



Internet addiction update: diagnostic criteria, assessment and prevalence

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ABSTRACT

In the last 15 years, Internet use has grown tremendously: now approximately 40% of the world population is online. Internet addiction is an emergent disorder, because the increasing popularity has led to the emergence of clinical cases presenting abuse symptoms. The classification of Internet Addiction is still controversial and there are several diagnostic criteria and various tools of measure. However there are no widely accepted diagnostic criteria.

Prevalence estimates vary widely, although we can estimate the internet addiction prevalence in the general adult population as approximately 2%.

Keywords

Internet addiction, Pathological internet use, Behavioral addiction, Prevalence addiction

Introduction

The word addiction comes from Latin *addictus*, which means excessively devoted to something with loss of ability to choose freely or slave.

In recent years, the term addiction has been expanded beyond substance dependence to include non-substance-related behaviors that cause problems and impairment [1].

Addiction to a substance and addiction to a behavior may look similar in their effects on behavioral patterns, emotions and physiology [2].

The first type, substance addiction, involves direct manipulation of pleasure using products legal or illegal that is ingested into the body, including drug use disorders and food-related disorders.

The second type, behavioral or process addiction comprises a series of potentially pathological behaviors that expose individuals to mood-altering events by which they achieve pleasure and become dependent [3].

There are several types of behavioral addiction including Internet use, gambling, sex, love, exercise, work, shopping [4].

Over the last 15 years, Internet use has grown very quickly: in contemporary society approximately 40% of the world population is online. Internet is an important tool for education, entertainment, communication and information-sharing [5].

The increasing popularity and frequency of internet use has led to the emergence of clinical cases presenting abuse symptoms [6].

The pathway from adaptive to pathological Internet use appears to be ambiguous and there are no widely accepted diagnostic criteria [7].

The clinical features of behavioral problems Internet-related have been described in various terms, including Internet addiction disorder, pathological internet use (PIU), problematic Internet use, excessive Internet use, Internet dependence, compulsive computer use and virtual addiction [8].

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The appropriate classification of Internet addiction is still controversial. It was classified as impulse-control disorder or as obsessive-compulsive disorder or as behavior addiction [9]. The inclusion of Internet Gaming Disorder in the appendix of the updated version of the Diagnostic and Statistical Manual for Mental Disorders (DSM-5) encourages further research [10].

The diagnostic criteria of Internet Gaming Disorder situates the behavior within the category of “Non-substance addictions” and suggests that Internet addiction might be one of the candidates for this category as is Pathological Gambling [11].

Several diagnostic criteria for Internet addiction have been proposed and the most popular are shown in **Table 1**.

Within the Internet Addiction phenomenon, five subtypes have been classified, because the people typically become addicted to a particular application that acts as a trigger for excessive Internet use [12].

- Cybersexual addiction: individuals are engaged in viewing, downloading and trading online pornography
- Cyber-relational addiction: people become overly involved in online relationship, more important than real life ones, with marital discord and family instability (chat-rooms, social networks)
- Net compulsions: gambling, shopping, trading online
- Information overload: excessive web surfing and information and database search
- Computer addiction: individuals are overly engaged with pre-programmed games

Aim and method

The aim of this paper is to review the internet addiction research with regard to diagnostic criteria, tools for assessment and prevalence in general adult population, in order to answer the following questions:

- i) What is internet addiction? ii) How it assessed?
- iii) How common is in general adult population?
- iv) Are there geographical differences or environmental risk factors? and v) is internet addiction a disorder?

In order to answer this questions a literature search was conducted using the database PubMed, PsycInfo, Scopus and Google Scholar using the following key-words: internet addiction, pathological internet use, behavioral addiction, prevalence addiction.

The studies were selected on the basis on the following inclusion criteria: i) contain quantitative empirical data ii) include a minimum of 1000 participants and iii) provide a full-text article published in English. There were no restrictions on time or publication status.

Assessment

Several instruments for Internet addiction assessment have been developed, but none have emerged as the “gold standard” [8].

The most commonly used ones are the Internet addiction test (IAT), the Young of the Internet Addiction Questionnaire (YDQI), the Chen's Internet addiction scale (CIAS) and the Internet addiction scale (IAS).

The IAT is a 20-item self-report scale that rates degree of compulsive use, loss of control, negative consequences and neglecting everyday life. The IAT is based on a Likert scale from 1 (“not at all”) to 5 (“always”), is valid and reliable, with satisfactory internal consistency (*Cronbach's alpha* of .84). Respondents with scores between 40-69 were classified as “addicted” and respondents with scores higher than 69 were classified as “possibly addicted” [12]. The IAT is a revised version of the IDQI, a 8 item self-report measure scored dichotomously and based on the diagnostic symptoms of pathological gambling: preoccupation, tolerance, loss of control, withdrawal, negative consequences, denial, staying online longer than originally intended and escapism. The criteria are evaluated through eight yes or no questions with a total score ranging 0-8. Those scoring ≥ 5 were classified as pathological [12].

The CIAS is a 26-item self-report validated measure, scored on a 4-point Likert scale, which rates five dimensions: compulsive use, tolerance, withdrawal problems with interpersonal relationship and time management [13-15]. Furthermore, the scale investigates weekly online hours and personal experience of the Internet use. The internal consistency of the scale is very satisfactory, with *Cronbach's alpha* values between .79 to .93 for the respective subscales.

Respondents with scores higher than 69 were classified as “addicted” [16]. It has also been reported that the screening cut-off of 58 points has high sensitivity but low specificity.

The IAS is a validate scale, based on combination of Young’s and Beard’s Internet addiction criteria, including preoccupation, loss of control, tolerance, withdrawal, deception, overall impairment and escapism. It’s a 20 items scored on a 4-point Likert scale with following scoring: 48-52 potential risk and 53/80 high risk for Internet addiction. The internal consistency is not registered [17].

Prevalence

The epidemiological findings of Internet addiction are shown in **Table 2**.

Prevalence studies have reported large variations (from 0.7 % to 27.7 %). These differences in the prevalence of Internet addiction were due to diverse study design, different assessment methods, and sampling from different sub-population in various studies [18-24]. Most importantly, a wide variety of scales have been applied to assess Internet addiction, sometime with the use of different cut-off points on the same measures across studies. Besides, the studies focus on younger population rather than the wider adult population [25].

In conclusion, we can estimate the internet addiction prevalence in the general adult population as approximately 2% [4].

The data prevalence show differences between geographical areas: in fact, many studies show that internet addiction was prevalent in Asian samples [26,27]. It might suggest that and environmental factors were associated factors for Internet addiction [28].

Various factors have been found to be statistically related with Internet addiction [29,30]. The strongest evidences are for the following variables: younger age, male gender, early exposure to the Internet and frequency use, availability of time [31,32].

Conclusions

The Internet use has radically changed our lives, more so than any other technological medium, yet we still know comparatively little about its effects on our psychological functioning, mental health and well-being. The more recent introduction of mobile devices (smartphones)

Table 1: Diagnostic criteria for Internet Addiction.

Young [12]	Griffiths [13]	Block [14]	Tao [15]
preoccupation	salience	excessive use with a loss of sense of time	preoccupation and withdrawal
mood change when attempting to stop Internet usage	mood modification	adverse consequences	functional impairment
the need to use Internet for increasing amounts of time	tolerance	tolerance	Duration of at least 3 months At least 6 hours of non-business Internet use per day
unsuccessful efforts to stop using Internet	withdrawal	withdrawal	One or more: tolerance, unsuccessful efforts to control use, continued use despite problems, loss of other interests, use to escape or relieve dysphoric mood
staying online longer than intended	conflict		
lying about Internet use	relapse		
jeopardizing of significant relationship or opportunities			
escape from problems or seeking to relieve bad mood states			

Table 2: Review of Internet addiction prevalence.

Author, Year	Sample	Country	Assessment	Results
1 Ak et al., 2013 [18]	4311 people aged 15-19	Turkey	IAT	5% addicted
2 Anderson, 2001 [19]	1302 people aged 18-22	US	IAT	8.1% addicted
3 Bakken et al., 2009 [20]	3399 people aged 16-74	Norvay	YDQI	1.0% addicted
4 Cao et al., 2006 [21]	2620 people aged 12-18	China	YDQI	2.4% addicted
5 Demetrovics et al., 2008 [22]	1037 adults	Hungary	IAT-YDQI	4.3 % addicted
6 Kim et al., 2006 [23]	1573 people aged 15-16	South Korea	IAS	1.6% addicted
7 Ko et al., 2009 [24]	2162 people aged 11-13	Taiwan	CIAS	10.8% addicted
8 Ni et al., 2009 [25]	3557 people aged 18-22	China	IAT	6.44 % addicted
9 Poli et al., 2012 [26]	2533 people aged 14-21	Italy	IAT	5.01% moderately 0.79% seriously addicted
10 Yen et al., 2009 [27]	2793 people aged 18-48	Taiwan	CIAS	12.9 % addicted

has also radically changed the way people connect, because internet use is pretty much everywhere.

There are extreme variances in Internet addiction across age, countries and cultures. The prevalence appears higher in younger people, in male gender and in Asian samples. In Eastern societies the Internet has been rapidly developed in recent years. It may suggest that early exposure to the Internet and to environmental factors were important associated factors for Internet addiction. However, the dissimilar rates reported

can be partially attributed to the use of different classification criteria used. In fact it's possible to use different measure instruments and in some studies the same scales have been used with different cut-off.

The Internet addiction is often associated with comorbid psychiatric disorder (depression, anxiety, ADHD, obsessive-compulsive symptoms, hostility/aggression) and the association is higher than expected by chance.

There is a debate between eastern scientists that are more oriented to accept the diagnosis and western scientists that are critical on the validity of the diagnosis.

Internet addiction remains an ill-defined and heterogeneous construct. Whether Internet

addiction is a primary and discrete disorder or whether a part of a larger behavioral syndrome is or whether is manifestation of an underlying disorder is controversial. The research suggests that the disorder and its symptoms are relatively common and are associated with comorbid psychiatric disorders [33].

Finally, is recommended that a clearly defined nosology of Internet addiction is established and to standardize the assessment measures.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationship that could be construed as a potential conflict of interest.

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