

## FEATURE

## ARTICLE

## INTERNATIONAL

# Internet Addiction and Interpersonal Problems in Korean Adolescents

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Today, using online services has become a necessity for many people around the world.<sup>1</sup> There were 3.10 million Internet users in Korea in 1998, a figure that rose to 3 billion people in 2004.<sup>2</sup> In particular, the rate of Internet use in Korean adolescents was around 50% in 1999, while this has reached to 90.6% in 2002.<sup>3</sup> The Internet is a useful tool for research, communication, entertainment, and commerce. Its unlimited supply of fun and excitement can be very attractive to adolescents. Once they fall into the temptation of the Internet, they spend more and more time using it, which leads to pathological use in some students. Consequently, unless they are able to control their Internet use, they can become addicted.

Internet addiction was first classified as a behavioral addiction by Goldberg<sup>4</sup> and characterized as a form of cybersexual addiction, cyber-relationship addiction, net compulsion, information overload, and addiction to interactive computer games by Young.<sup>5</sup> Young<sup>6,7</sup> proposed eight criteria for diagnosing Internet addiction based on *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*<sup>8</sup> criteria associated with pathological gambling and determined that those who met five of eight criteria for Internet addiction would be considered addicts. A number of researchers have used Young's criteria to determine the degree of Internet dependence in their subjects. In addition, Griffiths<sup>9</sup> defined Internet addiction as a technological addiction, one of a subset of behavioral addictions.<sup>10</sup> Technological addictions are defined as nonchemical behavioral addiction that include six core components of addiction, such as salience, mood

The purpose of this study was to examine the levels of Internet addiction and interpersonal problems, explore the relationship between the two, and identify the relevant factors of Internet addiction in Korean middle school students. A cross-sectional survey design was used. The participants were 676 middle school students. A Korean version of the Internet addiction self-test scale and a Korean version of the Inventory of Interpersonal Problems were used. Among the participants, 547 (80.9%) were identified as general users, 108 (16%) were potential risk users, and 21 (3.1%) were high-risk users. There were statistically significant positive correlations between Internet addiction and interpersonal problems ( $r = 0.425$ ,  $P = .000$ ). There were significant positive correlations between Internet addiction and hours spent playing games. Internet-addicted adolescents also had more interpersonal problems. It is important to raise awareness about Internet addiction, and close attention must be paid not only to students at risk of Internet addiction but also to students at low risk to prevent students from becoming addicted to the Internet.

## KEY WORDS

Adolescent • Internet addiction • Interpersonal problem

modification, tolerance, withdrawal symptoms, conflict, and relapse.<sup>11</sup> Greenfield considered that Internet addiction shares the same characteristics as others like substance-based addictions.<sup>12</sup> Also, Kandell<sup>13</sup> described Internet addiction as “a psychological dependence on the Internet, regardless of the type of activity once logged on.” However, until now, no criteria have been adopted into the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*<sup>14</sup> regarding this issue. Furthermore, the conceptualization of Internet addiction has

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not been sufficiently validated as a primary disorder.<sup>15,16</sup> Despite controversy regarding *Internet addiction*, the term has been widely used by various researchers. In particular, *Internet addiction* has been widely used by researchers in Korea.<sup>17</sup> It is becoming a serious social problem nowadays as use is increasing, especially among adolescents. The rate of Internet addiction among adolescents varies widely from 2.9%<sup>18</sup> to 62.4%<sup>19</sup> in Korea. The great disparity in these figures could be attributed to the use of different scales to measure Internet addiction.<sup>20</sup> Most studies use Young's Internet addiction scale<sup>5,6</sup> to screen for levels of addiction in adolescents. However, this scale has been criticized for not being based on psychometric procedures and for not being appropriate for Korean adolescents because it was originally developed for adults and did not reflect the Korean situation.<sup>20,21</sup> For these reasons, the need for the development of a psychometric scale was stressed, and a Korean version of the Internet addiction self-test scale<sup>20</sup> was developed. Therefore, it will be valuable to screen for Internet addicts and potential risk users among adolescents using this reliable scale.

Adolescence is an important period for developing a positive self-concept and self-identity by setting goals and exploring sound values. This is done through interaction with significant members of the family, friends, and others. Developing successful and appropriate interpersonal relationships forms the basis of efficiently carrying out one's social, occupational, and economic roles. Therefore, when an effective relationship is not properly developed during this stage of life, various mental and adaptation problems could arise, such as depression, anxiety, aggressiveness, maladaptiveness, and so on.<sup>22-24</sup> People who do not have good interpersonal relationships in the real world may choose to depend on the Internet for communication and entertainment needs.

Internet-addicted adolescents were shown to have more positive, accepting, and intimate relationships on the Internet compared with adolescents not addicted to the Internet.<sup>25</sup> It was also reported that adolescents who were addicted to relationships on the Internet had lower self-efficacy and self-esteem compared with adolescents not addicted to the Internet,<sup>19</sup> and this propelled them to meet their social needs through online relationships rather than real-world relationships.<sup>19</sup> High Internet use results in Internet addiction,<sup>1</sup> which can subsequently have a negative influence on real life.<sup>18</sup>

Korean adolescents are vulnerable to Internet addiction because they use the Internet as their main means to cope with stress, especially the enormous pressure related to academic achievement that focuses solely on college entrance.<sup>26</sup> When considering Korean adolescents' Internet use, it is necessary to identify Internet-addicted students, students at potential risk of Internet addiction, and the related factors before implementing Internet addiction re-

covery or prevention programs. Computers are most frequently used for playing games.<sup>27</sup> Spending time with and communicating with family will have a positive influence on preventing Internet addiction.<sup>28</sup> However, there are not many studies that examine whether these factors are related to Internet addiction among adolescents. Therefore, it is desirable to examine which factors are related to Internet addiction among Korean adolescents.

## Objectives

This study examined factors related to Internet addiction in Korean adolescents. The specific aims of this study were:

- to examine the level of Internet addiction and interpersonal problems,
- to explore the relationship between Internet addiction and interpersonal problems, and
- to identify the relating factors for Internet addiction in Korean adolescents.

## METHODS

### Study Design and Sample

This study is a cross-sectional descriptive survey and used for convenience sample. Before starting the study, a letter explaining the purpose of the study was sent to two middle school principals, and permission was received from these schools. The participants of this study were thus 676 students attending middle school in the Gangbuk area, located in the northern side of the Han River in Seoul, Korea. Human subject procedures in Korea are reviewed usually by authorities in research sites, and therefore, the questionnaires and procedures of this study were examined by the school officials and approved for conducting the survey.

### Instruments

The questionnaire included the following components: (1) demographics, (2) a Korean version of the Internet addiction self-test scale, (3) a Korean version of the Inventory of Interpersonal Problems, and (4) the number of hours spent playing Internet games, hours of time spent with family, and communication time with family.

### INTERNET ADDICTION

The instrument used in this study was the Korean version of the Internet addiction self-test scale developed

by Kim et al.<sup>20</sup> The questionnaire is composed of 40 items scored on a four-point Likert scale. The scale consists of seven subscales: disturbance of adaptive functions (nine items), disturbance of reality testing (three items), addictive autonomic thoughts (six items), withdrawal (six items), virtual interpersonal relationships (five items), deviant behavior (six items), and tolerance (five items). The total score ranges from 40 to 160, with a higher score indicating a higher possibility of Internet addiction. According to the guidelines presented by Kim et al,<sup>20</sup> a person with either a total score of 108 and above or a score in factor 1 (disturbance of adaptive functions), factor 4 (withdrawal), and factor 7 (tolerance) of greater than 23, 16, and 15, respectively, was classified as a high-risk group. In addition, a person with a total score of 95 to 107 or a score of 23 and above in factor 1 (disturbance of adaptive functions) or greater than 16 in factor 4 (withdrawal) or 15 in factor 7 (tolerance) was classified as potential risk group. The rest were classified as general user group.

Cronbach  $\alpha$  was used to establish the internal consistency of the instrument. Cronbach  $\alpha$  was .95 in the study of Kim et al,<sup>20</sup> who developed the instrument, and .93 in this study. A four-point Likert scale was used for the scoring system, with 1 representing "not at all" and 4 representing "always." A higher score indicated higher Internet addiction.

#### INVENTORY OF INTERPERSONAL PROBLEMS

Interpersonal problems were measured using the Korean version of the Inventory of Interpersonal Problems, originally developed by Horowitz et al,<sup>29</sup> which was translated and revised by Kim et al.<sup>30</sup> This scale consists of 107 items and seven subscales: interpersonal sensitivity (22 items), asocial behavior (24 items), nonassertiveness (23 items), criticism/distrust (20 items), overnurturance (10 items), sexual avoidance (four items), and irritability (four items). A five-point Likert scale ranging from "not at all" (0) to "always" (4) was used. Cronbach  $\alpha$  was .94 at the time of the development of this scale and .98 in this study. The Cronbach coefficient  $\alpha$  of the subscale ranged from .68 to .93 in this study, suggesting acceptable internal reliability.<sup>31</sup> Higher scores represent more interpersonal problems.

#### DEMOGRAPHICS AND COMPUTER USE-RELATED DATA

The demographic information included in the questionnaire was sex, age, and religion. Computer use-related questionnaire items were about presence of computer at home, venue of computer use, hours of computer use and games played per day, most frequently used programs, major reasons for playing games, time spent with family at home, and communication time with family per day.

## Data Collection

Data were collected from September to December 2003. After receiving approval for the study from the principals, the purpose of the study was explained to the students in the classroom by the researchers. The students' collaboration was requested before the questionnaires were distributed. Students were assured that their participation was voluntary and anonymous. The structured questionnaires were administered only to the students who verbally agreed to participate in the study, and completed questionnaires were then returned to the researcher. Completion of the questionnaire took approximately 20 minutes.

## Data Analysis

Data were analyzed using SPSS-PC (version 11.0 for Windows; SPSS, Chicago, IL). Descriptive analysis was used to describe students' demographic characteristics and the level of Internet addiction and interpersonal problems. Pearson correlation coefficients were used to measure the correlation between variables. One-way analysis of variance was used to compare differences in the mean scores among the three groups for interpersonal problems, hours spent playing games, hours spent with family, and time spent communicating with family. When differences among group means were significant, post hoc multiple comparison tests using the Duncan statistics approach were conducted to determine which groups showed significant differences. Cronbach  $\alpha$  coefficient was used to determine the reliability of instruments. The .05 level of significance was accepted.

## RESULTS

### Demographics and Internet Use-Related Characteristics

Table 1 shows the demographic and computer use-related characteristics. The participants ranged in age from 12 to 17 years, with an average age of 15.28 years. Among the respondents, there were 378 (55.9%) male students and 297 (43.9%) female students, with 62% reported as having a religion and the remaining 38% having no religion. Most of the students had computers at home (98.7%) and used them at home (93.0%). Among participants, 45.9% spent more than 2 hours a day on the computer, 40.5% spent 1 to 2 hours, and the rest used less than 1 hour. The most frequent activity on the computer was playing games (52.0%), followed by chatting (14.0%). The major reasons for students playing games were avoiding boredom (69.4%), followed

**Table 1****Demographics and Computer Use-Related Characteristics (N = 676)**

Characteristics	Category	No. (%)	Mean (SD)
Age, y	12–15	261 (38.7)	15.28 (0.98)
	16–17	414 (61.3)	
Sex	Male	378 (55.9)	
	Female	297 (43.9)	
Religion	Yes	417 (62.0)	
	No	257 (38.0)	
Computer at home	Yes	665 (98.7)	
	No	9 (1.3)	
Place of computer use	Home	615 (93.0)	
	PC room	35 (5.3)	
	Friend's house	4 (0.6)	
	Private institute	4 (0.6)	
	Others	3 (0.5)	
Hours of computer use daily	<1	92 (13.6)	
	1–2	274 (40.5)	
	>2	310 (45.9)	
Computer use for	Game	283 (52.0)	
	Chatting	76 (14.0)	
	E-mail	21 (3.9)	
	Information search	51 (9.4)	
	Shopping	6 (0.9)	
	Pornography	6 (0.9)	
	Download	51 (9.4)	
	Others	50 (9.2)	
	Reasons for game	To avoid boredom	
To relieve stress	122 (19.7)		
Just to spend time	44 (7.1)		
To make friends	16 (2.6)		
To study	8 (1.3)		
Hours	Playing game		1.5 (1.46)
	Staying with family		4.13 (2.95)
	Communicating with family		2.04 (1.85)

by relieving stress (19.7%). The mean (SD) hours of playing games, being with family, and communicating with family were 1.5 (1.46), 4.13 (2.95), 2.04 (1.85), respectively.

### Levels of Internet Addiction and Interpersonal Problems

The mean and standard deviation scores on Internet addiction by groups are presented in Table 2. The range of total scores of Internet addiction was 40 to 160, and the mean (SD) score for the total group was 67.11 (17.24). Among participants, 547 students (80.9%) were identified as general users, 108 students (16%) were potential risk users, and 21 students (3.1%) were high-risk users. The mean (SD) score of Internet addiction was 61.78 (12.48) for the general user group, 84.29 (10.09) for the potential risk group, and 118.00 (12.08) for the high-risk group.

The mean (SD) score for interpersonal problems was 91.08 (63.96). The highest interpersonal problem was interpersonal sensitivity, while the lowest interpersonal problem was sexual avoidance (see Table 3).

### Correlations Among Research Variables

The correlation matrix is listed in Table 4. There were statistically significant positive correlations between Internet addiction and interpersonal problems ( $r = 0.425$ ,  $P = .000$ ) and all subscales of interpersonal problems, such as interpersonal sensitivity ( $r = 0.396$ ,  $P = .000$ ), asocial behavior ( $r = 0.364$ ,  $P = .000$ ), nonassertiveness ( $r = 0.368$ ,  $P = .000$ ), criticism/distrust ( $r = 0.410$ ,  $P = .000$ ), overnurturance ( $r = 0.388$ ,  $P = .000$ ), sexual avoidance ( $r = 0.177$ ,  $P = .000$ ), and irritability ( $r = 0.350$ ,  $P = .000$ ). In addition, Internet addiction was positively correlated with time spent on games ( $r = .299$ ,  $P = .000$ ), but it was negatively correlated with the amount of time

**Table 2**

Mean and Standard Deviation of Internet Addiction Self-test Scale by Groups (N = 676)



Category	No. (%)	Mean (SD)	Range of Scores
Internet addiction			
General user group	547 (80.9)	61.78 (12.48)	40–94
Potential high-risk group	108 (16.0)	84.29 (10.09)	95–107
High-risk group	21 (3.1)	118.00 (12.08)	108–160
Total	676 (100)	67.11 (17.24)	40–160

spent with family ( $r = -0.085$ ,  $P = .031$ ) and communication time with family ( $r = -0.078$ ,  $P = .048$ ).

### Comparison of the General Users, Potential Risk, and High-Risk Group

Table 3 shows the results of an analysis of the difference among Internet addiction groups in interpersonal problems, hours spent playing games, hours spent with family, and communication time with family. Overall, high-risk users had significantly higher scores than did both general users and potential high-risk users on all subscales of interpersonal problems. There were significant differences in interpersonal problems among the groups ( $F = 34.57$ ,  $P = .000$ ). Duncan post hoc follow-up testing showed significant differences between the general user and potential risk groups ( $P = .000$ ), between the general user and high-risk groups ( $P = .000$ ), and between the potential risk and high-risk groups ( $P = .009$ ).

The average time spent playing games per day was 3.23 hours (SD, 2.24 hours) for high-risk users, 1.96 hours (SD, 1.49 hours) for potential risk users, and 1.40 hours (SD, 1.37 hours) for general users, which revealed significant differences among three groups ( $F = 21.21$ ,  $P = .000$ ). Duncan post hoc follow-up testing

showed significant differences between the general user and potential risk groups ( $P = .001$ ), between the general user and high-risk groups ( $P = .001$ ), and between the potential risk and high-risk groups ( $P = .000$ ). There were no significant differences in hours spent with family and communication time with family among the three user groups.

### DISCUSSION

This study was conducted in order to examine the level of Internet addiction and the relationship between interpersonal problems and Internet addiction and to identify the related factors of Internet addiction. The study participants were 676 middle school students. Most of the participants owned and frequently used computers in their homes. Most of the adolescents in this study used the computer more than 1 hour per day, and the most frequently used computer programs were games, followed by online chatting. This result is similar to those of previous reports<sup>23,32</sup> that Internet addicts tend to spend most of their time playing games and chatting online. In Park's<sup>27</sup> study, the most frequently used computer programs were games, followed by e-mail and information searching and chatting. Simply comparing hours of Internet use, it is important to know what

**Table 3**

Difference of Interpersonal Problems Among Internet Use Groups (N = 676)



	Mean (SD)	General Users (n = 547), Mean (SD)	Potential Risk (n = 108), Mean (SD)	High Risk (n = 21), Mean (SD)	F	P
Interpersonal problems	91.08 (63.96)	82.27 (59.05)	121.16 (65.56)	165.76 (83.71)	34.57	.000
Interpersonal sensitivity	21.73 (15.76)	19.82 (14.85)	27.96 (16.15)	39.57 (17.96)	28.01	.000
Asocial behavior	18.14 (15.51)	16.21 (14.14)	24.90 (17.18)	33.48 (21.98)	26.63	.000
Nonassertiveness	20.96 (16.12)	18.81 (14.98)	28.48 (16.53)	38.24 (21.06)	31.22	.000
Criticism/distrust	15.47 (12.72)	13.88 (11.94)	20.95 (12.79)	28.90 (16.63)	28.12	.000
Overnurturance	7.70 (6.49)	6.98 (6.10)	9.98 (6.68)	14.71 (8.45)	23.83	.000
Sexual avoidance	3.35 (3.26)	3.16 (3.14)	4.09 (3.63)	1.48 (3.64)	19.27	.000
Irritability	3.90 (3.06)	3.60 (2.91)	4.87 (3.05)	6.90 (4.09)	5.01	.007
Hours of playing games	1.5 (1.46)	1.40 (1.37)	1.96 (1.49)	3.23 (2.24)	21.21	.000
Hours spent with family	4.13 (2.95)	4.20 (2.98)	3.88 (2.91)	3.58 (2.55)	0.89	.411
Communication time with family	2.04 (1.85)	2.08 (1.81)	1.98 (2.15)	1.50 (1.04)	0.99	.372



**Table 4**

**Correlation Coefficients Among Variables (N = 676)**



	1	2	3	4	5	6	7	8	9	10	11	12
1. Interpersonal sensitivity	1.00											
2. Asocial behavior	0.725 (.000)	1.00										
3. Nonassertiveness	0.675 (.000)	0.836 (.000)	1.00									
4. Criticize/distrust	0.801 (.000)	0.825 (.000)	0.659 (.000)	1.00								
5. Overnurturance	0.765 (.000)	0.788 (.000)	0.751 (.000)	0.755 (.000)	1.00							
6. Sexual avoidance	0.415 (.000)	0.601 (.000)	0.557 (.000)	0.535 (.000)	0.530 (.000)	1.00						
7. Irritability	0.721 (.000)	0.632 (.000)	0.555 (.000)	0.718 (.000)	0.651 (.000)	0.434 (.000)	1.00					
8. Interpersonal problems	0.883 (.000)	0.934 (.000)	0.880 (.000)	0.900 (.000)	0.875 (.000)	0.620 (.000)	0.747 (.000)	1.00				
9. Hours of playing games	-0.031 (.434)	0.041 (.299)	0.035 (.371)	0.019 (.631)	0.034 (.385)	-0.013 (.729)	0.031 (.424)	0.019 (.619)	1.00			
10. Hours spent with family	-0.069 (.080)	-0.108 (.006)	-0.084 (.034)	-0.121 (.002)	-0.109 (.006)	-0.057 (.151)	-0.048 (.222)	-0.106 (.007)	0.109 (.056)	1.00		
11. Communication time	-0.025 (.526)	-0.065 (.100)	-0.070 (.074)	-0.084 (.032)	-0.086 (.029)	-0.001 (.984)	-0.043 (.278)	-0.066 (.092)	-0.019 (.628)	0.452 (.000)	1.00	
12. Internet addiction	0.396 (.000)	0.364 (.000)	0.368 (.000)	0.410 (.000)	0.388 (.000)	0.177 (.000)	0.350 (.000)	0.425 (.000)	0.299 (.000)	-0.085 (.031)	-0.078 (.000)	1.00

Numbers inside the parentheses represent *P* values.

motivates Internet use.<sup>33</sup> In this study, respondents reported that the main reasons for playing Internet games were “boredom” and “stress relief.” According to Whang et al,<sup>34</sup> the major purpose of Internet use was entertainment, that is, to escape reality and kill time. Their findings showed that the nonaddictive Internet group had higher off-line club activity than the addictive Internet group did.<sup>35</sup> Internet or computer games may become a dangerous addiction for adolescents unless strict control measures and actions are taken. Thus, it is important to raise awareness about Internet addiction to encourage students to engage in social activities and to become more educated about dealing with stress rather than spending too much time on the Internet.

Three types of Internet users were identified in this study: general, potential high-risk, and high-risk users. The potential risk users comprised 16.0% of the study, and high-risk users made up 3.1%. This result is quite similar to that of Kim et al,<sup>17</sup> who used Young’s Internet Addiction Scale and rated 1.6% of their subjects as Internet addicts and 38.0% as possible Internet addicts from 1573 high school students in Korea. Internet addiction rate is also high in other countries. Among 1708 students in a Taiwanese high school, 236 (13.8%) were identified as addicts using the eight-item Internet Addiction Diagnostic Questionnaire developed by Young.<sup>36</sup> It is also reported that 1.98% of Norwegian youth are addicted to the Internet.<sup>37</sup> Although the rate of Internet

addiction is somewhat different from study to study, it is increasing more and more nowadays. Therefore, close attention must be paid to students at risk of Internet addiction. It is worth making an effort to prevent the potential Internet addiction risk groups from developing into Internet addicts, as well as helping Internet addicts recover from their addiction. It is essential to provide education about Internet addiction not only to students but also to parents and teachers.

This study shows that adolescents at risk of Internet addiction were much more likely to have interpersonal problems. Specifically, high-risk users appear to have higher rates of interpersonal sensitivity, asocial behavior, nonassertiveness, criticism and distrust of others, overnurturance, sexual avoidance, and irritability than general users do. The findings of this study support the findings that there are significant differences between addicts and nonaddicts in interpersonal relationships<sup>33,36</sup> and that Internet-addicted adolescents have more negative interpersonal relationships in off-line situations.<sup>25</sup> This study also shows that individuals at risk of Internet addiction have a tendency to spend more time alone. A previous study<sup>38</sup> reported that Internet-addicted adolescents were withdrawn from peers, felt isolated or had poor relationships with parents and friends,<sup>33,39,40</sup> and had conflicts with their parents over Internet overuse.<sup>23</sup> It was also found that the higher the level of parental control over Internet use, the more addicted the adolescents

were.<sup>33</sup> It is important that adolescents spend enough time communicating with their families. This study shows that as the hours of communication time increased, Internet addiction and interpersonal problems decreased. Oh<sup>33</sup> also reported that when parental support is high, Internet addiction is lowered. Thus, the strategy of providing positive support rather than controlling or scolding the adolescents is essential in preventing and recovering from Internet addiction.

Frequently and increasingly, Internet addicts cut themselves off from their family, friends, and social activities and choose to spend most of their time alone. This study showed significant differences among the general users, potential risk users, and high-risk users in interpersonal relationships and hours spent playing games per day. Therefore, factors such as interpersonal problems and duration of time spent on games must be seriously considered in developing strategies in preventing Internet addiction and planning educational programs for adolescents. Cognitive-behavioral group counseling and peer counseling training programs are effective for reducing interpersonal relationship problems among Internet addicts.<sup>41,42</sup> Thus, using these programs would be beneficial. There is no doubt that Internet use among adolescents will continue to grow at an exponential rate and that the number of Internet addicts may dramatically increase unless concerted efforts are made to minimize the effects of computer use on adolescents' development and health.

Based on the review of Yellowless and Marks<sup>14</sup> on Internet addiction, so far, two schools of thought have emerged in the area of Internet research. One is that Internet addiction should be classified as a new psychiatric disorder in its own right. The other is that it is unlikely that Internet addiction exists as a disorder in its own right. Researchers in the second thought have noted that individuals who have a history of impulse-control and addictive disorders tend to overuse the Internet.<sup>43,44</sup> Using the term *addiction* in the area of Internet research has been controversial.<sup>45</sup> However, Brown<sup>46,47</sup> has suggested that the term not be restricted to the ingestion of potentially harmful physical substances because of its usefulness in describing other potentially harmful behaviors.<sup>45</sup> Because the power of the Internet is increasing considerably and some adolescents are using it excessively, whether the term *Internet addiction* can be useful for research, especially for that dealing with adolescents, remains unclear.

## Limitation

This study is limited by sample and method. A convenience sample and a questionnaire survey were used for this study. Since the findings of this study are based

on 676 middle school students in Korea, the generalizability of the findings is limited to Korean middle school students.

## CONCLUSION

Although the rate of adolescent Internet addiction was 3.1%, students at potential risk of Internet addiction were 16.0%. They spend most of their leisure time playing online games or chatting online. As a result, they do not have time to interact with people, such as their family and friends, in the real world. These activities lead to interpersonal problems because these adolescents are more comfortable in the cyberworld, where they can express their feelings and thoughts anonymously. It is important to make an effort to prevent general users and potential Internet addicts from progressing into Internet addiction. It is also crucial that we help Internet addicts recover.

The Internet is an essential means of communicating information and sharing media today. It has many merits but has, at the same time, drawbacks. Thus, it is necessary to offer education on appropriate ways of using the Internet. The following suggestions are made on the basis of the study results. First, it is necessary to develop sound and wide-ranging cultural and leisure activities for adolescents. Second, effective counseling programs for school nurses to offer to Internet-addicted adolescents need to be developed. Third, interpersonal skills training needs to be carried out for Internet-addicted adolescents. Finally, we should decide how we can improve socialization within our current education system.

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