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INTERNET AND GAMING ADDICTION: EXPLORING THE ROLE OF PHARMACOLOGICAL TREATMENTS

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ABSTRACT

Internet and Gaming Addiction have emerged as critical behavioural disorders in the digital age, marked by overuse of digital technologies, online gaming, and virtual interactions. This review provides an in-depth analysis of the numerous internet-related addictions, including social networking, cybersex, information overload, and gaming disorders. The paper explores the psychological, social, and neurological underpinnings of these addictions and highlights their association with co-occurring mental health conditions such as depression, ADHD, and obsessive-compulsive disorder. The review further examines diagnostic features, risk factors, and the evolving landscape of treatment options, including cognitive-behavioural therapy, pharmacological interventions, and technology-based therapies. Special attention is given to emerging treatments and the ethical considerations in clinical research. The results highlight the critical need for all-encompassing, empirically supported therapy and suggest more investigation into scalable, easily accessible treatments for Internet and gaming disorders.

Keywords: Internet, Gaming Addiction, pharmacological interventions

INTRODUCTION:

The rapid expansion of digital technology has transformed modern life, offering convenience, connectivity, and new forms of entertainment. However, it has also led to the emergence of problematic behaviour collectively known as **Internet Addiction Disorder (IAD)** and **Internet Gaming Disorder (IGD)**. First recognised in the 1990s, these conditions are now viewed as significant public health concerns, particularly among adolescents and young adults. While initially dismissed as a minor issue, mounting evidence suggests that excessive use of the internet and gaming platforms can lead to serious psychological, neurological, and social consequences. This review article aims to provide a comprehensive overview of the types and symptoms of internet and gaming addictions, drawing on multidisciplinary research in psychology, neuroscience, and clinical medicine. It investigates the underlying causes, which include personality qualities, genetic predispositions, and environmental variables. Additionally, the review delves into established and emerging treatment modalities such as **cognitive-behavioural therapy (CBT)** and pharmacological approaches.

Types of Internet Addiction:

According to research conducted in 1999, the term "Internet addiction" refers to a broad category that can be subdivided into various behavioural and psychological disorders associated with impulse control issues **[1]**. An individual's behaviour has an impact on both mental and physical health; it affects relationships with family and friends; it disrupts professional obligations; it causes economic instability; and it could lead to criminal activity **[2]**.

- **Hypersexual Addiction:** Refers to the obsessive use of adult websites for cybersex and pornography.
- **Cyber-relationship Addiction:** Excessive participation in virtual partnerships.
- **Internet addictions:** Compulsive shopping, gambling, or day-trading.
- **Information overload:** Excessive online browsing or database searches.
- **Computer addiction:** Obsessive computer game playing.

According to the American Centre for Online Addiction, five distinct forms of Internet addiction have been recognised in general. **[3]**

1) Cyber sexual Addiction: Addicts who are addicted to cyber-sex and cyber- pornographic materials usually participate in adult chat rooms and download, utilise, and sell these materials. **[3]**

2) Addiction to Cyber interactions: Addicts tend to be excessively invested

in online interactions and may even engage in online adultery **[4]**.

3) Social Network Addiction: Every online group where users can make public or semi-public profiles. The most well-known social network is Facebook, which has 60 million users and continues to expand. **[4]**

4) Internet gaming addiction: This encompasses a variety of behaviours, such as compulsive e-trading, gambling, video games, and shopping. **[5]**

5) Information Overload: Also referred to as addiction to knowledge overload. A new obsessive behaviour connected to online browsing or database searching is brought about by the wealth of information available on the Internet. **[5]**

6) Computer Addiction: Researchers discovered that compulsive computer game playing became troublesome in organisational settings in the 1980s, when games like Minesweeper and Solitaire were included in computers.**[5]**

Characteristics of gaming disorder

- Over the past 60 years, video games have evolved from a niche hobby for young men to a mainstream pastime enjoyed by people of all ages and genders. **[6]**
- Consequently, the video game industry targets men as its primary demographic and continues to create games for them, further solidifying the dominance of men among video game players. **[7]**
- Genetics strongly influence substance use disorders by affecting brain response to drugs and alcohol, thus increasing addiction vulnerability. **[8]**
- Traditionally, children and teenagers were the main participants in gaming, but these days, adults also enjoy playing games.**[9]**
- The internet gaming market is growing. In 2012, the video game industry grew by 8%, fuelled by over a billion players.**[10]**
- Research on Internet gaming addiction in the new millennium has yielded prevalence estimates that vary considerably, with figures as low as 0.2% in Germany.**[11]**

Treatment of internet and gaming disorder

Cognitive-behavioural therapy (CBT), family therapies, and pharmaceutical treatments have been some of the most popular and well-studied treatment approaches for IGD. Psychiatrists who consider gaming a problem to be a mental illness are typically the ones who support the use of pharmaceutical treatment for it. The neurological process underlying the impulse exhibited by a person with a gaming

disorder toward the game is comparable to that of a substance addict toward their habit. Furthermore, individuals with a gaming problem frequently have additional concomitant mental conditions. This serves as the basis for pharmacological therapy. **[12]**

Pharmacological interventions:

Table 1: A review of the clinical data on medication to treat Internet addiction [13]

Medical Intervention	Clients	Predominant comorbid mental disease	Principal results
Escitalopram	Internet and Gaming addicts	Major depressive disorder	Reducing time spent online, Reduced online gaming activity, reduction in symptoms of depression, a decrease in the intensity of the disorder caused by Internet gaming
Bupropion	Internet and Gaming addicts	Major depressive disorder	Reducing time spent online, less desire to play games online, a reduction in symptoms of depression, and a reduction in the severity of Internet gaming disorder
Quetiapine (in Combination with Citalopram)	A single Internet addict	No comorbid diagnosis	Reducing time spent online, reduced obsessive-compulsive characters
Naltrexone (in Combination with Sertraline)	A single Internet sex addict	Obsessive-compulsive Disorder (OCD).	Recovery from the symptoms of depression and the Internet addiction.
Methylphenidate	Internet and Gaming addicts	Attention-Defined Hyperactivity Disorder (ADHD).	Reduction in Internet usage, Improvement in ADHD symptoms, a decrease in the severity of the disorder associated with Internet gaming

The research literature on treatment interventions for gaming disorder is currently limited but diverse. Studies on cognitive-behavioural therapy appear to be the most prevalent **[14]**. Escitalopram and bupropion have been the subject of two RCT studies that have looked at pharmacological interventions.**[15]** According to the reviews Given the existing issues in the realm of treating gaming disease well-designed treatment trials and agreement on the construct are required. The majority of research on cognitive-behavioural treatment uses small sample sizes, active control groups, or combines cognitive-behavioural therapy with drugs. Two randomised controlled trials on psychopharmacological therapies each comprised fewer than 50 participants. Currently, no attempt has been undertaken to evaluate variation in treatment impact across diverse therapeutic approaches utilising cutting-edge meta-analytic methodologies.**[14]**

- Escitalopram, an antidepressant medication that belongs to the selective serotonin reuptake inhibitor class, showed modest promise in treating IAD in early clinical trials. Addicts' moods

improved, and their online time was significantly reduced after taking escitalopram (20–30 mg/day). **[16]**

- Bupropion, an antidepressant that acts as a nicotinic acetylcholine receptor antagonist and dopamine and norepinephrine transporter inhibitor, appears to have better evidence for quitting smoking.**[17]**
- Addicts who took 150–300 mg/day of bupropion reported decreased desire and gaming time, along with depressive symptoms during the drug-active period. An oral dosage of 100 mg/day of sertraline (serotonin-selective reuptake inhibitor), another antidepressant medication, did not have any effect on a male addict's Internet sex addiction. Olanzapine dosages ranging from 2.5-15 mg per day did not affect compulsive gambling; however, when citalopram (40 mg/day) and quetiapine (200 mg/kg) were taken together, the amount of time spent was decreased, according to a case study.**[14]**
- An additional investigation evaluated the efficacy of methylphenidate in combating illegal online gaming in teenagers with ADHD, compared to that of atomoxetine, a non-stimulant drug that is used to treat ADHD and is a selective norepinephrine reuptake inhibitor. The intensity of symptoms of Internet gaming disorder was lessened by atomoxetine (10–60 mg/day) and methylphenidate (10–40 mg/day), and this decrease was linked to a decrease in impulsivity, which was another effect of both ADHD drugs.**[16]**
- Glutamatergic medications may be used to treat Internet addiction since changes in the glutamatergic system have additionally been linked to the pathophysiology of behavioural and chemical addictions. Alpha-2 agonists have also been shown in clinical studies to be effective in treating ADHD symptoms that are similar to those of individuals with IAD.**[17]**
- Acamprosate is another potential medication for IAD; it works similarly to naltrexone in treating alcoholism.**[18]** Acamprosate is commonly referred to be an "anti-raving" medication due to its effects on glutamatergic and GABAergic transmission. **[19]**

Psychological therapy:

Individualised treatment.

Cognitive behavioural therapy (CBT) is the most widely used individual treatment.**[20]** Individual consultations are the primary method of treatment. The average duration of CBT is several months, and 8–28 sessions, lasting one to two hours each, are typically needed. Cognitive-behavioural therapy (CBT) is the most commonly used individual treatment.

The content of the treatment consists of: 1. Detection of cognitive distortions associated with gaming behaviour 2. Searching for proof to support this cognitive distortion 3. Assessing fundamental ideas and negative schema 4. substitution with more flexible ways of thinking 5. Implementing relapse prevention techniques and developing treatment strategies; 6. addressing issues with self-control and other things. The findings demonstrate that cognitive behavioural therapy is useful for treating gaming disorders and can alter a person's thoughts about the game.**[20]**

Group counselling:

Groups or teams are used for psychological therapy, which is often referred to as collective therapy or team therapy. These types of therapy often involve six to ten people, one to two sessions each week (lasting one to two hours), and a minimum of six months. Group members might better identify their issues by discussing their gaming experiences with others. Furthermore, group therapy can establish a safe and somewhat confined space where delicate subjects like gaming disorder can be freely discussed. Group therapy can help people learn from others who are also coping with a gaming disorder, which can help them cope better because everyone handles their gaming disorder differently.**[21]**

CBT-based psychotherapy:

Four studies, all including adult samples, assessed CBT for Internet addiction using pretest-post-test procedures. Treatment methods varied widely, ranging from combined cognitive behavioural therapy for Internet use. **[22]**. short-term treatment for internet and computer game addiction, which included 15 group sessions and 8 individual CBT sessions **[23]**. The two individual CBT studies also included six-month follow-ups and found that the benefits of treatment were maintained over time **[24]**. Cognitive Behavioural Therapy (CBT) effectively treats various conditions, including substance abuse, gambling, emotional disorders, and eating disorders. Based on the cognitive behavioural model, CBT suggests altering thoughts to modify feelings and behaviours **[25]**.

Technology-based therapies for IGD:

Technology-based therapies are among the approaches that have perhaps the most promise. The general phrase "tech-based" or "tech-based" describes creative approaches that use digital platforms to offer evaluation, prevention, and intervention. These strategies include wearable technology, smartphone apps, virtual reality platforms, and web-based tools.**[26]** Compared to conventional treatment methods, technology-based therapies for IGD appear to be understudied, as only one study has included and evaluated a technology-based intervention. Oddly, tech-based therapies

for IGD haven't received more attention in the reviews, although there isn't much research that focuses on them.**[26]**

Ethical and legal issues:

The ethical and legal ramifications of using human subjects in clinical research have long worried lawmakers, lawyers, scientists, and medical professionals. Ethical standards outlined by the Declaration of Helsinki are applied in therapeutic research involving human participants. By systematically collecting and evaluating data, clinical research seeks to enhance clinical practice and help patients in the future by making recommendations that may be applied to different circumstances. Therefore, it is essential to comprehend Good Clinical Practice (GCP), a worldwide quality standard that was created by the International Conference on Harmonisation of Technical Requirements for Pharmaceuticals for Human Use [ICH] **[25]**. Additionally, the Belmont Report offers an analytical approach for assessing research according to three ethical standards. **[26]** Benefits can be used to show gratitude or compensate for time and effort, but they should not be used as an incentive to participate.**[27]**

Causes of Internet Addiction:

The effects of internet addiction disorder (IAD) can ruin lives by causing neurological problems, social problems, and psychiatric difficulties. Surveys in Europe and the United States have indicated alarming prevalence rates of 1.5% to 8.2% **[28]**. It was the first major proposal for diagnostic criteria when Dr. Young made changes to the DSM-IV criteria for problematic gambling in 1996 **[29]**. Furthermore, evaluation has made use of a variety of assessment tools. Internet Addiction in Young People. The brain's "reward centre" or "pleasure pathway" is a complex network of pleasure-related brain areas that are known to be activated by addictions. It is increasingly clear that there is a hereditary component to addictive behaviours. It has been noted by numerous academics and medical practitioners that IAD co-occurs with various mental diseases. It is debatable whether the addiction or the co-occurring illness occurred initially **[30]**.

Signs and symptoms:

Recognising the warning signs and symptoms of video game addiction is crucial. Always advisable to get aid immediately as feasible. The symptoms listed below can assist you in making informed decisions and successfully navigating addiction **[31]**.

- **Fixation on Gaming:** Addiction to video gaming begins when players become so engrossed in the game that they neglect other things, such as their studies, in favour of thinking and dreaming about it **[31]**.

- **Hiding or Lying About Using Gaming:** Playing video games can cause gamers to neglect their diet, sleep, and personal hygiene for hours on end. Additionally, they could spend hours in their rooms lying to loved ones about what they are doing. Gamers may fabricate several excuses for their inability to socialise with others, or claim that they are using their PC for work, or they may tell their parents that they are finishing their job **[31]**.
- **Loss of Interest in Other Activities:** As the addiction to video games increases, people lose interest in commonplace activities they used to like **[32]**. For example, a gamer's mother said that her son was a varsity member on his high school baseball team and loved the game until he discovered Xbox Live, which led to a decline in his academics **[33]**. But he loved baseball so much that it wasn't until he stopped playing that she realised anything was amiss.
- **Social Withdrawal:** As video game addiction increases, people lose interest in commonplace activities they once enjoyed. One gamer's mother, for example, claimed that her son was a varsity baseball player on his high school team and loved the game until he discovered Xbox Live, which led to a decline in his academics. But she didn't realise something was wrong until he stopped playing baseball because he loved it so much **[33]**.
- **Psychological withdrawal:** When unable to play a game, gamers may experience a sense of loss because they miss it and feel compelled to play. This tendency may grow so strong that it leads to emotional instability when the game is forced to stop. They are therefore unable to focus on anything but playing **[31]**.
- **Defensiveness and anger:** Addicts may get defensive and incensed when they are compelled to play or are forced to stop. Parents who want to set time limits for the game have said that their kids can respond violently, argue, and become irritated. **[31]**.
- **Continued Use despite the Consequences:** Gamers typically want to be the best in their games. They therefore need to play the game more as they advance and grow in it. In journey-style games, where players cooperate to complete game objectives, this evolution is especially noticeable **[31]**. Lastly,

despite the negative effects on their lives, gamers may keep playing games. While adults may lose their jobs or relationships, and children may quit school and neglect personal hygiene and self-care just to play, gamers often keep playing **[33]**.

CONCLUSION AND FUTURE DIRECTIONS:

The new yet rapidly expanding field of IGD treatment development and evaluation provides plenty of space for progression. On the other hand, the issue of IGD remains urgent since it is becoming increasingly widespread among many populations and is connected to several unfavourable psychological, behavioural, and physical effects. This review made an effort to outline the exciting possibilities of cutting-edge methods that are being applied more frequently to treat a range of illnesses, including addictions. Despite being little researched concerning IGD, technology-based therapies have demonstrated encouraging outcomes as a successful therapeutic approach. The appeal of audio-visual content and the degree of interaction that may appeal to the target audience are the fundamental benefits of technology-based solutions. Furthermore, digital acceleration following the COVID-19 epidemic has led to rapid adoption and spread of technology-based treatments, increasing the tolerability of such approaches. The research on technology-based treatment that has been evaluated in the current work has revealed some preliminary scientific evidence for treating IGD, but rare. New experimental offerings require rigorous study, a broader assessment, and extra regulations before they can be scaled up. Further research into this fascinating topic of study could aid in the development of novel therapy options that are effective, safe, and cost-effective in supporting recovery, as well as lengthening our understanding of the mechanics and underlying patterns of IGD.

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