

ORIGINAL ARTICLE

Internet addiction disorder's screening and its association with socio-demographic and clinical variables in psychiatric outpatients

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Abstract

OBJECTIVES: The Internet Addiction Disorder (IAD; Young 1998) seems to be poorly investigated among populations of psychiatric outpatients. Our aim has then been to verify the possible presence of Internet Addiction and its association with diagnosis, trauma, type of use, treatment span and socio-demographic variables in psychiatric outpatients.

METHODS: The study has enrolled 63 subjects, out of the outpatients of the Territorial Psychiatric Services of a Hospital in Milan, Italy. Socio-demographic and clinical data got out of the medical records. The Internet Addiction Test (IAT) has been used, with a score range 0-100.

RESULTS: 36.5% of the participants show a mild impairment in daily functioning (IAT cut-off ≥ 40 and ≤ 69). No significant differences in IAT scores between males and females. Younger subjects show worst scores in IAD; as well as the shorter the treatment the outpatients went under, the higher the IAT's scores. No significant differences in IAT's scores following either the psychiatric diagnosis as the presence/absence of traumatic events.

CONCLUSION: One third of the participants shows a somehow dysfunctional Internet use, although of a small magnitude. The clinical sample doesn't satisfy the full criteria for IAD and this data could be explained by the effects of the treatment the patients underwent, either drug or psychotherapy, or by the fact that the psychiatric conditions of this population do not allow a frequent and intensive use of Internet. No significant differences gender-related: we discuss this fact under the light of the change in the use of Internet in females. Young people are the most risk-prone to develop IAD. Diagnosis and presence/absence of trauma in the personal history do not look associated to the onset and development of IAD. These data are coherent to evidence already shown in literature. We explain a fraction of the score's variability by the period of time the outpatient has been undertaken by the Territorial Psychiatric Service: the more the time, the more likely the benefit of treatment. Based on the outcome of this study, we state the convenience of a regular use of Internet Addiction screening in the routine patient intake assessment.

INTRODUCTION

The spread of Internet has deeply changed both society and individual life under several features. This change, if risk factors are present, could promote the emergence of a Problematic Use of Internet (PIU), term often used in literature as equivalent as Internet Addiction Disorder (IAD). The definition of IAD is the inability in staying in control in the use of Internet along with functioning impairment (Young 1996).

Despite IAD is not yet a psychiatric official disorder, researches and papers on the subject are increasing; and there is increasing evidence that IAD can be put in the category of behavioral addictions, as it has been for the gambling (APA 2013): patients with control impairment in the use of Internet undergo more and more often the clinical attention.

IAD shows several negative sides effects (Chia *et al.* 2020; Moretta *et al.* 2022; Reed *et al.* 2018; Truzoli *et al.* 2019, 2023) and it appears in co-morbidity with other psychiatric disorders (Ho *et al.* 2014).

There is also evidence (Kuss *et al.* 2014; Truzoli *et al.* 2021) for several IAD's risk factors such as demographic variables (i.e. age and gender) and for co-morbidities such as depression, anxiety, impulsivity, ADHD (Reed *et al.* 2015; Romano *et al.* 2013, 2014, 2017).

Epidemiological data on IAD are not final, and have large variability in the general population worldwide and furthermore are not well investigated in the clinical population.

Several studies show that in the general population the IAD rate ranges from 0.3% to 38% (Cash *et al.* 2012; Moreno *et al.* 2019).

In Europe, Rumpf (2020) reports a IAD prevalence, between 0.2% and 11.8%, while in Italy with gaps between different areas of the country the prevalence lays between 0,8% and 5,4% (Durkee *et al.* 2012; Pallanti *et al.* 2006; Poli & Agrimi 2012; Villeda *et al.* 2011). A metaanalysis by Cheng *et al.* (2014) on the young and teen agers of 31 nations shows a global prevalence of 6%. In Europe, among young students aged 14-17 the prevalence results in 13,9% (Tsitsika *et al.* 2014).

Among the psychiatric population, there is a study by So *et al.* (2017) in teen agers with Autistic Spectrum Disorder (ASD) and ADHD that shows a prevalence between 10.8% and 20.0%; Yar *et al.* (2019) in adolescent outpatients with psychiatric diagnosis report a prevalence of 24.1%; in a sample of children and adolescents (6-17 years old) with one or more psychiatric diagnosis and mild impairment of functioning, the prevalence was 21.9% and IAD 2.3% (2.1% in the sub-group adolescents) compared to non-clinical controls with respectively 8.5% and 1.7% (Basay *et al.* 2020). Li *et al.* (2021) in stabilized adolescents with psychiatric symptoms during Covid 19 outbreak have shown a prevalence of 31.2% and have pointed out that it appears to be higher compared with other studies

(20.7% in Austria; 24.1% in Turkey; 11,3% Germany; 12.9% Japan).

Few are the studies on prevalence and psychiatric co-occurrence in psychiatric adult population (Balhara *et al.* 2020; de Vries *et al.* 2018).

De Vries *et al.* (2018) report a rate of 25.1% as PIU prevalence in a sample of psychiatric patients. The smaller the age, the higher the PIU prevalence rate. Socio-demographic variables and diagnosis do not interfere neither on Internet Addiction Test' scores (IAT; Young 1998) nor on those of Compulsive Internet Use Scale (CIUS; Meerkerk *et al.* 2009). Balhara *et al.* (2020) have found a prevalence of 29.3% of PIU in psychiatric outpatients of a tertiary care center in India, using the Generalized Problematic Internet Use Scale-2 (GPIUS-2; Caplan 2010). Even in this case, the smaller the age the higher the PIU prevalence, with no variation on the PIU proportion depending on the different psychiatric diagnosis. On regard to the diagnosis of depression only, Kwon *et al.* (2013) have found no association between the level of the depression severity and smartphone's addiction; even though Lim *et al.* (2021) have found that 58.6% of the subjects in a sample of in and outpatients with diagnosis of major depressive disorder, were at risk of developing a smartphone addiction.

Differences in epidemiologic data could be referred to differences in methods, screening tools, cut off values, population target, level of technological evolution of different society and broader cultural differences (Minutillo *et al.* 2022). Outcomes on the trend of the correlation between age and IAD in the general population are alike diversified.

Some cross-sectional studies show no significant effects of the age (Poli & Agrimi 2012); others suggest that older adolescents are at higher risk for IAD (Karacic & Oreskovic 2017); while other researches state that IA behaviors tend to decrease during adolescence (Bakken *et al.* 2009; Ko *et al.* 2012; Yen *et al.* 2009); following Lozano-Blasco *et al.* (2022) IAD is inversely proportional to age. Anyway, the teen-age years appear to be at relatively high risk for developing IAD (Derevensky 2019; Kuss *et al.* 2014) because prefrontal cortex and executive functions fully develop only in the late teen age; then, in pre-adolescence and early-adolescence the inhibitor activity doesn't allow to moderate the addictive Internet use behavior (Bernheim *et al.* 2013; Hammond *et al.* 2014).

On regard to the effects of gender on IAD, the literature shows heterogeneous outcomes (Lopes *et al.* 2022).

Several researches in general population have shown no statistical significance in difference between males and females IAT's score (Dahl & Bergmark 2020; Gamez-Guadix *et al.* 2015; Sechi *et al.* 2021; Sun *et al.* 2012; Tran *et al.* 2017; Zhang *et al.* 2018).

Hassan *et al.* (2020) pointed out a gender correlation with IAD in young adults; nevertheless, the gender did not emerge as significant in the logistic regres-

sion model. And differently from the previously seen outcomes, in Laconi *et al.* (2018), and Leung (2004) PIU appeared to be prevalent among females. Furthermore, Černja *et al.* (2019) highlight that females have higher score in some IAT's sub-scale. On the contrary, other studies have stressed a greater prevalence of the disorder in male (Anand *et al.* 2018; Anderson *et al.* 2017; Chen *et al.* 2015; Dieris-Hirche *et al.* 2017; Karacic & Oreskovic 2017; Shi *et al.* 2017; Thorens *et al.* 2014).

Several studies highlighted the role of traumatic early experiences in the development of IAD. Traumatic childhood experiences can negatively affect the brain development, damaging the ability of behavioral control and inhibition, in so setting up conditions for the later onset of IAD (Brand *et al.* 2016; Jhone *et al.* 2021).

Particularly, childhood trauma (CT) such as physical and emotional abuse, neglect seem to be more connected to the later development of IAD (Emirtekin *et al.* 2019; Kwak *et al.* 2018; Zhang *et al.* 2012); in fact, the IAD's prevalence in people exposed to childhood trauma, appears to be 1.5 times higher than in general population (Yang *et al.* 2022).

CT is a risk factor for psychological conditions. The study of Sheng *et al.* (2022) showed that CT significantly affected the incidence of IA in adolescents; Kwak *et al.* (2018) point out that adolescents with parental neglect during the childhood, show impairment in the control of the smartphone's use; while a longitudinal study by Hsieh *et al.* (2021) reports that as children grow into adolescence, the level of IAD increases for those who report higher levels of neglect and community violence.

Kircaburun *et al.* (2019) highlight that in online gamblers the existence of an history of emotional abuse is associated with depression which in turn is a risk factor for the development of the Online Gaming Disorder.

In a population of college students, Evren *et al.* (2019) have found the association between the severity of CT (abuse and neglect) and severity of IAD. Imperatori *et al.* (2023) report that the interaction between CT and psychological dissociation fosters the development of behavioral addictions, as IAD. In high school students, the interaction between CT and IAD has been noted among the male population only. Borghesi *et al.* (2022) report that the same interaction CT-IAD seems to be mediated by mentalization's skills and no gender influence was found. We could not find specific piece of work regarding the psychiatric population on the topic.

In light of what we have shown up to this point, the aims of this paper have been: to evaluate of the IAD prevalence among psychiatric outpatients in the overall sample and by gender; to highlight the IAD's association with socio-demographic variables (gender, age, education, work, marital status) as well as clinical ones (psychiatric diagnosis, trauma, drug treatment); to evaluate the possible correlations between variables

either socio-demographic either clinical and IAD, and to verify which ones among the correlated variables can explain the variability of the dependent variable (IAT).

MATERIAL AND METHODS

Participants

Participants have been enrolled among the outpatients of a Territorial Psychiatric Services in Milan, out of those patients under integrated psychiatric and psychological treatment or psychological only. The enrollment has been on a voluntary basis and the informed consent has been gathered, following Art.7 general policy UE679/2016.

All followed procedures were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the 1975 Helsinki Declaration along with its latter amendments.

Materials

The Italian version (Ferraro *et al.* 2007) of the Internet Addiction Test (IAT; Young 1998) has been used: it is a self-report 20 items scale, with a score-range 20-100 and cut off ≥ 40 for the dysfunctional Internet use (Young 2009). Internal reliability between .90 and .93 (Hardie & Tee 2007); and concurrent validity is acceptable.

Furthermore, socio-demographic (gender, age, education, work, marital status) and clinical (psychiatric diagnosis, possible presence and type of trauma, drug treatment, treatment duration) data have been gathered.

Procedures

Participants have been taught about the study's aim of screening IAD, and then they have been asked to fill the IAT. Socio-demographic and clinical data have been gathered by the medical records.

Statistic

The study has used descriptive analysis (mean, median and standard deviation); in order to compare the frequencies we used the χ^2 or the Fisher Exact Test if appropriate; in order to compare ordinal data, we used the median test. The association between dependent and independent variables have been verified by using Spearman r ; the predictor IAD's factors have been analyzed by using the linear regression method.

RESULTS

A sample of 63 outpatients (45 females = 69.2% and 18 males = 27.7%) out of a Territorial Psychiatric Services in Milan.

Mean age of the overall sample was 45.73 (SD = 16.15; range 18-70 yrs); mean female age = 45.33 (SD = 16.55, range = 18-70 yrs); mean male age = 46.72 (SD = 15.52; range = 20-70 yrs).

Tab. 1. Frequency (%) of socio-demographic and pharmacological treatment data

Level of education	
Middle school	5 (7.93)
High school	33 (52.38)
University degree	25 (39.68)
Marital status	
Unmarried male	11 (17.46)
Unmarried female	22 (34.92)
Married	15 (23.8)
Separated	4 (6.35)
Divorced	4 (6.35)
Cohabitant	5 (7.94)
Widowed	2 (3.17)
Employment status	
Employee	26 (41.27)
Self-employed	5 (7.94)
Unemployed	18 (28.57)
Student	7 (11.11)
Retired	7 (11.11)
Pharmacological treatment	
Antidepressant	22 (34.92)
Anxiolytic	4 (6.35)
Antidepressant and anxiolytic	12 (19.05)
Antipsychotic	6 (9.52)
Antidepressant and antipsychotic	1 (1.59)
Antiepileptic	2 (3.17)
No treatment	16 (25.4)

Tab. 2. Frequency (%) of IAT scores divided into cut off between males, females and the overall sample

	IAT*	
	≤ 39	≥ 40 ≤ 69
M	11 (17.5)	7 (11.1)
F	29 (46)	16 (25.4)
Overall sample	40 (63.5)	23 (36.5)

Legend: *no participants exceeds the cut-off >70

Tab.1 shows data on socio-demographic and pharmacological treatment.

Tab. 2 shows IAT scores divided into cut off between males, females and the overall sample.

About Tab. 2, in a contingency table 2(gender)x2(cut off), no significant differences emerge at χ^2 .

Regarding the years of treatment, it was found on the total sample M = 3.39, DS = 4.01, range = 1-17.

Regarding the psychiatric diagnosis, 9.52% (N = 6) of the patients did not have a precise diagnosis and were

Tab. 3. Total frequency (%; gender frequency) of IAT scores divided into cut off between psychiatric diagnoses

Psychiatric diagnosis	IAT	
	≤ 39	≥ 40 ≤ 69
Personality disorders	6 (9.52; 1 M, 5 F)	3 (4.76; 1 M, 2 F)
Schizophrenia spectrum and other psychotic disorders	1 (1.59; M)	0
Bipolar and related disorders	1 (1.59; M)	0
Depressive disorders	10 (15.87; 2 M, 8 F)	5 (7.94; 1 M, 4 F)
Anxiety disorders	11 (17.46; 4 M, 7 F)	7 (11.11; 1 M, 6 F)
Obsessive-compulsive and related disorders	3 (4.76; F)	1 (1.59; M)
Trauma and stressor related disorders	1 (1.59; F)	5 (7.94; 2 M, 3 F)
Somatic symptom and related disorders	1 (1.59; F)	1 (1.59; M)
Neurodevelopmental disorders	1 (1.59; F)	0
No psychiatric diagnosis	5 (7.94; 2 M, 3 F)	1 (1.59; F)

Legend: *no psychiatric diagnosis exceeds the cut-off >70; M=Male; F=Female

Tab. 4. Total frequency (%; gender frequency) of IAT scores divided into cut off between traumatic events

TRAUMATIC EVENTS*	IAT	
	≤ 39	≥ 40 ≤ 69
Covid hospitalization	1 (1.59; F)	0
Physical infant abuse	0	1 (1.59; F)
Torre Moro fire	3 (3.17; 1 M, 2 F)	2 (3.17; 1 M, 1 F)
Imprisonment	1 (1.59; M)	0
Attend to uncle's suicide	1 (1.59; F)	0
Suicide attempt	1 (3.17; M)	1 (1.59; F)
Father's death	0	1 (1.59; F)
Total trauma	7 (11.11)	5 (7.94)
No trauma	33 (52.38)	18 (28.57)

Legend: *no trauma event exceeds the cut-off >70; M=Male; F=Female

cared for by the Psychology Outpatient Department of the Territorial Psychiatric Service.

Table 3 shows the data relating to the IAT scores for each diagnostic classification, divided by IAT cut-off and gender.

About Tab. 3, in a contingency table 10(diagnosis) x2(cut off), no significant differences emerge at χ^2 .

Tab. 4 shows the data related to the IAT scores by type of trauma between IAT cut-off.

Data reported in Tab.4 show no significant differences at Fisher Exact Test.

We adopted a procedure seen in literature (de Vries et al. 2018) in order to verify possible differences between age and IAT scores, putting together the following range of age and the connected value of Median (Md): 20-25 yrs, IAT Md = 43; 26-36 yrs, IAT Md = 42; 37-45 yrs, IAT Md = 34; 46-56 yrs, IAT Md = 31; 59-65 yrs, IAT Md = 32.5; 66-78 yrs, IAT Md = 38.

We then compared the different range of age with the connected IAT's scores by the Median Test on the overall sample: Md = 36, Test' statistics = 12.011 with Degree of Freedom=5, $p = 0.035$. At pairwise method with Bonferroni correction we found significant differences in the younger range (20-25 yrs) as well as in the adult (46-56 yrs): Statistics of the Test = 12.764, $p = 0.005$.

Correlations

Statistically significant negative correlation between IAT and the number of years the outpatient has been undertaken by the Territorial Psychiatric Services ($r = -.250$; $p = .05$); the correlation between IAT and age is weak with a trend toward significance ($r = -.244$; $p = .057$). No other correlations between IAT and the remaining clinical variables.

Linear Regression

The linear regression with Stepwise method has been used: statistical assumptions have been satisfied (CP Mallows equals the number of predictors plus the constant), with $F(1) = 4.008$, $p = .05$; the outcome has been $R^2 = .063$ ($R^2c = .047$). The predictor "the number of years under the care of the Territorial Psychiatric Services explains 5% circa of the variability of the dependent variable IAT.

DISCUSSION

Epidemiological data on the prevalence of IAD in both general and psychiatric population, either in national or international literature are different (Cash et al. 2012; Moreno et al. 2019; So et al. 2017; Yar et al. 2019). Considering our hypothesis on the prevalence of IAD, in the overall sample the mean is in the high range of normal ranges. However, even if none of the participants exceeds the cut off $IAT \geq 70$ - cut off which indicates a significant impairment of functioning -, 36.5% of the participants shows some level of impairment in their daily functioning. Our outcome is slightly higher than the data in the literature, which oscillate between about 25% and 29%.

Regarding the distribution of IAD by gender, no statistically significant differences emerge in the IAT scores between males and females. This data is consistent with those as of general (Dahl & Bergmark 2020; Gamez-Guadix et al. 2015; Sechi et al. 2021; Sun et al. 2012; Tran et al. 2017) as clinical population (Fuchs

et al. 2018; Vigna-Taglianti et al. 2017; Winds et al. 2022; Yar et al. 2019).

Regarding age, younger people tend to have a higher level of IAD severity than adults; the data is consistent with studies by Lozano-Blasco et al. (2022), Derevensky (2019) and Karacic and Oreskovic (2017).

With regard to the clinical variables, no significant differences emerge when comparing IAT scores by diagnosis. This data also is consistent with Kwon et al. (2013); de Vries et al. (2018); Balhara et al. (2020). About the presence or absence of traumatic events, there are no significant differences out the IAT scores. Even concerning the limitation of the present study, the data is new in relation to the characteristics of the participants. In addition, it should be noted that approximately 8% of the participants who reported a trauma reported Internet use with mild impairment of functioning. Finally, for the other variables listed in Table 1, no significant differences emerge.

About the analysis of correlation, we found significant even if weak correlations between the number of years for the patient to be taken in care by the Territorial Psychiatric Services and the patient's age with IAT. So that, a smaller amount of years of therapy (either integrated or psychotherapy) and younger age, seem to be associated with higher levels of PIU.

The only predictor factor pointed out by this study, among all the other variables, is the number of years the patient has been taken care by the Territorial Psychiatric Services, although this datum explains only a small percentage of the variability of the IAT' scores.

CONCLUSION

The IAD is a behavioral addiction that has been investigated by several pieces of research. Our epidemiological data highlights the absence of a serious IAD, even if a slight problematic use emerges with a proportion of certain relevance. One hypothesis is that the participants, being outpatients undergoing pharmacological and/or psychotherapeutic treatment at a territorial service, may report relatively low IAT scores because they have already benefited, at least in part, from the treatment in progress. Alternatively, one explanation for the finding may be related to the level of severity of the psychiatric disorder, which may be such that excessive Internet use is not facilitated. These hypotheses can be explored in future research.

With regard to age, the relevant data is that even with a sample of patients undergoing psychiatric and/or psychological treatment, young people represent an age group most at risk.

As far as gender is concerned, the overlapping of data between males and females probably reflects the evolution whereby females also begin to use applications or sites with a high additive impact or are negatively affected by the high exposure to social networks, which is in fact very widespread among females (Winds et al. 2022).

The exposure to a trauma does not show significant impact on the development of IAD: this datum too can be deeply investigated by the enrollment of a larger sample in further studies.

The results of the correlation and regression relating to the number of years of care and IAT, in line with a possible explanation presented above relating to the epidemiological data, seem to give account of a possible beneficial effect of the treatment the outpatients have went under. This study has some limitations.

As cross-sectional in nature, this study does not allow to show the direction of the relationships between variables. About the sample, in this case the participants came all from the same Territorial Psychiatric Service, so that it will be possible for further studies to enrollee participants from a larger number of Services. Our sample was appropriately large enough for the statistics of the study, even if in order to confirm our outcomes the sample should be larger.

The lower number of males compared to females should be noted; future studies should also take into consideration the known epidemiological fact that certain disorders are more frequent among women and others among men. For the linear regression, while expecting a low impact of the predictor, we decided to evaluate how much variability of the dependent variable IAT is explained.

As long as we know, this study explore for the first time the relationship between the exposure to trauma and the development of IAD in psychiatric patients. Furthermore, it allows recommending that Territorial Psychiatric Services involve the screening of IAD in the outpatients' intake assessment on a regular basis in order to provide a dedicated psychological help.

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