Original Research

# The mediating role of Internet addiction in depression, social anxiety, and psychosocial well-being among adolescents in six Asian countries: a structural equation modelling approach

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C.M. Lai [a], K.K. Mak [b,*], H. Watanabe [c], J. Jeong [d], D. Kim [e], N. Bahar [f], M. Ramos [g], S.H. Chen [h], C. Cheng [b]

[a] Department of Psychology, Chinese University of Hong Kong, Hong Kong
[b] Department of Psychology, University of Hong Kong, Hong Kong
[c] Department of Children and Women's Health, Osaka University Graduate School of Medicine, Japan
[d] Department of Bio and Brain Engineering, Korea Advanced Institute of Science and Technology, Republic of Korea
[e] Department of Education, Seoul National University, Republic of Korea
[f] Department of Psychiatry, Selayang Hospital, Malaysia
[g] Department of Psychiatry, National University Hospital at Manila, Philippines
[h] Department of Psychology, National Taiwan University, Taiwan

## ARTICLE INFO

## ABSTRACT

*Objectives:* This study examines the associations of Internet addiction with social anxiety, depression, and psychosocial well-being among Asian adolescents. A self-medication model conceptualizing Internet addiction as a mediating role in relating depression and social anxiety to negative psychosocial well-being was tested.
*Study Design:* A cross-sectional survey.
*Methods:* In the Asian Adolescent Risk Behavior Survey (AARBS), 5366 adolescents aged 12—18 years from six Asian countries (China, Hong Kong, Japan, South Korea, Malaysia, and Philippines) completed a questionnaire with items of the Internet Addiction Test (IAT), Social Anxiety Scale for Adolescents (SAS-A), Center for Epidemiological Studies Depression Scale (CESD), Self-Rated Health of the Nation Outcome Scales for Children and Adolescents (HoNOSCA—SR) in the 2012—2013 school year. Structural equation modelling was used to examine the mediating role of Internet addiction in depression, social anxiety, and subjective psychosocial well-being.
*Results:* Significant differences on the scores of IAT, SAS-A, CESD, and HoNOSCA-SR across the six countries were found. The proposed self-medication model of Internet addiction received satisfactory goodness-of-fit with data of all countries. After the path from social anxiety to Internet addiction had been discarded in the revised model, there was a

significant improvement of the goodness-of-fit in the models for Japan, South Korea, and the Philippines.

*Conclusions:* Depression and social anxiety reciprocally influenced, whereas depression associated with poorer psychosocial well-being directly and indirectly through Internet addiction in all six countries. Internet addiction mediated the association between social anxiety and poor psychosocial well-being in China, Hong Kong, and Malaysia.

## Introduction

Internet addiction was commented to be one of the most serious public health concerns with the widespread growth of Internet users.[1] In the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5)[2], problematic Internet use on gaming has been considered to merit inclusion in the future edition of DSM. Owning to variations of definitions of Internet addiction and diagnostic instruments for assessments,[3] the prevalence estimates of Internet addiction vary widely. According to a recent meta-analysis reporting the prevalence of Internet addiction across 31 nations, Asian countries have a leading prevalence of 7.1% (95% CI = 5.3%–8.9%).[4]

Previous studies demonstrated the high comorbidity of Internet addiction with psychiatric symptoms and functional impairment in both adolescent and adult populations.[3,5] Depression and social phobia have been repeatedly reported to be associated with Internet addiction for adolescents.[6,7–10] In the study by Bernardi and Pallanti[11] among 50 adult patients with Internet addiction, 15% had a diagnosis of generalized anxiety disorder, 15% had social anxiety disorder, and 7% had dysthymia. With a prospective design, the incidence of depression and social phobia were found to predict the occurrence of Internet addiction in Taiwanese adolescents.[12] It was found that the diagnosis of depression and social phobia was associated with 1.56 and 1.35 times of rate of Internet addiction than the normal group two years later, respectively.

Consistent findings have been obtained that Internet addition or problematic Internet use is associated with negative outcomes such as poor school performance,[13] family function,[14] psychosocial functioning,[13] self-esteem and life satisfaction,[15] and mental health.[16] Based on these past findings, the self-medication hypothesis of addiction,[17–19] in which additive behaviours are characterized as maladaptive ways of coping with excessively difficult states of emotions or stress, may help understand the psychopathological pathway of Internet addiction. Under this model, Internet addiction emerges as a result of individual attempt to 'self-treat' their stress, anxiety, and depression. In other words, the Internet provides as an arena particularly for adolescents with social anxiety and interpersonal problems to develop the 'ideal self-identity' to compensate their imperfections in the real world.[20] In this sense, Internet use is like a double-edge sword which serves a compensatory function psychologically for the depressive and socially anxious individuals. At the same time,

it could deprive the persons from real-world social relationship due to the excessive amount of time spent online. Internet use as a coping strategy may leave adolescents even worse off if the underlying depression and social anxiety is left untreated at the developmental period of identity formation, when reliance on the Internet may become heavier and finally turn to be excessive and addictive.

### Hypotheses

As discussed above, depression and social anxiety were found to have high comorbidity with Internet addiction.[6,7–10] In line with the cognitive-behavioural model of pathological Internet use,[21] depression and social anxiety are viewed as distal antecedents to Internet addiction in the proposed model. At the beginning, deficient self-regulation of Internet use may be initiated by self-reactive incentives to relieve boredom, engage in para-social relationship, and seek self-identity validation.[22,23] Unfortunately, depression and social anxiety, which were demonstrated to frequently co-occur,[24–26] together interfere with cognitions maintaining effective self-regulation, and hence downward spiral dysregulated use of Internet. For instance, people with social anxiety may attribute their unsuccessful interpersonal relationship to their lack of social skills or even their own incompetence and worthlessness. The immediate positive effect of Internet use in alleviating distress may motivate further Internet use for some individuals.

As a result, we first tested a model in which the association between Internet use and dysregulated emotion encompassing both depression and social anxiety, was positive. As suggested by LaRose et al.,[22] deficient self-regulation of Internet addiction may occur to all Internet consumers, even among those whose consumption amount and patterns are generally considered normal. The construct of 'Internet addiction' is conceived as an indicator of risks or tendency to Internet addiction that could be found in the non-addictive population in this study.

Specifically, the following hypotheses were proposed:

Hypothesis 1 (H1): Depressive symptoms will be positively and directly related to Internet addiction.

Hypothesis 2 (H2): Social anxiety symptoms will be positively and directly related to Internet addiction.

Hypothesis 3 (H3): Social anxiety symptoms will be positively and directly correlated with depressive symptoms.

When Internet use becomes addictive, it in turn causes life problems. For instance, the excessive time spent online would take away valuable study time, result in academic setbacks