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The effects of ADHD, interpersonal sensitivity, depression, and anxiety on the smartphone addiction of University students.

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Abstract

This study was conducted in order to examine the relation of mental health and smartphone addiction on university students, and to identify the factors that influence Smartphone addiction. Data were collected from 399 university students. The collected data were analyzed by using chi-square test, ANOVA, Pearson correlation coefficient, and stepwise multiple regression. Smartphone addiction shows a positive correlation with ADHD (r=0.487, p=0.000), interpersonal sensitivity (r=0.448, p=0.000), depression (r=0.502, p=0.000) and anxiety (r=0.419, p=0.000). Variables that influence Smartphone addiction are ADHD (B=0.194, p=0.002) and depression (B=0.299, p=0.006). The study results suggest that a variety of interventions designed to reduce the symptoms of ADHD and depression are needed to improve the Smartphone addiction of the university students.

Keywords: Smartphone, Behavior, Addiction, Mental Health, Adult.

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Introduction

Recently, the problem of smartphone addiction (SA) among the university students in Korea has become a significant social issue. According to the survey on SA by the Ministry of Science and ICT, the addiction rate of adults in their 20s is 19.6%, which is approximately 4 times that of the adults in their 50s (4.8%). In particular, the addiction rate of the university students is 20.5%, which is higher than that of the adults in their 20s, thereby indicating that the university students are relatively vulnerable to SA [1].

SA is a state where a person is excessively immersed in smartphone use for a long period of time, which causes irritability, anxiety, and violence, and hinders daily life activities, including school and health, when smartphone use is stopped or reduced [2]. SA decreases academic and vocational ability, and it negatively affects mental health, such as obsessive compulsive disorder [3]. It also reduces the contact between people and encourages the user to pursue a virtual world, thereby causing social relationship problems [4].

Based on the previous studies [5,6], the SA of university students is expected to be associated with mental health problems, such as Attention Deficit/Hyperactivity Disorder (ADHD), interpersonal sensitivity, anxiety, and depression. However, there are only a few studies on the association between SA and mental health in university students. Therefore, this study aimed to provide basic data for developing a program that will prevent SA by evaluating mental health problems related to excessive smartphone use among the university students.

Materials and Methods

The subjects of this study are university students in the Seoul Metropolitan Area and Kangwon province. The sample size was estimated with the G*Power version 3.1.9.2 program for regression analysis by setting the significance level to 0.05, effect size to 0.10, power to 0.95, and predictor variable to 9. As a result, the sample size required for this study was 245, but the analysis was carried out for 339 persons who participated in the survey.

ADHD was measured using the Korean Adult ADHD Scale (K-AADHDS), whose reliability and validity have been verified by Kim [7]. The reliability of the instrument in this study was Cronbach's α of 0.84. Interpersonal sensitivity, depression, and anxiety were measured with Symptom Checklist-90-Revised (SCL-90-R), which was translated into Korean by Kim et al. [8] and re-standardized. In this study, Cronbach's α values were 0.88, 0.87, and 0.91, respectively. SA was measured using the Adult Smartphone Addiction Self-assessment Scale (S-scale) developed by the National Information Society Agency [9]. Depending on the results, the subject was classified into a high-risk user group, a potential-risk user group or a general user group. The Cronbach's α value in this study was 0.89.

The general characteristics, ADHD, interpersonal sensitivity, depression, and anxiety level among the smartphone high-risk user group, potential-risk user group, and general user group were compared by using the chi-square test and ANOVA. The correlations among ADHD, interpersonal sensitivity, depression, anxiety, and SA were analyzed by using the Pearson correlation coefficient. In order to identify the factors affecting SA, stepwise multiple regression was performed with the variables that have differences between the SA groups as independent variables. All analyses were carried out by using the IBM SPSS 20.0 program (IBM Corp., Armonk, NY, USA), and the statistical significance level was set to 0.05.

Results

The mean age of the subjects was 20.27±1.86 years, and there were 116 males (34.2%) and 223 females (65.8%). The mean daily use time of smartphone was 3 to 5 hours in 144 (42.5%), 6 to 8 hours in 102 (30.1%), and 3 or more hours in more than 70% of subjects.

The variables that showed differences between the smartphone addition groups were ADHD (F=12.549, p=0.000), interpersonal sensitivity (F=6.942, p=0.001), depression (F=6.263, p=0.003), and anxiety (F=6.376, p=0.002) (Table 1).

Table 1. *Differences in variables between the SA groups (N=339).*

Variables	High-risk user (n=27)	Potential-risk user (n=50)	General user (n=262)	χ2 or F	p
	n(%) or M ± SD	n(%) or M ± SD	n(%) or M ± SD		
Gender					
Male	2 (1.4)	4 (2.9)	33 (23.7)	2.769	0.25
Female	9(6.5)	20(14.4)	71(51.1)		
Age (year)	20.8 ± 1.66	19.7 ± 1.31	20.3 ± 1.96	1.662	0.194
Smoking					
Yes	5 (1.5)	6 (1.8)	25 (7.4)	1.944	0.378
No	23 (6.8)	44 (13.0)	236 (69.6)		
Drinking alcohol					
Yes	12 (3.5)	17 (5.0)	75 (22.1)	2.675	0.262
No	16 (4.7)	33 (9.7)	186 (54.6)		
ADHD	44.73 ± 14.47	46.3 ± 8.72	35.3 ± 10.75	12.549	0
Interpersonal sensitivity	22.2 ± 8.78	24.5 ± 5.55	19.5 ± 5.85	6.942	0.001
Depression	34.5 ± 13.53	31.6 ± 10.42	25.7 ± 9.48	6.263	0.003

In addition, SA had positive correlations with ADHD (r=0.487, p=0.000), interpersonal sensitivity (r=0.448, p=0.000), depression (r=0.502, p=0.000), and anxiety (r=0.419, p=0.000) (Table 2).

The factors affecting SA were ADHD (B=0.194, p=0.002) and depression (B=0.299, p=0.006), and the explanatory power of these variables was 27.7%.

Table 2. *Correlation between variables (N=339).*

Variables	Smartphone addiction r (p)	ADHD r (p)	Interpersonal sensitivity r (p)	Depression r (p)	Anxiety r (p)
ADHD	0.487(0.000)	1			
Interpersonal sensitivity	0.448 (0.000)	0.600 (0.000)	1		
Depression	0.502 (0.000)	0.538 (0.000)	0.758 (0.000)	1	
Anxiety	0.419 (0.000)	0.561 (0.000)	0.649 (0.000)	0.827 (0.000)	1

Discussion

There were no statistically significant differences in gender and age among the SA groups according to the general characteristics and independent variables. However, high-risk users and potential-risk users had statistically significantly higher levels of ADHD, interpersonal sensitivity, depression, and anxiety than that of the general users. Paek [10], who studied the relationship between SA and depression in 286 university students, found that there was no significant difference in SA depending on age, but there was a significant difference in gender and depression. Li et al. [11] described depression as the most common psychiatric problem in adolescents who are addicted to smartphones.

In terms of correlations between SA and the variables, SA showed positive correlations with ADHD, interpersonal sensitivity, depression, and anxiety. Park and Park [12], who conducted a study on 173 nursing students, found that there was a positive correlation between SA and interpersonal anxiety. Lee, who conducted a study on 170 employees, found that SA is positively correlated with depression and anxiety [13]. Smartphone users are more likely to become addicted to the Internet because they can access the Internet freely with their smartphones as compared to ordinary mobile phones, and it is considered to be related to ADHD.

As a result of the multiple regression analysis, ADHD and depression were the factors affecting SA, and their explanatory power was 27.7%. Kim et al. [14] performed a regression analysis on SA in 200 university students and reported that ADHD affects SA. A previous study [15], which was conducted to identify the factors affecting SA in 349 university students, reported that self-esteem and depression were predictors of SA, thereby supporting the results of this study.

Conclusion

Based on the above study results, it was found that SA in university students is closely related to ADHD, interpersonal sensitivity, depression, and anxiety, and that ADHD and

depression are factors affecting the SA of the university students. In the future, the development of education or counseling programs that can reduce interpersonal sensitivity, depression, and anxiety should be promoted when managing the SA of the university students.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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