Prevalence, correlates, psychiatric comorbidities, and suicidality in a community population with problematic Internet use

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ABSTRACT

We examined the prevalence, correlates, and psychiatric comorbidities of community-dwelling subjects with problematic Internet use (PIU). In an epidemiological survey of mental disorders among Korean adults conducted in 2006, 6510 subjects (aged 18–64 years) completed the Korean version of the Composite International Diagnostic Interview for DSM-IV psychiatric disorders; Diagnostic Interview Schedule exploring pathological gambling; Adult ADHD Self-Report Scale-Version 1.1 Screener; questionnaire for sleep disturbances; and questionnaire for suicidal ideations, plans, and attempts. Young's Internet Addiction Test was administered to 3212 individuals who had used the Internet within one month before the interviews in order to identify problematic Internet users (cutoff > 39). The prevalence of PIU was 9.3% in the general population of South Korea. Being male, younger, never married, or unemployed were all associated with increased risks of PIU. Significant positive associations were observed between PIU and nicotine use disorders, alcohol use disorders, mood disorders, anxiety disorders, somatoform disorders, pathological gambling, adult type ADHD symptoms, sleep disturbances, suicide ideas and suicide plans compare to subjects without PIU, after controlling for socio-demographic variables. These findings suggest that careful evaluation and management of such psychiatric disorders is needed for individuals with PIU.

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1. Introduction

In the past few decades, Internet use has increased greatly in the world. With the growth of Internet use, problematic use of the Internet has become a major health concern in many countries (Block, 2008; Christakis, 2010). There have been a series of cardiopulmonary-related deaths in Internet cafés (Block, 2008; Lee, 2004), epileptic seizures while playing online games (Chuang, 2006), and even game-related murder (Block, 2008). South Korea carries out a nationally enforced gaming curfew for adolescents in an effort to stem the growing issue of excessive Internet use among adolescents (The Korea Times, 2010). China is also restricting computer game use of more than 3 h per day in teenagers (People's Daily Online, 2007). Although many patients and families experience Internet-related behavioral problems, limited data are available on its natural course, comorbidities with other

psychiatric disorders, and appropriate treatment. In addition, it is not clear whether Internet addiction is truly a discrete disease or a manifestation of an underlying disorder (Pies, 2009). As a result, additional empirical data are needed to consider Internet-related behavioral problems as a formal psychiatric disorder in the forthcoming diagnostic nomenclature. Research related to comorbidities with other psychiatric conditions are particularly essential to determine if Internet addiction is an independent disorder or associated more closely with other disorders. In a recent systematic review and a meta-analysis, it has been reported that Internet addiction is significantly associated with various psychiatric disorders such as alcohol abuse, attention deficit and hyperactivity (ADHD), depression, anxiety, and hostility/aggression (Carli et al., 2013; Ho et al., 2014). However, most of these data were based on surveys of adolescents or college students; thus, epidemiological evidence in the general population is still lacking. To the best of our knowledge, there have been no studies that assessed the psychiatric comorbidities of internet addiction in the general population via face-to-face interviews with well-validated

diagnostic tools for psychiatric disorders as defined by the Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV) (American Psychiatric Association, 1997). Moreover, the associations of Internet addiction with other psychiatric disorders that are rare in adolescence, such as pathological gambling, nicotine dependence, and somatoform disorders, have not been well explored. In addition, considering that Internet addiction is often associated with poor impulse control, which is a significant marker of high risk of suicide (Lee et al., 2012), it is likely that it is associated with increased suicidality. However, there has been no study on the relationship between Internet addiction and suicidality in the general population.

The purpose of this study was therefore to investigate the prevalence, correlates, and comorbid psychiatric disorders of subjects with problematic internet use (PIU) in the community-dwelling general population. We also examined adult ADHD symptoms, sleep disturbances, and suicidality in problematic Internet users.

2. Methods

2.1. Terminology

The nomenclature of Internet-related behavioral problems has been defined in various ways, such as "Internet addiction" (IA) (O'Reilly, 1996), "problematic Internet use" (Shapira et al., 2003), or "pathological Internet use" (Young, 1998). To reduce confusion, we defined Internet addiction and problematic Internet use differently in this article. We used IA to refer to subjects with more severe symptoms of Internet-related behavioral problems. We used PIU as a larger concept encompassing IA, such that PIU included both IA and possible IA. More detailed explanations for IA and PIU can be found in Section 2.4. To designate a meaning narrower than that used in a specific article (i.e., to cite the results of previous studies), we used double quotation marks ("Internet addiction" or "problematic Internet use"). To designate general usage of Internet addiction, in other words, to refer to Internet addiction, problematic Internet use, and pathological Internet use simultaneously, we used single quotation marks ('Internet addiction').

2.2. Sampling and procedures

We used data from the Korean Epidemiologic Catchment Area Study Replication (KECA-R), which was conducted from July 2006 to April 2007. The KECA-R was a nationwide study undertaken to estimate the prevalence and correlates of psychiatric disorders in Korean adults. A multistage, cluster sampling design was adopted, and the sample was drawn from respondents of the 2005 population census of the community registry office in South Korea. A total of 79 interviewers recruited from each catchment area received a 5-day training session according to the standard protocols and training materials developed by the WHO. Of the 7972 eligible respondents between the ages of 18 and 64, a total of 6510 completed face-to-face interviews by the trained interviewers (participation rate, 81.7%). The interview typically took 1–2 h to complete. The Institutional Review Board of Seoul National University College of Medicine approved this study. All participants were informed about the aims and methods of the survey, and written informed consent was obtained before participation.

2.3. Assessment of demographic characteristics

The following socio-demographic variables were collected during the interview: gender, age (18–24 years, 25–34 years, 35–44 years, 45–54 years, 55–64 years), years of education (< 10 years,

10–12 years, > 12 years), area of residence (urban/rural), marital status (married/never married/separated, divorced or widowed), and employment status (full time job/part time job/unemployed).

2.4. Assessment of IA and PIU

The Korean version of the Internet Addiction Test (IAT) was administered to 3212 individuals who had used the Internet within one month before the interviews in order to identify addicted Internet users and problematic Internet users. The IAT, originally developed by Young (Young, 1998), is among the most widely used and oldest of these scales that had been translated into Korean by Kim (Kim, 2000). The 20 items of the IAT have calibrated scores ranging from 1 to 5 (total score ranged from 20 to 100), with higher scores reflecting a greater tendency toward addiction. Three types of Internet user groups were identified in accordance with the original scheme of Young: scores from 20 to 39 suggest an average online user who has complete control over his/her usage; scores from 40 to 69 signify frequent problems due to Internet usage; and scores from 70 to 100 indicate that the Internet is causing significant problems for the user. In previous studies, the group scoring 70 or over was considered as the IA group and the group scoring from 40 to 69 was considered the possible addiction (PA) group (Kim et al., 2006) or the intermittent addiction group (Jang et al., 2008). In this study, we used the terms IA and PA to refer to the same cut-off score as in Kim et al.'s study and regarded both the IA group and the PA group together as the PIU group, because both groups suffer from Internet-related problems thus need clinical attention as well.

2.5. Assessment of mental disorders

To ensure that the psychiatric diagnoses were based on the DSM-IV (American Psychiatric Association, 1997), all KECA-R respondents completed an interview using the Korean version of the Composite International Diagnostic Interview 2.1 (K-CIDI) (Cho et al., 2002). The CIDI is a structured diagnostic interview designed to make psychiatric diagnoses using the criteria of the DSM-IV (World Health Organization, 1990). It has been translated into Korean according to the guidelines for CIDI translation (World Health Organization, 1997). A study comparing the K-CIDI with the Korean version of the Structured Clinical Interview for DSM-IV (SCID) showed that the K-CIDI has high validity and reliability (Hahm, 2001).

DSM-IV disorders assessed in the KECA-R were nicotine use disorders (nicotine dependence, nicotine withdrawal), alcohol use disorders (alcohol abuse, alcohol dependence), mood disorders (major depressive disorder, dysthymic disorder, bipolar disorder), psychotic disorders (schizophrenia, schizophreniform disorder, schizoaffective disorder, delusional disorder, brief psychotic disorder), anxiety disorders (obsessive compulsive disorder (OCD), post-traumatic stress disorder, panic disorder, agoraphobia, social phobia, specific phobia, and generalized anxiety disorder (GAD)), and somatoform disorders (somatization disorder, conversion disorder, pain disorder, hypochondriasis).

We used the Korean version of the Diagnostic Interview Schedule-IV (K-DIS-IV) for pathological gambling to identify subjects who were pathological gamblers (Suh et al., 2001). The DIS-IV (Robins et al., 1995) is a fully structured diagnostic interview designed to achieve psychiatric diagnoses using the definitions of DSM-IV, and contains a section for pathological gambling. It has been translated into Korean and validated by Suh et al. (2001).

2.6. Assessment of adult type ADHD symptoms

We used the Adult ADHD Self-Report Scale-Version 1.1 (ASRS-