

Prevalence and Correlates of Excessive Internet Use among Youth in Singapore

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Abstract

Introduction: There has been an explosive growth of Internet usage worldwide and this is expected to continue with its use becoming an integral part of everyday life. The Internet provides tremendous educational benefits; however, excessive Internet use can lead to negative outcomes such as poor school performance and social isolation. **Materials and Methods:** The survey consisted of a 69-item, anonymous, self-administered paper-and-pencil questionnaire. Data collected included demographic data, academic performance, social support and general wellbeing as well as questions pertaining to Internet use. For the purposes of our study, we defined Internet use of more than 5 hours a day as “excessive use”. **Results:** Of the 2735 adolescents who took part in the study, 1349 (49.3%) were male and 1383 (50.6%) were female. The mean age of the adolescents was 13.9 years [standard deviation (SD), 1.0]. A quarter of the adolescents surveyed (25%) reported that they did not access the Internet everyday, while 17.1% of adolescents reported using it for more than 5 hours every day. Excessive Internet use was associated with (i) no rules of Internet use at home ($\chi^2 = 313.1, P < 0.001$), (ii) less likelihood of having confidants ($\chi^2 = 15.8, P = 0.003$), (iii) feelings of sadness or depression ($\chi^2 = 49.6, P < 0.001$) and (iv) perceived poorer grade/school work ($\chi^2 = 226.1, P < 0.001$). **Conclusions:** The high figures of excessive Internet use (17.1%) reported in our study is not equivalent to Internet addiction as no diagnostic instruments were used. However, school counsellors and teachers need to be made aware of the prevalence of and problematic behaviours associated with excessive Internet use. Training and resources should also be made available to parents and caregivers so that they can play a greater role in setting boundaries and detecting early warning signs.

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Introduction

There has been an explosive growth of Internet usage worldwide and this is expected to continue with its use becoming an integral part of everyday life. The Internet has become more accessible in homes, schools, colleges, libraries and Internet cafes; access is further aided with the increasing affordability of home computers over the last decade. Preliminary studies done by the National Center of Education Statistics have shown that a large number of children and adolescents in America (5 to 17 years old) have access to the Internet and are being exposed to the Internet at a very early age.¹ Common online activities include completing schoolwork, playing online games, reading and writing emails and engaging in real time chatting.^{2,3} The Internet provides tremendous educational benefits including access to information across a wide variety of topics, establishing educational links and

enhancing communication with teachers and classmates. However, excessive Internet use can lead to negative outcomes such as poor school performance,⁴ social isolation,⁵ and might impede adolescent's achievement of psychosocial developmental tasks.⁶

Studies have shown that an increase in virtual interaction decreases the amount of face-to-face interaction between people and this in turn may lead to social isolation and depression.⁷ While no causal relationship between Internet use and depression has yet been ascertained, there is an association between increased Internet use and psychological distress and loneliness.^{5,8} In addition, an increase in the amount of time spent in front of the computer would generally cause the adolescent to spend less time on other important activities such as schoolwork.⁹ Other studies have suggested that time spent on the Internet is not related to depression among youth.^{10,11} Campbell et al¹¹ concluded

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that chat users were more likely than non-users to find the Internet psychologically beneficial to them and were less likely to be socially anxious.

Of late, the Internet has received increased attention due to its controversial nature and the possibility that a new kind of compulsive activity – “Internet addiction” – is on the rise. Various criteria as well as terms have been used to describe Internet addiction and include Internet dependence, technology addiction, Problematic Internet Use (PIU) and Pathological Computer Use. Internet addiction is not yet a Diagnostic and Statistical Manual-Fourth Edition (DSM-IV) diagnosis, but its definition has been derived from DSM-IV criteria for addiction and obsession. Ivan Goldberg,¹² a psychiatrist, first proposed the existence of Internet addiction as a discrete disorder in 1995. Borrowing from the DSM-IV criteria for pathological gambling, Young^{4,13} concluded that symptoms such as tolerance, withdrawal, craving, preoccupation and negative life consequences characterise PIU. Young considered individuals who met 5 of these 8 criteria to qualify for Internet addiction. Research done by Walker¹⁴ would label Internet addiction as an obsessive and compulsive spectrum behaviour, based on its similarities to other behavioural addictions like gambling and compulsive shopping. Griffiths¹⁵ considered it a subset of behaviour addictions and any behaviour that meets the 6 “core components” of addiction, i.e. salience, mood modification, tolerance, withdrawal, conflict and relapse, is defined as functionally addictive.

Singapore is a multiracial and multicultural city-state located just North of the equator at the southern tip of the Malay Peninsular. The latest data from 2005 shows the racial breakdown as follows: Chinese (76%), Malays (13.7%), Indians (8.4%) and others (1.8%). The total resident population is just over 3.5 million people. The literacy rate of Singapore’s population is 95.4%.¹⁶ Eighty-four per cent of the resident population aged 10 to 14 years uses the Internet, compared to 64% of the 15 to 59 years age group, and 21% for the 60 years and older age group. Seventy-eight per cent of households in Singapore have at least one computer (i.e. desktop/laptop) at home and the proportion of households with access to the Internet at home is 71%.¹⁷ The most common usage of Internet applications was for communication (96%) and for obtaining information (89%). Sixty-one per cent of the individuals surveyed used the Internet for leisure activities including playing/downloading games, listening to music or watching films.¹⁸

The aims of our study were to examine the prevalence of Internet use among secondary school students in Singapore, its consequences as experienced by them, and the predictors of heavy use.

Materials and Methods

The sample included 2735 Singapore school students from Secondary 1, 2 and 3 (age range, 12 to 18 years). This study was part of a bigger study meant to profile youth behaviour in Singapore. Eight schools were selected randomly, e-mails were sent outlining the study and inviting them to participate in the study. Three schools accepted the invitation.

Approval for the study was granted by the Institutional Review Board, National Healthcare Group, Singapore. The survey was conducted in classroom settings at a predetermined time, in the presence of school personnel. Passive consent procedures were used by sending a letter home to parents (or guardians) through the students. The letter described the study and notified parents that unless they informed the school (via the enclosed reply slip) to exclude their child from the survey, their children would be asked to participate. At the time of administration, students were informed that their participation was voluntary and they could quit at any time or skip items that they chose to. Students were also reassured about the anonymity and confidentiality of the study.

The survey consisted of a 69-item, anonymous, self-administered, paper-and-pencil questionnaire. Data collected included demographic data, academic performance, social support and general wellbeing. The questions pertaining to Internet use included average number of hours spent on the Internet everyday, sites surfed, parental rules regarding Internet surfing, whether they stayed on longer than intended, whether grades and school work suffered because of time spent online and preoccupation with the Internet.

Statistical analysis was carried out using SPSS for Windows, version 13.0. Standard descriptive statistics were used to analyse the characteristics of subjects. Chi-square test was used to test for significant differences between groups. A stepwise logistic regression was performed to assess predictors of excessive computer use.

Results

Of the 2735 adolescents who took part in the study, 1349 (49.3%) were male and 1383 (50.6%) were female. The mean age of the adolescents was 13.9 years [standard deviation (SD), 1.0]. A quarter of the adolescents surveyed (25%) reported that they did not access the Internet everyday, 12.4% used it for at least 1 hour a day, 22.4% used it for 2 hours a day, 21.8% used it for 3 to 5 hours per day and 17.1% of adolescents reported using it for more than 5 hours every day. For the purposes of our study, we defined Internet use of more than 5 hours a day as “excessive use”. Commonly surfed sites reported by adolescents included chat, music sites, online games, movie and sports-related

Table 1. Time Spent on the Internet According to Gender and Ethnicity

	Average number of hours spent surfing the Internet everyday				
	Do not surf daily n (%)	1 hour n (%)	2 hours n (%)	3 to 5 hours n (%)	More than 5 hours n (%)
Gender*					
Male	271 (20.4)	157 (11.8)	312 (23.4)	280 (21.0)	311 (23.4)
Female	406 (29.5)	181 (13.2)	295 (21.4)	317 (23.0)	177 (12.9)
Ethnicity*					
Chinese	495 (24.6)	220 (10.9)	454 (22.5)	454 (22.5)	391 (19.4)
Malay	51 (25.2)	23 (11.4)	42 (20.8)	50 (24.8)	36 (17.8)
Indian	95 (26.4)	73 (20.3)	87 (24.2)	61 (16.9)	44 (12.2)
Other	34 (27.2)	22 (17.6)	21 (16.8)	30 (24.0)	18 (14.4)

* $P < 0.005$

sites. There were no significant differences in the number of hours of Internet use between the different grades. Boys reported excessive Internet use significantly more than girls ($\chi^2 = 67.5$, $P < 0.001$). Significant differences were also observed among the ethnic groups with regard to patterns of Internet use ($\chi^2 = 42.5$, $P < 0.001$) (Table 1). We also observed significant differences in the pattern of use depending on the age of onset of Internet use. Adolescents who initiated Internet use before 7 years of age were significantly more likely to be excessive users as compared to adolescents who initiated Internet use when they were older ($\chi^2 = 84.1$, $P < 0.001$).

Significantly more of the excessive users felt that “grade/school work suffers because of the time spent online” ($\chi^2 = 226.1$, $P < 0.001$). There were also significant differences in the student’s perceptions of how well they do in school between the different groups classified on the basis of average hours spent surfing the net ($\chi^2 = 38.6$, $P < 0.001$). The excessive users were significantly more likely to stay on longer than intended ($\chi^2 = 562.8$, $P < 0.001$), hide how long they have been online ($\chi^2 = 126.6$, $P < 0.001$) and miss being on the Internet or think continuously about it when they were offline ($\chi^2 = 373.4$, $P < 0.001$) (Table 2).

Internet use was significantly different among adolescents with different rules at home about Internet use ($\chi^2 = 313.1$, $P < 0.001$). Those with no rules at home were significantly more likely to use the Internet for more than 5 hours a day. Those with excessive Internet use were significantly less likely to have someone they felt they could confide in ($\chi^2 = 15.8$, $P = 0.003$) and were significantly more likely to feel sad or depressed ($\chi^2 = 49.6$, $P < 0.001$).

To identify the predictors of excessive use, all variables were entered into a logistic regression analysis with excessive use as the dependent measure. The model showed that the strongest predictors of excessive use were male

[odds ratio (OR), 2.1; 95% confidence interval (CI), 1.7 to 2.7], with no rules in the household regarding Internet surfing (OR, 2.9; 95% CI, 1.5 to 5.4), those who stayed on the Internet longer than intended all the time (OR, 3.8; 95% CI, 2.6 to 5.5) and those who missed being on the Internet or thought continuously about it all the time when they were offline (OR, 6.0; 95% CI, 4.0 to 9.0).

Discussion

Our study was conducted as a preliminary survey to study the extent of excessive Internet use and to determine its correlates. Using a conservative definition of “>5 hours a day” of average use as “excessive” Internet use, we found that 17.1% of adolescents are excessive users. These users use the Internet to such an extent that it interferes with their academic studies and they are very much preoccupied with it. However, defining this problem as an addiction remains a controversial move.

It is still very much a matter of debate whether Internet addiction is a distinct disorder or a behavioural problem secondary to another disorder.¹⁹ A recent study by Ko et al²⁰ suggests that other than symptoms of preoccupation, tolerance, withdrawal, impairment of control, etc, functional impairment such as poor academic performance and difficulties in interaction with family and peers must be included for making the diagnosis of Internet addiction. Using Young’s criteria for Internet addiction, studies have reported rates ranging from 8.1% to 13.8%.^{21,22} Yang and Tung²² also reported a positive correlation between the number of hours spent online per week and Internet addiction. The average number of hours per week spent online by addicted individuals in this study was 21.2 hours. Adolescents who were excessive users in our study were spending an average of 35 hours per week surfing the Internet.

Table 2. Co-relates of Internet Use

	Average number of hours spent surfing the Internet everyday				
	Do not surf daily n (%)	1 hour n (%)	2 hours n (%)	3 to 5 hours n (%)	More than 5 hours n (%)
Household rules with regard to Internet surfing*					
No Internet access	102 (63.4)	22 (13.7)	11 (6.8)	12 (7.5)	14 (8.7)
Access only when parents are around	131 (37.4)	77 (22.0)	85 (24.3)	36 (10.3)	21 (6.0)
Allowed to surf on special occasion	44 (45.4)	11 (11.3)	18 (18.6)	15 (15.5)	9 (9.3)
No rules	397 (19.1)	226 (10.9)	487 (23.4)	531 (25.5)	441 (21.2)
Grade/school work suffers because of time spent on-line*					
Rarely	418 (63.1)	190 (56.0)	255 (42.4)	178 (29.9)	170 (35.0)
Occasionally	148 (22.4)	92 (27.1)	212 (35.2)	240 (40.3)	148 (30.5)
Frequently	59 (8.9)	40 (11.8)	99 (16.4)	123 (20.7)	87 (17.9)
Always	37 (5.6)	17 (5.0)	36 (6.0)	54 (9.1)	81 (16.7)
Do well in school*					
Yes	411 (61.9)	222 (66.9)	368 (62.3)	325 (55.7)	239 (50.3)
No	226 (34.0)	98 (29.5)	200 (33.8)	242 (41.4)	223 (46.9)
Average	27 (4.1)	12 (3.6)	23 (3.9)	17 (2.9)	13 (2.7)
Staying online longer than intended*					
Rarely	261 (39.2)	119 (35.2)	130 (21.5)	61 (10.2)	65 (13.3)
Occasionally	218 (32.8)	129 (38.2)	231 (38.1)	174 (29.1)	72 (14.8)
Frequently	118 (17.7)	56 (16.6)	168 (27.7)	223 (37.4)	103 (21.1)
Always	68 (10.2)	34 (10.1)	77 (12.7)	139 (23.3)	247 (50.7)
Hiding amount of time spent online*					
Rarely	502 (77.0)	249 (73.5)	391 (65.1)	350 (58.7)	300 (62.0)
Occasionally	100 (15.3)	62 (18.3)	127 (21.1)	139 (23.3)	75 (15.5)
Frequently	34 (5.2)	15 (4.4)	52 (8.7)	71 (11.9)	41 (8.5)
Always	16 (2.5)	13 (3.8)	31 (5.2)	36 (6.0)	68 (14.0)
Missing being online/thinking continuously about it/ fantasising about it*					
Rarely	480 (73.5)	235 (69.9)	345 (57.7)	285 (48.0)	158 (32.6)
Occasionally	122 (18.7)	68 (20.2)	168 (28.1)	186 (31.3)	125 (25.8)
Frequently	34 (5.2)	23 (6.8)	57 (9.5)	79 (13.3)	84 (17.4)
Always	17 (2.6)	10 (3.0)	28 (4.7)	44 (7.4)	117 (24.2)
Have someone to confide in and discuss problems with*					
Yes	561 (83.2)	286 (84.4)	510 (84.9)	492 (83.1)	370 (76.4)
No	113 (16.8)	53 (15.6)	91 (15.1)	100 (16.9)	114 (23.6)
Felt depressed or sad most of the days in the past year*					
Agree	113 (16.9)	72 (21.6)	104 (17.5)	130 (21.9)	142 (29.4)
Somewhat agree	188 (28.1)	75 (22.5)	173 (29.1)	184 (31.0)	144 (29.8)
Somewhat disagree	161 (24.1)	76 (22.8)	140 (23.5)	131 (22.1)	90 (18.6)
Disagree	207 (30.9)	111 (33.2)	178 (29.9)	148 (25.0)	107 (22.2)

* $P < 0.005$

Excessive Internet use negatively affects many aspects of an adolescent's life. Our study suggests that excessive Internet use is associated with academic problems. Significantly more adolescents who use the Internet

excessively feel that grades and schoolwork almost always suffer because of being online. A study by Tsai and Lin²¹ on Taiwanese adolescents reported that Internet-dependent adolescents perceive that the Internet negatively affects

their daily routine, school performance and parental relations.

We found that males were twice as likely as females to be excessive Internet users. Niemi et al²³ similarly reported that males were 3 times as likely to be pathological Internet users. This finding is also consistent with Anderson,²⁴ who found that males were 7 times more likely to be Internet-dependent than females. Griffiths²⁵ has suggested that males are more likely to use the Internet to fuel other addictions such as gambling and gaming, which could explain the higher incidence of Internet addiction in male. While we asked about the sites commonly surfed by students, we did not ask them to specify the activity they engaged in the most. However, clinical experiences would indicate that girls spend more time in chat rooms while boys spend more time on games and pornographic sites.

Adolescents in our study who were excessive Internet users were significantly less likely to have someone they felt they could confide in. While some studies have argued that Internet use removes the human touch in our social interaction and thus increases a sense of isolation, others believe that real-time programmes such as Internet relay chat (IRC) may serve as a form of low-risk opportunity for youth to practise their communication skills.¹¹ It is possible that during adolescence, teenagers start to get involved in the cyber world to gain acceptance among their friends and not to be lost amidst the Internet lingo.^{26,27} Kraut et al⁵ described the Internet paradox as one where a social technology used primarily for interpersonal interaction could increase social isolation and decrease psychological wellbeing among its users. They reason that the superficial relationships formed online displace meaningful relationships in the real world. While it is possible that Internet use may result in isolation, the reverse is also possible. In other words, feelings of social isolation may draw teenagers into finding a sense of belonging in the virtual world. LaRose et al²⁸ have suggested that Internet communication with people we know can alleviate depression, at least among socially isolated and moderately depressed populations such as college students, who may tend to rely on social technologies to receive social support. Educationists as well as parents should try to understand the root causes of this isolation and its correlates in youth.

It is alarming that excessive Internet users are more likely to report having felt sad or depressed most of the days in the past year. Kim et al,²⁹ in their study on Korean adolescents, have reported significant correlations among Internet addiction, depression and suicidal ideation. Ha et al³⁰ found that almost one third of subjects in their study diagnosed as Internet addicts had a significant level of depressive symptoms that required psychiatric intervention. They opined that the possible comorbidity of major depressive

disorder among Internet-dependent adolescents could be explained by the internalising tendency of the adolescents. Internalised depressive adolescents can escape from the realities or problems of the real world by losing themselves in the cyber world. The behaviours related to Internet addiction may be a symptom of depressive disorders in adolescents.

Another interesting finding from this study is that a lack of rules in the household regarding Internet surfing was a significant predictor of excessive Internet use. Purposeful activities on the Internet, which are focused, for example on academics-related research or discussing a project online, can be completed in relatively shorter periods of time through good planning. However, use of the Internet for entertainment may not have a time limit and some activities like multi-player games can be highly compulsive. Parental rules in such situations can set the limit and thereby reduce excessive use and limit negative outcomes.

While this is an important study which raises concerns about the adolescent's preoccupation with the Internet to the exclusion of academic and other social activities, the study has some important limitations. The results are based entirely on students' self-report and not supplemented with parent or teacher reports. We did not use a diagnostic instrument as we still feel that it is controversial to diagnose an adolescent based on symptomatic criteria and there is as yet no official psychiatric diagnosis of an Internet addiction. We would recommend carrying out future studies using a locally validated instrument, on a representative sample to get a complete picture. An attempt must also be made to determine the true extent of behavioural, psychological and academic problems in the group with excessive Internet use. School counsellors and teachers also need to be made aware of the prevalence and the problematic behaviours associated with excessive Internet use. We need interventions to be developed which can be easily administered at the school level as a form of early prevention. Training and resources should also be made available to parents and caregivers so that they can play a greater role in setting boundaries and detecting early warning signs.

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