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Prevalence of internet addiction and its risk and protective factors in a representative sample of senior high school students in Taiwan

Min-Pei Lin^{a,*}, Jo Yung-Wei Wu^b, Jianing You^c, Wei-Hsuan Hu^b, Cheng-Fang Yen^{d,e}

^a Department of Educational Psychology and Counseling, National Taiwan Normal University, No.162, Sec. 1, Heping E. Rd., Da-an District, Taipei City 106, Taiwan

^b Department of Counseling and Guidance, National University of Tainan, No.33, Sec. 2, Shu-Lin St., Tainan 700, Taiwan

^c Center for Studies of Psychological Application, Guangdong Key Laboratory of Mental Health and Cognitive Science, Research Center for Crisis Intervention and Psychological Service of Guangdong Province, and School of Psychology, South China Normal University, No. 155 Zhongshan W. Rd, Tianhe District, Guangzhou, China

^d Department of Psychiatry, Kaohsiung Medical University Hospital, No.100, Tzyou 1st Road, Kaohsiung 807, Taiwan

^e Department of Psychiatry, School of Medicine, and Graduate Institute of Medicine, College of Medicine, Kaohsiung Medical University, No.100, Tzyou 1st Road, Kaohsiung 807, Taiwan

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ABSTRACT

The aim of this study investigated the prevalence of Internet addiction (IA) in a large representative sample of secondary school students and identified the risk and protective factors. Using a crosssectional design, 2170 participants were recruited from senior high schools throughout Taiwan using both stratified and cluster sampling. The prevalence of IA was 17.4% (95% confidence interval, 15.8%–19.0%). High impulsivity, low refusal self-efficacy of Internet use, high positive outcome expectancy of Internet use, high disapproving attitude of Internet use by others, depressive symptoms, low subjective well-being, high frequency of others' invitation to Internet use, and high virtual social support was all independently predictive in the logistic regression analysis. The prevalence of IA among secondary school students in Taiwan was high. Results from this study can be used to help educational agencies and mental health organizations create policies and design programs that will help in the prevention of IA in adolescents.

1. Introduction

The last decade has witnessed a dramatic proliferation of research on the newly emerging mental health problem of Internet addiction (IA) (Kuss, Griffiths, & Binder, 2013; Lin, Ko, & Wu, 2011). IA is characterized by a maladaptive pattern of Internet use leading to clinically significant impairment or distress (Weinstein & Lejoyeux, 2010). Frequently, Internet use is portrayed as an inclusive medium without differentiating the types of online activities and applications that might be engaged by the users (Király, Nagygyörgy, Koronczai, Griffiths, & Demetrovics, 2015). In accordance with the reviews conducted by Kuss, Griffiths, Karila, and Billieux (2014), with the development in IA research, many researchers have adapted the diagnostic criteria for substance dependence or/and pathologic gambling in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV/DSM-IV-TR; American Psychiatric Association, 1994, 2000), and modified the IA diagnostic criteria according to diagnostic interview results; suggesting an IA cut-off point. Worldwide prevalence varied significantly; 0.8% of Italian high school students were considered to be seriously addicted (Poli & Agrimi, 2012), and the prevalence of IA in Hong Kong adolescents ranged from 17% to 26.8% during the high school

* Corresponding author.

E-mail address: lmmp@ntnu.edu.tw (M.-P. Lin).

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years (Shek & Yu, 2016). Although studies have yielded inconsistent prevalence, there is without a doubt that IA has emerged as a rapidly growing problem in young people and has attracted worldwide attention (Wu et al., 2016). When compared to adults, adolescence is a critical period for addiction vulnerability (Pallanti, Bernardi, & Quercioli, 2006). Adolescents have a natural tendency towards the Internet and are more likely to adopt patterns of IA (Tsitsika et al., 2009). Their noticeable Internet literacy has been linked to IA (Leung & Lee, 2012; Veen & Vrakking, 2006). Furthermore, adolescents typically have free and unlimited Internet access, flexible living schedules, and freedom from parental interference (Kuss, Griffiths, et al., 2013). Generally speaking, IA is common among adolescents, and associated risk and protective factors are found both at home and at school (Wu et al., 2016). Therefore, it is important to assist adolescents from becoming addicted to Internet use, and close attention need to be given by parents, teachers, and health care professionals regarding these risk and protective factors (Tang et al., 2014; Wu et al., 2016).

A large number of studies have examined the associations between IA and psychosocial risk and protective factors in adolescents. Comprehensively, we incorporated the theory of triadic influence (TTI) (Flay & Petraitis, 1994; Petraitis, Flay, & Miller, 1995) as a conceptual framework for understanding psychosocial risk and protective factors for IA. TTI integrates variables and processes from many psychological and social theories of behavior onset and change, and it provides a unified theoretical framework that incorporates influential factors, or the causes of the behavior (Flay, Petraitis, & Hu, 1999). More recently, the TTI has been used as a framework in research to examine adolescents' addictive behaviors (Chun, 2015; Defoe, Semon Dubas, Somerville, Lugtig, & van Aken, 2016; Grigsby, Forster, Unger, & Sussman, 2016). The TTI organizes the influences on addictive behaviors into three substantive domains of influence (interpersonal stream, cultural/attitudinal stream, and intrapersonal stream) and discusses the extent to which different factors influence behavior as ranging from very proximal to distal and ultimate (Grigsby et al., 2016).

According to the reviews conducted by Chun (2015) and Klein Velderman et al. (2015), proximal determinants are conceptualized as rather addictive behavior-specific, being highly predictive for one addictive behavior, which include attitudes (an adolescent's expectations and evaluations of the benefits of addictive behaviors, such as positive outcome expectancies), poor coping skills, and lower refusal self-efficacy. Distal determinants of addictive behaviors are causes of addictive behaviors that are intermediate between proximal and ultimate, and these include substance-specific behaviors of influential role models (such as knowing and observing the smoking and/or drinking behavior of parents), general values that affect the attitudes of adolescents towards substance use, and affective states related to internal motivation to substance uses, which include low self-esteem and emotional factors. Ultimate determinants of addictive behavior are believed to also affect addictive behaviors, but to be almost unchangeable (i.e. more deeply rooted), and these include an adolescent's immediate surroundings, such as neighbors, schools, and culture, including weak public policies on substance use; characteristics of parents, family members, and other influential role models, as well as personal traits and biological dispositions that may encourage an internal motivation for substance use (such as genetic susceptibility to substance dependence, impulsivity, and emotional instability) (Flay et al., 1999; Petraitis et al., 1995).

On the other hand, previous studies have also indicated that behavioral factors (greater impulsivity) (Zhang et al., 2015), cognitive factors (higher positive outcome expectancy of Internet use and lower refusal self-efficacy of Internet use) (Lin, Ko, & Wu, 2008; Lin et al., 2011; Wu, Ko, Tung, & Li, 2016a; Wu, Ko, Wong, Wu, & Oei, 2016b), emotional factors (more depressive symptoms) (Lee, Shin, Cho, & Shin, 2014; Nie, Zhang, & Liu, 2017), self-esteem (Nie et al., 2017; Younes et al., 2016), alexithymia (Dalbudak et al., 2013; Scimeca et al., 2014), and subjective well-being (Lai et al., 2015; Mei, Yau, Chai, Guo, & Potenza, 2016), are all correlated with IA. Moreover, studies also discovered that social factors, including actual social support (Wegmann & Brand, 2016; Wu et al., 2016), virtual social support (Yeh, Ko, Wu, & Cheng, 2008), social influence for Internet use (Wu et al., 2016b), and accessibility (Ak, Koruklu, & Yilmaz, 2013; Lin et al., 2011; Wu et al., 2016), were associated with IA.

Although a number of psychosocial risk and protective factors have been associated with IA, few studies have surveyed a large representative sample of senior high school students through a comprehensive investigation that incorporated psychological and social factors targeting this population. Most studies, however, have been limited by relatively small or unrepresentative samples, or have only examined a minimal number of psychosocial factors, which restricts the comprehensiveness to understand or compare the related factors associated in the relationship. In educational practices, agencies and mental health organizations have limited resources and time, thus, can only choose two to three important psychosocial factors at a time to focus on preventive education. For this reason, it is important to integrate related psychosocial factors in IA, and probe at two to three critical psychosocial factors. Therefore, the aim of this study was to examine the prevalence of IA and the associations between IA, and psychological and social factors in a large representative sample of senior high school students in Taiwan. These findings can be used to help educational agencies and mental health organizations create policies and design programs that will help in the prevention of IA in adolescents.

2. Methods

2.1. Participants and procedure

A cross-sectional design was applied in this study. Participants were recruited from senior high schools throughout Taiwan using both stratified (by school type (i.e. regular high school or vocational high school) and clustered (by class) sampling. The 2011 school year data provided by the Department of Statistics, Ministry of Education (<https://stats.moe.gov.tw/qframe.aspx?qno=MQA1AA2>) showed a total of 401,958 regular high school students and 366,449 vocational high school students in Taiwan (ratio of 52: 48). In accordance to the ratio, the present study invited two regular high schools and two vocational high schools during the time period of October through December of 2013, and selected 2253 students (1152 regular high school students, yielding 51.13% of the total sample size, which was close to the ratio of the population group). 2170 students (Mage = 15.83, SD = 0.38) participated in the final data analysis, resulting in a response rate of 96.32%.

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