

Effect of the Circadian Rhythm on Social Network Service Addiction

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Abstract

This study is a descriptive survey research to investigate the effect of the circadian rhythm of the college students in different departments on the addiction to SNS. The subjects of this study were 150 freshman students in the Department of Nursing in K university, a four-year university located in Gumi, Gyeongbuk, and 130 freshmen students in the Department of Mechanical Engineering in K Engineering university located in the same city. In this study, the difference of circadian rhythm and SNS addiction was analyzed among the subjects in different departments. The result showed that the circadian rhythm was not significantly different between the departments, but SNS addiction showed significant difference between the departments.

Keywords: *Circadian Rhythm, Social Network Service Addiction, Engineering department, Nursing department*

1. Introduction

1.1 Need for Study

Social media have involved various types of social networking sites (SNSs) to support a variety of uses with different interests and practices. Recently, the use of social network service (SNS) has rapidly been spread, and the addiction to SNS has become severe[1]. The addiction to SNS caused various negative effects with the rapid increase of SNS use. A recent study has shown that the desire to check SNS alerts from Facebook or Twitter is stronger than the addiction to smoking or drinking (Hofmanann, Vohs, & Baumeister., 2012) [2]. A survey on the mobile use of the internet performed in 2015 by the Korea Internet & Security Agency showed that the rate of the mobile use of SNS was in the order of the age groups of 20s (94.8%), 30s (88.6%) and 10s (86.5%), indicating that the rate was highest in the 20s [3]. College students spend a large amount of time in a day using SNS, are immersed in SNS excessively, and fail to control SNS use to the extent of having a negative effect in the daily life. Oh and Lee reported that SNS makes the users be obsessed with the use of a smart phone, causing continued anxieties.

All humans have a biological rhythm in a period of 24 hours, which is called a biological clock. The biological clock, controlled by the hormone secretion from the hypothalamus in the body, harmonizes the periodicity of the internal physiology with the external change of the environment, and thus controls the

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circadian rhythm to maintain the best health conditions [4]. A problem in the biological clock may cause health problems, including difficulty in the adjustment to time difference and other serious problems such as cardiac diseases, gastrointestinal disturbance, and depression, and may result in troubles in normal daily life. The circadian rhythm of human body harmonizes the periodicity of the internal physiology with the external change of the environment, and thus controls the circadian rhythm to maintain the best health conditions (Morrey, McLachlan, Serkin, & Bakouche, 1994; Reinberg, 2008; Takahashi, & Zatz, 1982) [5].

The individual difference of the circadian rhythm affects the sleep-wake period pattern. In line with the circadian rhythm, the awake cycles preferred by individuals are classified as morningness, being active during the day, and eveningness, being active during the night (Kerkhof, 1985) [6]. Kim (1998) reported that individuals may be divided into morningness type persons and eveningness type persons with reference to the sleeping patterns by using a circadian rhythm scale [7]. The morningness type persons tend to wake up in the morning and be active mainly in the morning and during the day, feeling it difficult to remain awake until late in the evening and preferring to go asleep early. On the contrary, the eveningness type persons tend to wake up late in the morning and be active even in the evening with no difficulties for the activities in the evening and night, going asleep later in comparison with the morningness type persons (Vink, Groot, Kerkhof & Boomama, 2001) [8]. Morningness and eveningness are dependent on the age; The adolescents and young adults are highly probable to have eveningness (Horne & Ostberg, 1976) [9].

The college students in the engineering departments are interested in information technology and those in the nursing departments are interested in medicine. The students may have applied to the individual departments by considering their aptitude, and they show significantly different degrees of satisfaction to the majors in practical training, study of the majoring subjects, and school life and culture. Drinking parties are frequently held among students in the engineering departments due to a high ratio of male students. Students in the nursing departments are affected by the human relationship resulting from a high ratio of female students, a great number of classes, and huge amount of homework. Therefore, the circadian rhythms of the students are different.

According to the previous studies, the circadian rhythm (morningness and eveningness) is assumed to have a correlation with SNS addiction. It is presumed that active SNS users are more likely to be eveningness type persons, and that the eveningness type persons are more likely to be active in the use of SNS. The present study was conducted to identify the correlation between the circadian rhythm of the students in different departments, which is a physiological aspect, and SNS addiction, which is a behavioral aspect.

1.2 Purpose and Hypothesis

The purpose of this study was to investigate the effect of the circadian rhythm on the use of SNS in college students. Among the factors that may affect the circadian rhythm, the use of SNS was examined to investigate SNS addiction depending on the circadian rhythm of the college students in different departments.

2. Methods

2.1 Study Design

This study is a descriptive survey research to investigate the effect of the circadian rhythm of the college students in different departments on the addiction to SNS.

2.2 Subjects

The subjects of this study were 150 freshman students in the Department of Nursing in K university, a four-year university located in Gumi, Gyeongbuk, and 130 freshmen students in the Department of Mechanical Engineering in K Engineering university located in the same city.

2.3 Research Tools

A. SNS Addiction Survey Tool

SNS addiction scale for college students, developed by Jeong and Kim (2014) through validation, was employed to measure SNS addiction in college students. The questionnaire consists of 24 questions in 4 subcategories (control failure and daily living hindrance; immersion and tolerance; avoidance of negative emotions; and orientation to virtual world and taboo), and rated in a 4-point scale from 1 point for 'absolutely disagree' to 4 points for 'Absolutely agree.' A higher score means a higher degree of SNS addiction. The Cronbach's α for overall SNS addiction was .935.

B. Circadian Rhythm Survey Tool

In this study, a translated version of the Morningness-Eveningness Questionnaire (MEQ) was employed to measure morningness and eveningness. MEQ, developed by Horne and Ostberg (1976), a self-reporting questionnaire consisting of a total of 19 questions, and a higher score means higher morningness. According to the score, subjects are classified into 5 types: definitely evening type (16 to 30 points), moderately evening type (31 to 41 points), intermediate type (42 to 58 points), moderately morning type (59 to 69 points), and definitely morning type (70 to 86 points). In the study, the subjects were not classified into groups according to the score, but the score was analyzed as a continuous number according to a previous study where the score was considered as a continuous number (Drennan et al., 1991; Hasler et al., 2010). However, while a high score was considered as an indicator of high morningness in the original scale, but it was considered as an indicator of high eveningness for the convenience of data analysis in the study. The coefficient of internal consistency (Cronbach's α) was .65 in this study.

2.4 Data Collection Methods

The structured self-reporting questionnaire was given to the subjects by the researchers after providing an explanation on the purpose of the study. After implementing the survey, the questionnaires were returned. The period of survey was from November 1 to December 1, 2017. A total of 150 copies were distributed to the Department of Nursing in the four-year university and a total of 150 copies also to the Department of Mechanical Engineering in the Engineering University. Among the 300 copies, 111 copies and 130 copies were returned respectively (return rate: 73.3% and 86.67%), and thus 241 copies were used in the analysis.

2.5 Data Analysis Methods

The data were analyzed by using SPSS/WIN 20.0 statistical software program. The following specific analytical methods were used:

- The frequency and percentage of the general characteristics were calculated.
- The degree of clinical performance capability was tested by performing t-test.
- The study pattern and the study pattern depending on the general characteristics were analyzed by performing χ^2 -test.
- The clinical performance capability depending on the general characteristics and the clinical performance capability depending on the study pattern in different curricula were analyzed by performing ANOVA.

3. Results

3.1 General Characteristics

The general characteristics of the subjects investigated in this study included gender, grade, important factors to college life, religion, type of residence and degree of satisfaction to major. With regard to the gender, male students were dominant in the engineering department (40.6%), while female students were dominant in the nursing department (38.6%). Study was selected as an important factor to the college life by the greatest number of students both in the engineering department and in the nursing department. In terms of religion, the greatest number of students responded as 'no religion,' both in the engineering department

(19.1%) and in the nursing department (29.4%). For the type of residence, the greatest number of students responded that they live in a dormitory both in the engineering department (31.1%) and in the nursing department (26.6%). And for the degree of satisfaction to major, the number of students who responded 'moderate' was highest in the engineering department (16.2%) and 'satisfied' in the nursing department (22.9%) (Table 1).

Table 1. General characteristics of subjects

		Department		Total
Characteristic	Item	Engineering, N(%)	Nursing, N(%)	
Gender	Male	98(40.6)	18(7.5)	116(48.1)
	Female	32(13.3)	93(38.6)	125(51.9)
	Study	54(22.4)	58(24.2)	112(46.6)
Important factor to college life	Social relationship	48(19.9)	48(19.9)	96(39.8)
	Employment	27(11.2)	28(11.6)	55(22.8)
	Dating	1(0.4)	1(0.4)	2(0.8)
Religion	Christian	51(21.2)	19(7.9)	70(29.1)
	Buddhist	28(11.6)	13(5.4)	41(17.0)
	Catholic	5(2.1)	8(3.3)	13(5.4)
Type of residence	No religion	46(19.1)	71(29.4)	117(48.5)
	Family home	34(14.1)	43(17.8)	77(31.9)
	Boarding house	21(8.7)	4(1.7)	25(10.4)
Degree of satisfaction to major	Dormitory	75(31.1)	64(26.6)	139(57.7)
	Very satisfied	14(5.8)	9(3.7)	23(9.5)
	Satisfied	34(14.1)	55(22.9)	89(37.0)
Degree of satisfaction to major	Moderate	39(16.2)	43(17.9)	82(34.1)
	Dissatisfied	33(13.7)	2(0.8)	35(14.5)
	Very dissatisfied	10(4.1)	2(0.8)	12(4.9)
Total		130(54.0)	111(46.0)	241(100)

3.2 Circadian Rhythm in Different Departments

Among the total of 242 subjects in the study, 38.5% of the students were found to be intermediate type and 20.0% moderately evening type in the engineering department. In the nursing department, 36.1% of the students were found to be intermediate type and 22.5% moderately morning type (Table 2).

Table 2. Circadian Rhythm in Different Departments

Circadian rhythm	Engineering department (n=130)	Nursing department (n=111)	χ^2	p
	N(%)	N(%)		
Definitely evening type	25(19.2)	12(10.8)	6.457	.486
Moderately evening type	26(20.0)	22(19.8)		

Intermediate type	50(38.5)	40(36.1)
Moderately morning type	18(13.8)	25(22.5)
Definitely morning type	11(8.5)	12(10.8)

3.3 SNS Addiction in Different Departments

The SNS addiction of the subjects was significantly different between the departments ($t=1.99$, $p=.048$). The score in the subcategories was in the order of immersion and tolerance, avoidance of negative emotions, orientation to virtual world and taboo, and control failure and daily living hindrance in the engineering department. In the nursing department, the score in the subcategories was in the order of avoidance of negative emotions, immersion and tolerance, orientation to virtual world and taboo, and control failure and daily living hindrance (Table 3).

Table 3. SNS Addiction in Different Departments

Classification	Engineering	Nursing	t	p
	Mean±SD	Mean±SD		
SNS Addiction	2.61±0.45	2.91±0.46	1.99	.048
Control failure and daily living hindrance	2.43±0.50	2.55±0.49	1.67	.064
Immersion and tolerance	2.98±0.48	2.78±0.52	2.78	.043
Avoidance of negative emotions	2.60±0.57	3.14±0.56	3.59	.013
Orientation to virtual world and taboo	2.51±0.48	2.68±0.54	1.86	.061

3.4 SNS Addiction Depending on the Circadian Rhythm in Different Departments

The SNS addiction showed significant difference on the circadian rhythm in the nursing department. With regard to the subcategories, avoidance of negative emotions showed a significant difference in the nursing department. In the engineering department, there was no significant difference in SNS addiction on the circadian rhythm (Table 4).

Table 4. SNS Addiction Depending on the Circadian Rhythm in Different Departments

SNS addiction	Circadian rhythm	Engineering			Nursing		
		Mean±SD	F	p	Mean±SD	F	p
Avoidance of negative emotions	Definitely evening type	14.725±3.174	0.90	0.522	17.333±2.568A	3.12	0.023
	Moderately evening type	13.654±3.092			16.028±2.626BA		

	Intermediate type	14.417±2.660			13.800±1.651B		
	Moderately morning type	15.282±2.720			16.833±2.300A		
	Definitely morning type	14.282±2.720			13.833±2.300B		
	Definitely evening type	149.700±20.354	0.74	0.652	165.048±16.076A	3.04	0.027
	Moderately evening type	148.462±16.325			158.056±20.586BA		
Total	Intermediate type	151.917±17.997			149.400±18.149B		
	Moderately morning type	152.205±16.276			168.208±17.235A		
	Definitely morning type	151.917±17.997			149.400±18.149B		

4. Conclusions

In this study, the difference of circadian rhythm and SNS addiction was analyzed among the subjects in different departments. The result showed that the circadian rhythm was not significantly different between the departments, but SNS addiction showed significant difference between the departments. The circadian rhythm of the subjects in different departments was classified into a total of 5 morningness-eveningness types. The number of the students classified as 'intermediate type' was highest both in the engineering department (50 students, 38.5%) and in the nursing department (40 students, 36.1%). SNS addiction of the subjects in different departments was analyzed in a total of 5 subcategories, and a significant difference between the departments was found in the subcategories of 'SNS addiction ($t=1.99$, $p=0.048$),' 'immersion and tolerance ($t=2.78$, $p=0.043$),' and 'avoidance of negative emotions ($t=3.59$, $p=0.013$).'

The significant difference was found both in immersion and tolerance and avoidance of negative emotions, related to the attitude toward study, because the students in both nursing and engineering departments should study the extensive expertise to be professionals in their respective fields.

The analysis of SNS addiction depending on the circadian rhythm in different departments showed that a significant difference was found in the 'overall score/ definitely evening type ($F=3.04$, $p=0.027$)' only in the nursing department. Among the subcategories, a significant difference was found in the 'avoidance of negative emotions/definitely evening type ($F=3.12$, $p=0.023$).'

Most people are dominated by depressed feelings with the stress of coming Monday, which is called Sunday Night Blues. This means that people are depressed on Sunday nights thinking of the stressful five days of the upcoming week. Similarly, the significant difference in the subcategory of 'avoidance of negative emotions/definitely evening type' found in the nursing department may be because of a large number of classes, huge amount of homework, and stress in human relationship and commuting.

The result of this study showed that SNS addiction and the circadian rhythm depending on the general characteristics of the subjects are dependent on the department to which the students belong, indicating that the circadian rhythm in each department has an effect on SNS addiction. Therefore, further studies need to be conducted to generalize the relevant results and by developing an appropriate tool to measure SNS addiction, a definite cause-and-effect correlation between the variables must be identified.

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