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Internet Addiction Disorder in a Sample of 402 High School Students

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Summary

Internet Addiction Disorder can be defined as “the inability of individuals to control their Internet use, resulting in marked distress and/or functional impairment in daily life.” It carries the same social aftermath of impulse control and substance misuse disorders such as loss of control, craving and withdrawal symptoms.

Aim: In this paper, we aimed to assess the prevalence of IAD in an Italian sample of high-school students. We also explored the relationship between Social Phobia and IAD diagnosis; lastly, we investigated the association between IAD and substance misuse.

Methods: The research was conducted in accordance with the Helsinki Declaration. Assessments administered in this study consisted of three parts: 1) collecting information about general and personal data of the subjects; 2) the Internet Addiction questionnaire proposed by Ko, composed by 9 different areas; 3) the Social Anxiety Spectrum Self-Report (SHY-SR) Lifetime Questionnaire.

Results: 19 of 402 subjects (i.e. 4.7% of the sample) fulfilled the diagnostic criteria for IAD, showing a slight predominance of males. 10.9% of subjects met diagnostic criteria for a Social Phobia Spectrum disorder. Six IAD subjects (31.8%) were also diagnosed with a social phobia spectrum condition. Within the group of students diagnosed with IAD, 4 (21.05%) subjects reported current or past use of drugs.

Conclusion: Our results suggest that there is a sizable population of youth already showing or at risk of developing some kind of problematic relationship with the web. Social Anxiety Disorder seems to be both a risk factor and a frequent co-morbid disorder of Internet misuse. Further studies along with shared diagnostic criteria and tools will facilitate research on treatments for these rapidly expanding and disabling conditions.

Key words: Internet Addiction Disorder, Pathological Internet Use, Social Phobia.

Introduction

There is a clear albeit dimensional distinction between the majority of web users who are able to exploit the potential of the Internet in a controlled manner, and a subgroup of individuals who gradually lose their ability to manage the frequency and duration of access to the Web. Although the last fifteen years have shown an increase of research on the so-called Internet Addiction Disorder (IAD), there is still a considerable controversy about this newly emerging mental health problem. According to Ha et al. [1] and as summarized by Pies [2], IAD can be defined as “the inability of individuals to control their Internet use, resulting in marked distress and/or functional impairment in daily life.” Lately, in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), Internet gaming disorder has been included in Section III of the manual: disorders listed in this section require further research before being considered as formal disorders [3].

Conceptually, the diagnosis of Internet Addiction is a compulsive-impulsive spectrum disorder that involves offline and/or online computer usage [4, 5]. In all of the variants it is possible to distinguish four main common components: *excessive use*, *withdrawal*, *tolerance*, and *negative repercussions* [6] and carries the same social aftermath of impulse control and substance misuse disorders such as loss of control, craving and withdrawal symptoms.

Evidences arising from research carried out in many different countries show that IAD is widespread, but the lack of shared and uniform definitions as well as the use of different assessment tools have hindered a reliable appraisal of its prevalence so far. A recent review [7] detected an IAD prevalence ranging from 0.3% to 0.7% in the USA and of 0.8% in Italy, while the prevalence in Asian countries is significantly higher (for example, in Hong Kong is 26.7%). The frequency of comorbidities in patients with IAD is considerably high: the most common psychiatric disorders associated with this phenomenon are attention-deficit hyperactivity disorder, social phobia and major depressive disorder [8].

The teenage world seems to be the most affected by the phenomenon of IAD [9]: two recent Italian studies focused on adolescents showing a percentage of IAD that is around 5% [10, 11].

Objective

In this paper, we aimed to assess the prevalence of IAD in an Italian sample of high-school students aged 14-16. We also explored the relationship between social phobia and IAD diagnosis, focusing on sub-threshold symptomatology by means of the *Structured Clinical Interview for Social Phobia Spectrum (SCI-SHY)*. Lastly, we investigated the association between IAD and substance misuse to shed light about comorbidity among disorders arising from alleged common etiological roots.

Methods

The research was conducted in accordance with the Helsinki Declaration. The Ethics Committee and the Biomedical Institutional Review Board of the University Hospital of Siena approved all recruitment and assessment procedures. All subjects were asked to provide written informed consent after receiving a complete description of the study and having the opportunity to ask questions. The study sample for this report included 402 students, all attending the same High School in Siena, class I, II, III (aged 14 to 18, mean age 15.60 ± 0.940).

Research method

Assessments administered in this study consisted of three parts. The *first* part collects information about general and personal data, subject's school performance, household composition, residential typology (i.e. urban, suburban, rural), smoking habits, and history of drug misuse.

The *second* part consists of 9 diagnostic area fulfilling the main criteria defined by Ko [12] to make an accurate diagnosis (see Table 1). Ko et al. have structured a clinical interview specifically for teenagers that can provide health care professionals with a means to identify college students with Internet addiction and a first-aid screening instrument in clinical practice, or a discriminative instrument in massive survey for Internet addiction of college students. They have suggested that diagnosis of IAD may be confirmed if at least six out of these nine symptoms/conditions are present. Diagnostic criteria were translated in 9 corresponding items on a self-assessment checklist. The subject must fill out the check list by marking a YES/NO box depending on whether he/she has shown the described symptoms/behaviours. Item 7 provides also the approximate indication of the number of hours spent daily online.

The *third* part of the assessment tool is the Social Anxiety Spectrum Self-Report (SHY-SR) Lifetime Questionnaire that was designed to gather very accurate information about the social phobia symptomatologic spectrum [13]. SHY Self-Report Lifetime is a list of 169 items, grouped into 4 domains (i.e. "Social phobic traits in childhood and adolescence", "Interpersonal sensitivity", "Behavioural inhibition and somatic symptoms" and "Specific anxiety and phobic features"), plus an appendix (i.e. "Substance Abuse").

Table 1. **Proposed Diagnostic Criteria for Internet Addiction (Ko et al., 2005).**

Six (or more) of the following symptoms have been present:
Preoccupation with Internet activities
Recurrent failure to resist the impulse to use the Internet
Tolerance: a marked increase in the duration of Internet use needed to achieve satisfaction
Withdrawal, as manifested by either of the following:
Symptoms of dysphoric mood, anxiety, irritability, and boredom after several days without Internet activity;
Use of Internet to relieve or avoid withdrawal symptoms
Use of Internet for a period of time longer than intended
Persistent desire and/or unsuccessful attempts to cut down or reduce Internet use
Excessive time spent on Internet activities and leaving the Internet
Excessive effort spent on activities necessary to obtain access to the Internet
Continued heavy Internet use despite knowledge of having a persistent or recurrent physical or psychological problem likely to have been caused or exacerbated by Internet use

Statistical analyses were based on the non-parametric independent samples Mann Whitney U Test and on the chi-squared test for continuous and categorical measures respectively. All statistical analyses were two-tailed, with a significance level of 0.05 and were carried out using SPSS version 12.0 for Windows.

Results

The sample consisted of 402 high school students, (N = 191 males and N = 211 females) aged 14-18 years (mean 15.60; SD 09–40) who were enrolled from three different grades (N = 150 were attending the 1st high school year, N = 128 the 2nd year and N = 124 the 3rd year). Fifty six students (13.9%) reported to smoke habitually and 41% of them used to smoke approximately less than 5 cigarettes per day. Twenty four participants had used drugs at least once in their life, N = 21 of whom (87.5%) had used marijuana and N = 2 cocaine. One subject did not specify the type of used drug. No significant association were found between a diagnosis of IAD and sex, presence and number of brothers/sisters, scholastic achievement, household composition, type of residence and smoking habit.

As shown in Table 2, the majority of students answered affirmatively to the items A3 (57.5%) and A4 (69.9%) what shows that *tolerance* and *withdrawal* are the two main clinical features of subjects' attitude toward the Internet. Frequencies recorded for items A1, A7 and A9, concerning *preoccupation* with Internet activities, *excessive time* spent on the Internet and *continued heavy Internet use*, have been reported by a large number of subjects, with a rate of positive answers of 33.6%, 33.3% and 34.1% respectively.

Table 2. **Diagnostic items: Positive answer frequency and %**

Item	Investigated symptom	Frequency
A1	Preoccupation with Internet activities	135
A2	Recurrent failure to resist the impulse to use the Internet	60
A3	Tolerance	231
A4	Withdrawal	281
A5	Use of Internet for a period of time longer than intended	47
A6	Persistent desire and/or unsuccessful attempts to cut down or reduce Internet use	28
A7	Excessive time spent on Internet activities and leaving the Internet	134
A8	Excessive effort spent on activities necessary to obtain access to the Internet	26
A9	Continued heavy Internet use	137

Therefore, in the present study, $N = 19$ of 402 subjects (i.e. 4.7% of the sample) fulfilled the diagnostic criteria for IAD according to Ko et al., (i.e. 6 or more positive answers). This sub-group had a mean age of 15.47 ± 0.177 years, showing a slight predominance of males (11 males vs. 8 females). As mentioned before, item 7 included information about the amount of time spent online everyday; as a whole, the subjects included in this sample reported to spend about 3 hours a day on the Internet (average of 3.06 ± 0.15 hours). Individuals diagnosed with IAD used to spend significantly more time on the Internet than non-diagnosed subjects (4.21 ± 0.55 vs. 2.90 ± 0.15 hours daily; $p = 0.014$).

In our sample, 10.9% of subjects ($N = 44$, 28 female and 16 male) met diagnostic criteria for a Social Phobia Spectrum disorder, exceeding the minimum threshold value of 59 positive answers at the SHY Self-Report Lifetime Questionnaire. Considering only subjects diagnosed with IAD, 6 (31.6%) showed a social phobia spectrum condition. The subgroup with IAD scored significantly higher on the SCI-SHY rating scale in comparison with its not-affected counterpart (Median: 47 vs. 26; $U = 2117.00$; $p = 0.002$). Subjects with severe Internet misuse got significantly higher scores also when sub-analyses were conducted on each psychopathological SCI-SHY sub-domain: "Social phobic traits in childhood and adolescence" (Median: 4 vs. 2; $U = 2345.00$; $p = 0.008$); "Interpersonal sensitivity" (Median: 14 vs. 7; $U = 2060.50$; $p = 0.001$); "Behavioural inhibition and somatic symptoms" (Median: 9 vs. 4; $U = 2082.50$; $p = 0.002$); "Specific anxiety and phobic features" (Median: 21 vs. 13; $U = 2525.00$; $p = 0.024$).

In our sample 6% of subjects ($N = 24$, 6 female and 18 male) reported current or past use of drugs. Within the group of students diagnosed with IAD, 4 (21.05%) subjects reported current or past use of drugs. Subjects with IAD showed significantly higher SCI-SHY "Substance Abuse" subscale scores than those without IAD (Median: 1 vs. 0; $U = 2710.00$; $p = 0.032$).

Discussion and Conclusions

The main result of our study is the high prevalence (4.7%) of IAD in an Italian sample of young students aged 14 to 18, (mean age 15.6). Considering that Internet misuse is likely distributed on a continuum of severity, this result suggests that there is an even greater population of youth already showing or at risk of developing some kind of problematic relationship with the web. This is in accordance with existing literature on the topic highlighting that IAD is a widespread disorder. Variability in prevalence rates is to some extent explained by the geographical origin of samples, with our result being similar to those found in European and American studies [14, 15] but lower than prevalence found in Asian samples [16]. In fact, IAD is likely to be influenced by cultural, social and technological factors such as the rate of global Internet access in a specific country, the use of the Internet in school activities, parents' attitudes etc.. In particular, our data are in line with those reported by other Italian studies [10, 11] and also with two Polish studies that distinguished similar prevalence of IAD among adolescents and young adults [17, 18]. Consistently with the results of another recent Italian study, that used an online assessment questionnaire, adolescents might be a more at-risk group than adults: "they perceive a compromised social and individual quality of their life that led them to make a compensatory usage of the Internet" [19].

On average, individuals included in the sample used to spend much of their time online (i.e. almost 3 hours per day). Given that Italian students spend 5 to 6 hours per day at school, 3 hours per day implies that they spend online almost one third of their time out of school. An intuitive consequence of Internet use may be the decrease of time available for homework, friendship and physical activities etc., that is a substantial change in lifestyle of the youths. How much this latter may be associated with negative consequences on health and social achievements is a topic deserving closer examination in appropriately designed long-term follow-up studies. We noted that subjects diagnosed with IAD spent significantly more time online (i.e. more than 4 hours per day). Information gathered from item A7 and A) of the Diagnostic Criteria for Internet Addiction demonstrated that one third of students recognize or perceive to spend excessive time on the Internet and to be heavily attracted by it, despite problems conceivably related to the web misuse.

Based on a weekly assessment, Bernardi et al. [20] showed an even longer online stay of individuals in their sample (i.e. 42.21 ± 3.09 hours, about 6 hours per day). However, results from this research are difficult to compare because we did not ask students about their Internet use during weekends, a period of likely increase of time spent connected.

Subjects identified as "Internet Addicted" displayed higher social-phobia SCI-SHY scores, both at SCI-SHY total score and at each investigated domain of the assessment tool as compared to non-addicted counterparts, in agreement with findings reported by Yen et al. [21] and Ko et al. [12]. Given the cross-sectional design of our survey, the association between IAD and Social Phobia remains of uncertain causal direction. In fact, the Internet can be both a sheltered place to establish interpersonal relationships from a safer standpoint (i.e. phobia precedes addiction) and an alienating place,

where individuals progressively lose their interpersonal skills up to becoming social phobic (i.e. addiction precedes phobia). In the same vein, in a review summarizing cross-sectional studies of IAD, Weinstein et al. commented that Social Anxiety Disorder is both a risk factor and a frequent comorbid disorder [22] of Internet misuse.

We also found a significant association between IAD and a history of substance misuse. The impairment of mesocorticolimbic dopamine pathways regulating reward, novelty seeking and pleasure has been proposed as the common pathogenetic basis underlying the onset and development of addictions and may relate these two phenomena [2]. Even if this theory were proven also for new behavioural addictions, we would still need to find out the specific susceptibility factors (e.g. genetic, familiar, environmental, educational, psychiatric risk factors etc..) leading patients to develop a particular addiction rather than another one. Beard et al. [23] have rightly argued that so far an excessive number of theoretical hypotheses have arisen to support different diagnostic criteria, with substantial disagreement on some crucial points. Unfortunately, the heterogeneity of diagnostic criteria adopted, enrolled samples and of assessment tools have been some of the main obstacles to the progression of research on IAD. Tao et al. [24] have attempted to overcome this problem subsuming proposals from previous literature in standardized and simply structured diagnostic criteria including IAD symptoms, global impairment and course as well as exclusion criteria. This would also ease a specific treatment to IAD that, up to now, have tested only some psychotropic medications (like Escitalopram, Naltrexone or Methylphenidate) and cognitive behaviour therapy [25].

Besides the adoption of somewhat arbitrary diagnostic criteria and of self-administered assessment questionnaires, our findings should be interpreted in light of other limitations. We recruited a sample of youths aged 14-18, from a single high-school in our city. Hence, results may be not fully generalizable to different geographical areas, educational backgrounds or to different age spans. Moreover, we used a cross-sectional design that prevents us from drawing aetiological conclusions and conducting prognostic evaluations. Finally, the Internet addiction is an heterogeneous phenomenon and we did not discriminate among sub-groups of internet users. For example, online addicts to sexual activity (i.e. viewing cyber-porn and/or engaging in cybersex), video-gaming, gambling, browsing websites, information gathering, downloading files, chatting/social networking, shopping etc., are likely to differ in terms of age, gender, psychiatric comorbidity, and course characteristics. Further prospective, long-term, epidemiological and clinical data along with shared diagnostic criteria and tools will also facilitate research on psychotherapeutic and pharmacologic treatments for these rapidly expanding and disabling conditions.

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