Mamun, M.A., Hossain, S., Moonajilin, S., Siddique, A.B., Huq, N., Masud, M., Griffiths, M.D. (2020). Does loneliness, self-esteem and psychological distress correlate with problematic internet use? A Bangladeshi survey study. ***Asia-Pacific Psychiatry,*** **DOI: 10.1111/appy.12386**

Abstract

Background: Researchers have claimed that problematic internet use (PIU) and internet addiction (IA) is a global mental health problem. However, little research has addressed this issue in Bangladesh and no previous study has examined the relationship between PIU and potential psychological risk factors.
Aim: The present study examined the prevalence of PIU and its associated risk factors including socio-demographic variables, internet use behaviors, and other psychological variables including loneliness, self-esteem, and psychological distress.
Methods: A cross-sectional study was conducted among Bangladeshi students (N=605). Measures included the Internet Addiction Test (IAT), Rosenberg's Self-Esteem Scale, the UCLA Loneliness Scale, and the General Health Questionnaire.
Results: Using a cut-off score of ≤60 (out of 100) on the IAT, the prevalence of PIU was 16.5% (n=100). Regression analysis showed that sleep disturbance (more or less than 6-7 hours sleeping time), not using internet for academic purposes, and online chatting were risk factors for PIU. Loneliness and psychological distress were positively correlated with PIU, whereas self-esteem was negatively correlated.
Conclusions: The present study highlights that PIU among Bangladeshi university students is an issue of concern and that targeted prevention is needed among emerging adults to help overcome the potentially negative effects of problematic internet use.

Keyword: Internet addiction; Problematic internet use; Self-esteem; Psychological distress; Loneliness; Bangladeshi students

Introduction

Research concerning problematic internet use (PIU) and internet addiction (IA) has become a much-increased research area following the growth of internet technology. IA has been found to be associated and correlated with a variety of psychiatric disorders (e.g., substance use disorder, depression, anxiety, stress, loneliness, psychological distress, attention-deficit hyperactivity disorder, self-esteem, hostility, etc.) and the relationships between IA and psychopathology have been studied in many countries (e.g., Bozoglan, Demirer, & Sahin, 2013; Cheung & Wong, 2011; Cheung et al., 2018; Ko, Yen, Yen, Chen, & Chen, 2012; Kuss et al., 2017; Islam & Hossin, 2016; Lin et al., 2018; Shi, Wang, & Zou, 2017; Simcharoen et al., 2018; Uddin et al., 2016; Younes et al., 2016). Although the American Psychiatric Association (2013) introduced 'internet gaming disorder' (IGD) as a tentative disorder in the most recent (fifth) edition of the *Diagnostic and Statistical Manual of Mental Disorders,* internet use disorder (and its derivatives such as IA was not0 (Kuss, Griffiths, & Binder, 2013). This is most likely due to the fact that IA is an umbrella term comprising other problematic behaviors such as internet gaming disorder, online gambling disorder, social media disorder, etc. and/or might be better explained as a consequence of other primary disorders (Ko et al., 2012). Irrespective of whether IA exists as a standalone disorder or not, further research is needed examining predisposing factors, etiological frameworks, and psychosocial or psychiatric comorbidities.

Four main types IA risk factors (i.e., sociodemographic variables, internet-related variables, psychosocial factors, and psychiatric comorbidities) were suggested by Kuss et al. (2014). Some variables that have been associated with PIU and IA include being male (Vigna-Taglianti et al., 2017), being a student at high school or university (Afrin et al., 2017; Uddin et al., 2016; Vigna-Taglianti et al., 2017), living in a city as opposed to rural areas (Ni, Yan, Chen, & Liu, 2009; Younes et al., 2016), being in a romantic relationship (Lee et al., 2016), sleep disturbance including sleeping too long or too little (Afrin et al., 2017; Bener et al., 2018; Morrison & Gore, 2010; Shahnaz & Karim, 2016), using the internet for a wide variety of social networking activities such as being on *Facebook*, *Twitter, YouTube,* or *Instagram*, blogging, playing online games, and accessing movie or music sites, and accessing pornography (e.g., Bener & Bhugra, 2013; Cheung, Chan, Lui, Tsui, & Chan, 2018; Kuss et al., 2014; Lee et al., 2016; Lin, Ko, & Wu, 2011; Mamun et al., 2019a; Morrison & Gore, 2010; Simcharoen et al., 2018; Vigna-Taglianti et al., 2017; Xin et al., 2018). The worldwide prevalence rates of IA have been noted as varying from 0% to 55% (Bozoglan, Demirer, & Sahin, 2013; Cheung et al., 2018; Kuss et al., 2013; Laconi et al., 2018; Lee et al., 2016; Shao et al., 2018; Younes et al., 2016; Yücens & Üzer, 2018). In Bangladesh (where the present study was carried out), the prevalence rates of IA have varied from 0% to 19% (Afrin et al., 2017; Islam & Hossin, 2016; Jahan et al., 2019; Karim & Nigar, 2014; Mamun et al., 2019b; Uddin et al., 2016) although rates of PIU have been reported as being as high as 46%. These wildly varying rates are most likely due to the use of non-representative samples, differing screening instruments (and differing cut-offs being used on the same screening instrument), and different conceptualizations of PIU and IA (Mamun & Griffiths, 2019a,c).

Internet penetration rates have increased over the past three decades. In Bangladesh, this has occurred due to the Bangladesh government wanting a technologically developed country, and is known as the 'Digital Bangladesh' movement. The movement is reflected by the fact that by March 2019 there were 93.1 million internet subscribers (BTRC, 2019; Mamun & Griffiths, 2019b). With increasing internet use, negative online behaviors have been reported in the country including

internet dependence, problematic internet use, and internet addiction (Mamun et al., 2019a,b,c). However, there is a relative scarcity of research addressing this emerging issue in Bangladesh. A few recent studies in the country asserted that further IA research is needed and that associated psychosocial and psychiatric comorbidities should be investigated (e.g., self-esteem, loneliness, hostility, personality disorders, etc.) (Islam & Hossin, 2016; Mamun et al., 2019b,c). Consequently, in order to fill this knowledge gap, the present study assessed the prevalence of PIU, and potential associated risk factors (i.e., socio-demographics, internet use behaviors, and a number of psychological issues (including self-esteem, loneliness, and psychological distress).

Methods

Participants and procedure: A cross-sectional 'paper-and-pencil' offline survey was conducted among students (N=662) at Jahangirnagar University (the second largest public university situated in the the capital city of Dhaka, Bangladesh) in November and December 2018. Data from 605 participants were kept for final analysis following the removal of incomplete questionnaires. The survey data were collected using a convenience sampling design during student lectures. The only criterion for inclusion was that participants were required to be internet users. Verbal and formal consent was taken before the interview and all ethical procedures regarding the study were provided to the participants according to the guidelines of the Declaration of Helsinki 1975. Additionally, participants were informed that all their information would be kept anonymous and confidential, and they were provided with information about the nature and purpose of the study, the procedure, and the right to withdraw their data.

Materials

Internet Addiction Test (IAT): Internet addiction was accessed using the Internet Addiction Test (Young, 1998). The IAT comprises 20 Likert-type questions (e.g., *"How often do your grades or school work suffer because of the amount of time you spend online?"*) assessed on a six-point scale (from 0 = *never* to 5 = *always*) and the total score on the IAT ranges from 20 to 100. In the present study, the cut-off score for PIU was 60, and the participants were separated into two groups i.e., problematic or non-problematic internet user groups based on IAT score. Adequate and acceptable reliability and validity have been demonstrated for the scale, and previous studies showed that it has a good validity and reliability (Anderson, Steen, & Stavropoulos, 2017). Good internal consistency was obtained in the current sample (Cronbach's α value = 0.89).

Rosenberg Self-Esteem Scale (RSES): The Rosenberg Self-Esteem Scale is a 63-item self-report scale (e.g., *"I am able to do things as well as most other people"*) assessed using a four-point Likert scale (from '*strongly agree'* to '*strongly disagree'*) to assess global feelings of self-worth and self-acceptance. Higher scores on the scale items indicate higher levels of self-esteem (Rosenberg, 1965). The scale entails of 12 sub-categories. The first 10 questions of the original scale were used in the present study. It is internally reliable, with a coefficient alpha of 0.80–0.84 (Kivimäki & Kalimo, 1996). Acceptable internal consistency was obtained in this sample (Cronbach's α value = 0.71).

UCLA Loneliness Scale (ULS): The University of California and Los Angeles (UCLA) Loneliness Scale was developed by Russell (1996) is used to assess college students' loneliness levels. The original questionnaire comprised 20 questions (e.g., *"How often do you feel that there is no one*

you can turn to?"), where items were scored from one to four (1=*never*, 4=*often*). The scale has adequate psychometric properties, has been extensively validated, and shows high internal consistency, with an alpha coefficient of 0.94 (Russell, 1996). The higher the score obtained on the scale, the higher the degree of loneliness. Acceptable internal consistency was obtained in the present study (Cronbach's α value = 0.79).

General Health Questionnaire (GHQ): The General Health Questionnaire (GHQ) was used to determine the presence or absence of psychological distress and was developed by Goldberg, Oldehinkel and Ormel (1998). The instrument was initially developed as a screening test for detecting minor psychiatric disturbance or strain. The GHQ Version 12 (GHQ-12) was used in the present study. It contains positively and negatively phrased questions (e.g., *"Felt constantly under strain?"*) in which each item is rated on a four-point scale: less than usual, no more than usual, rather more than usual, or much more than usual. In this study, the 0–0–1–1 scoring method was used which produces a score ranging from 0 to 12, with a higher score indicating higher psychological distress. The higher the score obtained on the scale, the higher the degree of psychological distress. Acceptable internal consistency was obtained in the present study (Cronbach's α value = 0.61).

Statistical analysis: SPSS 22.0 was used for statistical analysis. The analyses included descriptive statistics (i.e., frequencies and percentages for categorical variables and mean values with standard deviations for continuous variables), chi-square tests, Pearson correlation coefficients, and scale reliability analyses. All variables found significant in bivariate analysis were then entered into a binary logistic regression model with PIU as the dependent variable. The results of logistic regression are reported with unadjusted and adjusted odds ratios and 95% confidence intervals. A *p*-value less than 0.05 was considered as statistically significant.

Results

The characteristics of the total sample (*N*=605) are presented in Table 1. The participants' mean age was 20.26 years (*SD*=2.08 years). Of these 605 participants, 51.6% (n=312) were male and 48.4% (n=293) were female. Half of the participants were freshers (i.e., first-year students) and 80.7% of the total sample were single. Approximately 58% of the participants were normal sleepers (6-7 hours per day). Four-fifths of the sample used the internet for educational purposes (81.3%), 88.3% for chatting online with friends, and 86.9% for watching online videos (Table 1)

One hundred participants (16.5%) were classified as having PIU, with slightly more males (18.3%) scoring 60 or above in IAT score than females (14.7%) but this was not statistically significant (χ^2=1.414, df=1, p=0.234). Participants who had a longer than normal sleep time (26.6%) were significantly more like to be at risk of PIU compared to those who slept normally (11.7%) (χ^2=16.485, df=1, p<0.001). Participants who had a shorter than normal sleep time (19.1%) were significantly more like to be at risk of PIU compared to those who slept normally (11.7%) (χ^2=3.298, df=1, p=.048). Among participants who did not use the internet for educational purposes, 29.2% had PIU compared to 13.6% who did use the internet for educational purposes (χ^2=16.179, df=1, p<0.001). Among participants who used the internet to communicate with others, 17.6% had PIU compared to 8.5% who did not use the internet to communicate with others (χ^2=3.805, df=1, p=0.05) (Table 1).

The mean score on the IAT was 69.42 among those with PIU (*SD*=8.16) and 38.73 for the non-problematic internet users (*SD*=12.14) which was significant (t=-24.208, df=603, $p<0.001$). Results also demonstrated that problematic internet users showed significantly higher mean scores for loneliness (48.88 [±9.67] vs. 44.17 [± 9.98]; t=4.336, df=603, $p<0.001$), and psychological distress (4.75 [±1.88] vs. 5.40 [±2.08]; t=3.076, df=603, $p<0.001$), and significantly lower mean scores for self-esteem (23.20 [±4.72] vs. 25.42 [±4.55]; t=4.440, df=603, $p<0.001$). (Table 2). As seen in Table 3, there was a significant positive correlation between PIU and age, loneliness, and psychological distress, and a significantly negative correlation with self-esteem (Table 3).

All variables in the univariate analysis were entered into for the regression model. In the unadjusted model, having sleep disturbance (i.e., having more or less sleeping hours compared to the normal six to seven hours of sleep time), not using the internet for educational purposes, and using the internet for communication purposes significantly increased the likelihood of being a problematic internet user (Table 4).

Discussion

The present study assessed the prevalence rate of problematic internet use (PIU), and its' association with socio-demographic variables, internet use behaviors, and a number of psychological variables (i.e., self-esteem, loneliness, and psychological distress). In the present study, the prevalence rate of PIU using the IAT with a cut-off score of 60 (out of 100) was 16.5% (n=100). This is much higher that the rates reported in two previous Bangladeshi studies. In the first study, Mamun et al. (2019) reported that 3.9% of their sample of recent graduate job seekers scored ≥ 60 on the IAT (and also argued that being an active job seeker might be a protective factor because the individuals didn't have the time to spend hours a day on the internet because they were actively job-seeking). In the second study by Karim & Nigar (2014) reported that 1.74% university students in their sample scored ≥ 62 on the IAT. However, the prevalence rate reported in the present study is much lower than two other Bangladeshi studies examining PIU among university students with the IAT in the Bangladesh capital Dhaka. These two studies reported PIU prevalence rate as between 24% and 46% (Islam & Hossin, 2016; Uddin et al., 2016). Two other Bangladeshi studies using Orman's (non-validated) Internet Addiction Survey reported that 2.5% high school students in Chittagong were addicted to the internet (Afrin et al., 2017), and that 19.3% medical students in Dhaka were addicted to the internet (Jahan et al., 2019).

These differences in rates of PIU and IA are most likely due to sampling biases, the use of different screening instruments, and the different target populations studied (Mamun & Griffiths, 2019a). The differences may have also occurred due to different geographical location of studies and the age differences of the participants (Afrin et al., 2017; Vigna-Taglianti et al., 2017). However, compared with other recent studies in other countries, the ranges of PIU in Bangladesh are arguably less varied than elsewhere. Depending upon the different scales used, the different populations studied, and the different conceptualizations of problematic internet use, all studies show wide variations. For instance, prevalence rates of PIU have been reported as being 23% among university students in Turkey (Bozoglan et al., 2013), 17.2% among adolescents in Hong Kong (Cheung & Wong, 2011), 22.7% among secondary school adolescents in Hong Kong (Cheung et al., 2018), 27.8% among college students in China (Jiang & Shi, 2016), 16.8% among university students in the United States (Younes et al., 2016), 35.4% among the general population in South Korea (Lee et al., 2016), 36.7% among medical students in Thailand (Simcharoen et al., 2018),

12.1% among high school students in Italy (Vigna-Taglianti et al., 2017), 27% among university students in Turkey (Yücens & Üzesr, 2018), and between 14% and 33% in a large-scale European study among the participants aged 18 to 87 years old (Laconi et al., 2018).

Previous Bangladeshi research indicates males are more likely to be problematic internet users than females due to their high online sensation seeking behaviors (Islam & Hossin, 2016; Shahnaz & Karim, 2016). Although the present study found a slightly higher PIU prevalence rate among males, there was no significant gender difference, which is similar to a previous study that also found no gender differences among students (Bozoglan et al., 2013; Simcharoen et al., 2018). The present finding of no gender differences may be due to all students having equal access to online facilities on the same university campus.

As with the findings of the present study, previous studies have found an association between sleep disturbances and PIU (e.g., Afrin et al., 2017; Bener et al., 2018; Morrison & Gore, 2010) including insomnia (Cheung & Wong, 2011; Younes et al., 2016). It has been reported that individuals with IA have more irregular sleeping patterns and episodes of disturbed sleep than non-problematic internet users (Bener & Bhugra, 2013; Bener et al., 2018). In other studies conducted in Bangladesh, it has also been reported that having more and less sleeping time is a risk factor for IA (Afrin et al., 2017; Islam & Hossin, 2016; Jahan et al., 21019, Mamun & Griffiths, 2019a; Mamun et al., 2019b).

Previous studies outside of Bangladesh have reported many different risk factors for PIU and IA including the use of social media and social networking (i.e., Facebook, Twitter etc.), the use of online chat rooms, online gaming, online gambling, online shopping, and online sex and pornography use (Alexandraki, Stavropoulos, Burleigh, King, & Griffiths, 2018; Cheung et al., 2018; Kuss et al., 2014; Lin et al., 2011; Morrison & Gore, 2010; Simcharoen et al., 2018; Vigna-Taglianti et al., 2017; Xin et al., 2018). In the present study, some of these variables were assessed for the first time in a Bangladeshi context. The only risk factors for PIU that were identified were not using the internet for educational purposes and using the internet for communication purposes (e.g., online chatting).

Recently, IA has been become a topic of increasing research interest has found to be associated with numerous psychiatric disorders (Ko et al., 2012; Kuss et al., 2017), even can be life threatening in some cases (*see* [Mamun & Griffiths, 2019d] *for the consequences of gaming addiction*). As with previous studies, the present study found that loneliness was a risk factor of PIU (e.g., Bozoglan et al., 2013; Cheung et al., 2018; Shi et al., 2017; Simcharoen et al., 2018) as was poor psychological wellbeing (assessed using the GHQ in the present study). Most studies have found that any disruption of psychological wellbeing and psychological disturbances have a strong positive correlation with IA (Cheung & Wong, 2011; Islam & Hossin, 2016; Uddin et al., 2016), although some studies have reported that psychological distress does not necessarily play any role in IA (Niemz, Griffiths, & Banyard, 2005). This study also showed higher scores on psychological distress have higher level of PIU. Moreover, the present study also found that low self-esteem was associated with PIU as has been reported in previous studies (e.g., Widyanto & Griffiths, 2011). Self-esteem is described as individual's attitude to themselves and reflects how an individual evaluates their self-concept in the current situation (Aydm & San, 2011). A lower self-esteem score can be an indicator of psychological disturbance and poorer psychological

wellbeing, which can be predisposing factors in addictive behaviors such as IA (Bozoglan et al., 2013; Lin et al., 2018; Shi et al., 2017; Younes et al., 2016).

Limitations of the present study include the cross-sectional nature of data collection which cannot provide indications of causality factors underlying PIU among Bangladeshi individuals. Consequently, longitudinal investigations of IA in Bangladesh are needed to assess causal relationships between the assessed variables in the present study. Furthermore, the present study was conducted at only one university in Bangladesh so, the result cannot be generalized to other universities student samples in the country. Despite these limitations, this study will hopefully facilitate further study and provide culturally relevant applications and implication for education and intervention programs with the aim of reducing PIU.

Conclusions

The present study is the first in Bangladesh to assess relationship between psychological variables (i.e., loneliness, self-esteem, and psychological distress) and PIU. Approximately one-sixth of the participants in the present study had PIU (16.5%). Individuals who are lonely, have low self-esteem, and experience psychological distress were more likely to experience PIU. Whether PIU arises as a result of these psychological variables or that loneliness, low self-esteem, and psychological distress are a consequence of PIU (or both) remains unanswered.

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Table 1: Distribution of categorical variables among the total sample, non-problematic internet users, and problematic internet users

Variables	Total Participants (605); n (%)	Non-PIU (505, 83.5%); n (%)	PIU (100, 16.5%); n (%)	X^2 test value	*df*	*p*-value
Gender						
Male	312 (51.6)	255 (81.7)	57 (18.3)	1.414	1	0.234
Female	293 (48.4)	250 (85.3)	43 (14.7)			
Student status						
Fresher	307 (50.7)	259 (84.4)	48 (15.6)	0.361	1	0.548
Non-fresher	298 (49.3)	246 (82.6)	52 (17.4)			
Permanent residence						
Village	351 (58.8)	285 (81.2)	66 (18.8)	3.036	1	0.081
Town	246 (41.2)	213 (86.6)	33 (13.4)			
Relationship status						
Single	484 (80.7)	405 (83.7)	79 (16.3)	0.214	1	0.644
In a relationship	116 (19.3)	95 (81.9)	21 (18.1)			
Sleep status						
Normal (6-7 hours)	350 (57.9)	309 (88.3)	41 (11.7)	16.485	1	<0.001
More than normal	139 (23.0)	102 (73.4)	37 (26.6)			
Sleep status						
Normal (6-7 hours)	350 (57.9)	309 (88.3)	41 (11.7)	3.298	1	0.048
Less than normal	110 (18.1)	89 (80.9)	21 (19.1)			
Using the internet for educational or learning purposes						
Yes	492 (81.3)	425 (86.4)	67 (13.6)	16.179	1	<0.001
No	113 (18.7)	80 (70.8)	33 (29.2)			
Communicating online/online chatting						
Yes	534 (88.3)	440 (82.4)	94 (17.6)	3.805	1	0.050
No	71 (11.7)	65 (91.5)	6 (8.5)			
Online gaming						
Yes	268 (44.3)	220 (82.1)	48 (17.9)	0.666	1	0.415
No	337 (55.7)	285 (84.6)	52 (15.4)			
Watching online videos						
Yes	526 (86.9)	436 (82.9)	90 (17.1)	0.987	1	0.321
No	79 (13.1)	69 (87.3)	10 (12.7)			
Watching online sexually explicit materials or pornography						
Yes	163 (26.9)	130 (79.8)	33 (20.2)	2.234	1	0.135
No	442 (73.1)	375 (84.8)	67 (15.2)			
Using social media (*Facebook*, *Twitter* etc.)						
Yes	507 (83.8)	420 (82.8)	87 (17.2)	0.903	1	0.342
No	98 (16.2)	85 (86.7)	13 (13.3)			
Downloading online files						
Yes	477 (78.8)	394 (82.6)	83 (17.4)	1.241	1	0.265
No	128 (21.2)	111 (86.7)	17 (13.3)			
Online marketing						
Yes	273 (45.1)	228 (83.5)	45 (16.5)	0.001	1	0.978
No	332 (54.9)	277 (83.4)	55 (16.6)			

Table 2: Distribution of continuous variables among the total sample, non-problematic internet users, and problematic internet users

Variables	Total Participants (mean ± *SD*)	Non-PIU (mean ± *SD*)	PIU (mean ± *SD*)	t test value	*df*	*p*-value
Age (year)	20.260 ± 2.088	20.180 ± 2.173	20.649 ± 1.557	-1.988	551	0.047
Self-esteem score	25.056 ± 4.646	25.424 ± 4.547	23.200 ± 4.718	4.440	603	<0.001
Loneliness score	44.947 ± 10.073	44.168 ± 9.977	48.880 ± 9.668	-4.336	603	<0.001
Psychological distress score	4.861 ± 1.931	4.754 ± 1.883	5.400 ± 2.084	-3.076	603	<0.001

Table 3: Correlations between continuous variables

	1	2	3	4	5
Problematic internet use (1)	1				
Age (2)	0.141**	1			
Self-esteem (3)	-0.196**	0.025	1		
Loneliness (4)	0.188**	0.046	-0.108**	1	
Psychological distress (5)	0.142**	0.007	-0.085*	0.315**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 4: Risk factors for problematic internet use identified by binary logistic regression analysis

Predictors	Unadjusted model			Adjusted model		
	OR	95% CI	*p*-value	AOR	95% CI	*p*-value
Gender						
Male	1.300	0.843 - 2.003	0.235	1.216	0.680 - 2.177	0.509
Female	Reference			Reference		
Student status						
Fresher	0.877	0.571 - 1.347	0.548	1.206	0.645 - 2.256	0.557
Non-fresher	Reference			Reference		
Permanent residence						
Village	1.495	0.949 - 2.354	0.083	1.599	0.934 - 2.736	0.087
Town	Reference			Reference		
Relationship status						
Single	0.882	0.519 - 1.500	0.644	0.882	0.479 - 1.622	0.686
In a relationship	Reference			Reference		
Sleep status						
Normal (6-7 hours)	Reference		<0.001	Reference		0.012
Less than normal	2.734	1.662 - 4.497		1.543	0.799 - 2.981	
More than normal	1.778	0.999 - 3.165		2.391	1.344 - 4.253	
Using the internet for educational or learning purposes						
Yes	0.382	0.236 - 0.618	<0.001	0.355	0.190 - 0.663	0.001
No	Reference			Reference		
Communicating online/online chatting						
Yes	2.314	0.974 - 5.499	0.050	3.055	0.987 - 9.452	0.053
No	Reference			Reference		
Online gaming						
Yes	1.196	0.778 - 1.838	0.415	0.829	0.489 - 1.406	0.487

No	Reference			Reference		
Watching online videos						
Yes	1.424	0.707 - 2.871	0.323	1.350	0.548 - 3.327	0.514
No	Reference			Reference		
Watching online sexually explicit materials or pornography						
Yes	1.421	0.895 - 2.255	0.136	1.444	0.786 - 2.652	0.237
No	Reference			Reference		
Using social media (*Facebook, Twitter*, etc.)						
Yes	1.354	0.723 - 2.537	0.344	1.377	0.548 - 3.461	0.496
No	Reference			Reference		
Downloading online files						
Yes	1.375	0.784 - 2.414	0.267	1.355	0.630 - 2.916	0.437
No	Reference			Reference		
Online marketing						
Yes	0.994	0.646 - 1.530	0.978	1.033	0.609 - 1.751	0.904
No	Reference			Reference		
Age (y)	1.148	1.007 - 1.309	0.038	1.102	0.915 - 1.328	0.307
Self-esteem	0.911	0.872 - 0.952	<0.001	0.907	0.856 - 0.961	0.001
Loneliness	1.068	1.037 - 1.101	<0.001	1.038	1.005 - 1.073	0.023
Psychological distress	1.195	1.065 - 1.342	0.002	1.107	0.967 - 1.266	0.139