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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

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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, self-esteem, 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).

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