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Problematic internet use among high school students: Prevalence, associated factors and gender differences

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ABSTRACT

This study aimed to measure the prevalence of Problematic Internet Use (PIU) among high school students and to identify factors associated with PIU underlining gender differences. The students filled a self-administered, anonymous questionnaire collecting information on demographic characteristics and patterns of Internet use. Multiple logistic regression analysis was performed to identify factors associated with PIU in the overall sample and by gender. Twenty-five schools and 2022 students participated in the survey. Prevalence of PIU was 14.2% among males and 10.1% among females. Males 15-year-olds and females 14-year-olds had the highest PIU prevalence that progressively lowered with age among females. Only 13.5% of pupils declared parents controlled their Internet use. The sensation of feeling lonely, the frequency of use, the number of hours of connection, and visiting pornographic websites were associated with the risk of PIU in both genders. Attending vocational schools, the activities of chatting and file downloading, and the location of use at Internet point among males, and younger age among females were associated with PIU, whilst information searching was protective among females. PIU could become a public health problem in the next years. The physical and mental health consequences should be studied.

1. Introduction

Internet Addiction (IA) and Problematic Internet Use (PIU) have recently emerged as problems of social concern. Neither the International Statistical Classification of Diseases and Related Health Problems, tenth revision (ICD-10) (World Health Organization, 1992) nor the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) (American Psychiatric Association, 1995) assess IA and PIU as diseases, and no agreement for classifying such conditions has been reached within the scientific community (Block, 2008; Byun et al., 2009; Pies, 2009; Weinstein and Lejoyeux, 2010). Nonetheless, the DSM-V now includes Internet Gaming among the conditions warranting more clinical research in order to be assessed as a formal disorder (American Psychiatric Association, 2013).

In 1995, the American psychiatrist Ivan Goldberg coined the term "Internet Addiction Disorder" and proposed maladaptive use of the Internet, tolerance, and withdrawal as diagnostic criteria (Goldberg, 1995). Later, Young (1998) described IA as a disorder of impulse control and went on create and validate the Internet Addiction Test (IAT) (Young, 1999). Beard and Wolf introduced the term "Problematic Internet Use" (PIU) to identify excessive Internet use causing psychological, social, educational, and work problems in people's lives (Beard and Wolf, 2001). More recently, Meerkerk defined "Compulsive Internet Use" (CIU) as that characterized by preoccupation, loss of control, and use to escape from negative feelings (Meerkerk et al., 2009).

The prevalence of the disorder varies by context, assessment tools, and cut-offs scores (Ko et al., 2012). Studies using a cut-off score of IAT ≥50 found the prevalence of PIU to range between 5.8%

and 17.2% (Cao et al., 2011; Kilic et al., 2016; Koyuncu et al., 2014; Lam et al., 2009; Poli and Agrimi, 2012; Pontes et al., 2014; Rücker et al., 2015; Tan et al., 2016; Tang et al., 2014; Wang et al., 2011; Wu et al., 2016). Studies adopting lower cut-off scores reported higher PIU prevalence of between 12.8% and 20.9% in Greek population samples (Kormas et al., 2011; Tsitsika et al., 2009, 2016) and from 26.8% to 49.7% in other populations (Choi et al., 2009; Kim et al., 2006; Lim et al., 2015; Pawlowska et al., 2015; Pontes et al., 2014). A lower prevalence (4.0–6.0%) was reported by studies involving university students (Christakis et al., 2011; Ni et al., 2009), and a higher prevalence ranging from 10.7% (Johansson and Götestam, 2004) to 39.1% (Hawi, 2012) by those using phone or Internet as recruitment methods, respectively. Finally, studies utilizing other assessment tools (Chen Internet Addiction Scale, Diagnostic Questionnaire for Internet Addiction, Chinese Internet Addiction Scale, Compulsive Internet Use Scale) found a prevalence of between 4.2% and 26.8% (Canan et al., 2012; Chang et al., 2015; Durkee et al., 2012; Johansson and Götestam, 2004; Ko et al., 2008, 2009a, 2009b; Mei et al., 2016; Park et al., 2008; Sasmaz et al., 2014; Shek et al., 2008; Shek and Yu, 2016; van den Eijnden et al., 2010; Yang and Tung, 2007; Yen et al., 2007; Yen et al., 2008; Yu and Shek, 2013).

Teenagers are likely to be the most susceptible population: they are particularly vulnerable to the initiation of addictive behaviours and they are the population subgroup most exposed to the Internet (Grant et al., 2010; Huang and Shen, 2010).

To date, few prospective studies have investigated risk factors for IA and PIU. The unique life cohort analysed so far has mapped a longitudinal sequence from adolescent conflictual parent-child relationship to later internalizing behaviours, substance use problems, and affective disorders which, ultimately, were associated with symptoms of IA in early midlife (Zhang et al., 2016). In the two large prospective studies conducted on adolescents until now, one in Taiwan and the other in Hong Kong, male gender, family economic disadvantage, one-parent family, interparental conflicts, attention-deficit/hyperactivity disorder (ADHD), depression, aggressive behaviours, social phobia, and parental permission to use the Internet more than 2 h per day were predictors of internet addictive behaviours, whereas positive youth development was a protective factor (Ko et al., 2009a, 2015; Shek and Yu, 2016; Yu and Shek, 2013).

Cross-sectional adjusted studies have identified the following factors as correlates of IA and PIU: gender, age and age at first exposure, type of school, academic performance, urban context, socio-economic status, one-parent household, family rules and parental control, relationship with parents, parental communication about the Internet, peers and teachers, other risk behaviours, stressful life events, coping skills, selfesteem, depression, anxiety, ADHD, aggressive behaviours, amount of hours spent on the net, and activities of gaming, chatting, searching for sex information on the net (Chang et al., 2015; Durkee et al., 2012; Johansson and Götestam, 2004; Kilic et al., 2016; Ko et al., 2009a, 2009b; Kormas et al., 2011; Koyuncu et al., 2014; Lam et al., 2009; Mei et al., 2016; Ni et al., 2009; Rücker et al., 2015; Sasmaz et al., 2014; Shek et al., 2008; Tan et al., 2016; Tang et al., 2014; van den Eijnden et al., 2010; Wang et al., 2011; Yen et al., 2007; Yen et. al, 2008).

Two prospective studies have investigated the consequences of IA. Kraut et al. found an association between greater Internet use and a decline in participants' communication with family members in the household, a decline in the size of their social circle, and an increase in depression and loneliness (Kraut et al., 1998). Weiser noted that excessive Internet use negatively influenced psychological well-being by reducing social integration (Weiser, 2001).

Among the few studies investigating gender differences in risk factors for IA, Ko et al. reported that ADHD was associated with IA for both genders, whilst hostility and lack of care by parents were associated with IA only for males, and inter-parental conflicts and parental permission to use the Internet more than 2 h per day only for females (Ko et al., 2009a, 2015). Yen et al. noted that ADHD and depression were associated with IA for both genders, and again hostility only for males (Yen et al., 2007). Gender differences in other potential risk factors, such as frequency and characteristics of use, have not been investigated so far.

Because of the ubiquitous Internet use among today's adolescents, and depending on the health consequences of maladaptive use, IA and PIU could become a public health problem in the next years. Data on the prevalence of the condition, risk factors, effects on health, and gender differences are needed to inform effective prevention interventions by health care professionals. Moreover, since the bulk of research has been conducted in Asia, addressing the European context is desirable. Finally, there is a paucity of work on gender-related differences among factors associated with IA and PIU.

The aim of this study was to determine the prevalence of PIU among students in secondary education in a school district of northwest Italy, and to identify the factors associated with PIU underlining gender differences.

2. Methods

2.1. Study design and population

The study was carried out during the 2010/2011 school year following a cross-sectional study design.

All 25 high schools of the Pinerolo school district in province of Turin (Italy) were invited and agreed to participate in the study: 11 lyceums, 8 technical schools, and 6 three-year vocational schools. Parents were informed about the study aims and procedures during a School Internal Review Board meeting at the beginning of the school year. At each school, depending on teacher availability, one class per grade participated in the study, for a total of 97 classes (86%) and 2088 students. Eleven students (0.5%) did not fill the questionnaire; 55 students aged younger than 14 or older than 19 years were excluded from the sample, leaving a study population of 2022 students available for the analysis.

2.2. Data collection

Data were collected between December 2010 and March 2011. One hour of class time was devoted to presentation of the survey and administration and collection of the questionnaires in each class. The students were informed about the aims of the study, and that their participation was voluntary. The students accepting to participate completed a self-report, anonymous questionnaire under the supervision of their teachers and the study researchers. In order to ensure participant anonymity, the students deposited their questionnaire in a box.

The questionnaire was created ad hoc for this study. It included 43 items that investigated demographic characteristics (age, gender, type of school), patterns of Internet use (location of the Internet access point; number of Internet accesses per week; hours continuously spent online per day; activities carried out on the Internet: information searching, chatting, e-mailing, social networking, multi-user dungeon (MUD) gaming, downloading music and other files, shopping, gambling, visiting pornographic websites, indiscriminate surfing), parental control of Internet use ("Do you use the Internet under the control of your parents?"), sensation of feeling lonely ("How often do you feel lonely?"), and included the Italian version of the IAT (Young, 1999). Previously validated on cross-national samples, the IAT is the most widely used questionnaire to assess PIU and IA (Chang and Law, 2008; Ferraro et al., 2007; Wang et al., 2011; Widyanto and McMurran, 2004; Yen et al., 2009; Young, 1999; Young and Rogers, 1998). The test was derived from the DSM-IV criteria for pathological gambling and consists of 20 questions investigating the degree of preoccupation, compulsive use, behavioural problems, emotional changes, and diminished functionality related to Internet use as perceived by the respondent. The responses are marked on a Likert scale from 0 to 5 (0=Does not apply; 1=Never; 2=Rarely; 3=Occasionally; 4=Often; 5=Always). The overall score is classified in four categories: very low Internet use ($\leq$19); normal Internet use with good control and management of the time spent online (20–49); difficulties in

controlling and managing the time spent online, with some consequences for the person's life (50–79); and Internet use causing significant problems in the person's life, with important consequences for emotions, relationships, and social functioning (80–100) (Ngai, 2007; Young, 2012).

2.3. Statistical analysis

The study population was described according to the information collected and by gender. Internet users were classified by IAT score into two categories: non-problematic Internet users (NPIU) (IAT score 0–49); and problematic Internet users (PIU) (IAT score ≥50). Multiple logistic regression models were performed to identify factors independently associated with PIU in the overall sample and by gender. Correlation between variables was checked. In order to adjust for the possible cluster effect, the "robust" option of STATA was used. The model was run on 1886 students who reported using the Internet and provided complete information. No statistically significant differences were detected between the students excluded from and those included in the analysis. The Hosmer-Lemeshow chi-square test showed an excellent fit of the multiple logistic regression model (chi-square 0.98) (Lemeshow and Hosmer, 1982).

Statistical analyses were carried out using STATA software release 10.0 (Stata Corporation, 2007, College Station, TX, USA).

3. Results

The characteristics of the total sample (n=2022) are presented in Table 1. Forty-eight percent (n=972) were male and 52% were female (n=1048). The mean age was 16.2 years. The majority of the male students attended a vocational school (42.7%) or a lyceum (32.2%); the majority of the female students attended a lyceum (44.7%) or a technical school (33.5%).

Only 13 students (0.6%) reported they did not use the Internet. An IAT score indicating IA (≥80) was observed for only 0.4% of the sample; an IAT score indicating maladaptive Internet use (≥50) was noted for 12.1% percent of students (14.2% males and 10.1% females; p=0.005).

A higher proportion of males than females accessed the Internet every day or several times a day (61.5% vs 53.7%) and only 4.9% on average connected less than once a week. The amount of hours continuously connected was higher among the males than the females (11.4% vs. 8.0% connecting more than 4 h a day). The most common reasons for Internet use were information searching, social networking, and file downloading, with differences noted between the genders: males more often engaged in online role-play games (MUD), file downloading, shopping, gambling, visiting pornographic websites, and indiscriminate surfing, whereas the females more often engaged in information searching, chatting, e-mailing, and social networking. The majority of the students accessed the Internet from their home (68.8%) and only 1.8% from an Internet access point. Only 13.5% of the students reported parental control of their Internet use, with a higher proportion among the females than the males (16.1% vs. 10.5%). A higher proportion of females than males stated they felt lonely sometimes (62.3% vs. 39.2%) or often (7.8% vs. 6.2%).

Fig. 1 shows the proportion of PIU by age and gender. Overall, the prevalence of PIU was 16% for 14-year-olds and 9% for 18–19-yearolds. Among the females, the highest proportion was observed for 14- year-olds (17.2%), whilst among the males the highest proportion was observed for 15-year-olds (17.7%). Among the females, this proportion progressively declined with age (p for trend < 0.001), reaching the lowest value for the older age group, whilst the trend was less clear for the males, in which the proportion of PIU was 14.0% for the older age group. Frequency of MUD gaming increased from 15.3% for the 14-yearolds to 17.2% for the 16-year-olds, then dropped to 11.2% for the older age group (p for trend =0.081) (Fig. 2).

Frequency of online gambling and visiting pornographic websites did not differ by age. Indiscriminate surfing increased from 12.6% for the 14-year-olds to 19.6% for the 16- year-olds to

23.3% for the older age group (p for trend < 0.001). Parental control of Internet use dropped from 23% for 14-year-olds to 12.3% for 16-year-olds to 8.5% for 18–19-year-olds (p for trend < 0.001). Univariate analysis revealed statistically significant associations between PIU and all variables of interest (demographics, patterns of Internet use, psychological aspects), except for parental control, online shopping, social networking, and e-mailing (Table 2). In the adjusted model, gender, location of Internet access point, MUD gaming, downloading files, gambling, and indiscriminate surfing lost statistical significance (Table 2). Students attending a vocational high school had a 62% greater risk of developing PIU than lyceum students (OR 1.62; 95% CI 1.07–2.47), similarly to younger vs. older students (OR 1.71; 95% CI 1.08–2.70). A dose-response relationship emerged with the frequency of Internet use and the number of consecutive hours connected. Compared to those connecting once a week at most, the risk was 4 times higher among those connecting every day (OR 3.97; 95% CI 1.57–9.99), and 8 times higher among those connecting several times a day (OR 8.17; 95% CI 3.18–21.03). The risk of PIU was two times higher for students who spent 2–3 h a day on the net than those online for less than 2 h a day (OR 2.34; 95% CI 1.60–3.41); the risk was almost 5 times higher for those surfing the net 4–5 h per day (OR 4.64; 95% CI 2.67–8.08), and 6 times higher for those using the Internet for more than 5 h a day consecutively (OR 5.90; 95% CI 3.26–10.67).

Among Internet activities, visiting pornographic sites doubled the risk of PIU (OR 2.44; 95% CI 1.62–3.69), whereas Internet search for specific information (for study or other reasons) was protective (OR 0.48; 95% CI 0.33–0.70). No other activities were associated with the risk of PIU. Finally, students who reported feeling lonely "sometimes" or "often" had a risk 2 and 4 times higher (OR 2.25; 95% CI 1.56–3.24 and OR 3.65; 95% CI 2.05–6.51, respectively) than those who stated they never felt lonely.

Several gender differences in the factors associated with PIU were observed (Table 3). The frequency of Internet use, the number of consecutive hours connected, visiting pornographic websites, and the sensation of feeling lonely sometimes were independently associated with an increased risk of PIU for both genders. However, attending a vocational school, online chatting, file transferring, Internet access point location, and the sensation of often feeling lonely were associated with an increased risk of PIU only for the males, and younger age for the females. Moreover, information searching was associated with a lower risk of PIU for the females, and was only slightly significant for the males (p=0.071).

4. Discussion

The prevalence of Internet users in our study sample of high school students was 99.4%, which reflects the ubiquitous use of the Internet among young people (Internet World Statistics, 2017). Consistent with prevalence rates reported elsewhere (1.3% in Kilic et al. (2016); 0.6% in Lam et al. (2009); 0.8% in Poli and Agrimi (2012); 0% in Pontes et al. (2014); 1.2% in Villella et al. (2011); 0.2% in Wu et al. (2016)), the prevalence of IA in our sample was very low (0.4%). The prevalence of PIU was 12.1%, similar to that as measured by IAT in several Chinese studies (10.8% in Lam et al. (2009); 12.2% in Wang et al. (2011); 10.4% in Wu et al. (2016)), to the 11.7% reported by Rucker et al. in their Swiss study (Rücker et al., 2015), and to the 10.0% reported by Durkee et al. for the Italian sample of their European survey (Durkee et al., 2012). However, a lower prevalence of 5.8% was reported in the Italian study by Poli (Poli and Agrimi, 2012). Though the two studies were quite similar as regards general demographics, age and gender, the higher proportion of PIU we observed in our sample could be explained by the more recent year of our survey, which suggests an increase of the problem with time, by contextual factors such as the wealthier study area of their survey, and by the difference in the number of participating schools (25 in our study vs. 6 in the study by Poli).

The adjusted analysis showed that gender was not associated with the risk of PIU, consistent with the studies by Koyuncu et al. (2014), Wang et al. (2011) and Wu et al. (2016), whilst other studies,

however, found male gender to be an independent risk factor for PIU (Chang et al., 2015; Durkee et al., 2012; Kilic et al., 2016; Ko et al., 2009a; Kormas et al., 2011; Lam et al., 2009; Mei et al., 2016; Sasmaz et al., 2014; Shek and Yu, 2016; Tang et al., 2014; Yen et al., 2007, 2008).

The risk of PIU was highest for the 14–15 year age group, and was more evident for the females. Moreover, though the prevalence of PIU progressively decreased with age among the females, an age-related decrease among the males was less clear. To our knowledge, this is the first time that such a finding is shown. Due to the cross-sectional design of the study, this result could be due to differences in Internet use prevalence year by year, with adolescents born in 1993 less apt to use the Internet and develop problematic Internet use than their counterparts born in 1994, 1995, 1996, or later. On the other hand, this result is consistent with the observation that younger adolescents are more vulnerable to novelty and to risky and compulsive behaviours since they have relatively few mechanisms for coping and may be less resilient (Berkowitz and Begun, 2006). Better coping mechanisms and greater resilience in late adolescence could explain the lower risk behaviour with age among the females (Amaro et al., 2001; Hess and Richards, 1999).

Our observation of a higher risk of PIU for vocational school students than for those attending a lyceum is similar to what observed in the Italian study by Poli (Poli and Agrimi, 2012), and in other studies (Kilic et al., 2016; Yen et al., 2008). In Italy, vocational school students generally come from families with a low socio-economic status, a characteristic that has been associated with higher PIU risk (Mei et al., 2016; Shek and Yu, 2016; Wang et al., 2011).

The frequency of connection to the Internet and the amount of hours spent online were observed to increase the risk of PIU with a dose response effect, a common finding in cross-sectional adjusted studies (Johansson and Götestam, 2004; Koyuncu et al., 2014; Ni et al., 2009; Sasmaz et al., 2014; Wang et al., 2011). Among the activities carried out on the net, visiting pornographic sites was associated with an increased risk of PIU, whilst using the Internet to search for specific information had a protective effect. These results, too, are consistent with previous work (Johansson and Götestam, 2004; Kormas et al., 2011; Shek et al., 2008; Wang et al., 2011; Weiser, 2001). However, since cross-sectional studies are affected by possible reverse bias, it is still unclear whether the amount of time spent online and the types of activities young people engage in while on the net precede (and cause) or are consequent to the development of PIU. Prospective studies are needed to clarify this point, as well as the role of other variables possibly acting as risk factors.

Our observation that parental control of Internet use was not a protective factor contrasts with the studies by Ko et al. (2015), and Wu et al. (2016), and previous studies on other risk behaviours among adolescents (Guo et al., 2011; Mahabee-Gittens et al., 2013; Van Ryzin et al., 2012). Parental control was higher in the younger age groups among which PIU was more frequent. Though parents generally slacken control of their children as they grow up, the proportion of students using the Internet under parental supervision was quite low in our sample, even among the younger age groups. Since parental rules about the content of Internet use and quality of parental communication about Internet use have been shown to prevent compulsive internet use (van den Eijnden et al., 2010), interventions to increase parents' awareness of the protective role of parental control behaviours and the value of guided Internet use during adolescence are advisable.

The sensation of feeling lonely was associated with a higher risk of PIU, as observed in previous studies (Koyuncu et al., 2014; MorahanMartin, 1999; Morahan-Martin and Schumacher, 2000). This finding was expected, since depression symptoms are commonly associated with the risk of maladaptive Internet use (Carli et al., 2013; Ho et al., 2014; Ko et al., 2009a, 2012; Lam, 2014; Sasmaz et al., 2014; Tan et al., 2016; Wu et al., 2016; Yen et al., 2007, 2008; Zhang et al., 2016). In their prospective study, however, Kraut et al. found a causal relationship between greater Internet use and depression and loneliness (Kraut et al., 1998). Also here the role of predictor or consequence of problematic use needs to be elucidated.

We noted that the association between loneliness and PIU was stronger for the males: among those reporting they often felt lonely often the risk of PIU was 6 times higher than among those who stated they never felt lonely. The result is clearly a call for action in the development of preventive

interventions, especially if loneliness will be confirmed as a predictor of PIU in future research. We noted several gender differences in the factors associated with PIU. Younger age was associated with the risk of PIU only for the females, and attending a vocational school only for males; information searching was a stronger protective factor for the females than the males, whilst online chatting and file transferring, and Internet point access outside the home, and the sensation of feeling lonely often were all associated with the risk of PIU only for the males. No comparison with the literature can be made owing to the paucity of studies on gender differences in the risk factors for PIU. However, some results are consistent with what previously observed: for example, online chatting was more frequent among the males also in the study by Poli (Poli and Agrimi, 2012).

This study has several strengths. It involved all the secondary education institutions of the district; the sample included students of all school grades, the sample size was adequate, and the possible risk factors were evaluated through adjusted analyses.

The study has also several limitations. The cross-sectional study design did not allow us to evaluate the temporal sequence of the events. So, the factors we identified might actually follow the onset of the problem as a consequences or symptom of PIU. A second possible bias of the present study is that voluntary participation (one class for each grade) could have led to a selection of subjects and thus limit the generalizability of the findings. However, since it is common practice in Italy to compose classes so as to achieve high diversity within each class and high homogeneity between classes, it is unlikely that the study sample substantially differed from the general school population. Finally, due to missing data, the adjusted model was run on 93.3% of subjects; however, no statistically significant differences were found between the overall population and the analysis sample.

If the prevalence of PIU as measured in our study correctly estimated the problem, a large number of Italian adolescents may already be maladaptive Internet users: applying the value of 12.1% to 2647,057 Italian high school students (ISTAT, 2014), the estimated number of potentially problematic Internet users could be 320,293. This is a large population at risk of developing health problems due to PIU, and could become a public health problem in the next years. It is therefore urgent for researchers to carry out large, well-designed prospective studies to identify the physical and mental health consequences of maladaptive Internet use, and for public health professionals to implement interventions that promote safe Internet use among adolescents. Periodic surveys measuring PIU and IA at the European level, or incorporating measures of PIU and IA in future data-collection waves of the European School Survey Project on Alcohol and Other Drugs (ESPAD) or the Health Behaviour in School-aged Children (HBSC) survey, could be useful to monitor the problem.

References

1. Amaro, H., Blake, S.M., Schwartz, P.M., Flinchbaugh, L.J., 2001. Developing theory-based substance abuse prevention programs for young adolescent girls. J. Early Adolesc. 21, 256–293.

2. American Psychiatric Association, 1995. Diagnostic and Statistical Manual of Mental Disorders. (4th ed.). Washington, DC.

3. American Psychiatric Association, 2013. Internet Gaming Disorder Factsheet. (www.dsm5.org/Documents/Internet%20Gaming%20Disorder%20Fact%20Sheet.pdf).

4. Beard, K.W., Wolf, E.M., 2001. Modification in the proposed diagnostic criteria for Internet addiction. Cyber. Behav. 4, 377–383.

5. Berkowitz, M.W., Begun, A.L., 2006. Designing prevention programs: the developmental perspective. In: Sloboda, Z., Bukoski, W.J. (Eds.), Handbook of Drug Abuse Prevention. Springer, New York, pp. 327–348.

6. Block, J.J., 2008. Issues for DSM-V: internet addiction. Am. J. Psychiatry 165, 306–307.

7. Byun, S., Ruffini, C., Mills, J.E., Douglas, A.C., Niang, M., Stepchenkova, S., et al., 2009. Internet addiction: metasynthesis of 1996–2006 quantitative research. Cyber. Behav. 12, 203–207.

8. Canan, F., Ataoglu, A., Ozcetin, A., Icmeli, C., 2012. The association between Internet addiction and dissociation among Turkish college students. Compr. Psychiatry 53, 422–426.

9. Cao, H., Sun, Y., Wan, Y., Hao, J., Tao, F., 2011. Problematic Internet use in Chinese adolescents and its relation to psychosomatic symptoms and life satisfaction. BMC Public Health 11, e802.

10. Carli, V., Durkee, T., Wasserman, D., Hadlaczky, G., Despalins, R., Kramarz, E., et al., 2013. The association between pathological internet use and comorbid psychopathology: a systematic review. Psychopathology 46, 1–13.

11. Chang, F.C., Chiu, C.H., Miao, N.F., Chen, P.H., Lee, C.M., Chiang, J.T., et al., 2015. The relationship between parental mediation and Internet addiction among adolescents, and the association with cyberbullying and depression. Compr. Psychiatry 57, 21–28.

12. Chang, M.K., Law, S.P.M., 2008. Factor structure for Young's Internet Addiction Test: a confirmatory study. Comput. Hum. Behav. 24, 2597–2619.

13. Choi, K., Son, H., Park, M., Han, J., Kim, K., Lee, B., et al., 2009. Internet overuse and excessive daytime sleepiness in adolescents. Psychiatry Clin. Neurosci. 63, 455–462.

14. Christakis, D.A., Moreno, M.M., Jelenchick, L., Myaing, M.T., Zhou, C., 2011. Problematic internet usage in US college students: a pilot study. BMC Med. 11, e77.

15. Durkee, T., Kaess, M., Carli, V., Parzer, P., Wasserman, C., Floderus, B., et al., 2012. Prevalence of pathological internet use among adolescents in Europe: demographic and social factors. Addiction 107 (12), 2210–2222.

16. Ferraro, G., Caci, B., D'Amico, A., Di Blasi, M., 2007. Internet addiction disorder: an Italian study. Cyber. Behav. 10, 170–175.

17. Goldberg, I., 1995. Internet Addiction Disorder. http://users.rider.edu/~suler/psycyber/index.html .

18. Grant, J.E., Potenza, M.N., Weinstein, A., Gorelick, D.A., 2010. Introduction to behavioural addictions. Am. J. Drug Alcohol Abus. 36, 233–241.

19. Guo, H., Reeder, A.I., McGee, R., Darling, H., 2011. Adolescents' leisure activities, parental monitoring and cigarette smoking–a cross-sectional study. Subst. Abus. Treat., Prev., Policy 6, 12.

20. Hawi, N.S., 2012. Internet addiction among adolescents in Lebanon. Comput. Hum. Behav. 28, 1044–1053.

21. Hess, R.S., Richards, M.L., 1999. Developmental and gender influences on coping: implications for skills training. Psychol. Sch. 36, 149–157.

22. Ho, R.C., Zhang, M.W., Tsang, T.Y., Toh, A.H., Pan, F., Lu, Y., et al., 2014. The association between internet addiction and psychiatric co-morbidity: a meta-analysis. BMC Psychiatry 14, 183.

23. Huang, S., Shen, F., 2010. Influencing factors of adolescents internet addiction. In: Proceedings of the 2010 IEEE 2nd Symposium, Web Society (SWS), August 16-17, Beijing (China), pp. 507–512.

24. Internet World Statistics, 2017. Usage and population statistics. Internet Users in Europe - March 31 2017. (http://www.internetworldstats.com).

25. ISTAT (National Institute for Statistics), 2014. Scuola secondaria di secondo grado. Anno di chiusura del periodo scolastico. (http://dati.istat.it/Index.aspx?DataSetCode=DCIS_SCUOLESECOND2).

26. Johansson, A., Götestam, K.G., 2004. Internet addiction: characteristics of a questionnaire and prevalence in Norwegian youth (12-18 years). Scand. J. Psychol. 45, 223–229.

27. Kilic, M., Avci, D., Uzuncakmak, T., 2016. Internet addiction in high school students in Turkey and multivariate analyses of the underlying factors. J. Addict. Nurs. 27 (1), 39–46.

28. Kim, K., Ryu, E., Chon, M.Y., Yeun, E.J., Choi, S.Y., Seo, J.S., et al., 2006. Internet addiction in Korean adolescents and its relation to depression and suicidal ideation: a questionnaire survey. Int. J. Nurs. Stud. 43, 185–192.

29. Ko, C.H., Wang, P.W., Liu, T.L., Yen, C.F., Chen, C.S., Yen, J.Y., 2015. Bidirectional associations between family factors and Internet addiction among adolescents in a prospective investigation. Psychiatry Clin. Neurosci. 69, 192–200.

30. Ko, C.H., Yen, J.Y., Chen, C.S., Yeh, Y.C., Yen, C.F., 2009a. Predictive values of psychiatric symptoms for internet addiction in adolescents: a 2-year prospective study. Arch. Pediatr. Adolesc. Med. 163, 937–943.

31. Ko, C.H., Yen, J.Y., Liu, S.C., Huang, C.F., Yen, C.F., 2009b. The association between aggressive behaviors and internet addiction and online activities in adolescents. J. Adolesc. Health 44, 598–605.

32. Ko, C.H., Yen, J.Y., Yen, C.F., Chen, C.S., Chen, C.C., 2012. The association between Internet addiction and psychiatric disorder: a review of the literature. Eur. Psychiatry 27, 1–8.

33. Ko, C.H., Yen, J.Y., Yen, C.F., Chen, C.S., Weng, C.C., Chen, C.C., 2008. The association between Internet addiction and problematic alcohol use in adolescents: the problem behaviour model. Cyber. Behav. 11 (5), 571–576.

34. Kormas, G., Critselis, E., Janikian, M., Kafetzis, D., Tsitsika, A., 2011. Risk factors and psychosocial characteristics of potential problematic and problematic internet use among adolescents: a cross-sectional study. BMC Public Health 11, e595.

35. Koyuncu, T., Unsal, A., Arslantas, D., 2014. Assessment of internet addiction and loneliness in secondary and high school students. J. Pak. Med. Assoc. 64 (9), 998–1002.

36. Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., Scherlis, W., 1998. Internet paradox. A social technology that reduces social involvement and psychological well-being? Am. Psychol. 53, 1017–1031.

37. Lam, L.T., 2014. Risk factors of Internet addiction and the health effect of internet addiction on adolescents: a systematic review of longitudinal and prospective studies. Curr. Psychiatry Rep. 16 (11), 508.

38. Lam, L.T., Peng, Z.W., Mai, J.C., Jing, J., 2009. Factors associated with Internet addiction among adolescents. Cyber. Behav. 12, 551–555.

39. Lemeshow, S., Hosmer, D.W., 1982. A review of goodness of fit statistics for use in the development of logistic regression models. Am. J. Epidemiol. 115, 92–106.

40. Lim, J.A., Gwak, A.R., Park, S.M., Kwon, J.G., Lee, J.Y., Jung, H.Y., et al., 2015. Are adolescents with internet addiction prone to aggressive behavior? The mediating effect of clinical comorbidities on the predictability of aggression in adolescents with internet addiction. Cyberphyscol., Behav. Social. Netw. 18 (5), 260–267.

41. Mahabee-Gittens, E.M., Xiao, Y., Gordon, J.S., Khoury, J.C., 2013. The dynamic role of parental influences in preventing adolescent smoking initiation. Addict. Behav. 38, 1905–1911.

42. Meerkerk, G.J., van den Eijnden, R.J.J.M., Vermulst, A.A., Garretsen, H., 2009. The compulsive internet use scale (CIUS), Some psychometric properties. Cyberphyscol. Behav. 12 (1), 1–6.

43. Mei, S., Yau, Y.H., Chai, J., Guo, J., Potenza, M.N., 2016. Problematic Internet use, wellbeing, self-esteem and self-control: data from a high-school survey in China. Addict. Behav. 61, 74–79.

44. Morahan-Martin, J., 1999. The relationship between loneliness and internet use and abuse. Cyberphyscol. Behav. 2, 431–439.

45. Morahan-Martin, J., Schumacher, P., 2000. Incidence and correlates of pathological Internet use among college students. Comput. Hum. Behav. 16, 13–29.

46. Ngai, S.S., 2007. Exploring the validity of the Internet addiction test for students in grades 5-9 in Hong Kong. Int. J. Adolesc. Youth 13, 221–237.

47. Ni, X., Yan, H., Chen, S., Liu, Z., 2009. Factors influencing internet addiction in a sample of freshmen university students in China. Cyberphyscol. Behav. 12, 327–330.

48. Park, S.K., Kim, J.Y., Cho, C.B., 2008. Prevalence of Internet addiction and correlations with family factors among South Korean adolescents. Adolescence 43, 895–909.

49. Pawlowska, B., Zygo, M., Potembska, E., Kapka-Skrzypczak, L., Dreher, P., Kedzierski, Z., 2015. Prevalence of Internet addiction and risk of developing addiction as exemplified by a group of Polish adolescents from urban and rural areas. Ann. Agric. Environ. Med. 22 (1), 129–136.

50. Pies, R., 2009. Should DSM-V designate "Internet Addiction" a mental disorder? Psychiatry 6, 31–37.

51. Poli, R., Agrimi, E., 2012. Internet addiction disorder: prevalence in an Italian student population. Nord. J. Psychiatry 66, 55–59.

52. Pontes, H.M., Patrao, I.M., Griffiths, M.D., 2014. Portuguese validation of the Internet Addiction Test: an empirical study. J. Behav. Addict. 3 (2), 107–114.

53. Rücker, J., Akre, C., Berchtold, A., Suris, J.C., 2015. Problematic Internet use is associated with substance use in young adolescents. Acta Paediatr. 104 (5), 504–507.

54. Sasmaz, T., Oner, S., Kurt, A.Ö., Yapici, G., Yazici, A.E., Bugdayci, R., et al., 2014. Prevalence and risk factors of Internet addiction in high school students. Eur. J. Public Health 24 (1), 15–20.

55. Shek, D.T.L., Tang, M.Y., Lo, C.Y., 2008. Internet addiction in Chinese adolescents in Hong Kong: assessment, profiles, and psychosocial correlates. Sci. World J. 8, 776–787.

56. Shek, D.T.L., Yu, L., 2016. Adolescent internet addiction in Hong Kong: prevalence, change, and correlates. J. Pediatr. Adolesc. Gynecol. 29, S22–S30.

57. Stata Corporation, 2007. Stata Statistical Software: Release 10. 0. Stata Corporation, College Station, TX.

58. Tan, Y., Chen, Y., Lu, Y., Li, L., 2016. Exploring associations between Problematic Internet Use, Depressive Symptoms and Sleep Disturbance among Southern Chinese Adolescents. Int. J. Environ. Res. Public Health 13, 313.

59. Tang, J., Yu, Y., Du, Y., Ma, Y., Zhang, D., Wang, J., 2014. Prevalence of internet addiction and its association with stressful life events and psychological symptoms among adolescent internet users. Addict. Behav. 39 (3), 744–747.

60. Tsitsika, A.K., Andrie, E.K., Psaltopoulou, T., Tzavara, C.K., Sergentanis, T.N., NtanasisStathopoulos, I., et al., 2016. Association between problematic internet use, sociodemographic variables and obesity among European adolescents. Eur. J. Public Health 26 (4), 617–622.

61. Tsitsika, A., Critselis, E., Kormas, G., Filippopoulou, A., Tounissidou, D., Freskou, A., et al., 2009. Internet use and misuse: a multivariate regression analysis of the predictive factors of internet use among Greek adolescents. Eur. J. Pediatr. 168, 655–665.

62. van den Eijnden, R.J.J.M., Spijkerman, R., Vermulst, A.A., van Rooij, T.J., 2010. Compulsive Internet Use among adolescents: bidirectional parent-child relationships. J. Abnorm. Child Psychol. 38, 77–89.

63. Van Ryzin, M.J., Fosco, G.M., Dishion, T.J., 2012. Family and peer predictors of substance use from early adolescence to early adulthood: an 11-year prospective analysis. Addict. Behav. 37, 1314–1324.

64. Villella, C., Martinotti, G., Di Nicola, M., Cassano, M., La Torre, G., Gliubizzi, M.D., et al., 2011. Behavioural addictions in adolescents and young adults: results from a prevalence study. J. Gambl. Stud. 27 (2), 203–214.

65. Wang, H., Zhou, X., Lu, C., Wu, J., Deng, X., Hong, L., 2011. Problematic internet use in high school students in Guangdong Province, China. PLoS One 6 (5), e19660.

66. Weinstein, A., Lejoyeux, M., 2010. Internet addiction or excessive internet use. Am. J. Drug Alcohol Abus. 36, 277–283.

67. Weiser, E.B., 2001. The functions of internet use and their social and psychological consequences. Cyberphyscol. Behav. 4, 723–743.

68. Widyanto, L., McMurran, M., 2004. The psychometric properties of the internet addiction test. Cyberphyscol. Behav. 7, 443–450.

69. World Health Organization, 1992. International statistical classification of disease and related health problems. Tenth Revision (ICD-10), Geneva.

70. Wu, X.S., Zhang, Z.H., Zhao, F., Wang, W.J., Li, Y.F., Bi, L., et al., 2016. Prevalence of Internet addiction and its association with social support and other related factors among adolescents in China. J. Adolesc. 52, 103–111.

71. Yang, S.C., Tung, C.J., 2007. Comparison of Internet addicts and non-addicts in Taiwanese high school. Comput. Hum. Behav. 23, 79–96.

72. Yen, C.F., Ko, C.H., Yen, J.Y., Chang, Y.P., Cheng, C.P., 2009. Multi-dimensional discriminative factors for Internet addiction among adolescents regarding gender and age. Psychiatry Clin. Neurosci. 63, 357–364.

73. Yen, J.Y., Ko, C.H., Yen, C.F., Chen, S.H., Chung, W.L., Chen, C.C., 2008. Psychiatric symptoms in adolescents with internet addiction: comparison with substance use. Psychiatry Clin. Neurosci. 62, 9–16.

74. Yen, J.Y., Ko, C.H., Yen, C.F., Wu, H.Y., Yang, M.J., 2007. The comorbid psychiatric symptoms of Internet addiction: attention deficit and hyperactivity disorder (ADHD), depression, social phobia, and hostility. J. Adolesc. Health 41, 93–98.

75. Young, K., 1999. In: Vande Creek, L., Jackson, T. (Eds.), Internet Addiction: Symptoms, Evaluation and Treatment. Innovations in clinical practice, Sarasota, FL, pp. 19–31.

76. Young, K.S., 1998a. Internet addiction: the emergence of a new clinical disorder. Cyberphyscol. Behav. 1, 237–244.

77. Young, K.S., 2012. The Internet Addiction Test. Center for on-line Addiction, Bradford, PA. (http//www.netaddiction.com).

78. Young, K.S., Rogers, R.C., 1998b. The relationship between depression and internet addiction. Cyber. Behav. 1, 25–28.

79. Yu, L., Shek, D.T.L., 2013. Internet addiction in Hong Kong adolescents: a three-year longitudinal study. J. Pediatr. Adolesc. Gynecol. 26, S10–S17.

80. Zhang, C., Brook, J.S., Leukefeld, C.G., Brook, D.W., 2016. Longitudinal psychosocial factors related to symptoms of Internet addiction among adults in early midlife. Addict. Behav. 62, 65–72.

Table 1
Description of participants, by gender.

Characteristic	Males (n=972)		Females (n=1048)		Overall (n=2022)		P-value
	n	%	n	%	n	%	
Age (years)							
14	163	16.8	169	16.1	332	16.4	0.918
15	200	20.6	221	21.1	421	20.8	
16	206	21.2	204	19.5	410	20.3	
17	192	19.8	216	20.6	409	20.2	
18	165	17.0	183	17.5	349	17.2	
19	46	4.7	55	5.3	101	5.0	
Mean ± SD	16.1	± 1.5	16.2	± 1.5	16.2	± 1.5	0.736
Type of school							
Lyceum	313	32.2	468	44.7	782	38.7	< 0.0001
Technical	244	25.1	351	33.5	595	29.4	
Vocational	415	42.7	229	21.9	645	31.9	
Internet use							
Yes	964	99.2	1043	99.5	2009	99.4	0.331
No	8	0.8	5	0.5	13	0.6	
Internet Addiction Test score							
0–19	19	2.1	11	1.1	30	1.6	< 0.0001
20–49	756	83.6	893	88.9	1650	86.3	
50–79	126	13.9	97	9.7	224	11.7	
80–100	3	0.3	4	0.4	7	0.4	
Frequency of Internet use							
Less than once per week	42	4.4	57	5.5	99	4.9	0.002
At least once per week	77	8.0	112	10.8	190	9.5	
Several times a week	250	26.1	313	30.0	563	28.1	
Daily	383	39.9	394	37.8	778	38.8	
Several times a day	207	21.6	166	15.9	373	18.6	
Internet use without interruption (hours/day)							
Less than 2	570	59.4	673	64.7	1243	62.1	0.004
2–3	281	29.3	284	27.3	565	28.2	
4–5	50	5.2	51	4.9	103	5.1	
More than 5	59	6.2	32	3.1	91	4.6	
Online activities							
Information searching	749	77.7	913	87.5	1663	82.8	< 0.0001
Online chatting	634	65.8	713	68.4	1349	67.2	0.217
E-mailing	463	48.0	556	53.3	1020	50.8	0.018
Social networking	651	67.5	800	76.7	1453	72.3	< 0.0001
Multi User Dungeon gaming	216	22.4	71	6.8	287	14.3	< 0.0001
File downloading (music or other)	735	76.2	739	70.9	1476	73.5	0.006
Online shopping	189	19.6	86	8.3	277	13.8	< 0.0001
Online gambling	128	13.3	21	2.0	149	7.4	< 0.0001
Visiting pornographic websites	291	30.2	31	3.0	323	16.1	< 0.0001
Indiscriminate surfing	251	26.1	117	11.2	368	18.4	< 0.0001
Location of Internet use							
At home	656	68.3	722	69.2	1380	68.8	0.792
Everywhere	286	29.8	304	29.2	590	29.4	
Internet point	19	2.0	17	1.6	36	1.8	
Parental control on Internet use							
Yes	101	10.5	167	16.1	269	13.5	< 0.0001
No	861	89.5	869	83.9	1731	86.6	
Sensation of feeling lonely							
Often	59	6.2	81	7.8	141	7.0	< 0.0001
Sometimes	376	39.2	649	62.3	1025	51.2	
Never	524	54.6	312	29.9	837	41.8	

Fig. 1. Prevalence of Problematic Internet Use, by gender and age. Test for trend: males $p = 0.396$; females $p < 0.0001$.
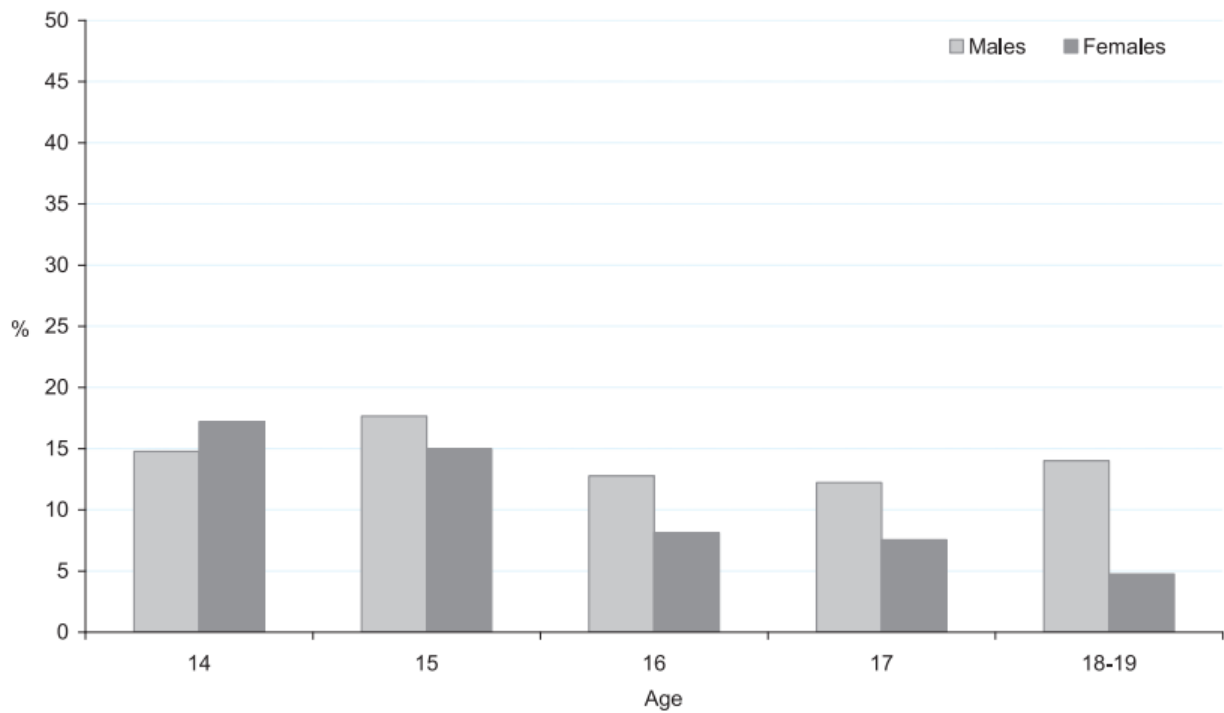

Fig. 2. Frequency of online activities and parental control, by age. Test for trend: MUD gaming $p = 0.081$; online gambling $p = 0.494$; visiting pornographic websites $p = 0.704$; indiscriminate surfing $p < 0.0001$; parental control $p < 0.0001$.
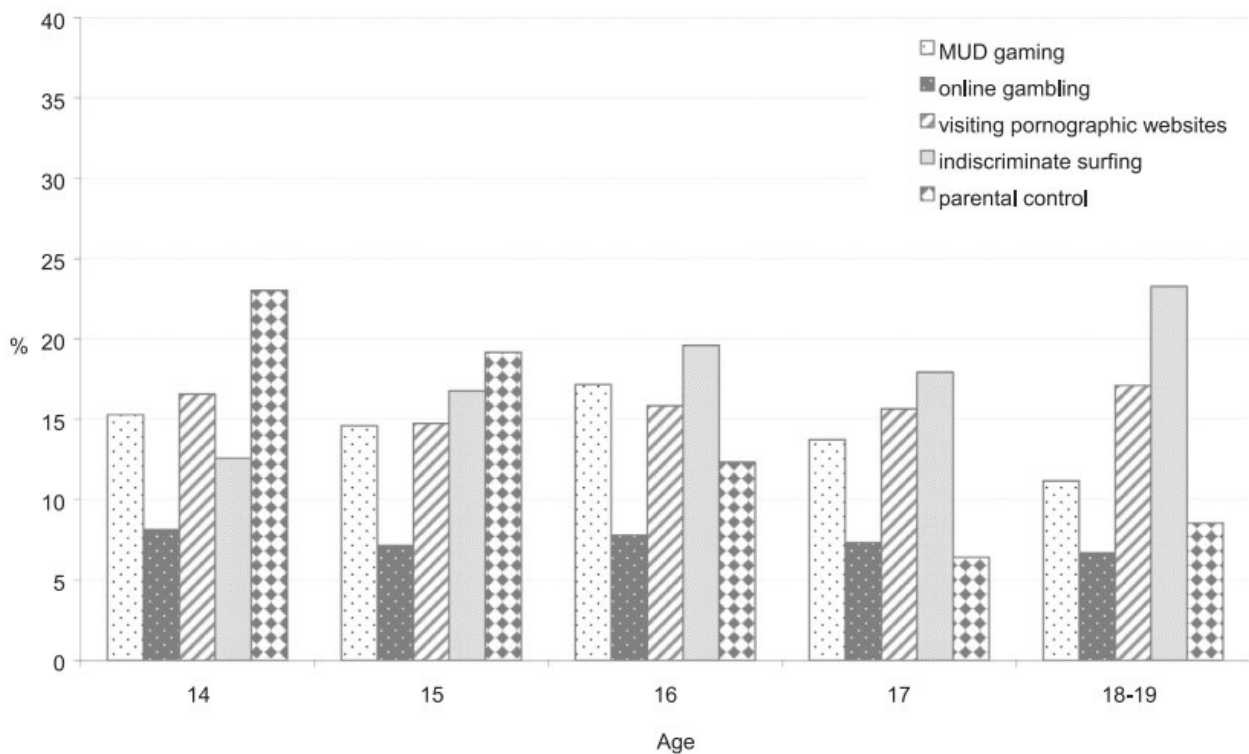
Table 2
Factors associated with PIU, overall sample.

Characteristic	PIU (n = 226)		NPIU (n = 1660)		Odds Ratios (95% CI)	Adj Odds Ratios[a] (95% CI)	P-value
	n	%	*n*	%			
Gender							
Female	101	44.7	895	53.9	1	1	
Male	125	55.3	765	46.1	**1.45 (1.09–1.91)**	0.87 (0.59–1.29)	0.491
Age							
18–19	39	17.3	389	23.4	1	1	
16–17	77	34.1	690	41.6	1.11 (0.74–1.67)	0.86 (0.54–1.37)	0.514
14–15	110	48.7	581	35.0	**1.89 (1.28–2.78)**	**1.71 (1.08–2.70)**	**0.022**
Type of school							
Lyceum	57	25.2	698	42.0	1	1	
Technical	66	29.2	486	29.3	**1.66 (1.14–2.41)**	1.32 (0.87–2.01)	0.195
Vocational	103	45.6	476	28.7	**2.65 (1.88–3.74)**	**1.62 (1.07–2.47)**	**0.024**
Frequency of Internet use							
Once per week or less	7	3.1	255	15.4	1	1	
Several times a week	25	11.1	504	30.4	1.81 (0.77–4.23)	1.82 (0.69–4.79)	0.223
Daily	97	42.9	647	39.0	**5.46 (2.50–11.92)**	**3.97 (1.57–9.99)**	**0.003**
Several times a day	97	42.9	254	15.3	**13.91 (6.34–30.55)**	**8.17 (3.18–21.03)**	**< 0.0001**
Internet use without interruption (hours/day)							
Less than 2	57	25.2	1113	67.0	1	1	
2–3	99	43.8	435	26.2	**4.44 (3.15–6.27)**	**2.34 (1.60–3.41)**	**< 0.0001**
4–5	34	15.0	64	3.9	**10.37 (6.33–17.00)**	**4.64 (2.67–8.08)**	**< 0.0001**
More than 5	36	15.9	48	2.9	**14.64 (8.81–24.33)**	**5.90 (3.26–10.67)**	**< 0.0001**
Information searching							
No	83	36.7	235	14.2	1	1	
Yes	143	63.3	1425	85.8	**0.28 (0.21–0.38)**	**0.48 (0.33–0.70)**	**< 0.0001**
Online chatting							
No	37	16.4	572	34.5	1	1	
Yes	189	83.6	1088	65.5	**2.69 (1.86–3.87)**	1.49 (0.96–2.30)	0.075
E-mailing							
No	120	53.1	794	47.8	1	1	
Yes	106	46.9	866	52.2	0.81 (0.61–1.07)	0.85 (0.60–1.20)	0.348
Social networking							
No	55	24.3	460	27.7	1	1	
Yes	171	75.7	1200	72.3	1.19 (0.86–1.65)	0.88 (0.59–1.30)	0.512
Multi User Dungeon gaming							
No	176	77.9	1444	87.0	1	1	
Yes	50	22.1	216	13.0	**1.90 (1.34–2.68)**	1.13 (0.74–1.73)	0.581
File downloading (music or other)							
No	32	14.2	462	27.8	1	1	
Yes	194	85.8	1198	72.2	**2.34 (1.58–3.45)**	1.52 (0.98–2.38)	0.063
Online shopping							
No	190	84.1	1440	86.7	1	1	
Yes	36	15.9	220	13.3	1.24 (0.84–1.82)	0.80 (0.50–1.29)	0.361
Online gambling							
No	190	84.1	1565	94.3	1	1	
Yes	36	15.9	95	5.7	**3.12 (2.07–4.71)**	1.15 (0.67–1.98)	0.601
Visiting pornographic websites							
No	144	63.7	1443	86.9	1	1	
Yes	82	36.3	217	13.1	**3.79 (2.79–5.14)**	**2.44 (1.62–3.69)**	**< 0.0001**
Indiscriminate surfing							
No	171	75.7	1369	82.5	1	1	
Yes	55	24.3	291	17.5	**1.51 (1.09–2.10)**	1.10 (0.72–1.68)	0.655
Location of Internet use							
At home	137	60.6	1167	70.3	1	1	
Everywhere	86	38.1	471	28.4	**1.55 (1.16–2.08)**	1.23 (0.88–1.72)	0.228
Internet point	3	1.3	22	1.3	1.16 (0.34–3.93)	3.31 (0.75–14.63)	0.114
Parental control on Internet use							
No	201	88.9	1431	86.2	1	1	
Yes	25	11.1	229	13.8	0.78 (0.50–1.20)	1.18 (0.71–1.96)	0.532
Sensation of feeling lonely							
Never	72	31.9	716	43.1	1	1	
Sometimes	126	55.8	840	50.6	**1.49 (1.10–2.03)**	**2.25 (1.56–3.24)**	**< 0.0001**
Often	28	12.4	104	6.3	**2.68 (1.65–4.34)**	**3.65 (2.05–6.51)**	**< 0.0001**

PIU = Problematic Internet Use; NPIU = Non Problematic Internet Use.

[a] Adjusted for all the variables in the table, and for cluster effect.

Table 3
Factors independently associated with PIU, by gender.

Characteristic	Males (N=890)		Females (N=988)	
	Adj Odds Ratios[a] (95% CI)	P-value	Adj Odds Ratios[a] (95% CI)	P-value
Age				
18–19	1		1	
16–17	0.61 (0.33–1.13)	0.119	1.38 (0.63–3.03)	0.418
14–15	1.21 (0.66–2.23)	0.543	**2.96 (1.36–6.45)**	**0.006**
Type of school				
Lyceum	1		1	
Technical	1.60 (0.83–3.11)	0.161	1.27 (0.71–2.29)	0.422
Vocational	**1.90 (1.02–3.57)**	**0.045**	1.75 (0.93–3.30)	0.081
Frequency of Internet use				
Once per week or less	1		1	
Several times a week	1.40 (0.32–6.17)	0.661	2.16 (0.59–7.97)	0.246
Daily	**4.30 (1.07–17.34)**	**0.041**	**3.65 (1.03–12.93)**	**0.045**
Several times a day	**9.51 (2.30–39.38)**	**0.002**	**7.19 (1.94–26.65)**	**0.003**
Internet use without interruption (hours/day)				
Less than 2	1		1	
2–3	**1.95 (1.14–3.35)**	**0.015**	**3.05 (1.74–5.35)**	**< 0.0001**
4–5	**4.85 (2.18–10.75)**	**< 0.0001**	**5.13 (2.26–11.63)**	**< 0.0001**
More than 5	**6.60 (3.06–14.26)**	**< 0.0001**	**3.75 (1.29–10.93)**	**0.015**
Information searching				
No	1		1	
Yes	0.62 (0.37–1.04)	0.071	**0.37 (0.21–0.65)**	**0.001**
Online chatting				
No	1		1	
Yes	**2.00 (1.07–3.74)**	**0.030**	0.92 (0.49–1.74)	0.808
E-mailing				
No	1		1	
Yes	0.93 (0.56–1.54)	0.789	0.76 (0.46–1.25)	0.271
Social networking				
No	1		1	
Yes	0.70 (0.41–1.18)	0.184	1.20 (0.63–2.31)	0.580
Multi User Dungeon gaming				
No	1		1	
Yes	0.90 (0.52–1.56)	0.713	1.77 (0.83–3.76)	0.137
File downloading (music or other)				
No	1		1	
Yes	**2.49 (1.21–5.13)**	**0.013**	1.12 (0.61–2.08)	0.711
Online shopping				
No	1		1	
Yes	0.68 (0.38–1.24)	0.213	1.09 (0.46–2.56)	0.843
Online gambling				
No	1		1	
Yes	1.19 (0.65–2.19)	0.570	0.92 (0.21–4.11)	0.911
Visiting pornographic websites				
No	1		1	
Yes	**2.46 (1.54–3.93)**	**< 0.0001**	**3.19 (1.10–9.30)**	**0.033**
Indiscriminate surfing				
No	1		1	
Yes	0.82 (0.47–1.42)	0.471	1.66 (0.83–3.29)	0.150
Location of Internet use				
At home	1		1	
Everywhere	1.11 (0.68–1.82)	0.675	1.48 (0.90–2.41)	0.119
Internet point	**6.99 (1.08–45.32)**	**0.042**	–	–
Parental control on Internet use				
No	1		1	
Yes	1.23 (0.52–2.91)	0.635	1.24 (0.64–2.42)	0.520
Sensation of feeling lonely				
Never	1		1	
Sometimes	**1.95 (1.20–3.16)**	**0.007**	**2.48 (1.35–4.56)**	**0.003**
Often	**6.18 (2.76–13.84)**	**< 0.0001**	2.18 (0.83–5.74)	0.114

[a] Adjusted for all the variables in the table, and for cluster effect.