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THE EFFECT OF MOBILE PHONE USAGE ON SLEEP QUALITY IN ADOLESCENTS

ADÖLESANLARDA CEP TELEFONU KULLANIMININ UYKU KALİTESİ ÜZERİNE ETKİSİ

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Abstract

To evaluate the effect of mobile phone usage on adolescents' sleep quality. This descriptive study took place from January 13-15, 2016 with 9th, 10th, and 11th grade students enrolled at Konya High School (n=380, 51.6% female, age 16.05±0.87). A questionnaire was used for data collection and the Pittsburgh Sleep Quality Index (PSQI) was used to measure the sleep quality of the students. Students received their first mobile phones at an average age of 12.29±1.41). They used their phones 3.03±2.18 hours per day on average, mostly for text messaging (89.5%). Average sleeping time was 7.34±1.22 hours when the next day was not a school day, and 9.11±1.79 hours when the next day was a school day. Sleep quality of the students decreased as the duration of mobile phone usage increased (p<0.01). Using the PSQI scale, it was determined that 20.5% of the students with good sleep quality and 79.5% of the students with poor sleep quality delayed their bedtime in favor of continued usage of their phone (p<0.05). Mobile phones should be removed from the bedrooms of adolescents. Parents should control their children's mobile phone usage and contents.

Keywords: adolescent, sleep quality, mobile phone, sleep routine.

Özet

Adölesanlarda cep telefonu kullanımının uyku kalitesi üzerine etkisini değerlendirilmek amaçlanmıştır. Bu tanımlayıcı araştırma, Konya Lisesinde kayıtlı 9., 10. ve 11. sınıf öğrencileri (n=380, %51.6'sı Bayan, yaş aralığı 16.05±0.87) üzerinde, 13-15 Ocak 2016 tarihleri arasında yapılmıştır. Öğrencilerin uyku kalitelerini ölçmek amacıyla Pitsburg Uyku Kalitesi Ölçeği (PUKİ) kullanılmıştır. Öğrenciler ilk cep telefonları ortalama 12.29±1.41 yaşında almıştır. Adölesanların cep telefonunu günlük ortalama 3.03±2.18 saat kullandıkları ve en çok mesajlaşmak (%89.5) için kullandığı belirlenmiştir. Ortalama uyuma saati ertesi gün okul yoksa 7.34±1.22 saat, ertesi gün okul varsa 9.11±1.79 saat olarak belirlenmiştir. Öğrencilerin cep telefonu kullanma süresi arttıkça uyku kalitesinin düştüğü belirlenmiştir (p<0.01). PUKİ ölçeğine göre uyku kalitesi iyi olan öğrencilerin %20.5'inin, kötü olanların ise %79.5'inin cep telefonu ile meşgul olduğu zaman yatma zamanını ertelediği belirlenmiştir (p<0.05). Cep telefonları adölesanların yatak odalarından çıkarılmalıdır. Aileler çocuklarının cep telefonu kullanımını, içeriğini kontrol etmelidirler.

Anahtar Kelimeler: *adölesan, uyku kalitesi, cep telefonu, uyku rutini*

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1. Introduction

Sleep is a basic necessity that constitutes almost one-third of the hours in a human's lifetime. It is a state of reversible unconsciousness, where the body and mind are renewed, repaired, and developed (Karadağ, 2017). Sleep is a cornerstone of adolescent development. Although sleep duration varies, 8-10 hours per night is sufficient for adolescents (Hirshkowitz et al., 2015). Electronic media has a negative effect on the sleep of children and adolescents (Cain & Gradisar, 2010; Hale & Guan, 2015).

Though the media has begun to form an important part of the daily life of young people, the increasing frequency of use of media such as television (TV), computer games, Internet, mobile phone usage threatens healthy sleep. Using the media can change the sleeping time and shorten the sleeping period. Media content can cause extreme excitement or cause recurring voyages (Van den Bulck 2010). Research shows that there is a relationship between mobile phone usage and sleep quality (Bruni et al., 2015; Demirci et al., 2015; Eyvazlou et al., 2016; Mohammadbeigi et al., 2016; Sahin et al., 2013; Yogesh et al., 2014). In other studies on adolescents, it has been found that the use of telephone delayed (Bartel et al., 2015), the sleeping time, making sleeping difficult (Arora et al., 2014), which affects the sleeping negatively (shortening the duration of sleep) (Hale & Guan, 2015). In another research conducted on the subject, it has been determined that despite the frequent use of television and computer, it is not related to sleep variables, whereas mobile phone use is associated with all sleep variables (Mak et al., 2014). Mobile phones are widely used among young people, and the effect of this habit on their sleep quality is not well-known. This study was conducted to evaluate the effect of mobile phone usage on adolescents' sleep quality.

2. Materials And Methods

2.1. Participants and Procedure

This descriptive study research was conducted January 13-15, 2016. The study population was 9th, 10th, and 11th grade students (n = 982) at Konya High School during the 2015-2016 school year. Students who reported that they had a mobile phone and did not have any psychological, neurological, or respiratory sleep problems were included in the survey. A total of 380 students (age 16.05±0.87) voluntarily participated in the study. A questionnaire for data collection was developed to obtain demographic information and mobile phone usage habits of the students, and the Pittsburgh Sleep Quality Index (PSQI) was used to measure the students' sleep qualities.

Institutional approval was granted from the Konya Provincial Directorate for National Education, and the ethical approval, with the decision number of 2016/2 dated January 12, 2016, was obtained from the Konya Selçuk University Ethics Committee. Informed consent was obtained from all participants and their parents. All procedures performed in this study involving human participants were in accordance with the ethical standards and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

2.2. Instruments

Introductory Characteristics of the Students and Status of Mobile Phone Use Habits Information Form:

This form was created by the researcher for the purpose of gathering information related to the variables that had been determined to have an impact, according to a review of the relevant literature, on the children constituting the study sample (Arora et al., 2014; Bartel et al., 2015; Bruni et al., 2015; Cain & Gradisar, 2010; Demirci et al., 2015; Eyvazlou et al., 2016; Hale & Guan, 2015; Mohammadbeigi et al., 2016; Sahin et al., 2013; Mak et al., 2014; Yogesh et al., 2014).

Pittsburgh Sleep Quality Index (PSQI): The PSQI was developed by Buysse et al. and adapted to Turkish by Ağargün et al. (1996) The PSQI is a 19-item self-report index that assesses sleep quality and disturbances over the responder's past month. It consists of 24 questions, including 19 self-report questions and 5 questions to be answered by spouse or roommate. The 24 questions of the index that are scored consist of 7 components. Each component is assigned a value of 0-3 points. The total score of the 7 components gives the total score of the index, which ranges from 0 to 21. A total score higher than 5 indicates poor sleep quality. The spouse/roommate section was not used in this study since it was conducted on adolescents.

2.3. Statistical Data

The data obtained from the study was evaluated using the SPSS 15.0 program. Daily mobile phone usage times were calculated as (weekday duration x5 + weekend duration x2)/7. To analyze student demographics and telephone usage habits, the bivariate Pearson correlation was used to identify the relationships between frequency, percentage retrieval techniques, frequency of cell phone use, and some sleep variables with PSQI. An independent two-group difference test (t-test) and a Chi-square test were applied to test the relationship between the postponement of bedtime and PSQI.

3. Results

The average age that the students received their first mobile phone was 12.29 ± 1.41. The students reported using their mobile phones 3.03 ± 2.18 hours a day on average. Some students (30.8%) reported many times daily phone usage, and most (57.1%) used their mobile phone many times a day. Most of the students (89.5%) used their mobile phones for messaging (Table 1). Students usually had a 23.34 ± 1.08 bedtime and 7.27 ± 1.30 wake up time. The average sleep duration was 7.35 ± 1.20 hours if there was no school the next day, and 9.15 ±1.66 hours if there was school the next day. The average score for total PSQI was 7.04 ± 3.36. According to these PSQI scores, 65.5% of the adolescents participating in the study had poor quality sleep.

Table 1. Descriptive Characteristics of the Study Group

Gender	n	%
Female	196	51.6
Male	184	48.4
Family Income Status	**n**	**%**
Low	14	3.7
Middle	185	48.7
Good	168	44.2
High	13	3.4
Family Structure	**n**	**%**
Nuclear	334	87.9
Broad	37	9.7
Broken	9	2.4
Thinking About Using a Phone Too Much	**n**	**%**
Yes	117	30.8
No	263	69.2
Frequency of Mobile Phone Usage	**n**	**%**
Every hour	72	18.9
Many times in an hour	37	9.7
Once daily	54	14.2
Many times daily	217	57.1
Use of the Mobile Phone*	**n**	**%**
Messaging	340	89.5
Speaking to family	311	81.8
Speaking to friends	288	75.8
Reading news	279	73.4
Going online, researching, solving problems.	245	64.5
Entering social networking sites	245	64.5
Playing games	150	39.5
Listening to music	124	32.6

*Multiple choices were permitted.

Table 2. Relationship Between Mobile Phone Usage Time and Some Sleep Variables and PSQI

		Mobile Phone Usage Time		Significance*
		n	x ± sd	
Sleep time sufficiency	Sufficient	193	2.48 ± 1.70	0.000 p<0.001
	Insufficient	187	3.60 ± 2.45	
Mobile phone available and close by while sleeping	Yes	159	3.52 ± 2.48	0.000 p<0.001
	No	221	2.68 ± 1.85	
	Min/Max	x ± sd	r	Significance**
Total PSQI	1/18	7.04 ± 3.36	0.165	0.001 p< 0.01

*Independent Samples t Test

**Bivariate Pearson Correlation

The duration of mobile phone use was 2.48 ± 1.70 hours for the students whose sleep time was sufficient, and 3.60 ± 2.45 hours for those whose sleep time was insufficient (p<0.001). The duration of mobile phone usage by students who kept their phone near them while sleeping was 3.52 ± 2.48 hours, and it was 2.68 ± 1.85 hours for those who did not keep their phone nearby (p<0.001). There was a positive correlation (r = .165, p <0.01) between the duration of mobile phone use and the total PSQI score of the students (Table 2).

Table 3. Sleep Routine Distribution of the Research Group

Sleep Routines*	Reasons For Delaying Bedtime	
	n	%
Studying	280	73.7
Reading	133	35.0
Using a mobile phone (playing games, speaking, messaging, etc.)	73	19.2
Social networking	69	18.2
Internet use	67	17.6
Watching TV or DVDs	65	17.1
Playing games with computers, game consoles, etc.	60	15.8
Studying with computers	47	12.4
Listening to music	41	10.8
Other (taking a bath, etc.)	28	7.4
Directly going to bed	16	4.2

The adolescents in the study group most often delayed their bedtime due to studying (73.7%), reading (35%), and using their mobile phone (19.2%) (Table 3).

Table 4. Relationship Between Bedtime Delay and PSQI in the Study Group

PSQI	Sleeping Time Delay Due to Mobile Phone Use				
	Yes		No		Significance*
	n	%	n	%	
Good	15	20.5	116	37.8	0.005 p<0.05
Poor	58	79.5	191	62.2	
Total	73	100	307	100	

*Chi-square Test

According to the PSQI scale, 20.5% of the students with good sleep quality and 79.5% of students with poor sleep quality delayed their bedtime due to mobile phone usage. This difference was statistically significant (p<0.05) (Table 4). All of the reasons for delaying sleeping time in Table 3 were compared with the PSQI scale and the only statistically significant difference was with "when busy with mobile phone".

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4. Discussion

In this study, 57.1% of students with mobile phones used them many times a day and their first mobile phone was bought for them at age 12.29 ± 1.41 on average. They spent 3.03 ± 2.18 hours on them daily, on average. In a study of adolescents in Japan, it was found that only 31.42% of the students had a mobile phone and they used the mobile phone in speaking mode for an average of 7.08 ± 21.42 minutes a day (Mortazavi et al., 2011). Another study by Munezawa et al. (2011) found that 84.4% of students use a mobile phone, even if only for a short time each day. In a survey conducted on adolescents, the average daily phone use of participants was 131.77 ± 119.9 minutes (Nikhita et al., 2015). In a study conducted by Mak et al. (2014), participants used mobile phones an average of 2.31 ± 3.74 hours a day. A study of university students in Turkey found that 28.3% of students acquired their first mobile phone at age 13 or younger, and they used them for more than five hours a day (Sahin et al., 2013). These results show that the mobile phone is one of the electronic media products most frequently used by adolescents. Today, young people socialize with their peers through technology, especially mobile phones. Mobile phones bring the ability to go online, transfer mobile data, playback music, record video, take pictures, and keep a calendar, while being portable. In this study, the increased frequency of mobile phone usage may be due to developmental factors of the adolescents or the increased social interaction. Young people may be using mobile phones because they see socialization and technological connection as a means of liberation, fashion, and social status indication.

In this study, 89.5% of adolescents used mobile phones for messaging and 81.8% used them to talk to their families. A survey conducted in India found that 94.2% of participants used their mobile phone to make calls (Stalin et al., 2016). Another survey found that 33.5% of students use mobile phones for messaging, and 28.5% use them for speaking to their families (Sahin et al., 2013). A study conducted by Charles Sturt University found that 55% of students prefer text messaging (SMS), while prefer 30% to speak (Carroll, 2005). Our study is similar to other study findings. Young people use mobile phones for purposes other than communication, which is the main function of the phone. Young people may prefer to communicate via SMS because it enables them to communicate as they are available and allows them to respond more quickly in everyday life and social relationships.

The students usually had a 23.34 ± 1.08 bedtime and 7.27 ± 1.30 wake up time. The average sleep duration was 7.35 ± 1.20 hours if there was no school next day, and 9.15 ± 1.66 hours if there was school the next day. In a study by Mak et al. (2014), the participants slept an average of 7.74 ± 1.46 hours per night. In another study conducted on adolescents, participants slept an average of 8.06 hours on weekdays and 9.30 hours on weekends (Gamble et al., 2016). Adolescents are not recommended to sleep more than 11 or less than 7 hours per night (Hirshkowitz et al., 2015). In the study group, although better on school nights, the sleep duration was at the lower end of the recommendation. The participants were careful not to allow lack of sleep to affect their daytime activities and performances by choosing to go to sleep earlier on school nights.

Students who slept next to their mobile phones and whose sleep period was considered inadequate had increased mobile phone usage times. According to PSQI scores, 65.5% of participants had poor quality sleep. The sleep quality of the students decreased as the duration of mobile phone usage increased. Mortazavi et al. (2011) determined a statistically significant relationship between the number of sleeping problems and the amount of time they used mobile phones for speaking. Another study among adolescents in Sweden found that the prevalence of sleep impairment is higher among people who use the mobile phone frequently (Thomée et al. 2011). Surveys on university students have found that sleep quality decreased as mobile phone dependency increased (Demirci et al., 2015; Sahin et al., 2013). In similar studies, there was a relationship between mobile phone use and sleep quality (Bruni et al., 2015; Eyvazlou et al., 2016; Mohammadbeigi et al., 2016; Yogesh et al., 2014). It was not possible to correlate the deterioration of the participants' sleep quality solely to mobile phone use. However, it was shown that excessive use of mobile phones affects sleep quality. Keeping mobile phones away from sleeping adolescents would be a method for reducing mobile phone usage that would cause minimal interference. It has been anticipated that it would be useful to conduct training and intervention studies about the arrangement of sleep pattern and media literacy in the study group in the future term. Adolescents should be directed to activities where they will spend quality time (e.g., sports, creative and social games, etc.).

The relationship between the adolescents' bedtime delay and their rank on the PSQI scale was statistically significant. In a meta-analysis of forty studies, phone use was found to delay bedtime in adolescents (Bartel et al., 2015). In a large participatory study of adolescents in Norway, 80% of females and 90% of males used their mobile phone an hour before bedtime, and this reduced sleep duration by two hours or more (Hysing et al., 2015). Munezawa et al. (2011) reported in their survey of Japanese adolescents, that every day, after turning off the lights, the participants used their mobile phones 8.3% to call and 17.6% to send messages. In the same study, sleep disturbances (short sleep duration, subjective sleep quality, daytime extreme sleepiness, and insomnia) were found in people who use their mobile phones to talk and send messages after the lights are turned off. In a study by Zarghami et al. (2015), there was a significant relationship between sleeplessness and mobile phone use late at night. In a study by Gamble et al. (2014), there was a relationship between the long-term use of mobile phones and delayed sleeping and waking. In a study by Fobian et al. (2016), there was a negative correlation between sleep efficiency and both daytime messaging and the number of nightly awakenings by mobile phone. The current study is similar to other study findings, in that the use of the phones causes sleep quality to deteriorate as a result of delaying bedtime in adolescents. Students that had their mobile phones near them while sleeping saw an

increased duration of mobile phone usage. As a result, adolescents are preoccupied with their phones before bed and it is inevitable that both sleeping and waking are delayed and sleep quality is affected. Sleep, which is a basic element in physical growth and in strengthening academic performance, must be adequate. Significant changes are needed in the habits of adolescents in the study group.

Among the limitations of the research, the sample size was small. However, as the number of research studies conducted in this country are few, the results remain important to raise awareness of this issue.

5. Conclusions

Sleep quality decreases as the duration of mobile phone usage increases. Young people prefer mobile phones over other media products because mobile phones are portable and include almost all the features and capabilities of other media products. The length of time adolescents spend with their mobile phone is a matter of concern for adolescents, and the use of mobile phones by children can cause health bad effects. Adolescents should make changes to regulate their sleep patterns. Mobile phones should be removed from the bedrooms of adolescents. Families should control their children's intended use of mobile phone and its content and should limit the time spent with them.

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