

Internet Addiction Disorder

Subjects: **Psychiatry**

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Internet addiction disorder (IAD), sometimes also called pathologic/problematic internet use (PIU), is widely defined in terms of an impulse control disorder characterized by uncontrolled Internet use. The disorder is associated with significant functional impairment and/or clinically measurable distress, anxiety, depression, and other psychopathological symptom.

internet addiction

adolescents

sleep loss

anxiety

depression

punishment-reward circuitry

dopamine transmitter pathways

brain

1. Introduction

Internet Addiction Disorder (IAD) is a disabling condition that calls for full consideration as it has a severe impact on young people's brain function. Internet addiction disorder (IAD), sometimes also called pathologic/problematic internet use (PIU), is widely defined in terms of an impulse control disorder characterized by uncontrolled Internet use^{[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18]}. The disorder is associated with significant functional impairment and/or clinically measurable distress, anxiety, depression, and other psychopathological symptoms^{[2][3][4][5][6][7][8][9][10][11][12]}. IAD is not (yet) classified as a mental disorder in the Diagnostic and Statistical Manual of Mental Disorders—Fifth edition (DSM-5), but a subtype of IAD, internet gaming disorder (IGD), which specifically refers to videogame addiction, has been included in Section 3 of the DSM 5^[12]. It is currently envisaged to include IAD and IGD also in the *International Classification of Diseases for mortality and morbidity statistics* ICD-11^[12]. A meta-analysis on IAD performed six years ago^[6] [6] and involving more than 89,000 participants from 31 nations reported a global prevalence estimate for IAD of 6% worldwide. The highest estimates for IAD prevalence were scored for the Middle East in terms of about 12% of the reference population, the lowest for Northern and Western Europe, with about 2.5% of the reference population. These estimates were made six years ago. A study conducted on Indian college students^[7] [7] identified male gender, continuous online availability, and predominant use of the internet for new friendships/relationships as major risk factors. Higher computer skills and easy Internet access in teenagers and young adults represent an augmented risk for IAD^{[7][8][9]}. Internet addiction (IA) has emerged as a universal issue, but its international estimates vary considerably.

2. Impact on Adolescents

Two factors have been considered to explain cross-national variations^{[3][4][5][6][7][8]}. One is internet access, which varies between continents and nations and predicts that IA prevalence should be positively related to the internet

penetration rate per capita. The other factor, referred to as real life quality, predicts that IA prevalence should be inversely related to the global national index of life satisfaction and/or other specific national indices of environmental and lifestyle quality. Personal Technology Usage (PTU) has hit young people in the USA “fast and hard”, with 92% internet penetration, which is currently the highest in the world, as pointed out in an article on the effects of PTU on children and youth^[18]. This recent online article published by the US Naval Institute Proceedings describes the internet in terms of a virtual hypodermic mechanism that delivers a digital drug content in a highly effective manner, particularly via the smartphone. This drug seems to hamper children’s ability to manage and balance time, energy, and attention and thereby leads to lifestyle changes and behavioral deficits. The mediating effects of insomnia and associations between problematic Internet use including Internet Addiction (IA), Online Social Networking Addiction (OSNA), and depression among adolescents^{[1][2][3][4][5][6][7][8][9][10]} have been highlighted in a population of more than one thousand secondary school students from Guangzhou in China^[10], which has about 70% internet penetration, i.e., about 30% less than the USA or Europe. Levels of depression, insomnia, IA, and OSNA were assessed using the Center for Epidemiological Studies Depression Scale (CESDS)^[19], the Pittsburgh Sleep Quality Index (PQI)^[20], Young’s Diagnostic Questionnaire for Internet Addiction (YDQIA)^[21], and the Online Social Networking Addiction Scale (OSNAS)^[22]. The results from this cross-sectional study reveal that a high prevalence of IA and OSNA is associated with an increased risk of developing depression among adolescents, both directly and/or as a consequence of insomnia associated with the addictive behaviour^{[9][10]}. Insomnia, therefore, is a factor that may be a trigger for or a chronically developing consequence of IA and OSNA. Likely, depression predicts IA and OSNA, and vice versa, among subjects who were free from either problem at baseline^{[9][10][11][12]}. Conclusions from this study suggest that it may be effective to consider problematic Internet use, insomnia, and depression jointly as all three seem to be clearly interdependent in light of these and other findings. The high incidence of depression and increasing suicide rates in teenagers has become a worldwide concern that calls for urgent scrutiny. Depressed individuals might go into online social networking as a secure and non-threatening means of communication with the outside world and as a means for alleviating anxiety related to personal problems. Thus, excessive internet use appears to be a maladapted coping strategy that accelerates the development of digital addiction on the one hand and augments the withdrawal from interpersonal offline activities that could lead to effective coping with real world problems. As a consequence, the young person, instead of coping or learning to cope with problems through real-world interaction with others, spirals further and further down the slippery slope of depression, insomnia, and ultimately, isolation and loneliness. A study published in 2017 by the American Journal of Epidemiology^[23] has shown that teenagers are particularly vulnerable in this respect and that the trend towards online technology-induced teenage depression and associated symptoms may well reach epidemic proportions if nothing gets done to stop it. The national statistics made available in a US Naval Institute Publication^[18] show estimates for suicide rates in individuals for two age ranges across the years 2000–2019 in terms of % of change per annum. The curves reveal an alarming trend towards an increase, which has been particularly steep for ages 15–34 between the years 2008 and 2016 (Figure 1). The publication explicitly links this trend to digital addiction.

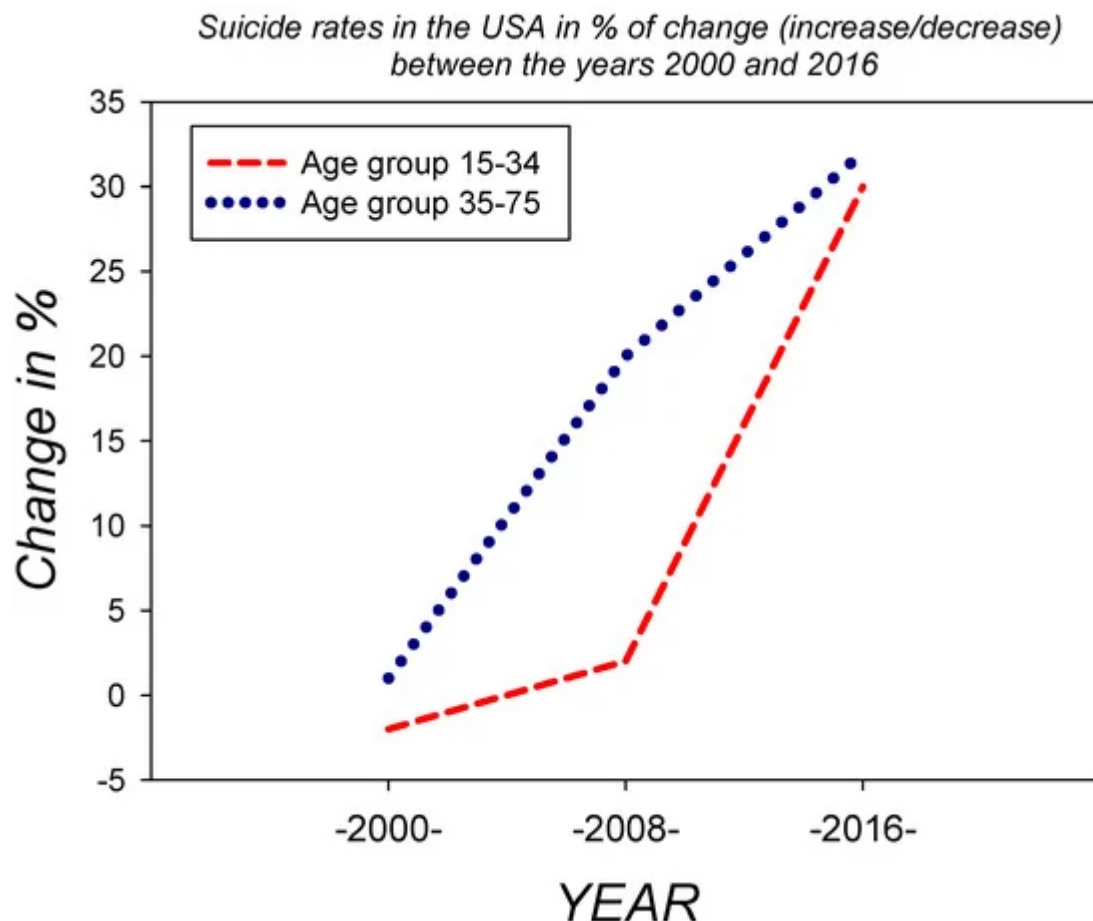


Figure 1. Estimates for suicide rates in the USA, which has an internet penetration index of 92% of the global population, between the years 2000 and 2016. Estimates are expressed herein as the % of change (increase/decrease) per annum, showing an alarmingly steep increase for the age group of 15 to 34 year old individuals. The key data shown here have been replotted on the basis of a report published by the US Naval Institute in 2018^[18], which points towards a link between the increase shown here and digital addiction, especially in younger individuals. The hypothesis is consistent with data from scientific studies, summarized above, showing a tight connection between internet addiction, insomnia, and depression in young males and females.

MRI studies suggest structural changes in the frontal cortex associated with functional abnormalities in Internet addicted subjects ^[15]. Nuclear imaging findings indicate that IA is associated with dysfunction of the brain dopaminergic systems^{[14][15]}, indicating that de-regulation of the prefrontal cortex may underlie reward specific uncontrolled behavior in internet overuse in addicted subjects. Results from a set of independent studies^{[24][25][26][27][28]}, mostly conducted in East Asia on young male subjects with internet gaming disorder, were recently analyzed in a comprehensive metareview^[29]. This analysis led to conclude on functional alterations, similar to those observed in substance abuse, in brain regions involved in cognitive control functions^{[24][25][26][27][28][29]}, and reward/punishment sensitivity balance^[26]. A working model pointing towards interrelated neurophysiological correlates of this new syndrome was recently suggest in^[30].

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