

Associations between Attention Deficit Hyperactivity and Internet Gaming Disorder

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Abstract:

Internet Gaming Disorder (IGD) has gained increasing clinical attention as problematic gaming may lead to impaired control, prioritization of gaming over other activities, persistence despite negative consequences, and functional impairment. Attention-Deficit/Hyperactivity Disorder (ADHD) has been identified as an important risk factor for IGD because both conditions share features such as impulsivity, impaired inhibitory control, difficulty delaying gratification, executive dysfunction, and abnormalities in reward-processing pathways. The relationship may be bidirectional, as ADHD symptoms can increase vulnerability to excessive gaming, while prolonged gaming, sleep deprivation, and academic disengagement may aggravate attentional and behavioral difficulties. This association may be particularly relevant among university and medical students, who commonly experience high academic demands, stress, irregular sleep, and easy access to digital devices. The co-occurrence of ADHD and IGD may complicate diagnosis and treatment, highlighting the importance of screening for both conditions and using integrated management approaches.

Keywords: Attention-Deficit/Hyperactivity Disorder; Internet Gaming Disorder; Gaming Disorder; Impulsivity; Executive function; Medical students; Behavioral addiction.

Introduction:

The widespread availability of digital technology has substantially increased opportunities for video gaming, particularly among adolescents and young adults. Gaming has become an important recreational and social activity, and many forms of gaming may provide opportunities for entertainment, social interaction, and engagement. However, gaming behavior exists on a continuum ranging from recreational and highly engaged gaming to problematic gaming and clinically significant Gaming Disorder (1).

Importantly, high gaming frequency alone should not be equated with a mental disorder; clinical significance depends primarily on impaired control, increasing priority of gaming, persistence despite negative consequences, and associated functional impairment (2).

Research on gaming has demonstrated that gaming may have heterogeneous effects depending on the intensity, context, and type of gaming. A longitudinal study of children found that gaming frequency was associated with some psychosocial outcomes, while the effects differed according to gaming patterns and game characteristics, emphasizing the importance of distinguishing ordinary gaming from problematic gaming (1).

The recognition of problematic gaming as a potential mental health condition has developed considerably over the past decade. The American Psychiatric Association included Internet Gaming Disorder (IGD) in Section III of the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), as a condition requiring further research. Subsequently, the WHO included Gaming Disorder (GD) as an official disorder in the ICD-11 (3).

ADHD has been increasingly identified as an important risk factor for the development of behavioral addictions, particularly Internet Gaming Disorder (IGD) (4).

Individuals with ADHD commonly exhibit impulsivity, impaired self-control, and difficulty delaying gratification, all of which increase vulnerability to excessive and uncontrolled gaming behaviors. These shared characteristics suggest a strong theoretical basis for the association between ADHD and IGD (5).

Evidence suggests that the relationship between ADHD and Internet Gaming Disorder may be bidirectional. While ADHD symptoms increase vulnerability to IGD, excessive gaming may also exacerbate attentional difficulties, impulsivity, and emotional instability (5).

Factors such as sleep deprivation, prolonged screen exposure, and academic disengagement associated with excessive gaming may worsen ADHD-like symptoms (6).

This heightened risk may be due to the overlapping neurobiological pathways involved in reward-seeking and impulse control (7).

Both ADHD and IGD are linked to dysregulation of the dopaminergic reward system, particularly involving the mesolimbic pathway (7).

Neuroimaging studies indicate that individuals with either condition often display reduced activation in the ventral striatum during reward anticipation, contributing to a preference for immediate over delayed gratification (7).

Functional MRI studies reveal overlapping patterns of impaired connectivity in the prefrontal cortex and anterior cingulate cortex in both ADHD and IGD, regions associated with executive control and decision-making (8).

This neural overlap may explain why individuals with ADHD are more susceptible to the reinforcing properties of online gaming (7).

Additionally, serotonin and norepinephrine system dysfunctions, which play roles in mood regulation and cognitive flexibility, have been implicated in both disorders. These neurotransmitter imbalances contribute to the maintenance of compulsive gaming behaviors in ADHD populations (9).

ADHD symptoms such as impulsivity and difficulty sustaining attention align closely with gaming behaviors that reward rapid responses and frequent task-switching. The fast-paced, highly stimulating environment of online games can temporarily compensate for attention deficits, reinforcing play (5).

Impulsivity represents a core mechanism linking ADHD to Internet Gaming Disorder. Individuals with elevated impulsivity may struggle to control gaming duration, resist urges to continue playing, or disengage from games even when facing negative consequences. This impaired inhibitory control can facilitate the transition from recreational gaming to disordered gaming patterns (5).

Deficits in executive functions—such as planning, working memory, and inhibitory control—are core features of ADHD and have been identified in IGD as well. These deficits impair the ability to regulate gaming time, increasing the risk of prolonged sessions and neglect of other responsibilities.

Furthermore, emotional dysregulation common in ADHD can lead individuals to use gaming as an avoidance or coping strategy to escape negative emotions, which may contribute to the development or maintenance of IGD.

Among university students, particularly medical students, the association between ADHD and Internet Gaming Disorder may be especially pronounced (10).

High academic demands, chronic stress, irregular sleep schedules, and easy access to digital devices create an environment conducive to excessive gaming. Students with underlying ADHD symptoms may be more likely to rely on gaming as an escape from academic pressure (11).

The co-occurrence of ADHD and IGD can complicate diagnosis, as overlapping symptoms may obscure the presence of either disorder when assessed independently. This necessitates comprehensive screening in clinical practice for both conditions, especially in youth presenting with excessive gaming habits (12).

Failure to address ADHD in individuals with IGD can undermine treatment outcomes, as untreated attentional deficits and impulsivity may perpetuate gaming behaviors despite psychosocial interventions (13).

Treatment approaches for comorbid ADHD and IGD often require multimodal interventions, integrating behavioral therapy, psychoeducation, and sometimes pharmacotherapy targeting ADHD symptoms to reduce vulnerability to gaming addiction (13).

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