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Susceptibility and perceptions of excessive internet use impact on health among Vietnamese youths



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HIGHLIGHTS

- Excessive Internet use among adolescents in Vietnam is an emerging health problem as Internet use in the country increases.
- The perception of whether Internet use affects health differs based upon gender, age, employment, and residence area.
- Understanding how different populations within Vietnam view the Internet's effect on health can improve interventions.

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ABSTRACT

Studies performed worldwide show excessive Internet use could have a negative impact on health. However, Internet use studies in Vietnam are limited. In this study, we reported a high prevalence of frequent Internet usage among Vietnamese youth between 16 and 30 years old. Of 1200 participants, almost 65% reported using the Internet daily. Moreover, 34.3% of the participants reported feeling anxious or uncomfortable after not using the Internet for one day irrespective of their gender, and 40% believed using the Internet frequently did not affect their health. Of those, there was a higher proportion of women than men that held this belief (42.1% vs. 35.9%, respectively, $p = .03$). In this cohort, undergraduate students were more likely than blue-collar workers to believe that frequent Internet use could affect health. Yet, undergraduate [OR = 1.50, 95%CI = (1.08, 2.09), $p < .05$] and high school students (OR = 1.54, 95%CI = 1.00, 2.37), $p < .1$) were more likely than blue collar workers to feel anxious or uncomfortable after a day without the Internet. Participants in urban areas were more than twice as likely than those from rural areas to believe the Internet did not affect their health [(OR = 0.60, 95%CI = (0.41, 0.89), $p < .01$)]. Lastly, participants between 16 and 18 years old were less likely to believe in the negative impact of the Internet on health than older participants. A better understanding of factors underlying high Internet usage and low perception of its health effects among Vietnamese youth might help develop better intervention strategies for Internet Use Disorder and other Technology Related Use Disorders.

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1. Introduction

Problematic Internet Use (PIU) is associated with adverse mental health outcomes, a leading cause of morbidity among adolescents worldwide (Anderson, Steen, & Stavropoulos, 2017; Müller et al., 2016; Selfhout, Branje, Delsing, ter Bogt, & Meeus, 2009). Specifically, PIU has characteristics of addiction and is associated with anxiety, depression, and other negative sequelae in youth in different countries including Australia, China, Germany, and the United States (Anderson et al., 2017).

In East Asia, the prevalence of Internet Addiction (IA) among the general public is 10.6% in Taiwan and 8% in Korea (Bonnaire & Phan, 2017). In China, college students have an IA prevalence of 15.2% (Bonnaire & Phan, 2017). In Vietnam, past studies have found a prevalence of IA at 21% among those between 15 and 25 years old (Ngo, Ross, & Ratliff, 2008; Tran et al., 2017).

Internet use among 16 to 30-year-olds in Vietnam is facilitated by affordable Internet access and growth in the percentage of people with smartphones (Poushter, 2016). Much of this growth in smartphone ownership and Internet use is among those between ages 18–34; 81% of people in Vietnam between 18 and 34 report using the Internet occasionally or owning a smartphone, compared to 25% of people above 35 (Poushter, 2016). Despite the growing number of users, research on the addictive potential and individual perception of the negative impact of excessive Internet use among youth in Vietnam remains limited.

Risk or protective factors - depending on whether they contributed to or prevent PIU - include gender, academic environment/performance, and social support (parental involvement/family dynamic, presence of friends, etc.). Youth with supportive families, peer groups, and academic settings were found to be less likely to develop PIU/IA or to relapse (Anderson et al., 2017). The converse is true - unsupportive environments were shown to be a risk factor for PIU. There have been mixed results on the effect of gender on IA. A study with first-year college students in Taiwan found that males were 1.3 times more likely than females to have IA (Tsai et al., 2009). Another study with Chinese adolescents also found males to have higher odds of having IA (Cao, Sun, Wan, Hao, & Tao, 2011). This same study found that IA was associated with urban areas and higher family economic position (Cao et al., 2011); these socioeconomic associations are supported by the results of this study. Within of Vietnam, a landmark study on IA among youth found no significant difference between the odds of having IA for males and females (Tran et al., 2017). This finding is notable because it differs from the aforementioned studies in Taiwan and China that found an association between sex and PIU/IA and the study is one of few analyzing this phenomenon in Vietnam.

The types of Internet use analyzed in prior studies include social media (Ng & Wiemer-Hastings, 2005; Selfhout et al., 2009), surfing (browsing websites) (Ngo et al., 2008; Poushter, 2016), and gaming (Ng & Wiemer-Hastings, 2005; Ngo et al., 2008). As online gaming increases in popularity, researchers have noted that players can display addictive behavior and a sub-field of PIU and IA research focuses on gaming (Chen & Gau, 2016; Son, Yasuoka, Poudel, Otsuka, & Jimba, 2013). Like with IA generally, gender may affect the risk of problematic gaming behavior (Anderson et al., 2017). So-Kum Tang et al. study in 2017 found that females in the United States, China, and Singapore were less likely than males to be addicted to gaming and more likely to be addicted to social media (OR = 1.543, 95% CI = 1.329–1.791) (Tang, Koh, & Gan, 2017). However, to date, studies regarding what Internet activities Vietnamese youth are preoccupied and whether these activities differ based on demographics remain limited.

Rigorous data that explains differences in Internet use patterns and perceptions across nations is needed for designing contextualized interventions. Indeed, the relationship Vietnamese youth have with the Internet is complex as it is both a potential tool to facilitate mental health treatment and a medium for compulsive and addictive behaviors (Nguyen, Dedding, Pham, Wright, & Bunders, 2013). Nguyen et al.'s,

2013 prevalence study on mental health problems among Vietnamese adolescents showed that anxiety- and depression-like symptoms were high (both > 20%) (Nguyen et al., 2013). Like Anderson et al.'s study that demonstrated an association between academic stress and mental distress (Anderson et al., 2017), Nguyen et al.'s study found that Vietnamese adolescents perceive academics as a strong risk factor for adverse mental health (Nguyen et al., 2013). In contrast to prior studies that characterize Internet use as detriment to mental well-being, the 2013 study found that students viewed the Internet as a potential solution. Ninety percent of the respondents indicated they would visit a website to confidentially share their mental health challenges (Nguyen et al., 2013). There is a lack of studies on the Internet use patterns of Vietnamese youth and adults that could explain this and other perspectives on the role of the Internet in mental health. In this study, we explored the Internet use patterns and perceptions of over 1000 Vietnamese youth and identified associated factors by using a cross-sectional study design over an eight-month period.

2. Methods

2.1. Study design and sampling

From January to August 2017, we conducted a cross-sectional survey in five provinces including Hanoi, Cao Bang, Kon Tum, Binh Thuan and Dong Thap. Communes in each province were listed and categorized into three groups: urban, rural and mountainous settings. A total of twelve communes (four communes per group) were selected as study settings. Using a convenience sampling, we recruited a total of 1200 participants for interviews who were between 16 and 30 years old, agreed to participate and signed the informed consent forms, and had sufficient ability to read and answer the questionnaire in Vietnamese.

2.2. Measurements

We collected data on Internet use, perceptions towards using the Internet, and sociodemographic characteristics using a 10-min self-administered questionnaire.

2.2.1. Sociodemographic characteristic

In this study, we asked participants to inform their socio-demographic data, such as gender (Male/Female), employment status (Blue-collar worker/ Farmer/ High school students/ Undegraduate students/ White-collar worker), living area (Rural/Urban/Mountainous areas), and age, were collected. For employment status, participants aged from 16 to 18 years old and were currently studying in a high school were categorized as “high school student”, while those working in factories were classified as “Blue-collar worker” and people working in an office or administrative place were “White-collar worker”. In terms of living area (or living location), we used the official classification of the Vietnam Government to identify the living area characteristic among participants that whether they resided in urban area, rural area or mountainous area.

2.2.2. Internet use

Data about Internet use among the participants in the last 30 days prior to their participation in the study were collected. Moreover, the participants were asked to report the timing and frequency of their online game playing in the past 30 days.

2.2.3. Perception towards using the Internet

We asked participants whether they felt anxious or uncomfortable if they did not use the Internet for one day. We also assessed their perception about online entertainment, including online game, and the perceived effect of Internet use on health and reality.

2.2.4. Factors associated with perception about using the Internet

In addition to information about Internet use and online game playing, sociodemographic data were assessed as potential factors associated with varying perception about using the Internet among the participants.

2.3. Statistical analysis

Data was analyzed using STATA version 12.0. Specifically, chi-squared tests were used to assess sex-related differences in Internet use between the two genders. Multivariable logistic regression models were employed to determine factors associated with participants' practice and perception of Internet use. A stepwise forward selection strategy was employed along with the regression models, using *p*-value < .02 of log-likelihood test as a threshold for selecting the variables into the finally reduced models. *P*-value of < 0.05 was concerned as threshold for statistical significance.

2.4. Ethical consideration

In order to ensure the confidentiality and quality of the responses, we invited participants to complete the surveys in a private area. All participants signed informed consent forms and were not compensated. The Institutional Review Board (IRB) of the Youth Research Institute approved the protocol of this study.

3. Results

Of the 1200 participants, 52.8% were male, and 47.2% were female. Additionally, 49.1% of participants were between the ages of 25–30 years old, 36.1% were between 18 and 25 years old, and 14.8% were under 18 years old. Farmers (26.8%), white-collar workers (26.0%) and blue-collar workers (21.5%) made up the majority of the occupation in this cohort. Meanwhile, 16.3% of participants were university students, and 9.3% were attending high school. Geographically, the participants lived in urban (39.3%), mountainous (32.7%) and rural (28.0%) areas.

Among all the participants, 94.7% reported current usage of the Internet with a plurality of participants (30.6–36.3%) spending one to three hours per day using the Internet (Table 1). In the past 30 days, 64.7% of the participants claimed they used the Internet daily, and 67.1% also reported staying up late to use the Internet. On the other hand, more than half of the participants (56.7%) had attempted not to use the Internet in the past 30 days. Comparing female and male participants, we observed a higher percentage of current Internet usage among the male participants (96.5% vs. 93.1%, respectively, *p* = .01). Additionally, female and male participants differed in the amount of time they spent using the Internet on the weekends: 40.1% of male and 32.7% of female participants spent 1–3 h on the Internet (*p* < .01). No difference was found between these two samples in their frequency of Internet usage, attempt to stop using the Internet, or amount of time spent using the Internet on the weekdays.

Regarding online gaming behavior, 63.2% of participants reported having played an online game with a higher proportion observed among the male participants (69.4% vs. 57.6%, respectively, *p* < .01) (Table 2). In addition, most of participants (27.8%) started online gaming after the age of 18, and 38.0% of them played for 1–3 days per week in the last 30 days. No difference was found between the female and male populations neither in the age they started playing online game nor in the frequency of such activity.

With regard to the participants' perceptions towards using the Internet, 34.3% of participants reported having anxiety or discomfort if they did not use the Internet for one day regardless of their genders (Table 3). Interestingly, approximately 40% of the participants believed that using the Internet frequently did not affect their health. Of those participants, there was a higher proportion of female than male

Table 1

Internet use.

	Male		Female		Total		p-Value
	n	%	n	%	n	%	
Using the Internet							0.01
Yes	546	96.5	590	93.1	1136	94.7	
No	20	3.5	44	6.9	64	5.3	
Frequency of Internet usage in the past 30 days							0.05
No	38	7.0	24	4.1	62	5.5	
Daily	361	66.1	374	63.4	735	64.7	
1–3 days per week	63	11.5	79	13.4	142	12.5	
4–6 days per week	84	15.4	113	19.2	197	17.3	
Average amount of time spent using the Internet on the weekends							< 0.01
< 1 h	101	18.5	84	14.2	185	16.3	
1–3 h	219	40.1	193	32.7	412	36.3	
3–5 h	114	20.9	151	25.6	265	23.3	
> 5 h	112	20.5	162	27.5	274	24.1	
Average amount of time spent using the Internet on the weekdays							0.13
< 1 h	161	29.5	173	29.3	334	29.4	
1–3 h	178	32.6	170	28.8	348	30.6	
3–5 h	103	18.9	102	17.3	205	18.1	
> 5 h	104	19.1	145	24.6	249	21.9	
Staying up late to use the Internet in the past 30 days							< 0.01
No	200	36.6	174	29.5	374	32.9	
Daily	158	28.9	143	24.2	301	26.5	
1–3 days per week	125	22.9	202	34.2	327	28.8	
4–6 days per week	63	11.5	71	12.0	134	11.8	
Attempting not to use the Internet in the past 30 days							0.86
Yes	308	56.4	336	57.0	644	56.7	
No	238	43.6	254	43.1	492	43.3	

Table 2

Timing and frequency of online gaming.

	Male		Female		Total		p-Value
	n	%	n	%	n	%	
Have ever played an online game							< 0.01
Yes	393	69.4	365	57.6	758	63.2	
No	173	30.6	269	42.4	442	36.8	
Age started playing online game							0.11
Under 10 years old	36	9.2	24	6.6	60	7.9	
10–12 years old	45	11.5	43	11.8	88	11.6	
12–14 years old	44	11.2	64	17.5	108	14.3	
14–16 years old	77	19.6	58	15.9	135	17.8	
16–18 years old	85	21.6	71	19.5	156	20.6	
> 18 years old	106	27.0	105	28.8	211	27.8	
Frequency of playing online game in the past 30 days							0.11
No	107	27.2	105	28.8	212	28.0	
Daily	59	15.0	76	20.8	135	17.8	
1–3 days per week	162	41.2	126	34.5	288	38.0	
4–6 days per week	65	16.5	58	15.9	123	16.2	

participants who held this belief (42.1% vs. 35.9%, respectively, *p* = .03). Moreover, 40.7% of participants believed that only online games, as opposed to general Internet use, could be addictive. Lastly, 41.1% believed that online entertainment is safer than other types of entertainment (e.g. games, music, film)—a statement that was supported by a larger percentage of female than male participants (44.5% vs. 37.4%, respectively, *p* = .01).

Table 4 indicates the factors associated with participants' perception towards using the Internet. Compared to blue-collar workers, high school (OR = 1.54, 95%CI = (1.00, 2.37)) and undergraduate

Table 3
Perception towards using the Internet.

	Male		Female		Total		p-Value
	n	%	n	%	n	%	
Feeling anxious and uncomfortable if not using the Internet for one day							
No	388	68.6	401	63.3	789	65.8	0.05
Yes	178	31.5	233	36.8	411	34.3	
Perception towards using the Internet							
Using Internet frequently did not affect health	203	35.9	267	42.1	470	39.2	0.03
Contents on the Internet were not able to affect real life	229	40.5	256	40.4	485	40.4	0.98
Only online game could be addictive	223	39.4	265	41.8	488	40.7	0.40
Online entertainment is safer than others	211	37.3	282	44.5	493	41.1	0.01

(OR = 1.50, 95%CI = (1.08, 2.09)) students were more likely to experience feeling of anxiety and discomfort if they did not use the Internet for one day. Compared to participants who did not stay up late to use the Internet in the past 30 days, participants who did daily

(OR = 2.66, 95%CI = (1.87, 3.78), or at least 1–3 days per week (OR = 1.53, 95%CI = (1.08, 2.18) for 1–3 days; OR = 2.33, 95%CI = (1.48, 3.67) for 4–6 days per week) were more likely to have such feelings. Compared to participants who used the Internet for less

Table 4
Factors associated with perception towards using the Internet.

	Feeling anxious and uncomfortable if not using the Internet for one day		Using the Internet frequently did not affect health		Contents on the Internet were not able to affect real life	
	OR	95% CI	OR	95% CI	OR	95% CI
Gender						
Male					Ref	
Female					0.79	0.59, 1.06
Employment						
Blue-collar worker	Ref		Ref		Ref	
Farmer			0.73	0.46, 1.17		
High school student	1.54*	1.00, 2.37	0.56**	0.32, 0.98	0.66	0.39, 1.12
Undergraduate student	1.50**	1.08, 2.09	0.22***	0.13, 0.38	0.41***	0.25, 0.66
White-collar worker			0.52***	0.34, 0.79	0.68**	0.47, 0.99
Living area						
Rural			Ref		Ref	
Urban			2.08***	1.41, 3.08	2.15***	1.51, 3.07
Mountainous			0.60***	0.41, 0.89	0.62**	0.43, 0.90
Age group						
16–18 years old			Ref		Ref	
19–24 years old			2.37***	1.66, 3.40	1.65***	1.15, 2.36
Using the Internet in the past 30 days						
No			Ref		Ref	
Daily			0.31***	0.22, 0.44	0.21***	0.11, 0.40
1–3 days per week			0.46***	0.28, 0.75	0.41**	0.20, 0.84
4–6 days per week					0.57	0.29, 1.14
Staying up late to use the Internet in the past 30 days						
No	Ref		Ref		Ref	
Daily	2.66***	1.87, 3.78	2.31***	1.66, 3.20	1.41**	1.01, 1.96
1–3 days per week	1.53**	1.08, 2.18				
4–6 days per week	2.33***	1.48, 3.67				
Average amount of time spent using Internet on weekends						
< 1 h	Ref		Ref		Ref	
1–3 h			0.71**	0.53, 0.96	0.76*	0.56, 1.05
3–5 h	2.01***	1.45, 2.78			0.54***	0.37, 0.80
> 5 h	2.01***	1.45, 2.77				
Average amount of time spent using Internet on weekdays						
< 1 h			Ref		Ref	
1–3 h			0.76*	0.56, 1.03	0.66**	0.47, 0.91
3–5 h					0.68**	0.46, 1.00
Attempting not to use the Internet in the past 30 days						
Yes			Ref		Ref	
No			1.93***	1.46, 2.56	2.34***	1.77, 3.09
Playing online games						
No	Ref		Ref		Ref	
Yes	0.79*	0.60, 1.04	1.35*	1.00, 1.82	1.52***	1.13, 2.04

*** $p < .01$.

** $p < .05$.

* $p < .1$.

than one hour on the weekend, participants who spent an average of three or more hours online were also more likely to feel anxious if they did not use the Internet for one day (OR = 2.01, 95%CI = (1.45, 2.77)).

When we asked the participants about their opinions on the potential negative impact of frequent Internet uses on their health and real life, we found that undergraduate students (OR = 0.22, 95%CI = (0.13, 0.38)) and white-collar workers (OR = 0.52, 95%CI = (0.34, 0.79)) were more likely than blue-collar workers to believe that frequent Internet use could affect their health and that online content could affect their real life (OR = 0.41, 95%CI = (0.25, 0.66) vs. OR = 0.68, 95%CI = (0.47, 0.99) respectively). Such belief was shared among participants who lived in mountainous areas (OR = 0.60, 95%CI = (0.41, 0.89)) compared to those who lived in rural areas.

Moreover, participants who used the Internet daily or 1–3 days per week were more likely to perceive the negative impact of frequent Internet uses compared to those who did not use the Internet at all in the past 30 days. Participants who spent more than one hour on the Internet during the weekend or weekday were also more likely to share this perception compared to those who spent less than one hour on the Internet.

In contrast, compared to the participants living in the rural areas, participants who lived in the urban areas were more likely to not believe in either the negative impact of frequent Internet use on health or that contents on the Internet might be able to affect their real life. Compared to the 16–18-year-old participants, young adults between the ages of 19 and 24 were also more likely to not share this belief. In addition, participants who stayed up late to use the Internet daily were more likely to believe that frequent Internet use would not affect their health or their real life compared to those who did not use the Internet late at night. Lastly, compared to the participants who attempted to stop using the Internet in the past 30 days and those who did not play online games, those who did not try to stop using the Internet for this period of time and those who played online games were both more likely to hold a more positive view of the Internet usage.

4. Discussion

Problematic Internet Use has been shown to have a negative effect on health and life in both developing and developed countries (Anderson et al., 2017; Zhang et al., 2017). However, information about Internet use and its effect in the context of Vietnam remain largely unexplored despite national increasing usage (Poushter, 2016). In this study, we described the pattern and susceptibility of excessive Internet use, and assessed the factors associated with the perception of its negative health effect among Vietnamese youth. In this cohort, we observed a high frequent usage of the Internet with over 60% of the participants using the Internet daily or staying up late to use the Internet. The participants' sociodemographic characteristics and Internet use frequency are significantly associated with of how positively they perceived Internet use and its potential effects on their health. Specifically, participants who were in their early twenties or came from urban areas had higher odds of thinking that frequently using the Internet does not affect health. Importantly, females had lower awareness of the negative impacts of Internet use than males in our cohort.

Worldwide, the Internet has become embedded into people's lives. Many countries consider the Internet crucial to school curricula. For example, Nong Lam University, reports that all of its students are equipped with computers, emails, and cell-phones (Sussman, Harper, Stahl, & Weigle, 2018). Vietnam's neighboring country of China reports its largest population of Internet users as 10- to 19-year-olds, with > 287 million adolescents using the Internet daily (Statistical report on the development of the Internet in China [In Chinese], 2016). The necessity of Internet use to students' success may explain why Vietnamese undergraduates and high school students relative to other occupation categories experience more anxiety from Internet cessation. The prevalence of PIU is high among university students in many other regions;

the PIU prevalence in Malaysian medical students is 36.9%; 40.7% in Iranian university students; and 63.5% in Japanese university students (Kitazawa et al., 2018).

Prior studies have also found that frequent Internet use impacts users' mental health when it becomes an addictive or compulsive behavior (Chen & Gau, 2016). In this study, we found that being an undergraduate student was strongly associated with feelings of anxiety after not using the Internet for a day. We also found that undergraduates were more likely to believe the Internet could affect real life and health. In addition to the association between PIU/IA and depression and anxiety, there are also links between excessive Internet use and low sleep quality and insomnia (Tang et al., 2017). We found that staying up late to use the Internet for at least four days a week (38.3% of participants) was strongly associated with the likelihood of feeling anxiety or discomfort without Internet use for a day. Taken together, these findings add to the evidence of the addictive potential of Internet use among youth.

Prior studies on PIU have explored the phenomenon in relation to specific forms of Internet use (Anderson et al., 2017). Researchers have singled out specific games such as Massively Multiplayer Online Role-Playing Games (MMORPGs) for unique qualities that lend them to be more addictive (Son et al., 2013). In our study, 63.2% of participants had played an online game and 38.0% had played for one to three days a week in the last 30 days. While our gaming questions were not specific to MMORPGs, our results support the association between online gaming and IA. We found online gamers had higher odds of believing that frequent Internet use did not affect health and that online content could not affect real life.

In this study, we collected responses over several months in which participants' Internet usage could have varied, particularly for students who go on breaks or have exam periods. Collecting responses in a shorter timeframe would eliminate the effect of school schedules on student reports of Internet use frequency. Despite the potential recall bias in self-reporting of the time participants spent online and convenience sampling, forms of researcher bias such as confirmation bias were greatly reduced with the use of a physical questionnaire as researchers could not affect or alter participants' answers based on their own hypotheses.

Our study provides several contributions for future research. First, because of the large sample size and inclusion of participants from multiple socioeconomic backgrounds and regions in Vietnam, our study results are representative of a diverse population in Vietnam. Second, our results cultivate further questions about the progression of IA symptoms and PIU. It would be useful to investigate whether frequent Internet use eventually leads to negative mental health outcomes or whether users with mental health issues turn to the Internet as a coping mechanism. These studies should clearly define PIU, IA, or online gaming metrics for increased comparability between studies. Finally, given the detrimental impact of excessive Internet use and the drastic increase in Internet use in Asia, more attention should be paid to the underlying factors that explain the difference in Internet use patterns. There should especially be a focus on understanding why young, urban females are less aware of the effects of Internet use on health. This knowledge would contribute to designing timely and more targeted interventions. Education on healthy and appropriate Internet use would be highly useful to incorporate into school curricula. Approaches given by mental health professionals on how to cope with Internet-related anxiety, depression, and addiction could also be emphasized to Vietnamese youth as part of a harm reduction strategy. Therefore, our findings on the association between residence area and Internet use and perceptions can be used to identify populations that might be at risk for PIU and therefore inform treatment possibilities.

5. Conclusion

In this study, we reported a high frequency of Internet use among

both female and male Vietnamese youth. Yet, awareness about the negative impact of Internet uses on health is lower among females than males. In addition to gender, we found that location, occupation, and age is significantly associated with one's perceptions about such impact of Internet use among Vietnamese youth. In particular, younger people from the cities were more inclined to believing that frequent Internet use did not affect their health compared to rural and older people. Undergraduate students and those who used the Internet more often on the weekend and at night were more likely to experience anxiety and discomfort when they did not use the Internet for one day. As the Internet becomes more enmeshed in the daily lives of young people globally and the prevalence of Internet Use Disorders in many Asian countries increases, a better understanding of Internet use patterns and the factors underlining one's perceptions of the negative impact excessive usage will provide important insight for developing strategies to tackle the addictive potential and effect of excessive Internet use on health.

Declarations of interest

None.

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