

The Relation of Internet Addiction, Insomnia and Excessive Daytime Sleepiness in Korean College Students

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Abstract

Purpose: Purpose of this descriptive research is to examine internet use and sleep related influencing factors of university students and to prepare for the basic data to develop nursing intervention which could be helpful to sleep management which is a major factor of university student's health management. Method: Study subjects were targeting 228 university students and the correlation between internet addiction disorder and sleep quality, excessive daytime sleepiness (EDS), insomnia was analyzed using Pearson's Correlation and logistic regression analysis was conducted with the variables which are predicted to affect the excessive daytime sleepiness(EDS) and insomnia like gender, internet addiction disorder and sleep aspect. Results: Sleep quality, excessive daytime sleepiness (EDS), insomnia and internet addiction disorder showed significant correlation. Logistic regression result identified the influencing factor of excessive daytime sleepiness (EDS) and insomnia as internet addiction disorder and it increases excessive daytime sleepiness (EDS) risk by 1.033(OR 1.033, 95%CI 1.07-1.059) and insomnia risk by 1.022 (OR 1.022, 95%CI 1.002-1.042).

Keywords: Excessive daytime sleepiness, internet addiction, sleep quality

1. Introduction

Internet in Korea is a medium which is deeply settled at our life in informatization times. According to '2014 internet use survey' by Korea Internet & Security Agency, the number of internet users per 100 people in 2006 was 78.1%, which increased to 84.3% users in 2014. At the ages of 20's and 30's, internet use rate shows 99.8% of high percentage[1], general life of 20's to 30's university students is spread mostly by internet utilization and the internet becomes the core media in university students' communication media[2]. Increase of internet use provides various benefits, but the internet addiction symptoms are being reported which could give serious influences to social and personal health. Internet addiction is a psychological disorder that internet user is addicted to the internet which is similarly addicted to drugs, alcohol and gambling and is a addiction state that the user is addicted to internet and shows the pathological symptom like dependence, tolerance and withdrawal symptom[3]. Those who are easily addicted to internet addiction have characteristics to behave impatiently and immediately and not to control their desires[4]. In addition, internet addicts are impulsive, have low problem solving ability, don't have amicable human relations and have high level of depression and anxiety[5]. Like this, internet addition symptom acts as an influencing factor to personal health, but there are insufficient researches about internet addiction of the university students who have relatively less control even though they have various exposures to the internet. In particular, there is no research about the relation between internet addiction and the sleep[6] which is an essential living area to human beings and important to maintain physical health. According to publicized research results of Korean Society of Sleep Medicine, approximately 17.5% of adults including university students complain of sleep

disorder more than one time per week and approximately 10.5% of total respondents are identified to have sleep disorder more than 3 times per week[7]. Adults who complain of insomnia, defined as subjective discomfort of sleep, has been reported more than 51% adults of the United States complained insomnia[8] . Additionally in the research by Lund, Reider, Whiting and Prichard[9], primary sleep problem of early adult was identified to be lack of sleep and excessive daytime sleepiness (EDS). Excessive daytime sleepiness means the state to be sleepy or to fall asleep against one's will at daytime, especially at passive state [10]. Reasons of university students' sleep disorder and excessive daytime sleepiness are classified into environmental factors and intrinsic factors. At university student, students are awake late at night because of increasing social and academic duties. And, because of their life habits to use electronic devices like computer and take caffeine, their general sleep aspect changes occur like insufficient sleep at night and excessive daytime sleepiness. University students' sleep disorder is an important problem which causes fatigue as life stress and reduces the concentration and disturbs their study[11]. Influencing variables to sleep disorder are gender, grade, residence type, environmental noise, school life satisfaction, physical condition and disease[12], reasons of excessive daytime sleepiness(EDS) are pathological state in central nervous system like hypnolesy, sleep apnea, insomnia and insufficient night sleep, working environments like jet lag or work shift and control disorder of circadian regulator and use of drugs, emotional states like stress or depression and age and gender [13,10], but there is no research about internet addiction which could be the major factor to sleep disorder of university student. Therefore, this study was conducted to examine internet use and sleep related influencing factors and to prepare for the basic data to develop nursing intervention which could be helpful to sleep management which is the major factor in university student's health management.

2. Purpose of this Study

Purpose of this study is to examine internet use and sleep related influencing factors and to prepare for the basic data to develop nursing intervention which could be helpful to sleep management which is the major factor in university student's health management.

3. Study Method

3.1. Study Design

This study is a descriptive research to identify the university student's sleep aspects and excessive daytime sleepiness level, insomnia and factors which are related with excessive daytime sleepiness and insomnia.

3.2. Study Subject

Study subjects were targeting the university students in two universities with snow ball recruitment method and research subjects were casted by explaining the study purpose to data collection assistant student and 228 students who understood and agreed to the research participated in the experiment. For Logistic regression analysis using G*Power program (0.05 of significance level, 0.90 of test power, 0.15 of effect size), 228 study subjects were needed. So in this study 196 study subjects were selected considering dropouts.

3.2. Data Collection Period and Method

In this study, data were collected from 2015 January to 2015 March and questions were asked to study subjects and small gifts were presented for the survey. In addition, this

research obtained research and review approval from Bioethics Committee Institute (IRB 14-1113-10). Followings are the explanation of the study tools of the survey.

Internet Use Addiction

Regarding internet use addiction, Young's study tool was used which was manufactured by referring Young[14]'s Internet Addiction Test and Goldberg[15]'s addition diagnosis standards. This study tool includes total of 20 questions and question contents are mobile phone use related compulsive behavior, emotional change, behavioral problems and the scores are measured by 5 point Likert scale. Higher scores mean high level of internet use addiction.

Excessive Daytime Sleepiness (EDS)

Excessive daytime sleepiness was developed by Johns[16], and translated version by Joo and others[17] was used for this study. It is composed of 8 questions to measure the sleepiness in everyday life with 4 point scale. Ranges of the scores are from 0 to 24 points and higher scores mean the subject feels more sleepiness and the scores of excessive daytime sleepiness are higher than 11 points. reliability of the tool was 0.82 in Johns [16], test-retest and Cronbach α coefficient was 0.88.

Sleep Quality

Sleep quality was measured by Sleep Quality Scale (SQS) which was developed by Yi[18]. SQS is 4 point scale with 28 questions and higher scores mean bad sleep quality. Cronbach α coefficient at the time of development was 0.92 and retest reliability was 0.81.

Insomnia

Insomnia was measured by Insomnia Severity Index which was developed by Bastien[18]. It is 4 point scale with 8 questions and the score under 7 means no insomnia state, score of 7-14 means light state of insomnia and the score of 15-21 means severe state of insomnia and the score of 22-32 means most severe state of insomnia.

3.3 Data Analysis Method

Collected data were analyzed using SPSS 18.0. General characteristics of the subjects were analyzed with average, standard deviation and percentage. Correlation between internet addiction disorder, sleep quality, insomnia and excessive daytime sleepiness was analyzed using Pearson's Correlation. Logistic regression analysis was conducted with the variables which were assumed to affect excessive daytime sleepiness and insomnia including gender, internet addiction disorder and sleep aspect. Regarding gender, internet addiction disorder and sleep aspect, the analysis was conducted by categorizing the hypnagogue hours and sleeping hours as independent variables and excessive daytime sleepiness (EDS) level as dependent variable.

4. Result

4.1 General Characteristics of Study Subjects and Average of Major Variables

Average age of study subjects was 19 years old and mostly (67%) 1st grade students. 75% of subjects were non-smokers and 55% didn't drink. Most subjects didn't have diseases and scores of sleep quality was 24 points which was relatively good, but some subjects had bad score of 75 pints out of 100. Average of excessive daytime sleepiness (EDS) was 7.84 points and highest score was 24 points, which showed much higher

scores than cut line score, 11 points. Average of internet addiction disorders was 25 points and highest score was 63 points (Table 1) .

Table 1. General Characteristics of Study Subjects and Average of Major Variables

N=228

Variable	Category	N	%	M	SD	Min	Max
Grade	1 st	153	67.11				
	2 nd	62	27.19				
	3 rd	6	2.63				
	4 th	7	3.17				
Gender	Male	62	27.19				
	Female	166	72.81				
Age				19.70	1.28		
Smoking	Never smoked	171	75				
	Have smoked but currently not smoking	26	11.4				
	Sometimes smoking	5	2.19				
	Habitually smoking	25	11.4				
Drinking	No	55	24.12				
	Yes	143	62.72				
	Previously drinking, but not currently drinking	30	13.16				
Disease	Yes	19	8.33				
	No	209	91.67				
Sleep quality				24.01	10.8	0	75
EDS				7.84	3.66	0	24
Insomnia				7.25	5.00	0	24
Internet addiction				25.23	14.0	0	63

4.2 Correlation between Sleep Quality, Excessive Daytime Sleepiness (EDS) and Internet Addiction Disorder

Sleep quality, excessive daytime sleepiness, insomnia and internet addiction disorder showed significant correlation like Table 2.

**Table 2. Correlation Between Sleep Quality, Excessive Daytime Sleepiness ,
 Insomnia and Internet Addiction Disorder**

N=228

	Sleep quality	EDS	Insomnia	Internet addiction
Sleep quality	1			
EDS	0.285	1		
Insomnia	0.474	0.234	1	
Internet addiction	0.322	0.285	0.198	1
P-value	p < .001	p < .001	p < .001	p < .001

4.3 Risk Factors of Excessive Daytime Sleepiness (EDS)

Logistic regression analysis results to identify the factors influencing excessive daytime sleepiness (EDS) risk. It showed that internet addiction increases excessive daytime sleepiness (EDS) risk by 1.033 (OR 1.033, 95%CI 1.07-1.059).

Table 3. Risk Factors of Excessive Daytime Sleepiness

N=228

	OR	95%CI	p
Age	0.966	0.793	1.078
Gender Male	0.877	0.4	1.025
Female	1		
Internet addiction	1.033	1.007	1.059
Sleeping hours at weekdays	0.979	0.939	1.02
Hypnagogue hour at weekdays	1.06	0.659	1.704
Get-up hours at weekdays	1.078	0.852	1.365
Sleeping hours at weekdays	0.993	0.828	1.191

<.001

Sleeping hours at weekend	1.008	0.966	1.053
Hypnagogue hour at weekends	0.903	0.605	1.347
Get-up hours at weekend	0.971	.867	1.087
Sleeping hours at weekend	1.011	0.877	1.152

4.4 Risk Factors of Insomnia

Logistic regression analysis results to identify the factors influencing Insomnia (EDS) risk. It showed that internet addiction increases excessive daytime sleepiness (EDS) risk by 1.022 (1.022 OR, 95% CI 1.002-1.042).

Table 4. Risk Factors of Insomnia

	OR	95%CI		N=228
			p	
Age	1.024	0.87	1.205	
Gender	1.048	0.573	1.92	
Male				
Female	1			
Internet addiction	1.022	1.002	1.042	<0.01
Sleeping hours at weekdays	1.001	0.972	1.031	
Hypnagogue hour at weekdays	1.033	0.732	1.457	
Get-up hours at weekdays	0.991	0.83	1.183	0.991
Sleeping hours at weekdays	0.974	0.844	1.125	
Sleeping hours at weekend	0.982	0.95	1.015	
Hypnagogue hours at weekends	1.35	1.016	1.794	
Get-up hours at weekend	1.067	0.989	1.151	
Sleeping hours at weekend	0.963	0.871	1.065	

5. Discussion

Results of this study showed significant correlation between sleep quality, insomnia excessive daytime sleepiness (EDS) and internet addiction. Higher the score of internet addiction is the sleep quality is bad and EDS and daytime sleepiness become also severe. And internet addiction was identified to be a significant factor of excessive daytime sleepiness and insomnia. For a one unit increase in internet addiction score, the odds of

high insomnia are 1.022 times greater than given the all the other variables are held constant. Likewise, for a one unit increase in internet addiction score, the odds of EDS are 1.033 times greater than given the all the other variables are held constant. So to control the insomnia and EDS factor to get good sleep quality we must apply nursing intervention to the college student preventing internet addiction. Considering that the sleep is a major factor in health and an influencing variable for learning effect of university student, it is considered that internet addiction should be managed which is an influencing factor of sleep quality, insomnia and excessive daytime sleepiness(EDS). Based on the study result that internet addiction disorder is severe in cases of psychological problems like anxiety or depression, lower grade in university student and no exercise, it is necessary to help university students not to be exposed to anxiety or depression by adopting mentor-mentee system targeting lower grade university students for the management of internet addiction disorder of university students. In addition, the efforts are required like to prepare for the system to actively fulfill the exercise. And following another study result the factors related to a higher risk of internet addiction were lower level of self-control, higher level of stress, using the internet for extended periods of time, and using the internet in their own rooms [20]. Therefore, to reduce the personal time in using internet, the college student should take a dorm life or take a roommate to live together. Also the college student who lives with their parents they would take more time with their family instead using internet in a personal place. And when we consider that the terms of average daily internet usage time and self control are the factors influencing internet addiction tendency, then we must develop a systematic program to reduce the use of the Internet and develop self control. And also emotional support should be apply to the student who are in high level of internet addiction to improving self control [21].

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