ORIGINAL ARTICLE

INTERNET ADDICTION AND ITS INFLUENCE ON SLEEP QUALITY AMONG THE MEDICAL STUDENTS

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Abstract

Background: Sleep is of physiological importance for quality life and health. The extensive use of the internet leads to a state of addiction gradually among young people globally. Addiction may comprehend to be a cause for psychological issues by changing lifestyle habits. This study aimed to understand the influence of internet addiction on sleep quality among medical students in Malaysia.

Methods: This observational cross-sectional study involved 120 consenting medical students. The participants provided demographic details and answered two validated questionnaires of PSQI (Pittsburgh Sleep Quality Index) for rating the sleep quality and Internet Addiction Test (IAT) for the level of internet use. The statistical analysis was done by using SPSS, version 22.

Results: The medical students' scores established that the internet addiction was average level while the sleep quality was affected. The correlation between sleep quality and internet addiction showed a weak positive association. IAT scores and PSQI Global scores of poor sleep quality (scores more than five) had a statistically significant ($p<0.05$) correlation.

Conclusion: Participants had complete control of their internet use, showed an average level of internet addiction, but sleep quality was affected considerably with a positive association.

Keywords: Quality of sleep, Internet addiction, Medical students, IAT scores

Introduction

Nowadays, internet use becomes inevitable for entertainment, communication, and education. Though it has its advantages, the emerging problems of overuse, such as online-related compulsive behavior may interfere with the quality of life among adolescents and young adults. Internet addiction causing dependency and compulsivity, added stress to family and friends, also tends to affect an individual's education and carrier. The desire to spend more time on the internet increases the emergence of problems in physical health and psychological issues including depression, poor quality of sleep, mood changes, obesity and decreased self–esteem.[1,2]

Adequate sleep is essential for normal growth hormone secretion and physical development in adolescents and for healthy living in all ages as the quality of sleep is affected by many factors, including internet overuse. Sleep plays a physiological role in cognitive functions related to academic performance such as learning, consolidation of memory, critical thinking, decision making. [3,4] The guidelines for sleep advocate 8.5 – 9.5 hours of sleep for adolescents and 7 – 9 hours for young adults.[5] Studies proved that the sleep requirements were not met among the university students, as 71% had less than 8 hours of sleep.[6] With advanced technology, smartphones become popular among students; the habit of prolonged use before sleep increases sleep latency and decreases the duration of sleep. [7]

The internet used for watching movies, chatting, and playing games before sleep affects sleep quality in more than 50% of students who were adversely affected by internet addiction. [8] Hence sleep deprivation resulted in reduced coping capability resulting in various problems, poor academic achievements, and increased risk of road traffic accidents among medical students in Sudan.[9] In a study conducted in China, students with internet addiction with poor sleep quality had more problems of sleep disturbances than others.[10] Similar results were observed in other studies conducted in Turkey, East Asia, Korea, and Saudi.[11,12]

This study is aimed to understand the level of internet addiction and the influence of internet addiction on sleep quality among medical students in Malaysia.

Materials and Methods

This study involved 120 students from Year-1 to Year-4 MBBS students of University Kuala Lumpur, Royal College of Medicine Perak. After prior approval from the university research ethics committee, all the participants were explained about the purpose of the study, and written informed consent was obtained. The respondents provided demographic details and filled two validated questionnaires including Internet Addiction Test (IAT; Young, 1998) and Pittsburgh Sleep Quality Index (PSQI). IAT questionnaire has 20-items, 5-point Likert scale, which measures internet addiction among the students. The score range 20-49 represents a mild level of addiction with complete control of internet use; 50-79 represents a moderate addiction level indicating over-use of the internet with frequent problems, and 80-100 represents severe addiction with significant problems from the internet use. Assessment of the sleep quality for the past month was done by PSQI with verified levels of reliability, consistency, and validity. PSQI consists of 19-items to formulate seven components that evaluate sleep quality, latency, duration, efficacy, disturbances, use of medication, and dysfunction during daytime. The summation of all components generates PSQI global score range from 0 to 21; a higher score indicates poor sleep quality. The scores > 5 were accurate to distinguish students with poor sleep quality from good sleepers (scores <5). After obtaining data, the ratings for sleep quality and internet addiction were calculated, the statistical analysis done using SPSS, version 22. Pearson correlation of internet addiction with PSQI global

scores done, and the p-value <0.05 was considered statistically significant.

Results

The study questionnaires responded by 120 MBBS students were analyzed to evaluate the sleep quality and the internet addiction level, to determine the influence of internet addiction on sleep quality. Pittsburgh sleep quality index (PSQI) global scores ranged between 2 to 14 with a mean value of 6.48. Internet addiction test (IAT) scores varied from 0 to 93, with a mean of 40.86 (Table 1). The patterns of sleep quality based on the seven components of sleep revealed that only 19.2% had poor sleep quality. Over three-quarters of the participants (75.8%) had a short duration of latency, and they fall asleep before 30 minutes. Also, about two-thirds of the students (66.7%) sleep for a period of 5-7 hours per night with good habitual sleep efficacy (93.7%). Only 23.3% of students sleep less than 5 hours, and 10% sleep more than 7 hours (Table 2). Based on their IAT scores, 105 students (87.5%) showed a varied level of internet addiction and were categorized as mild, moderate, and severe level of addiction. Out of 120 respondents, 34 students (28.3%) had a severe addiction to the internet use, and only 15 students (12.5%) used the internet below the average level (Table 3).

The average time spent on the internet for academic purposes (e.g., educational websites, journals) was about 2 hours 45 minutes per day, and for non-academic purposes (e.g., social media, online games) was about 4 hours 25 minutes daily. The maximum duration of internet use daily for academic reasons was about 7-8 hours, and for non-academic reasons was about 12 hours among the respondents. A weak association was established between sleep quality and the level of internet addiction. The correlation between the IAT scores and PSQI global scores of students with poor sleep quality (PSQI more than 5) was statistically significant ($r2=0.058$; $p< 0.05$). The Pearson correlation between PSQI global score

and IAT score of all students was shown in table 4.

Discussion

In our study, the medical students had the average level of internet addiction. The greater number of students had mild to moderate level of the internet use than severe level of addiction. Our study results were similar to the study done among university students in Saudi. [12] Whereas the research conducted in India showed less percentage of medical students were addicted to a moderate level (8.4%) and severe addiction (0.9%) as compared to a Taiwan study among female college students showed 13.9% of moderate addiction and 0.8% of severe addiction. [13,14] In this study, the PSQI global score of the students indicated that the sleep quality was affected. Only less percentage of students had poor sleep quality as compared to the study among the university students in Saudi as 32.1% and in India as 23.8%. [12,13] Previous studies showed the effect of nicotine in smoking and caffeinated beverages altered the sleep pattern and reduced sleep quality. [12,15,16] In this study, a positive correlation between subjective sleep quality and internet addiction was observed among the students but not statistically significant, in contrast to the more positive relationship shown in another study of Abolghasem. [17]

In our study, 75.8% had short latency of sleep less than 30 minutes and sleep latency correlated with the internet addiction test score. The previous studies showed that the students with long sleep latency spent more the time on internet before sleep for social networking, watching videos and playing internet games than others.[18] The respondents of this study had adequate sleep duration and had habitual sleep efficacy (93.4%) except that 23.3% had less than 5 hours of sleep. The sleep duration was associated with IAT scores similar to other studies where the internet use was extended for studies or during leisure. [19]

In this study, only 19 students experienced sleep disturbances for more than three times a week, breathing difficulties by four students (3.3%), and 18 respondents (15%) woke up in the middle night or in the early morning whereas occasional sleep disturbances by 45 (18.3%) respondents, such as feeling too hot while sleeping, and experiencing body pain. The medication usage was not prevalent among MBBS students of UniKL RCMP. The various drugs which may affect sleep quality were studied by Roux and showed that benzodiazepines were the most widely prescribed hypnotics. Further, the results of the study revealed that benzodiazepines effectively reduced sleep latency, increased sleep time, decreased the number of awakening after the onset of sleep, and overall improved sleep quality. The other medications used included antidepressants, antipsychotics, and opiates to overcome the other problems such as depression, anxiety, and pain due to disturbed sleep.[20] According to our study, 73% of respondents did not have trouble and stayed awake while driving, eating meals, or engaging in social activity for the past month. Others had a problem for less than once a week (5%), once or twice a week (16%), and three or more times a week (6%). In terms of keeping their enthusiasm in getting things done, 33 respondents had no problem at all, 62 students had a very slight problem, 20 agreed that they had somewhat a problem, only five had a very big problem of daytime dysfunction. This explains that most of them had normal sleep scale; accordingly, the daytime dysfunction, a component of sleep pattern was less affected.

In this study, the Pearson correlation between sleep quality and internet addiction showed positive association but not statistically significant ($p > 0.05$). On the contrary, the poor sleep quality among the problematic internet users (IAT scores more than 50) had a significant association in other studies conducted among university students and adolescents.[13,21] Further, our study revealed that there was a weak association of IAT scores with PSQI global scores (more than five) of respondents with poor sleep quality, and the correlation was statistically significant. The prevalence of sleep problems increased with the severity of internet addiction. Other factors that disturbed sleep, such as body pain, noise, medications, insomnia, anxiety, and caffeine did not affect most of the students in this study. However, although there were mentioning of these problems to a lesser extent. However, the daily internet usage non-academically (e.g., social media, online games) during leisure time may lead to a positive relationship with poor sleep quality.

Conclusion

Our research using Young's Internet Addiction Test (IAT) on respondents stated that the mean score was 40.86, an average online user score. This study concluded that internet addiction level was normal or average among medical students at UniKL Royal College of Medicine Perak. Students may surf the web a bit too long at times, but they had control over their usage either for studies or during leisure. The students on an average had a PSQI global score which indicated a slightly poor quality of sleep. In conclusion, students with poor sleep quality showed a significant positive correlation with internet addiction test scores, although it is a weak association. In this study, the students had relatively good sleep quality owing to the short-latency, adequate sleep duration, and habitual sleep efficacy. Thus, internet addiction among 28% of students indeed had a possible factor for a poor quality of sleep, which may be a concern of daytime dysfunction, including daytime sleepiness and cognitive disturbances. Furthermore, recommended strategies are needed to moderate the use of the internet for those with problematic addiction.

Limitations of the study
This study was conducted at one university hence it cannot be generalized. Comparison among medical students between private and public

universities with varying living environments can be done.

Acknowledgement

Author contributions

P-KM guided students in this study, from the conceptualization, decision of topic, designing to the analysis and wrote the first draft.

H-AR, K-A, Y-Y, I-ZA1, L-R and A-Z were responsible to collect data from respodents and data analysis. H-AR assisted in revising the extended analysis. R-SS critically reviewed the manuscript and contributed in statistical analysis.

Conflict of Interest

The authors declare no conflicts of interest in the publication of this article.

Table 1. PSQI Global Score and Internet Addiction Test Score

	n	Min	Max	Mean	SD
PSQI Global Score	120	2.00	14.00	6.48	2.40
IAT Score	120	0.00	93.00	40.86	18.59

Table 2. The scores of the components of sleep quality patterns among the medical students

Rating	0	1	2	3
Components of sleep pattern	n(%)	n(%)	n(%)	n(%)
1. Subjective sleep quality	14 (11.6%)	83 (69.2%)	21 (17.5%)	2 (1.7%)
2. Sleep latency	39 (32.5%)	52 (43.3%)	23 (19.2%)	6 (5.0%)
3. Sleep duration	12 (10.0%)	36 (30.0%)	44 (36.7%)	28 (23.3%)
4. Habitual sleep efficiency	86 (71.7%)	26 (21.7%)	5 (4.1%)	3 (2.5%)
5. Sleep disturbance	8 (6.7%)	93 (77.5%)	16 (13.3%)	3 (2.5%)
6. Use of sleep medications	108 (90.0%)	9 (7.5%)	2 (1.7%)	1 (0.8%)
7. Daytime dysfunction	27.5 % (33)	51.6% (62)	16.7% (20)	4.2% (5)

1. 0: very good sleep; 1: fairly good sleep; 2: fairly bad sleep; 3: very bad sleep

2. 0: $\leq$ 15 min; 1: 16-30 min; 2: 31-60 min; 3: :> 60min

3. 0: >7 hours; 1: 6-7 hours; 2: 5-6 hours; 3: <5 hours

4. 0: >85%; 1: 75-84%; 2: 65-74%; 3: <64% (Number of hours slept/hours spent in bed x100)

5. 0: not disturbed for the past month; 1: less than once per week; 2: once or twice per week; 3:three or more times per week

6. 0: not used in the past month; 1: less than once in a week; 2: once or twice in a week; 3: three or more times in a week

7. 0: no problem; 1: a very slight problem; 2: somewhat a problem; 3: a big problem

Table 3. The category of internet addiction of medical students based on their IAT scores

Scoring range	n (120)	%	Pattern of addiction
< 20	15	12.5%	Less than average
21-49	71	59.2%	Mild / complete control use
50-79	31	25.8%	Moderate /over user/possible addict
80-100	3	2.5 %	Severe addiction

Table 4. The Pearson correlation of PSQI global score and IAT score of all participants (n=120)

Correlations

		PSQI Global Score	Internet addiction test score
PSQI Global Score	Pearson Correlation	1	.296[**]
	Sig. (2-tailed)		.001
	N	120	120
Internet addiction test score	Pearson Correlation	.296[**]	1
	Sig. (2-tailed)	.001	
	N	120	120

**. Correlation is significant at the 0.01 level (2-tailed).

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