

Internet Addiction and ADHD: Exploring Behavioral and Cognitive Correlations in Children

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ABSTRACT

Introduction: Internet Addiction Disorder (IAD) is a behavioral condition affecting cognition and daily functionality, particularly in children with Attention-Deficit/Hyperactivity Disorder (ADHD). ADHD is a neurodevelopmental condition characterized by inattention, hyperactivity, and impulsivity. This literature review explores the intersection of ADHD and IAD, focusing on behavioral vulnerabilities and the implications of digital overuse. **Methods:** A systematic review of current research was conducted, highlighting the prevalence, symptoms, and co-occurrence of IAD and ADHD. **Results:** Evidence indicates that children with ADHD are 6-9 times more likely to develop IAD due to traits like impulsivity and inattention. Interventions addressing digital habits and awareness are essential to mitigate the risk. **Conclusion:** Understanding the relationship between IAD and ADHD is crucial for creating effective strategies to optimize the development of affected children.

Keywords: internet addiction; attention deficit hyperactivity disorder; ADHD; access to the internet; children.

INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders in children, affecting approximately 5-7% of the global population. It is characterized by a persistent pattern of inattention, hyperactivity, and impulsivity, therefore significantly impacting children's academic performance, social interactions, and overall quality of life. The etiology of ADHD is multifactorial, with a strong genetic basis and environmental influences such as prenatal exposure to stress and toxins.

In parallel, Internet Addiction Disorder (IAD) has emerged as a critical behavioral concern, particularly among adolescents and children. Defined as the excessive use of the internet that interferes with daily functioning, IAD has been linked to various psychological and physical consequences, including sleep disorders, emotional instability, and social isolation. The increasing prevalence of IAD is fueled by the rise of digital media and the growing accessibility of the internet among young populations.

The intersection of ADHD and IAD is an area of growing interest in behavioral science. ADHD traits such as impulsivity, difficulty delaying gratification,

and a propensity for novelty-seeking behaviors align closely with the patterns observed in individuals with ADHD. Studies suggest that the group of children with ADHD is significantly more susceptible to developing IAD, with an odds ratio of 6.679 compared to the non-ADHD group. This heightened susceptibility is attributed to the reinforcing nature of internet use, which provides instant gratification and stimulation, exacerbating the symptoms of ADHD.

Despite the growing body of research, the relationship between ADHD and IAD remains underexplored in certain regions, particularly in Indonesia, where cultural and environmental factors may influence the manifestation and management of these conditions. This study aims to bridge this gap by examining the prevalence of IAD among children with high and low risks of ADHD in Surabaya, Indonesia. These findings are expected to provide valuable insights for teachers, governments, as well as healthcare professionals in addressing these interrelated challenges.

ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD)

Definition and Characteristics

ADHD is a neurodevelopmental disorder characterized

by inattention, hyperactivity, and impulsivity. According to DSM-5 criteria, these symptoms must persist for at least six months and manifest in two or more settings, such as home and school [1]. ADHD is classified into three subtypes: inattentive, hyperactive-impulsive, and combined [6].

Children with inattentive type of ADHD struggle with maintaining focus, organizing tasks, and remembering focus, organizing tasks, and remembering instructions. In contrast, hyperactive-impulsive ADHD manifests through excessive physical activity, an inability to wait for turns, and impulsive decision-making [2]. The combined type incorporates features of both, making it the most severe form of ADHD.

Prevalence and Risk Factors

ADHD affects 5-7% of children worldwide, with boys being more affected than girls due to observable hyperactivity and impulsivity traits [16]. Studies in Indonesia showed that up to 12% of elementary school children may be at risk for ADHD. Genetic predisposition accounts for 70-80% of ADHD cases, with environmental factors such as maternal stress, smoking during pregnancy, and low birth weight further influencing the disorder's onset [13].

Behavioral and Cognitive Implications

ADHD significantly impacts academic performance and social interactions. Children with ADHD often display poor impulse control, difficulty in sustaining attention, and challenges in working memory. These deficits not only hinder their learning but also increase the likelihood of comorbidities, such as anxiety and depression [8].

INTERNET ADDICTION DISORDER (IAD)

Definition and Symptoms

IAD refers to excessive internet usage that interferes with daily life. Symptoms include preoccupation with online activities, withdrawal symptoms when offline, loss of interest in offline activities, and difficulty controlling internet use despite knowing the negative consequences [17]. Studies indicate that IAD affects approximately 6% of the population internationally, with higher prevalence rates in adolescents due to their frequent use of social media, gaming, and streaming platforms [10].

Impact on Children

Children are particularly vulnerable to IAD due to their underdeveloped self-regulation and executive function skills. Prolonged internet use has been linked to sleep disturbances, poor physical health, and emotional instability [11]. Studies have also shown that excessive screen time affects academic performance and reduces the ability to form meaningful social connections [3]. Children with ADHD are particularly vulnerable to IAD as their impulsivity and difficulty with time management lead them to seek instant pleasure online, exacerbating the addictive cycle [4].

INTERSECTION OF ADHD AND IAD

Shared Behavioral Traits

Children with ADHD often exhibit traits that overlap with the behaviors seen in individuals with IAD. Impulsivity, a main symptom of ADHD, predisposes children to compulsive online behaviors as they desire immediate rewards [14]. The internet's capacity to provide instant gratification reinforces these tendencies, making children with ADHD more susceptible to addiction [15].

Prevalence and Relationship

Studies consistently show that children with ADHD are significantly more likely to develop internet addiction. Research conducted in 2011 found that 54.1% of children with ADHD are addicted to the Internet, compared to only 15% of the low-risk group. This elevated risk is attributed to ADHD-related symptoms such as poor impulse control, hyperactivity, and an inability to delay gratification [9].

Cognitive and Behavioral Consequences

IAD has been shown to exacerbate ADHD symptoms, leading to further difficulties in attention, memory, and emotional regulation [7]. Furthermore, children with both conditions, ADHD and IAD, often encounter significant academic challenges, as prolonged screen time impacts their ability to focus, follow instructions, and complete tasks. They are also at risk of social isolation and heightened emotional instability [19].

PREVENTIVE AND INTERVENTIONAL STRATEGIES

Role of Parents and Teachers

Effective management of ADHD and IAD requires collaborative efforts from parents/caregivers, teachers, as well as healthcare professionals. Parents should monitor screen time and encourage offline activities such as sports, while teachers can implement structured routines and offer counseling services for children with ADHD as a support [5].

Behavioral Interventions

Cognitive-behavioral therapy (CBT) has been shown to be effective in managing both ADHD and IAD by teaching children self-regulation skills and healthier coping mechanisms. Reward systems and time-management tools can also help children balance online and offline activities [18]. Parental training programs also help parents establish routines, monitor internet use, and reinforce positive behaviors in their children.

Policy Implications

Policy initiatives are critical in addressing IAD, particularly among children with ADHD. Public awareness campaigns are crucial to reducing the stigma associated with ADHD and promoting healthy digital habits. Governments and educational institutions can work together to create digital literacy programs that educate children on the risks of excessive internet use, while also implementing measures that limit screen time in schools and at home.

DISCUSSION

The findings from this study underscore the significant association between ADHD and Internet Addiction Disorder (IAD) in children. The results suggest that children at high risk for ADHD are 6.679 times more likely to develop internet addiction compared to their low-risk counterparts. This aligns with the growing body of research highlighting the heightened vulnerability of children with ADHD to digital overuse, particularly when considering their impulsivity, inattention, and inability to regulate behavior effectively [4], [14]

Behavioral Mechanisms Linking ADHD and IAD

Children with ADHD exhibit behavioral traits such as impulsivity and a strong need for instant gratification, which predispose them to IAD [14]. This impulsivity mirrors the need for immediate rewards and feedback, which online platforms readily provide. Internet activities, particularly gaming, social media, and streaming services, reinforce impulsive behaviors by delivering continuous stimulation and instant rewards [15]. This constant cycle of feedback fosters dependency and exacerbates the symptoms of ADHD, contributing to a reinforcing loop where excessive internet use exacerbates inattention and impulsivity [9]. ADHD-related difficulties in self-regulation contribute significantly to IAD. Children with ADHD find it harder to self-monitor their internet use and regulate screen time, making it difficult for them to establish a healthy balance between online and offline activities [18]. Consequently, internet addiction becomes a coping mechanism to deal with the stress of ADHD-related challenges.

Cognitive and Emotional Consequences

The dual burden of ADHD and IAD can significantly impair children's cognitive and emotional development. Excessive internet use has been shown to worsen executive functions such as attention, working memory, and cognitive flexibility, which are already impaired in children with ADHD [7]. Moreover, children with both ADHD and IAD are more prone to social and emotional issues. Increased time spent on the internet, particularly in social media and online gaming, reduces face-to-face interactions, which further hinders the development of emotional regulation and interpersonal skills [10].

Furthermore, prolonged screen time in children with ADHD contributes to heightened emotional dysregulation, including increased irritability, mood swings, and anxiety. These emotional difficulties are often compounded by the isolation and poor social relationships that can result from excessive internet use [3]. The emotional toll of IAD in children with ADHD often leads to depressive symptoms and anxiety disorders, which are already prevalent in children diagnosed with ADHD [8].

Cultural and Regional Contexts

In Indonesia, where this study was conducted, the rising adoption of digital devices and increased internet accessibility among children exacerbate

concerns related to IAD. Cultural factors also play a crucial role; in a society where academic achievement is highly emphasized, children may be encouraged to use the internet for educational purposes, inadvertently increasing their screen time. While digital media has educational potential, excessive exposure can lead to addictive behaviors, particularly for children who already struggle with impulse control due to ADHD [11].

Implications for Intervention

The strong correlation between ADHD and IAD underscores the urgent need for integrated intervention strategies that address both conditions concurrently. Cognitive-behavioral therapy (CBT) is one promising approach, as it helps children develop better-coping mechanisms for managing both ADHD and internet addiction [18]. CBT has been shown to improve executive functioning, self-regulation, and time management, thus helping children strike a balance between online and offline activities [17].

Parent training programs are also critical, as they empower parents to monitor and manage their child's internet use while promoting structured routines that support healthy screen time habits [5]. In addition, schools can play a crucial role by incorporating digital literacy programs, teaching students about the risks of excessive internet use, and creating policies that limit screen time in educational settings.

Study Limitations and Future Directions

While this study provides valuable insights, it is not without limitations. The sample size was limited to children in three elementary schools in Surabaya, which may not fully represent the broader population of children in Indonesia. Future studies should aim to incorporate a larger and more diverse sample to improve the generalizability of the findings. Longitudinal research would also be valuable to assess the long-term impact of internet addiction on children with ADHD and the effectiveness of various intervention strategies.

Additionally, further research should explore regional and cultural variations in the ADHD-IAD relationship. By examining how ADHD manifests in different cultures and how these contexts influence internet usage patterns, we can develop more tailored interventions that reflect regional needs and values.

The Need for Policy and Awareness

The findings from this study highlight the importance of public health initiatives aimed at raising awareness about ADHD and IAD. Governments, educators, and healthcare professionals must work together to provide resources for early detection and intervention. Public awareness campaigns can help reduce the stigma surrounding ADHD and IAD, encouraging families to seek help early.

In addition, policymakers should consider implementing regulations around internet access for children, ensuring that digital platforms are designed

to foster healthy usage patterns. These regulations should aim to create safe online spaces for children while limiting the risks of excessive internet use and digital addiction [3].

CONCLUSION

This literature review underscores the significant intersection of IAD and ADHD in children, highlighting the need for early identification, targeted interventions, and ongoing support. By addressing both ADHD symptoms and internet addiction concurrently, we can improve the overall quality of life and academic success for children affected by these interconnected conditions.

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