

Sleep Quality and Internet Addiction Level among University Students

Maie Abdulrhman Khayat², Prof. Mohamad Hasan Qari¹, Basmah Salman Almutairi²,
Bashayer hassan Shuaib², Marwah Ziyad Rambo², Manal Jobran Alrogi², Sulaf Zaki
Alkhatabi², Dalya Abdulrahman Alqarni²

1 Professor, Department of Hematology, , Faculty of Medicine, King Abdulaziz University, 2
Medical Student, Faculty of Medicine, King Abdulaziz University, Saudi Arabia

Abstract

Background: Sleep is an essential need of humankind; it is necessary for quality of life and health at all ages. Poor sleep quality is closely associated with lifestyle habits including Internet use. This study aimed to evaluate the relationship between sleep quality and the level of Internet addiction among students at King Abdulaziz University (KAU). **Methodology:** This was a cross-sectional study carried out on July 2017 among 511 students aged 18-25 years enrolled at KAU in Jeddah, Saudi Arabia. The Pittsburgh Sleep Quality Index (PSQI) was used to evaluate sleep quality and habits, and Young's Internet Addiction Test was used to assess Internet addiction among students. Frequencies, chi-square, Pearson's correlation coefficient and multivariate analysis were used in data analysis. **Results:** A total of 511 students participated; 350 (68.5%) were women. Poor sleep quality was found in 54.4% of the participants, whereas Internet addiction was found to be mild in 42.3 %, moderate in 29.9%, and severe in 1.8%. A significant correlation was found between sleep quality and Internet addiction ($p = .00$). Other significant associations linked the quality of sleep to smoking and caffeine consumption. **Conclusion:** Sleep problems and poor sleep quality among KAU students were related to high Internet use. Further studies are needed to fully understand the factors that affect sleep behavior and Internet addiction among university students in Jeddah.

Keywords: Sleep, Internet, addiction, quality Sleep quality, internet addiction, university students, sleep disturbance, sleep medications, sleep behavior, internet use, poor sleep, sleep deprivation.

Introduction:

Sleep is an essential need of humankind, important for quality of life and health at all ages. Quality sleep has been associated with multiple factors including environmental factors, social life, and general health status^(1,2). Guidelines advocate 8.5 – 9.5 hours of sleep per night for adolescents 10 to 17 years old, while young adults, over 18 years, need 7 – 9 hours of sleep⁽³⁾. Sleep has been found to be fundamental for memory consolidation, learning, critical thinking and decision making^(4,5). Furthermore, it is necessary for cognitive functions related to academic performance in higher education. As students approach the college stage, they will be in an entirely different atmosphere. They will experience greater responsibilities with increasing pressure and more chaotic schedules affecting their sleep quality⁽⁶⁾. Studies have shown that most university students do not meet their sleep requirements, as 71% sleep less than 8 hours⁽⁷⁾. Sleep deprivation can result in serious outcomes including reduced coping mechanisms, poor

academic performance, and increased risk of motor vehicle accidents⁽⁸⁾.

Today, the Internet has become an important element in people's lives. It is used for entertainment, communication, and education. Despite its advantages, the side effects of Internet overuse have been emerging progressively⁽⁹⁾. Heavy internet use has many associations, with depression,⁽¹⁰⁾ poor sleep quality, mood changes, and poor health outcomes such as obesity and low self-esteem⁽¹¹⁾. Internet addiction (IA) is described as excessive or poorly controlled preoccupations or behaviors regarding Internet access, which lead to distress or impairment⁽¹²⁾. A multinational meta-analysis showed that 6% of people worldwide have an IA, ranking the Middle East in first place with 11%, while northern and western Europe were ranked the lowest with 3%⁽¹³⁾. Internet Addiction has been considered as a new type of addiction and mental disorder; like other already established addictions such as compulsive gambling and alcoholism⁽³⁾.

Researchers have linked the influence of Internet addiction to sleep disturbances and insomnia: a higher rate of insomnia – up to 3% – was found among heavy Internet users⁽¹⁴⁾. The effect of Internet addiction on sleep quality has been studied extensively in East Asia, Korea for example, because of the growing rate of Internet addiction in their communities⁽¹⁵⁾. The widespread use of cell phones and easy accessibility of the Internet worsen the issue. A study done in Riyadh, Saudi Arabia, involving university students found that 48% were addicted to smart phones⁽¹⁶⁾. Another local study linked utilization of cell phones with numerous health hazards including headaches (21.6%), sleep disturbances (4%), tension (3.9%), fatigue (3%), and dizziness (2.4%)⁽¹⁷⁾. Furthermore, a previous study showed that most students with sleep problems spend their time checking social networking websites and watching television⁽¹⁸⁾. Moreover, students who use Internet excessively have a higher chance of experiencing sleep problems⁽¹⁹⁾.

These studies indicate that the relationship between sleep quality and level of Internet addiction is somewhat complex and needs to be studied well. To this day, there is a lack of empirical studies targeting sleep quality and level of Internet addiction in Saudi Arabia, Jeddah precisely.

Our study aims to investigate the relationship between sleep quality and the level of Internet addiction among students at KAU in Jeddah, Saudi Arabia.

Methodology:

The study's protocol was approved by the Institutional Review Board of King Abdul-Aziz University. This analytical, cross-sectional study involving undergraduate students, from different majors and at various levels, studying at KAU, Jeddah, Saudi Arabia in 2017. Electronic-learning as well as master's and PhD students were excluded from the study. A total of 511 students completed a self-completion electronic questionnaire. We used the Pittsburgh Sleep Quality Index (PSQI) questionnaire to assess the students' sleep quality over a period of one month. The PSQI is used to assess sleep

quality and quantity with verified levels of consistency, reliability, and validity. It consists of 19 items generating 7 components that evaluate sleep quality, duration, latency, habitual sleep effectiveness, sleep difficulties, use of sleeping pills, and daytime dysfunction. In each component, the score ranges from 0 to 3. A global score resulting from summation of the component scores is used as sleep quality and ranges from 0-21. Students with scores ≥ 5 were categorized as poor sleepers while those with scores < 5 were categorized as good sleepers. Additionally, we used Young's Internet Addiction Test (IAT) to measure Internet addiction among the students. The IAT overall score was given by the examinee for the 20 item responses. Scores ranging from 0 to 30 reflect a healthy level of Internet use; scores of 31 to 49 reflect the presence of a mild level of Internet addiction; 50 to 79 reflect a moderate level; while scores of 80 to 100 reflect severe Internet dependence.

After data gathering by online Google Sheets and calculation of sleep quality and Internet addiction scores for each participant, statistical analysis was performed using SPSS, version 21. Descriptive statistics were done including central tendency, and frequency tables were used for categorical variables. Also, chi-square test was used to compare sleep quality scores and Internet addiction between participants based on demographic characteristics (gender, marital status, and other categorical data). Multivariate analysis to evaluate the impact of Internet addiction was required independently on sleep quality with Pearson's correlation coefficient and ANOVA test. A series of multiple logistic regressions were also performed, and 0.05 significance level was accepted for all tests.

Results:

Our aim in this study was to examine the relationship between sleep quality and level of Internet addiction among students at King Abdulaziz University in Jeddah, Saudi Arabia. Our sample consisted of 511 undergraduate students; 350 (68.5%) women and 161 (31.5%) men; 60% of the students were agerger, 169 (38.4%); the Faculty of

Sleep Quality and Internet Addiction Level among University Students

Economics and Administration, 48 (9.4%); then the Faculty of Law, 43 (8.4%). The majority of the students were studying in their 3rd year. Pittsburgh Sleep Quality scores varied between 0 and 16 with an average of 6.30 ± 2.84 points. Internet addiction scores fell between 0 and 100 with an average of 42.14 ± 17.9 . The number of students who were addicted to the Internet was 378 (74%). They were classified into mild internet addiction, 216 (42.3%); moderate, 153 (29.9%); and severe, 9 (1.8%). According to poor sleep quality, the prevalence was 54.4%, on the other hand 45% of the students had good sleep quality. A significant statistical correlation was established between sleep quality and level of Internet addiction ($p = .00$). The average sleep latency (the amount of time it takes to fall asleep, measured in minutes) was 33.91 minutes, while the average sleep duration (actual sleep hours) was 8.4 hours among respondents. Of the total sample, 188 (36.8%) women and 90 (17.6%) men were categorized as poor sleepers, although there was no significant statistical relation. There was also no significant relation between GPA results and sleep quality. Among the students

who consume caffeine, 57.3% had poor sleep ($p = .047$). This study also found that poor sleep quality was significantly higher in smokers than non-smokers ($p = .022$). Additionally, a correlation was found between sleep disturbance and marital status that showed significance; 6% of married students had severe sleep disturbance while the percentage was less in single students, 0.8% ($p = .030$). Among the 6th year students, 12% had no sleep disturbances compared to other students ($p = .030$). There was also a correlation between gender and use of sleep medications which was significant; 2% of the women used sleep medications once or twice a week while the percentage was 5% in men ($p = .028$). Students who frequently used sleep-enhancing medications were significantly more likely to be scored as poor sleepers ($p = .00$). Over 65% of participants with severe Internet addiction had GPA scores of less than 4.00. On the other hand, over 75% of participants who were not addicted to the Internet had GPA scores over 4.00 ($p = .001$). There was no relation reported between internet addiction and gender (Table1).

Table 1: Sleep quality patterns in the overall study sample (n=511)

Rating Variables	0		1		2		3	
	N	%	N	%	N	%	N	%
Subjective Sleep Quality	117	22.9	230	45.0	57	11.2	107	20.9
Sleep Latency	89	17.4	162	31.7	148	29.0	112	21.9
Sleep Duration	381	74.6	50	9.8	44	8.6	36	7.0
Sleep Efficiency	476	93.2	29	5.7	5	1.0	1	0.2
Sleep Disturbance	21	4.1	339	66.3	145	28.4	6	1.2
Need Meds to Sleep	451	88.3	33	6.5	15	2.9	12	2.3
Daytime Dysfunction	80	15.7	260	50.9	135	26.4	36	7.0

a 0: very good; 1: fairly good; 2: fairly bad; 3: very bad

b 0: not during past month; 1: less than once a week; 2: once or twice a week; 3: three or more times a week

Discussion:

To the best of our knowledge, there is no previous study has investigated the relation

between quality of sleep and the level of internet addiction among King Abdul-Aziz university students in Jeddah, Saudi Arabia. The main result of our study is that sleep quality was significantly higher in subjects with Internet addiction than those not addicted to the Internet. According to the results, more than half of the surveyed students (54.4%) reported being poor sleepers. They were also identified as mildly addicted to the Internet (22.8%). In line with other studies, 21.2% of the participants were diagnosed with Internet addiction. Of those who were addicted to the Internet, 26.7% also reported that they have had sleep-related difficulties⁽²⁰⁾.

Sleep quality and demographic data

The high prevalence of poor sleep quality in this study could be explained by smoking (72.5% of the participants were smokers), as earlier studies have found that smoking alters the normal sleeping pattern and reduces sleep quality^(21,22). Nicotine could be involved in the mechanism through which smoking results in reduced sleep quality, as nicotine is a risk factor for sleep-disordered breathing⁽²³⁾. In the present study, results reveal that the quality of sleep is lowered by consumption of caffeinated beverages (57.3%) as reported in other studies^(22,24). While adenosine agonists decrease wakefulness and increase sleep, caffeine is an adenosine antagonist which increases wakefulness and decreases sleep. Similar to other studies, our results found no significant difference between both genders in sleep quality^(22,26,27,28). Albeit male participants with poor sleep quality were comparatively more than females, that could be clarified by the effect of high levels of testosterone in males which have been shown to reduce time slept and induce sleep apnea⁽²⁹⁾. Although GPA score was not affected by sleep quality as they did not show any significant relation. On the other hand, GPA was significantly affected by Internet addiction level, 26.7% of participants with Internet addiction also reported having sleep related difficulties. This indicates the absolute importance of managing internet use in students since more than 65% of those with severe internet addiction had a GPA score

below 4. Married students had more sleep disturbances than single students. Previous studies proved that unhealthy relationships may lead to more sleep disturbances by increasing vigilance, heightening the risk for psychiatric disorders, promoting unhealthy sleep-related behaviors, and augmenting physiological responses that disturb sleep⁽³⁰⁾. The use of sleep medications is extremely corresponded with poor sleep quality. However, in our study the vast majority of students rarely used sleeping pills. This rate is similar to that reported from near regional countries. Our results demonstrated that the majority of students who take sleeping pills once or twice a week are men.

Internet addiction

In our study, results show that 24.2% of the men and 26.9% of the women were grouped as not addicted to the Internet which resulted in the absence of a significant difference in Internet addiction level between both genders. Another result found that GPA and smoking are statistically significant but no clear association was found or causation proven. It was found that Internet addiction was not associated with smoking habits. This result was consistent with those of previous studies, due to the design of these studies (cross-sectional) which didn't prove causation.

Conclusion:

The present study is possibly one of the first studies to determine not only the prevalence of the sleep quality in KAU students in Jeddah, Saudi Arabia, but also its correlation with Internet addiction. Our findings showed that sleep quality is strongly correlated with Internet addiction level. This indicates a growing need to increase awareness of healthy sleep habits to improve the quality of sleep. Furthermore, strategies are required to moderate the use of Internet. Different study designs with larger sample sizes are needed in order to fully explore the factors that affect sleep behavior and Internet addiction among university students in Saudi Arabia.

References:

1. **Sahn S, Ozdemir K, Unsal A and Temiz N (2013):** Evaluation of mobile phone addiction level and sleep quality in university students. *Pakistan Journal of Medical Sciences*, 29(4): 913–918.
2. **Thomé S, Härenstam A, Hagberg M (2011):** Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults - a prospective cohort study. *BMC Public Health*, 11(1), <https://doi.org/10.1186/1471-2458-11-66>
3. **National Sleep Foundation(2013):**Children, Teens and Sleep. Available From: <http://www.sleepfoundation.org>.
4. **Harrison Y, Horne J (2000):** The impact of sleep deprivation on decision making: A review. *Journal of Experimental Psychology: Applied*, 6(3): 236-249.
5. **Mednick S, Nakayama K, Stickgold R (2003):** Sleep-dependent learning: a nap is as good as a night. *Nature Neuroscience*, 6(7): 697-698.
6. **Vargas, Perla A, Melissa Flores, Elias Robles (2014):** Sleep Quality And Body Mass Index In College Students: The Role Of Sleep Disturbances. *Journal of American College Health*, (62)8: 534-541.
7. **Lund H, Reider B, Whiting A, Prichard J (2010):** Sleep Patterns and Predictors of Disturbed Sleep in a Large Population of College Students. *Journal of Adolescent Health*, 46(2): 124-132.
8. **Mirghani H, Mohammed O, Almutadha Y, Ahmed M (2015):** Good sleep quality is associated with better academic performance among Sudanese medical students. *BMC Research Notes*, doi: 10.1186/s13104-015-1712-9
9. **MOR (1996):** A new disorder enters the medical lexicon. *Canadian Medical Association Journal*, 154:1882–1883.
10. **Lai C, Mak K, Watanabe H, Jeong, J, Kim, D, Bahar N, Ramos M, Chen S, Cheng C (2015):** The mediating role of Internet addiction in depression, social anxiety, and psychosocial well-being among adolescents in six Asian countries: a structural equation modelling approach. *Public Health*, 129(9) : 1224-1236.
11. **Kim J, Lau C, Cheuk K, Kan P, Hui H, Griffiths S (2010):** Brief report: Predictors of heavy Internet use and associations with health-promoting and health risk behaviors among Hong Kong university students. *Journal of Adolescence*, 33(1): 215-220
12. **Shaw M, Black D (2008):** Internet Addiction. *CNS Drugs*, 22(5): 353-365.
13. **Cheng C, and Li A (2014):** Internet Addiction Prevalence and Quality of (Real) Life: A Meta-Analysis of 31 Nations Across Seven World Regions. *Cyberpsychology, Behavior, and Social Networking*, 17(12): 755-760.
14. **Lam L (2014):** Internet Gaming Addiction, Problematic Use of the Internet, and Sleep Problems: A Systematic Review. *Current Psychiatry Reports*, doi:10.1007/s11920-014-0444-1
15. **Lee J, Jang S, Ju Y, Kim W, Lee H, Park E (2017):** Relationship between Mobile Phone Addiction and the Incidence of Poor and Short Sleep among Korean Adolescents: a Longitudinal Study of the Korean Children & Youth Panel Survey. *Journal of Korean Medical Science*, 32(7): 1166.
16. **Aljomaa S, Al.Qudah M, Albursan I, Bakhiet S, Abduljabbar A (2016):** Smartphone addiction among university students in the light of some variables. *Computers in Human Behavior*, 61: 155-164.
17. **Al-Khlaiwi T, Meo SA (2004):** Association of mobile phone radiation with fatigue, headache, dizziness, tension and sleep disturbance in Saudi population. *Saudi Med J.*, 25: 732–736.
18. **Tavernier R, Willoughby T (2014),** Sleep problems: predictor or outcome of media use among emerging adults at university. *Journal of Sleep Research*, 23(4): 389-396

19. **Chen Y, Gau S (2016):** Sleep problems and internet addiction among children and adolescents: a longitudinal study. *Journal of Sleep Research*, 25(4): 458-465.
20. **<http://www.sciencedirect.com/science/article/pii/S1876201816305652>**
21. **Mesquita G, Ferreira S, Rossini S *et al.* (2011):** Effects of Tobacco and Alcohol Consumption on Sleep Quality of University Students. *Neurobiologia Journal*, 74(1): 19-27.
22. **<https://www.ncbi.nlm.nih.gov/pubmed/23239460>**
23. **Wetter DW, Young TB, Bidwell TR, Badr MS, Palta M (1994):** Smoking as a risk factor for sleep-disordered breathing. *Archives of internal medicine*, 154(19): 2219–2224.
24. **Sleep Quality, Sleep Patterns and Consumption of Energy Drinks and Other Caffeinated Beverages among Peruvian College Students**
25. **<https://www.ncbi.nlm.nih.gov/pubmed/25243056>**
26. **Tsai LL, Li SP (2004):** Sleep patterns in college students: gender and grade differences. *Journal of psychosomatic research*, 56(2):231–237.
27. **Cheng SH, Shih CC, Lee IH, Hou YW, Chen KC, Chen KT, Yang YK, Yang YC (2012):** A study on the sleep quality of incoming university students. *Psychiatry research*, 197(3): 270–4.
28. **Suen LK, Hon KL, Tam WW (2008):** Association between sleep behavior and sleep-related factors among university students in Hong Kong. *Chronobiology international*, 25(5): 760–775.
29. **Liu X, Zhao Z, Jia C, Buysse DJ (2008):** Sleep patterns and problems among Chinese adolescents. *Pediatrics*, 121: 1165-1173.
30. **Rajput T, Shabbir F, Ahmed A(2016):** Effect of internet addiction on academic performance of medical students. *Journal of Islamic International Medical College*, 11: 48-51.