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ORIGINAL PAPER

Differences of Self-Control, Daily Life Stress, and Communication Skills between Smartphone Addiction Risk Group and General Group in Korean Nursing Students

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Abstract

Concerns about smartphone addiction have been raised as the use time of and dependence on the smartphone is increasing. This study were to examine the differences of self-control, daily life stress, and communication skills between smartphone addiction risk group and general group in nursing students, South Korea. A cross-sectional descriptive design was adopted. Samples were total 139 nursing students (addictive risk: $n = 40$, general: $n = 99$) at G and B cities in South Korea. Measures were general characteristics form, self-control scale in Korean version, daily life stress scale for college students, and Global Interpersonal Communication Competence Scale (GICC). There were significant differences on self-control ($t = 3.02$, $p = 0.003$) and daily life stress ($t = 3.56$, $p < 0.001$), but there was no significant difference on communication skills ($t = 1.72$, $p = 0.088$) between two groups. Nursing students in smart phone addiction risk group had worse self-control and higher daily life stress than nursing students in general group. The preventive education programs for healthy smartphone use of Korean nursing students are needed.

Keywords Addiction · Smartphone · Self-control · Stress · Communication

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Smartphone addiction indicates disorder in daily life (e.g., agitation and anxiety), which occurs due to excessive immersion with one's smartphone [14]. The excessive use of one's smartphone not only disturbs one's studies or work but also causes behavior disorders such as deviation, forward head posture, and carpal tunnel syndrome and induces disorder in daily life [10, 18]. The smartphone addiction tendency is reported to be the highest among middle and high school students, followed by college students [30].

The interest in smartphone addiction has been increasing of late, but the relevant studies are still in the initial steps. Most studies regarding smartphones are about the economic aspect or operating system. Studies regarding the predictors of smartphone addiction are being conducted restrictively, and there is insufficient academic discussion of such [16, 17, 19, 32]. The studies on Internet addiction, however, which is similar to smartphone addiction, reported that psychological factors such as self-control and stress affect addiction [19, 25, 27, 31].

Self-control consists in consciously suppressing one's undesirable actions, consciously monitoring one's own action, and restraining one's automatic actions [28]. A review of the previous studies on Internet addiction, which is considered similar to smartphone addiction as the smartphone also uses the Internet, would reveal that people who are addicted to the Internet cannot control or regulate themselves, cannot set a long-term goal, and try to solve their problems immediately in virtual space [16, 17, 25, 27]. Therefore, self-control is thought to be closely associated with smartphone addiction, as with Internet addiction.

Daily life stress can also be considered an associated factor of smartphone addiction in college students. Several previous studies have reported that daily stress (e.g., a new role or responsibility, new expectations, a new status, or newly created personal relations) in college students is associated with smartphone addiction [11, 19]. Nursing students are exposed to more stress than other students [34]. Some nursing students experience mental problems like anxiety and tension due to the stress created by the strict curriculum combining theory education and clinical training, and due to the demanding amount of learning that they must accomplish [1, 12, 36]. Therefore, it will be meaningful to study the relation between the daily life stress of nursing students and their smartphone addiction.

There have been active communications of late through the chatting applications on smartphones and social networks such as Facebook and Twitter [23]. According to the previous relevant studies, people with communication problems have difficulty talking with other people, which lead to problems in establishing personal relations in the real world and to the desire to seek an alternative [19, 33, 35]. Like this, the decline of one's communication skill brings about a qualitative change in one's personal relations and can be inferred to cause smartphone addiction, along with the characteristic of anonymity in the virtual world [5].

Most of the recent studies on smartphones targeted teenagers, and there have been few studies targeting college or nursing students. Also, there has been little study on the relation between smartphone addiction and various factors, including nursing students' self-control, daily life stress, and communication skills.

Smartphone use is increasing all over the world [2, 31]. Research on health issues related to smartphone addiction of Korean nursing students may focus on the understanding of international nursing students. Therefore, this study was conducted to examine the differences among nursing students' self-control, daily life stress, and communication skills by dividing the

subject nursing students into the addiction risk group and the general group. The aims of this study were: (1) to identify the general characteristics of study participants; (2) to examine the differences on smartphone using between addiction risk group and general group; (3) to examine the differences on self-control, daily life stress, and communication skills between addiction risk group and general group.

Method

Study Design and Participants

A cross-sectional descriptive design was adopted. The study participants were total 139 nursing students (addictive risk: $n = 40$, general: $n = 99$) at two cities in South Korea. Study participants participated through convenience sampling into this study. Eligibility criteria included nursing students who agreed to take part in it, and who are using smart phone.

Sample size adequacy ($N = 39$ for each group) using t test, G power 3 analysis software was estimated based on an alpha level of 0.05, medium effect size of 0.65, and power of 0.80 [4]. Therefore, the sample size of this study was appropriate.

Measures

General Characteristics of Study Participants This consisted of gender, age, grade, record, satisfaction of school life, circle, housing, economic state, friend, and friend with the opposite sex. This consisted of a total of 10 items.

Characteristics of Smartphone Using This consisted of first time of using, using period, motivation of using, main function, and taking time at a using. This consisted of a total of five items.

Self-Control Scale This developed by Grasmick et al. [7] and revised to Korean version self-control scale by Ha [8] was used to measure the level of self-control of the participants. It consisted of a total of 24 questions using Likert 5 scores scale, and this had 6 subcategories (impulse, simple task, adventure, physical activity, self-center, anger nature). The higher the score of respondent was, the lower the level of his or her self-control. The reliability of this instrument was Cronbach's $\alpha = 0.83$.

Daily Life Stress Scale

This developed by Chon et al. [3] and revised by Lee [26] was used to measure the level of daily life stress of the participants. It consisted of a total of 27 questions using Likert 5 scores scale, and this had 4 subcategories (future & job, economy, learning, sense of values). The

higher the score of respondent was, the higher the level of his or her daily life stress. The reliability of this instrument was Cronbach's $\alpha = 0.94$.

Global Interpersonal Communication Competence Scale (GICC) This developed by Hur [9] was used to measure the level of communication skills of the participants. It consisted of a total of 15 questions using Likert 5 scores scale. The higher the score of respondent was, the better the level of his or her communication skills. The reliability of this instrument was Cronbach's $\alpha = 0.85$.

Procedure

Participants were informed about the aim and methodology of the study and were asked to participate. Participants were screened after the purpose and study procedures were explained. The double blind method was used and a research assistant was trained for error decline. The research assistant measured the study variables. Data were collected by a research assistant from July to October 2014.

In ethical considerations, this study was approved by the Institutional Review Board in a university, Pusan, South Korea (Approval No. 2–1,040,709-AB-N-01-201,405-HR-08-04). The study participants were informed of the aim and method and procedures of the study and were told that their participation was voluntary and that they had the right to withdraw from the study at any point. The participants were also informed of the anonymity of the data to be obtained from them in the study. The researchers received accomplished written consent forms from those who agreed to participate in the study.

Data Analysis

The collected data were analyzed using the SPSS version 21.0 statistical software program. General characteristics of the study participants and smartphone using were analyzed using descriptive statistics with frequency, percentage, mean, and standard deviation. Differences of characteristics and study variables between the smartphone addiction risk group and the general group were analyzed using χ^2-test and independent t-test. Significantly different items (gender, record, and housing) were controlled by ANCOVA statistics. A p value of less than 0.05 was considered statistically significant.

Results

General Characteristics of Study Participants

One hundred and fifty nursing students received the questionnaire, 145 were received back, yielding a response rate of 96.7%. During data entry, 6 incomplete questionnaires were found, and these were excluded from the analysis. Thus, 139 valid participants (95.9%) were included in the final analysis. As general characteristics of participants, women (84.2%) were the primary gender and 32.5% of them were in smartphone addiction risk. In the record, while 35.0% of participants in smartphone addiction risk were in low record, participants in general were only 17.2% in low record. In the housing, while 62.5% of participants in smartphone addiction risk were self-boarding students,

64.6% of participants in general were head family students. Between the two groups, there were significant differences in gender ($\chi^2 = 4.94$, $p = 0.026$), record ($\chi^2 = 6.81$, $p = 0.033$), and housing ($\chi^2 = 8.56$, $p = 0.003$) (Table 1).

Differences of Smartphone Using

In characteristics of smartphone using, most of participants (52.5%) have been using smartphone after entrance into a college. Three years above in using period was the most (50.4%), and 2–3 years was the most as 45.0% in smartphone addiction risk. Motivation of using was the most for communication (52.5%). Most of participants responded that main function of smartphone is social network (77.7%). Three hours below as taking time at a using was the most (42.4%) in all participants, and 3–6 h was the most as 40.0% in smartphone addiction risk. Between the two groups, there were no significant differences in all items (Table 2).

Differences of Self-Control, Daily Life Stress, and Communication Skills

There were statistical significant differences on self-control ($t = 3.02$, $p = 0.003$) and daily life stress ($t = 3.56$, $p < 0.001$) between two groups. Between the two groups, there was no significant difference on communication skills ($t = 1.72$, $p = 0.088$) (Table 3).

Table 1 General characteristics of study participants

Characteristics		Total ($N = 139$) n (%)	Addiction risk ($n = 40$) n (%)	General ($n = 99$) n (%)	χ^2	p
Gender	Male	22 (15.8)	2 (9.1)	20 (90.9)	4.94	.026*
	Female	117 (84.2)	38 (32.5)	79 (67.5)		
Age (year)	≤22	82 (59.0)	27 (32.9)	55 (67.1)	1.68	.190
	≥23	57 (41.0)	13 (22.8)	44 (77.2)		
Grade	1	9 (6.5)	0 (0.0)	9 (100.0)	4.33	.228
	2	61 (43.9)	18 (29.5)	43 (70.5)		
	3	31 (22.3)	11 (35.5)	20 (64.5)		
	4	38 (27.3)	11 (28.9)	27 (71.1)		
Record	High	32 (23.0)	5 (15.6)	27 (84.4)	6.81	.033*
	Moderate	76 (54.7)	21 (27.6)	55 (72.4)		
	Low	31 (22.3)	14 (45.2)	17 (54.8)		
Satisfaction of school life	Satisfactory	42 (30.2)	12 (28.6)	30 (71.4)	3.57	.168
	Moderate	83 (59.7)	21 (25.3)	62 (74.7)		
	Non satisfactory	14 (10.1)	7 (50.0)	7 (50.0)		
Circle	Yes	66 (47.5)	22 (33.3)	44 (66.7)	1.27	.259
	No	73 (52.5)	18 (24.7)	55 (75.3)		
Housing	Self-boarding	60 (43.2)	25 (41.7)	35 (58.3)	8.56	.003*
	Head family	79 (56.8)	15 (19.0)	64 (81.0)		
Economic State	High	35 (25.2)	7 (20.0)	28 (80.0)	2.06	.358
	Moderate	85 (61.2)	26 (30.6)	59 (69.4)		
	Low	19 (13.7)	7 (36.8)	12 (63.2)		
Friend (person)	≤2	8 (5.8)	2 (25.0)	6 (75.0)	.08	.963
	3–4	54 (38.8)	16 (29.6)	38 (70.4)		
	≥5	77 (55.4)	22 (28.6)	55 (71.4)		
Friend with the opposite sex	Yes	78 (56.1)	19 (24.4)	59 (75.6)	1.69	.193
	No	61 (43.9)	21 (34.4)	40 (65.6)		

Table 2 Differences of smartphone using between smartphone addiction risk group and general group

Characteristics		Total ($N = 139$) n (%)	Addiction risk ($n = 40$) n (%)	General ($n = 99$) n (%)	χ^2	p
First time of using	Middle S. below	13 (9.4)	3 (23.1)	10 (76.9)	1.27	.530
	High S.	53 (38.1)	13 (24.5)	40 (75.5)		
	College above	73 (52.5)	24 (32.9)	49 (67.1)		
Using period (year)	2 below	26 (18.7)	7 (26.9)	19 (73.1)	5.48	.065
	2–3	43 (30.9)	18 (41.9)	25 (58.1)		
	3 above	70 (50.4)	15 (21.4)	55 (78.6)		
Motivation of using	Fashion	45 (32.4)	15 (33.3)	30 (66.7)	.73	.696
	Communication	73 (52.5)	19 (26.0)	54 (74.0)		
	Information gain Other	21 (15.1)	6 (28.6)	15 (71.4)		
Main function	Call/letter/habit	15 (10.8)	4 (26.7)	11 (73.3)	.98	.611
	Internet search	16 (11.5)	3 (18.8)	13 (81.3)		
	Social network	108 (77.7)	33 (30.6)	75 (69.4)		
Taking time at a using (hour)	3 below	59 (42.4)	12 (20.3)	47 (79.7)	4.15	.126
	3–6	50 (36.0)	16 (32.0)	34 (68.0)		
	6 above	30 (21.6)	12 (40.0)	18 (60.0)		

Discussion

In this study, 32.5% of the subject female students belonged to the smartphone addiction risk group, compared to 9.1% of the subject male students, the former being about 3.6 times higher than the latter. The study conducted by Kim [20] also showed a higher smartphone addiction risk rate among the subject female students, with a 12.5% rate among the male students and a 21.9% rate among the female students. Other studies [19, 22, 29] on smartphone addiction also showed that females have a higher smartphone addiction rate compared to males, which is thought to be because females use their smartphones to express themselves, and consider sharing their feelings with their friends important, while males mostly use smartphones as a simple communication device [24].

In this study, the addiction risk group showed lower self-control than the general group. This corresponds with the results of the previous studies [11, 15, 19] regarding self-control and

Table 3 Differences of self-control, daily life stress, and communication skills between smartphone addiction risk group and general group ($N = 139$)

Variables		Addiction risk ($n = 40$) $M \pm SD$	General ($n = 99$) $M \pm SD$	t	p
Self-control	Impulse	2.96 ± 0.40	2.60 ± 0.57	4.22	<.001*
	Simple task	3.43 ± 0.61	2.98 ± 0.68	3.56	<.001*
	Adventure	2.72 ± 0.70	2.61 ± 0.69	.87	.387
	Physical activity	3.17 ± 0.81	3.17 ± 0.70	.00	.997
	Self-center	2.45 ± 0.59	2.26 ± 0.61	1.73	.086
	Anger nature	2.63 ± 0.84	2.40 ± 0.69	1.62	.107
	Total score	2.89 ± 0.38	2.67 ± 0.40	3.02	.003*
Daily life stress	Future, job	1.73 ± 0.63	1.37 ± 0.66	2.93	.004*
	Economy	1.35 ± 0.71	1.09 ± 0.74	1.95	.053
	Learning	2.38 ± 0.52	1.86 ± 0.72	4.70	<.001*
	Sense of values	2.15 ± 0.62	1.71 ± 0.70	3.48	<.001*
	Total score	1.84 ± 0.49	1.45 ± 0.62	3.56	<.001*
Communication skills	Total score	3.40 ± 0.52	3.53 ± 0.38	1.72	.088

smartphone addiction. Therefore, self-control is a major factor in smartphone addiction and is deeply associated with the addictive use of social networks such as Facebook [6]. Therefore, college students should find a way to raise their self-control and to recognize their wrongful behavior and to control it. This is thought to have a direct effect on the nursing activity in the nursing field, and as such, periodic internal and external motivation will be necessary to raise one's self-control in the entire nursing curriculum, starting from the first year.

In this study, the daily life stress score of the addiction risk group was significantly higher than that of the general group. This result corresponds with those of the previous studies [11, 13]. This is consistent with the results of the study that was conducted by Kim and Lee [19], which reported that people experiencing stressful situations are prone to addictive behavior and tend to perform addictive behavior to relieve their stress. Also, this study's results regarding a nursing student's future path and employment, economic power, and studies were shown to be statistically significant in the subdomain of daily life stress; as such, it is necessary to provide nursing students with adequate ways of relieving their stress, and to develop a nursing intervention program that will increase nursing students' stress threshold, which will minimize their smartphone addiction exposure.

In this study, the communication skills score of the smartphone addiction risk group was slightly lower than that of the general group, but the difference was not statistically significant. Kim and Jeon [21] reported, however, that in his study, the subjects' low communication skills led to their addictive use of the Internet. This result is thought to inapplicable to smartphone use, which involves more conversation or communication with other people through social networks compared to the Internet, hence the statistically insignificant result of this study. For nursing students, communication skills are important for establishing good relations with one's fellow students and patients, for problem solving, and for achieving one's practice goal during clinical training. Also, communication skills are very important for future nurses to maintain good therapeutic relations with their patients and their patients' family, and to obtain nursing knowledge and information.

Based on these findings of this study, the self-control and daily life stress of nursing students have been verified to be associated with smartphone addiction. It is difficult to generalize the results for the nursing students in a particular region, but smartphone addiction is considered to have a negative effect on nurses' therapeutic relations with their patients. As such, to lower the smartphone addiction rate among nursing students, an intervention program must be put in place to educate nursing students regarding appropriate smartphone use and to increase their self-control, help them recognize a proper daily life stress coping behavior, enhance their stress threshold, and improve their communication skills. For this, this study can be implied as basic data to provide education on appropriate smartphone use and on practical interventions for the prevention and treatment of smartphone addiction in nursing students, contributing to the training of outstanding nurses. Further studies on the nursing student's psychosocial problems related to smartphone addiction should be conducted. Additionally, in-depth qualitative studies are required to understand and analyze the inner world and life experiences of the nursing students with smartphone addiction in South Korea.

The generalizability of this study's results is limited because the study participants were recruited from nursing students at two cities in South Korea, which limited the characteristics of the resulting data. Therefore, a replication of this study using larger samples drawn from both the same and different regions of the country is recommended to confirm the generalizability of the study results.

In conclusion, nursing students with smartphone addiction risk showed statistically significant differences in self-control and daily life stress comparing with general group. Based on the findings, this paper suggests developing an intervention nursing program to increase self-control and foster resilience to daily stress among nursing students. Continuous attention and research appears to be needed in order for smartphone to be used for quality nursing education and field through education on proper smartphone use.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflicts of interest. Author Sohyune R. Sok declares that she has no conflict of interest. Author Mi Hyeon Seong declares that she has no conflict of interest. Author Mi Hye Ryu declares that she has no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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