Problematic use of Internet in a sample of psychiatric outpatients: preliminary observations from the “real world”

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Summary. Objective. This study aims to explore the prevalence, characteristics, and psychopathology related to Problematic Use of Internet (PUI), including Internet Addiction (IA), within a sample of psychiatric outpatients. Methods. 143 psychiatric stable outpatients (18-65, mean age: 49; F=84) were included in this study, regardless of their categorical diagnosis. Socio-demographic, clinical, psychopathological, and Internet use-related data (PIU-Scale, Internet Addiction Test, devices, use, activities) were collected across the sample. Results. The prevalence of PUI ranged between 1% (IAT) and 25% (PIU-S), with a homogeneous distribution of PUI symptoms’ severity among the four main psychopathological areas (depressive, bipolar, anxiety, and psychotic disorders). PUI was correlated with age and was higher in students as in the general population. Significant associations were found between PUI symptoms and both personality and eating disorders; PUI was also positively correlated with the presence of other addictions (e.g., alcohol and/or substances). A greater proportion of patients with PUI presented other forms of behavioural addiction compared to non-symptomatic patients. Social media and online shopping, as well as video-streaming, resulted to be the main forms of PUI among patients with problematic use of the Internet. Discussion. More studies are required among students diagnosed with eating and personality disorders. The association between PUI and other addictive disorders would support the hypothesis of their common shared pathophysiology. Conclusion. Healthcare providers and educators should be made aware of such risks. More studies are needed to confirm such preliminary findings.

Key words. Behavioural addictions, problematic use of Internet, Internet Addiction, psychopathology, psychiatric outpatients.

Introduction

Internet use has become part of daily life, and it has increased worldwide during the last decades. Eurostat estimated that around 98% of Europeans accessed the internet at least once a week during 2021. Moreover, high Internet accessibility (ranging from 68% to 90%) has been reported within 2019...
over about 10 years. In this scenario, characterized by a large and continuous access to the Internet, the Problematic Use of Internet (PUI) arises as a wide range of internet-related problematic behaviours, often classified as “non-substance addictions”.

Conceptualized as “an Impulse-Control Disorder that does not involve poisons”, PUI and Internet Addiction (IA) are largely overlapping terms used to describe poorly controlled and risky behaviours related to a dysfunctional use of the Internet (e.g., online videogames, pornography, social media, among others). However, PUI is considered a broader term referring to a heterogeneous and complex phenomenon including, as mentioned above, several forms of Internet dysfunctional use. Amongst various forms of PUI, only Internet Gaming Disorder (IGD) and Gambling Disorder (GD) have recently been included in the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5). Overall, PUI can lead to the development of addiction symptoms, such as tolerance, craving, and withdrawal symptoms. Such aspects are relevant from the public and mental health point of view, especially with the increased diffusion of PUI reported during the Covid-19 pandemic. On the other hand, IA should be considered as a more specific entity belonging to the groups of PUI and referring to the presence of addictive behaviours/symptomatology. A recent work estimated a high global prevalence of IA, among other forms of digital addictions. Further, according to a recent meta-analysis including 53,184 participants, a high prevalence for generalized IA was reported. PUI symptoms can be measured using specific questionnaires, such as the Problematic Internet Use Scale (PIU-S) or the Yung’s Internet Addiction Test (IAT). These scales assess similar but slightly different constructs (respectively PUI and IA) with potential different diagnostic observations that should be better defined and taken into careful consideration while using these instruments.

Several studies have suggested that PUI and IA are particularly diffuse among adolescents, young adults, and students with damaging consequences on life quality and mental health. Typical psychiatric symptoms and disorders associated with PUI in adults and adolescents include insomnia, post-traumatic stress disorder (PTSD) and bipolar symptoms, obsessive-compulsive, depressive, anxious, and attention deficit hyperactivity disorder (ADHD) features. However, these latter symptomatologic associations have been considered not specific. Further, a significant association between PUI/IA and co-occurring psychiatric disorders, especially anxiety/depressive disorders, ADHD, and autism spectrum disorders (ASD) has also been highlighted. Of concern are also the comorbidities with eating disorders, substance use disorders, including alcohol intake, other behavioural addictions, and personality disorders.

Despite such extensive studies in adolescents and young adults reporting the association between PUI/IA and conditions of mental distress or psychopathological features, little is still known about this phenomenon and its correlates in patients with mental illness. Only a few studies have been conducted in adolescent and adult psychiatric patients with PUI/IA. Evidence suggests that PUI leads to worse outcomes in psychiatric disorders, e.g., excessive use of social networks for depression and increased suicidality. Moreover, subjects with PUI and psychiatric disorders have shown a lower quality of life compared to non-psychiatric patients.

Therefore, built on this previous limited evidence, the present study aims to explore the prevalence, characteristics, and psychopathology of PUI-related within a sample of psychiatric outpatients. Based on the reviewed literature, we expected to find a higher level of prevalence of PUI in psychiatric patients respect to the general population. Moreover, we hypothesized that PUI symptoms would be associated with younger age, and with the presence of other behavioural addictions, such as gambling or substance use. Further, we would like to assess if the two main instruments at hand to assess symptoms of PUI and IA, i.e., the Problematic Internet Use Scale (PIU-S) and the Yung’s Internet Addiction Test (IAT), would lead to similar or different outcomes, and gain insight on how their results should be interpreted.

**Methods**

**Participants**

All patients referred to the outpatient psychiatric unit of Psychiatry and Clinical Psychopharmacology (University), A. Fiorini Hospital (Latina Province, Italy), were routinely considered for this study regardless of their categorical diagnosis. Inclusion criteria were the following: (i) age between 18 and 65 years; absence of (ii) acute psychiatric symptoms; (iii) neurodegenerative disorders; or (iv) moderate-to-severe intellectual disability. Patients who did not fulfil the mentioned inclusion criteria were excluded from the study. The primary diagnosis, determined by the clinical evaluation following the DSM-5 criteria and reported in the medical records, was considered for all patients, including those with multiple diagnoses. Diagnoses were obtained from their medical records, and participants were subsequently divided into 8 groups, based on their main diagnosis, which were: Anxiety Disorder (AD); Depressive Disorder (DD); Psychotic Disorder (PsyD); Bipolar Disorder (BD); Eating Disorder (ED); Obsessive-Compulsive Disor-
der (OCD); Personality Disorder (PD), including all clusters (A, B and C); and Substance Use Disorder (SUD). Overall, a total of 143 patients (84 females and 59 males; with a mean age of 49; range 18-65 years), were included in this study.

After applying all the inclusion criteria, we collected a sample including 143 patients, 50 (35% of the sample) were with AD; 47 (32.9%) with DD; 17 (11.9%) with PSyD; 14 (9.8%) with BD; 7 (4.9%) with ED; 3 (2.1%) with OCD; 3 (2.1%) with PD; and 2 (1.4%) with SUD. Most of the patients had more than one diagnosis (N = 105; 73.4% vs 26.6% of single diagnosis), showing the following psychiatric comorbidities: PD (55.3%), DD (15.8%), SUD (13.2%), AD (10.5%) and ED (2%). For more details on descriptive statistics see Table 1.

MEASURES AND PROCEDURES

The anonymity of personal information was assured, and participants provided their written in-consented and provided their written informed consent. We used a semi-structured interview typically administered to all patients as per standard clinical practice, collecting the following data: (1) socio-demographic information (i.e., age, sex, residence, job status, education level, and marital status); and (2) clinical variables including psychiatric diagnosis; the presence of addictive disorders (behavioural addictions vs substance use disorder) and patient’s insight; PUI was evaluated through the Problematic Internet Use Scale (PIU-S), the Yung’s Internet Addiction Test (IAT), and an inventory about both Internet device’s hold/frequency of use, i.e., PC, smartphone, tablet, smartwatch and videogame console; and main online activities, i.e., none, social media, instant messaging, email, source platform, news sites, entertaining, online streaming, online shopping, gambling, gaming, massive multiplayer online role-playing game (MMORPG), pornography, and drug selling.

PIU-S is a self-report questionnaire having good psychometric properties and internal coherence (Cronbach’s α = 0.88). It is widely used to investigate the impact of Internet use on an individual’s life (including school, work, relations, personal stress, withdrawal symptoms, and mood alterations). The scale consists of 13 dichotomous (0= “no”; 1= “yes”) items. The total score ranges between 0 to 13, and a cut-off of ≥4 is used to assess a problematic use of the Internet (PUI); a score of 1-3 points indicates a mild level of PUI symptoms; for the study, we used the official Italian version (Cronbach’s α = 0.89).

We also applied the Italian version of IAT, a self-administered questionnaire with good psychometric proprieties (Cronbach’s α = 0.82). IAT is commonly used to assess the presence of IA and includes 20 items rated on a 5-point Likert scale (from 1= “rarely” to 5= “always”). Typical addiction’s symptoms (e.g., salience, excessive use, working neglect, anticipation, lack of control, and social neglect) can be identified taking into account the scores: a score of 20-49 indicates normal Internet use, 50-79 is related to occasional or often PUI, a score ≥80 is suggestive of presence of IA.

All procedures of the study were conducted according to the Principles of Human Rights.

Results

Prevalence of PUI

Overall, PUI prevalence was different when considering either the PIU-S (25%) or the IAT (1%), showing the differences in psychometric properties between the two questionnaires. More specifically, the receiver operating characteristic (ROC) analysis (the outcome was the admission of having a PUI) indicated that both tests have good diagnostic qualities with

Table 1. Socio-demographic data of the sample N (%).

<table>
<thead>
<tr>
<th>Age</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-34</td>
<td>35 (24.48%)</td>
</tr>
<tr>
<td>35-50</td>
<td>39 (27.27%)</td>
</tr>
<tr>
<td>51-65</td>
<td>69 (48.25%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Residence</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Province</td>
<td>116 (81.12%)</td>
</tr>
<tr>
<td>City</td>
<td>27 (18.88%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marital status</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmarried</td>
<td>49 (34.27%)</td>
</tr>
<tr>
<td>Married</td>
<td>63 (44.06%)</td>
</tr>
<tr>
<td>Cohabiting</td>
<td>12 (8.39%)</td>
</tr>
<tr>
<td>Divorced</td>
<td>14 (9.79%)</td>
</tr>
<tr>
<td>Widowed</td>
<td>5 (3.50%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education level</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>13 (9.09%)</td>
</tr>
<tr>
<td>First Grade</td>
<td>49 (34.27%)</td>
</tr>
<tr>
<td>Second Grade</td>
<td>61 (42.66%)</td>
</tr>
<tr>
<td>University</td>
<td>20 (13.99%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Job status</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee</td>
<td>39 (27.27%)</td>
</tr>
<tr>
<td>Self-employed</td>
<td>8 (5.59%)</td>
</tr>
<tr>
<td>Student</td>
<td>13 (9.09%)</td>
</tr>
<tr>
<td>Occasional</td>
<td>6 (4.20%)</td>
</tr>
<tr>
<td>Stay-at-home</td>
<td>24 (16.78%)</td>
</tr>
<tr>
<td>Retired</td>
<td>21 (14.69%)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>32 (22.38%)</td>
</tr>
</tbody>
</table>
the PIU-S being highly sensitive and lower specific, and the opposite for IAT. The suggested cut-off for the questionnaires is respectively 4.5 (PIU-S) and 36.5 (IAT). Considering the prevalence for the PIU-S items and the medium score for IAT one, the distribution of the single questions is shown in Table 2.

**Relationship between PUI and socio-demographic data**

We conducted a series of analyses in order to evaluate the relationship between the presence of PUI and socio-demographic variables of the sample. In all the analyses, we included both the scores at IAT and PIU-S as measures of PUI. For the continuous variables (e.g., age and education level), we used bivariate Pearson’s correlation, whereas one-way ANOVA analysis was used to compare questionnaires’ scores between groups for the categorical variables (e.g., residence, marital status, and job status). We found a significant negative correlation between PUI and age, with \( r = -0.49, p < 0.01 \), and \( r = -0.47, p < 0.01 \), respectively for PIU-S and IAT scores. We also found a significant effect on PUI symptoms of job status, \( F_{6,136} = 2.98, p < 0.01 \), for PIU-S score, but not for IAT score, with higher levels of PUI in students. Overall, this analysis indicated that young students had on average a higher presence of PUI. Analysis of the other socio-demographic variables did not show any significant effect on or relationship with PUI.

**Table 2. PIU-Scale and IAT. Single items prevalence in the general sample of patients and patients/users with PUI.**

<table>
<thead>
<tr>
<th>PIU-S (prevalence %)</th>
<th>General (N=143)</th>
<th>Users with PUI (PIU-S≥4) (N=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Original version</strong></td>
<td><strong>Italian version</strong></td>
<td></td>
</tr>
<tr>
<td><em>I have never gotten into arguments with a significant other over being online</em></td>
<td>Non ho mai discusso con una persona per me importante a causa del fatto di essere troppo spesso online</td>
<td>22%</td>
</tr>
<tr>
<td>I have been told I spend too much time online</td>
<td>Mi è stato detto che passo troppo tempo online</td>
<td>29%</td>
</tr>
<tr>
<td>If it has been a while since I last logged on, I find it hard to stop thinking about what will be waiting for me when I do</td>
<td>Se passa un po’ di tempo dall’ultima volta che mi sono loggato, trovo difficile non pensare a cosa mi aspetta quando riaccenderò</td>
<td>20%</td>
</tr>
<tr>
<td><em>My work and/or school performance has not deteriorated since I started going online</em></td>
<td>Il mio rendimento scolastico/ lavorativo non è peggiorato da quando ho iniziato a stare online</td>
<td>15%</td>
</tr>
<tr>
<td>I feel guilty about the amount of time I spend online</td>
<td>Mi sento in colpa rispetto alla quantità di tempo che passo online</td>
<td>17%</td>
</tr>
<tr>
<td>I have gone online to make myself feel better when I was down or anxious</td>
<td>Vado su Internet per sentirmi meglio quando mi sento giù o sono ansioso</td>
<td>31%</td>
</tr>
<tr>
<td>I have attempted to spend less time online but have not been able to</td>
<td>Ho provato a trascorrere meno tempo online ma non ne sono stato capace</td>
<td>15%</td>
</tr>
<tr>
<td>I have routinely cut short on sleep to spend more time online</td>
<td>Ho ridotto le ore di sonno per poter trascorrere più tempo online</td>
<td>17%</td>
</tr>
<tr>
<td>I have used online to talk to others at times when I was feeling isolated</td>
<td>Di solito parlo con altre persone su Internet nei momenti in cui mi sento isolato</td>
<td>28%</td>
</tr>
<tr>
<td>I have missed classes or work because of online activities</td>
<td>Ho saltato lezioni o perso ore di lavoro per svolgere delle attività online</td>
<td>5%</td>
</tr>
<tr>
<td>I have gotten into trouble with my employer or school because of being online</td>
<td>Mi sono messo nei guai col lavoro o con lo studio a causa del tempo trascorso online</td>
<td>6%</td>
</tr>
<tr>
<td>I have missed social engagements because of online activities</td>
<td>Ho mancato degli impegni sociali per essere online</td>
<td>6%</td>
</tr>
<tr>
<td>I have tried to hide from others how much time I am actually online</td>
<td>Ho provato a nascondere agli altri quanto tempo trascorro realmente online</td>
<td>8%</td>
</tr>
</tbody>
</table>

* Reverse item

(Continued)
The table describes the comparison between the general sample and the patients/users with PUI: items with a prevalence ≥50% (PIU-S: 2-6-9-3-1-8) or a score ≥2.5 (IAT: G-L-A-T-R-M) are referred to coping strategies plus addiction’s symptoms like withdrawal, social impairment, tolerance, and anticipation.

### Relationship between PUI and psychopathology

A one-way ANOVA between groups was realized to evaluate the prevalence of PUI symptoms among different diagnostic groups. No significant main effect of the group on PUI severity as measured with both PIU-S and IAT was found concerning the main diagnostic groups (DD, PsyD, AD, and BD). However, the effect of the empirically derived diagnostic groups was significant for both PIU-S, $F_{4,155} = 4.39$, and IAT.
p<0.01, and IAT score, F5,135= 4.12, p<0.01. Post-hoc t-tests revealed that the two diagnostic categories of ED and PD reported higher scores respect to the other groups (p<0.05 for all comparisons).

**RELATIONSHIP BETWEEN PUI AND ADDICTIONS**

An ANOVA test revealed an association between PUI severity and IA’s insight of the patients with PUI (PIU-S, F1,135= 19.74, p<0.01; IAT, F5,135= 25.68, p<0.01), with more severe PUI linked to a reduced insight. Further, in post-hoc analysis, all comparisons related to items evaluating IA’s insight were significant (p<0.05).

A Pearson’s Chi-Squared test was used to compare the PIU-S’s severity group with the presence of another behavioural addiction: although the general effect was significant for “absence of behavioral addictions”, post-hoc analysis showed that such addictive behaviors are more frequent in patients with mild-severe PUI (1-3-point score or more) symptoms (p<0.05 for all comparisons). ANOVA analysis also revealed a link between the presence of current or past abuse of substances/alcohol and PUI in both scales (PIU-S, F1,141=9.70, p<0.01; IAT, F1,141=10.52, p<0.01). For more details see also Table 3.

**CORRELATIONAL ANALYSIS BETWEEN PUI AND PATTERN OF INTERNET USE**

As reported in Table 4, further analysis showed a positive association between PUI, PC, and smartphone use considering both scales. According to the χ² test, instead, we found an association between PIU-S’s severity symptoms and some specific activities: mild-severe PUI symptoms were associated with the prevalent use of social networks, instant messaging, source platforms, and online streaming.

**Discussion**

Although several psychiatric symptoms/disorders have been frequently associated with PUI/IA in adolescent and adult populations25-34,36,37, limited evidence21,45-51 on PUI/IA among psychiatric patients is available. This observational study is thus one of the first investigations into the PUI phenomenon, conducted with a sample of psychiatric outpatients, irrespective of their categorical diagnosis. Among the 143 participants enrolled in this study, the prevalence of PUI was estimated between 1% (using the IAT score) and 25% (using the PIU-S score), with these questionnaires showing a different value according to their different intrinsic characteristics. As previously mentioned, the PIU-S and the IAT questionnaires are used to evaluate similar but different conditions, with the IA only being part of a wider and more complex PUI phenomenon. Such results highlight, in line with previous evidence58,59, the need of a unique diagnostic tool to assess this form of behavioral addiction. Such findings would also suggest that IA and PUI, terms widely used in the literature to define the same construct, may be considered as two separate entities. IA appears to describe a more severe condition in comparison to the mild addictive behavior defined by the PUI umbrella.

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**Table 3. Results’ summary of correlational and ANOVA analyses.**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Test</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PIU-S</td>
<td>IAT</td>
</tr>
<tr>
<td><strong>Socio-demographic data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>t=-0.36</td>
<td>t=-0.15</td>
</tr>
<tr>
<td>Age</td>
<td>r=-0.49</td>
<td>r=-0.47</td>
</tr>
<tr>
<td>Residence</td>
<td>F(6,136)=1.87</td>
<td>F(1,141)=1.4</td>
</tr>
<tr>
<td>Education level</td>
<td>F(1,141)=0.94</td>
<td>F(3,139)=1.54</td>
</tr>
<tr>
<td>Job status</td>
<td>F(6,136)=2.98</td>
<td>F(6,136)=1.87</td>
</tr>
<tr>
<td><strong>Psychopathological data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 principal diagnostic spectrum (DD, PsyD, AD, BD)</td>
<td>F(3,125)=1.05</td>
<td>F(3,125)=0.52</td>
</tr>
<tr>
<td>4 principal diagnostic spectrum plus ED and PD</td>
<td>F(5,155)=4.39</td>
<td>F(5,135)=4.12</td>
</tr>
<tr>
<td>Dependency insight</td>
<td>F(7,135)=19.74</td>
<td>F(7,135)=25.68</td>
</tr>
<tr>
<td><strong>Other dependencies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol/Substances related</td>
<td>F(1,141)=9.70</td>
<td>F(1,141)=10.52</td>
</tr>
<tr>
<td>Behavioural addictions</td>
<td>χ²(2)=11.99</td>
<td>χ²(1)=3.81</td>
</tr>
</tbody>
</table>
In this study, the PUI phenomenon presented a homogenous distribution among the main psychopathological areas (AD, DD, PSyD, BD, OCD). This result confirmed previous evidence reporting a significant link between PUI, AD, DD and OCD. Further, it adds information on the potential link between PUI and other diagnostic categories considered (BD; PSyD). This aspect is consistent with findings from a recent study which found no difference in mental health-related Internet use among psychiatric patients with different diagnoses. It is also in line with previous findings suggesting that, in psychiatric patients, PUI might not be only considered as a sign of addictive behaviors, but also as a way to cope with anxiety-depressive symptoms related to a spectrum of psychological disorders. In fact, according to the “mood enhancement hypothesis”, individuals may escape from negative emotions using recreational activities. Thus, such theory might help to understand the link between depressive/anxiety features and PUI.

Further, it has been found a strong correlation between PUI symptoms’ severity and PD, ED, and other addictions, including both behavioral and substance use (e.g., alcohol and/or substances) disorders. These results are consistent with previous works revealing a significant association between PUI and (i) PD, especially personality clusters A and B (e.g., borderline) and obsessive-compulsive or avoidant tracts; (ii) ED; (iii) alcohol abuse and addictive disorders.

The relation between PUI and both addictive behaviors and past/current alcohol/substance abuse found in the sample would provide some support to the theory hypothesizing the presence of a common neurobiological mechanism underlying all these disorders, with recent evidence suggesting the involvement of compulsive and impulsive features in several forms of PUI. In fact, evidence suggests the potential role of impulsivity/compulsivity circuits and prefrontal functions (e.g., executive control functions) in the generation of PUI, with a continuous call for more studies on this topic.

The level of PUI in this sample of psychiatric outpatients was significantly associated with both age and job status, with younger patients, mainly students, reporting more severe PUI symptoms. These results are consistent with data in the literature reporting a wide presence worldwide of PUI among adolescents, young adults, and students (e.g., executive control functions), and confirm such demographic variables as relevant risk factors linked to the development of PUI. The findings from our study are also in line with evidence from two recent studies reporting IA in young psychiatric patients and with a study describing the association between PUI, lower age and psychiatric comorbidity in a sample of more than three hundred adult psychiatric patients.

PUI/IA has been linked per se to several psychopathological conditions and to the worsening of their prognosis or of patients’ quality of life.

| Table 4. Relationship between PUI and online devices/activities. |
|------------------------|-------------|-----------|-----------|-------------|-----------|
| Variables              | Test        | p value   | Post-hoc analysis with PIU-S |
|                        | PIU-S       | IAT       | PIU-S     | IAT         |
| Principal devices      |             |           |           |             |
| PC                     | r=0.47      | r=0.46    | p<0.01    | p<0.01      |
| Smartphone             | r=0.39      | r=0.36    | p<0.01    | p<0.01      |
| PC and smartphone      | r=0.50      | r=0.48    | p<0.01    | p<0.01      |
| Online specific activities |             |           |           |             |
| Social network         | χ²(2)=38.61 | χ²(1)=8.11| p<0.019   | p<0.01      |
| Instant messaging      | χ²(2)=23.70 | χ²(1)=3.20| p<0.01    | p=0.07      |
| Email/source platform  | χ²(2)=12.67 | χ²(1)=0.41| p<0.01    | p=0.52      |
| News pages             | χ²(2)=8.47  | χ²(1)=0.28| p<0.05    | p=0.59      |
| Entertaining and online streaming | χ²(2)=19.59 | χ²(1)=2.12| p<0.01    | p=0.14      |
| Online shopping        | χ²(2)=21.45 | χ²(1)=2.66| p<0.01    | p=0.10      |

The relation between PUI and both addictive behaviors and past/current alcohol/substance abuse found in the sample would provide some support to the theory hypothesizing the presence of a common neurobiological mechanism underlying all these disorders, with recent evidence suggesting the involvement of compulsive and impulsive features in several forms of PUI. In fact, evidence suggests the potential role of impulsivity/compulsivity circuits and prefrontal functions (e.g., executive control functions) in the generation of PUI, with a continuous call for more studies on this topic.

The level of PUI in this sample of psychiatric outpatients was significantly associated with both age and job status, with younger patients, mainly students, reporting more severe PUI symptoms. These results are consistent with data in the literature reporting a wide presence worldwide of PUI among adolescents, young adults, and students (e.g., executive control functions), and confirm such demographic variables as relevant risk factors linked to the development of PUI. The findings from our study are also in line with evidence from two recent studies reporting IA in young psychiatric patients and with a study describing the association between PUI, lower age and psychiatric comorbidity in a sample of more than three hundred adult psychiatric patients.

PUI/IA has been linked per se to several psychopathological conditions and to the worsening of their prognosis or of patients’ quality of life.
Thus, the results of the present study would highlight the importance for clinicians to monitor Internet usage patterns in psychiatric patients, especially if young, regardless of their diagnosis. Patients in mental health treatment who have behavioral addictions and comorbid PUI might benefit from more targeted education surrounding how to avoid using the Internet to reinforce those behaviors (e.g., using the Internet for online gambling, purchasing drugs or alcohol, or perpetuating disordered eating). This might potentially help to avoid the addictive effect of PUI-related psychopathology in worsening the psychiatric disorders’ specific features.

**Limitations**

This study has the strength to have investigated the PUI phenomenon in a sample of psychiatric outpatients collecting observations from the “real world”, while also adding the comparison between IA and PUI. Nevertheless, it also has several limitations: (1) its transnosographic with non-randomized recruitment design does not allow a specific analysis of the PUI phenomenon for each psychiatric categorical diagnosis, with a limited number of subjects for each diagnostic group; (2) participants were evaluated in only one center, thus results of the present study are only preliminary and should be interpreted with caution; (3) diagnoses are clustered, which may influence the homogeneity shown in the spread of PUI among participants; (4) further, data were related to patients’ self-reports, with the potential risk of social bias; (5) only psychiatric outpatients in a stable psychopathological condition have been enrolled in such a study, this might have defined a potential selection bias; (6) part of the study was conducted during the COVID-19 pandemic, which is suggested to have contributed to the worsening of PUI15,17,69 and this might have influenced the results of our study. Finally, (7) another limiting element per se is the lack of a standardized model for the recognition of PUI and its classification, suggesting, in line with previous research38,39 the necessity to introduce unanimous diagnostic criteria.

**Conclusions**

PUI is a growing health concern, and the present study adds further evidence on the association between PUI and psychiatric disorders, with the prevalence of PUI in young students, especially those diagnosed with eating disorders and personality disorders, confirming previous findings. The association between PUI and other addictive disorders would also support the hypothesis of their common shared pathophysiology. Healthcare providers and educators should be made aware of such risks. Further, longitudinal studies are needed to confirm these preliminary findings and to better define the directionality of the complex relationship between PUI and psychiatric disorders.

**Conflict of interests:** the authors have no conflict of interests to declare.

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