disturbed sleep patterns, mainly characterized by insufficient sleep, poor sleep quality and resulting daytime sleepiness symptoms. Several explanations may be proposed for this association. Nightly internet use may directly displace

**Table 4. Comparison of the adolescents's sleep habits according to their IAS total scores**

	<b>IAS: &lt;40 n (%) 836 (69)</b>	<b>IAS: 40-69 n (%) 345 (28.5)</b>	<b>IAS: &gt;70 n (%) 31 (2.6)</b>	<b>P *</b>
When do you usually get to bed in? (In hours, n %)				
22:00:	265 (75.3)	79 (22.4)	8 (2.3)	0.001
23:00:	355 (68.4)	157 (30.3)	7 (1.3)	*0.001
24:00 †:	216 (63.3)	109 (32)	16 (4.7)	
How much time does it take to fall asleep in the nights?				
5-20 minutes	673 (71.6)	247 (26.3)	20 (2.1)	0.002
At least 30 minutes	88 (63.8)	46 (33.3)	4 (2.9)	*0.001
30 minutes †:	75 (56)	52 (38.8)	7 (5.2)	
After falling asleep, how many times a night do you get awake?				
Never	763 (69.4)	314 (28.5)	23 (2.1)	0.001
1-4 times	61 (68.5)	24 (27)	4 (4.5)	*0.014
5-10 times	12 (52.2)	7 (30.4)	4 (17.4)	
How often do you sleep after coming from school?				
Never or rarely	547 (72.9)	186 (24.8)	17 (2.3)	0.001
Occasionally	184 (62.6)	105 (35.7)	5 (1.7)	*0.001
Frequently	105 (62.5)	54 (32.1)	9 (5.4)	
How do you grade your sleep quality?				
Good:	471 (74.8)	149 (23.7)	10 (1.6)	0.001
Moderate:	247 (64.3)	129 (33.6)	8 (2.1)	*0.001
Bad:	118 (14.1)	67 (33.8)	13 (6.6)	

Chi-square test and \*Linear-by-Linear Association

the time of sleep. Internet use in the evenings may also cause adolescents to become physiologically aroused, making it more difficult for them to relax prior to bedtime. Another explanation may be that excessive nightly exposure to bright light from computer screens may suppress melatonin and consequently delay the circadian rhythm (31).

This study has several noteworthy limitations. One of them is the lack of a standardized questionnaire on sleep habits and problems. Such a questionnaire might increase the validity of our findings on sleep. The use of only self-report data may also be considered as a limitation. Although the self-report data of adolescents is important, information taken from the parents would add further valuable

results to the study. This study has been conducted in five centrally located high schools in Hatay in which students from middle socioeconomic status are educated. Therefore, our results can not be generalized to all adolescents in Hatay and Turkey. In the present study, there was no distinction between computer based and cell-phone based internet use of adolescents. In addition, internet use of adolescents in public internet cafes was not examined separately. Since the availability, social-parental acceptance and the psychosocial risks of home and public internet use are different, there may also be differences regarding the sleep habits of adolescents with such preferences.

**Table 5. Comparison of IAS groups according to their frequencies of sleep problems**

	<b>IAS: &lt;40 n (%) 836 (69)</b>	<b>IAS: 40-69 n (%) 345 (28.5)</b>	<b>IAS: &gt;70 n (%) 31 (2.6)</b>	<b>p*</b>
<b>How often do you fall asleep in class?</b>				
Never or rarely	684 (74.1)	227 (24.6)	12 (1.3)	0.001
Occasionally	128 (56.8)	80 (36.5)	11 (5)	*0.001
Frequently	24 (34.3)	38 (54.3)	8 (11.4)	
<b>How often do you feel sleepy during lessons</b>				
Never or rarely	437 (82.5)	89 (16.8)	4 (0.8)	0.001
Occasionally	293 (63.6)	160 (34.7)	8 (1.7)	*0.001
Frequently	106 (48)	96 (43.4)	19 (8.6)	
<b>How often do you have difficulty to fall asleep</b>				
Never or rarely	527 (73.7)	175 (24.5)	13 (1.8)	0.001
Occasionally	207 (67.2)	89 (28.9)	12 (3.9)	*0.001
Frequently	102 (54)	81 (42.9)	6 (3.2)	
<b>How often do you feel sleepy and tired in the day</b>				
Never or rarely	244 (82.2)	49 (16,5)	4 (1.3)	0.001
Occasionally	328 (71)	130 (28.1)	4 (0.9)	*0.001
Frequently	264 (58.3)	166 (36.6)	23 (5.1)	
<b>How often do you have difficulty to wake up in the morning</b>				
Never or rarely	343 (78.6)	82 (19)	6 (1.4)	0.001
Occasionally	215 (74.4)	66 (22.8)	8 (2.8)	*0.001
Frequently	278 (56.5)	197 (40)	17 (3.5)	
<b>How often do you have nightmares</b>				
Never or rarely	648 (70.4)	253 (27.5)	20 (2.2)	0.006
Occasionally	135 (68.5)	58 (28.4)	4 (2)	*0.003
Frequently	53 (56.4)	34 (36.2)	7 (7.4)	
<b>How often do you talk in sleep (your or your families' statement)</b>				
Never or rarely	703 (70.2)	278 (27.8)	20 (2)	0.002
Occasionally	89 (69.5)	34 (26.6)	5 (3.9)	*0.001
Frequently	44 (53)	33 (39.8)	6 (7.2)	

Chi-square test and \*Linear-by-Linear Association

## Conclusion

Internet addiction, which is a public health problem in youth, appears to be related with problematic sleep habits and sleep problems. Further studies with larger sample size and better methodology are needed to understand the nature, dimensions and the ethiological background of this relationship. Health care providers must be aware of the possible negative impact of excessive and uncontrolled internet use on adolescents' sleep habits. Careful evaluation of the exposure of adolescents to internet and their sleep habits and daytime functioning will help to identify the adolescents who are under the risk of internet addiction and sleep problems.

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