LUMEN ET VIRTUS

The Relationship Between ADHD and Substance Use Disorder in Adults

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ABSTRACT

Attention-Deficit/Hyperactivity Disorder (ADHD) is often comorbid with Substance Use Disorder (SUD), creating a complex challenge for clinical management. Individuals with ADHD are at high risk of developing SUD, driven by neurobiological dysfunctions, such as dopaminergic dysregulation, and psychosocial factors, such as the use of substances for self-medication. This study offers a narrative review of the existing literature on the prevalent relationship between ADHD and Substance Use Disorder (SUD) in adults. This intersection requires an integrated therapeutic approach, which combines pharmacological interventions, such as psychostimulants, with psychotherapeutic approaches aimed at the management of impulsivity and inattention. Studies highlight that early screening for ADHD in patients with SUD, and vice versa, is essential to improve clinical outcomes. Treatment programs that simultaneously address both disorders can significantly mitigate the impact of these conditions, providing a more favorable prognosis. In addition, it is important to consider that pharmacological treatment may require adjustments, such as higher doses of psychostimulants in patients with comorbidity, due to the neuroadaptation caused by substance use. The complexity of the relationship between ADHD and SUD, evidenced by the high prevalence of co-occurrence and therapeutic challenges, underscores the need for comprehensive and personalized interventions to improve patients' prognosis and reduce the risk of associated complications.

Keywords: ADHD, SUD, Adults, Mental Health.

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INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most frequent mental disorders in childhood, being the most prevalent among neurodevelopmental disorders, affecting between 3.4% and 7.2% of children (Polanczyk et al., 2015). Although symptoms usually begin in childhood, it is estimated that between 60% and 80% of cases persist into adulthood (Karam et al., 2009), with an estimated prevalence of between 2% and 4% in the general population (Weibel et al., 2019).

The high prevalence of ADHD and these negative outcomes are associated with so many social and financial impacts on families and society as a whole that this disorder can be considered a relevant public health concern (Polanczyk et al., 2014).

ADHD is characterized by an ongoing pattern of inattention and/or hyperactivity and impulsivity, which begins in childhood or adolescence and has a significant impact on the development and functioning of individuals. For the diagnosis to be confirmed, the symptoms need to be present in more than one environment, and may vary in intensity according to the context, such as at home, in the work environment or in other situations (APA, 2014). Impulsivity is a central feature of ADHD and is considered a paradigmatic example of impulsive disorders within the category of mental disorders (Robbins et al., 2012).

Impulsivity is defined as a tendency to hasty reactions in search of immediate gratification in the face of external stimuli, often leading to adverse consequences. It can be divided into four categories: lack of motor inhibition, difficulty in decision-making, difficulty in postponing immediate gratifications, and difficulty in withholding information for future decisions (Robbins et al., 2012).

In childhood, the symptoms of impulsivity, inattention, and hyperactivity are more evident, but in adulthood, these clinical manifestations can present themselves in different ways, depending on the individual's circumstances. In the work context, for example, the individual may encounter difficulties in time management, procrastination and disorganization, which can lead to job instability, low performance and professional devaluation. With regard to interpersonal relationships, impulsivity, inattention, and difficulty in hearing can make it difficult to establish bonds and develop healthy relationships. In addition, impulsivity is a risk factor for other complications, including increased susceptibility to substance use disorder (Breyer et al., 2014; Hirsch et al., 2023).

The diagnosis of ADHD is an important risk factor for the development of Substance Use Disorder (SUD) (Regan; Tubman, 2019; Rohner et al., 2023). This relationship (ADHD and SUD) is so relevant that studies have already pointed out that more than 60% of adolescents in treatment in specialized substance abuse services meet criteria for a diagnosis of ADHD (Chan et al., 2008), and it is estimated that patients with ADHD are 2 to 3 times more likely to develop nicotine use disorders,

alcohol, marijuana, cocaine, and other substances (Rad et al., 2020; Schellekens et al., 2020; Young; Woodhouse, 2021).

This study offers a narrative review of the existing literature on the prevalent relationship between ADHD and Substance Use Disorder (SUD) in adults, with the aim of exploring and discussing the relationship between these two disorders, highlighting the risk factors, the mechanisms underlying co-occurrence and the implications for diagnosis and treatment, seeking to deepen the understanding of this complex relationship, contributing to the dissemination of the importance of adequate diagnosis and more effective interventions that can mitigate the negative impacts associated with ADHD and SUD in adult life.

DEVELOPMENT

Studies indicate that both ADHD and SUD have a strong hereditary base, with high coheritability. Neuroimaging and neurocognitive studies have identified that cognitive control, reward, and emotion regulation pathways are involved in both conditions, suggesting a shared biological basis for comorbidity (Schellekens et al., 2020).

Compared to children with ADHD, in the adult population there is a tendency for hyperactivity to improve, but with maintenance or worsening of the other symptoms (inattention, impulsivity, and emotional dysregulation), culminating in difficulties in social adaptation and, sometimes, in association with other psychiatric comorbidities, such as alcohol and other substance abuse, mood disorders, anxiety, and eating compulsions. which directly impacts the therapeutic management of ADHD (Barbuti et al., 2023).

There are several hypotheses about the causal link between ADHD and substance abuse, one of them being the tendency to use recreational drugs as a method of self-medication or with the purpose of reducing the intensity of negative emotions (Young; Woodhouse, 2021). Other hypotheses consider the lack of self-control caused by a deficit in executive functioning associated with impulsivity, a deficit in the reward system (with the dopaminergic circuits in the mesolimbic and mesocortical pathways dysfunctional) and genetic predisposition, with a high degree of heritability (Rad et al., 2020).

Dysfunction in the brain's reward system, which results in impulsivity and inability to delay gratification - characteristic of ADHD - acts as a risk factor for the development of chemical dependence in adolescence. The theory that explains this association points out that dopaminergic transmission related to the processing of impulses from the prefrontal cortex and in the striatum is impaired in individuals with ADHD and the use of some substances is capable of increasing the release of dopamine in these circuits, promoting relief of the symptoms of the disorder, such as inattention and restlessness (Barbuti et al., 2023).

Individuals diagnosed with ADHD are more likely to start substance use earlier, with a higher risk of developing SUD earlier and a higher risk of relapse compared to people without ADHD (Schellekens et al., 2020), and are also more likely to abuse a greater variety of substances, a higher rate of hospitalizations, greater tendency to suicidal behaviors and lower adherence to treatment (Barbuti et al., 2023).

Patients with ADHD often face an unhealthy vicious cycle regarding substance use, where intense emotional states exacerbate their symptoms and vice versa. This cycle can increase the risk of substance abuse to temporarily relieve ADHD symptoms or cope with stressful situations, and frequent substance use can lead to medical complications, financial difficulties, and social problems, especially for young people without solid coping strategies or social networks (Young; Woodhouse, 2021).

Individuals with co-existing ADHD and Substance Use Disorder (SUD) tend to have significantly lower cognitive performance compared to patients without SUD, suggesting that substance use may worsen cognitive difficulties in individuals with ADHD. Studies also suggest that patients with SUD have higher levels of functional impairment, including a higher risk of suicidal behavior and a higher prevalence of dysfutional personality traits (MacDonald; Sadek, 2021).

The issue of gender is also an important aspect to be observed. According to epidemiological data, the diagnosis of ADHD is more common in male patients (in the ratio of approximately 2:1), as well as the diagnosis of SUD in this gender (also in the approximate ratio of 2:1). However, there is evidence that indicates that female patients diagnosed with ADHD and SUD tend to have a more severe presentation of symptoms than males, as well as experiencing more anxious symptoms, self-injurious behavior, and depressive symptoms (Regan; Tubman, 2019).

Regarding drug treatment, therapeutic proposals for SUD in patients diagnosed with ADHD commonly involve increasing dopamine and norepinephrine through psychostimulant drugs (methylphenidate and amphetamines) and non-stimulants (guanfacine, clonidine, and bupropion), with psychostimulants being the first line of treatment. Studies suggest that drug therapy demonstrates effectiveness in improving symptoms and executive functions in both youth and adults (Barbuti et al., 2023).

In people with ADHD and SUD due to cocaine/crack use, however, the proposal for treatment with psychostimulants is different. Therapy with this class of drugs is hampered in these cases due to neuroadaptation in dopamine transporters after multiple drug intoxications. In these cases, a longer period of treatment is recommended, with the use of stimulants in doses up to 40% higher than in individuals with ADHD without SUD, in association with psychotherapy (Barbuti et al., 2023).

Regarding cannabis dependence, it is estimated that about 35% of adolescent users have ADHD. Chronic substance use has an important impact on the dopaminergic system, causing even

more intense deficits in executive functions with chronic substance use. Studies have demonstrated a modification of the thickness of the central pre- and post-gyri and of the nucleus accumbens, as well as an increase in the density of dopamine transporters. In these cases, there are studies that suggest that atomoxetine, in 12 weeks of use, is effective in reducing ADHD symptoms, although it does not have such a relevant impact on the intensity of cannabis use (Barbuti et al., 2023).

Although pharmacotherapy is effective, the response to treatment with psychostimulants may differ in patients with ADHD and SUD compared to those without SUD, possibly requiring higher doses in virtually all cases. Identifying the correct dose and managing potential side effects are crucial for successful treatment (Schellekens et al., 2020). However, due to the behavioral functioning pattern of these patients, greater attention is needed to the risk of misuse and abuse of the psychostimulant drugs themselves (Barbuti et al., 2023).

The correct identification of ADHD in children and adolescents and its appropriate treatment (drug and non-drug) can have a significant impact on reducing the risk of developing SUD (Schellekens et al., 2020). The coexistence of ADHD and SUD is associated with worse clinical and functional outcomes, so it is necessary to think about therapeutic approaches that can treat both conditions simultaneously, with early and comprehensive interventions to improve both the cognitive and psychosocial outcomes of these patients (MacDonald; Sadek, 2021).

Conducting brief screenings for ADHD can provide valuable data for personalizing substance abuse treatment services to improve health outcomes for high-risk adolescents and adults (Regan; Tubman, 2019). It is recommended that screening for ADHD be performed in all patients diagnosed with substance use disorder (Schellekens et al., 2020; Rohner et al., 2023).

And for patients with a previous diagnosis of ADHD and who have SUD, it has been shown that traditional psychological interventions for Substance Use Disorder are also effective in treating those with a comorbid diagnosis. It is observed, however, that these interventions are commonly available only in specialized services for the treatment of harmful substance use, representing a missed opportunity for early intervention in ADHD patients with onset of substance abuse (Young; Woodhouse, 2021).

The treatment of SUD is complex and challenging, especially for people who are predisposed to have difficulties with the management of immediate gratification, as are often the case with young people and adults with ADHD. The therapeutic techniques proposed and diligently applied by health professionals should support these individuals, helping them to cope with harmful thoughts, developing strategies to manage emotions, motivating them to resist substance use, and promoting a healthy lifestyle in the long term (Young; Woodhouse, 2021; Barbuti et al., 2023).

CONCLUSION

The relationship between Attention-Deficit/Hyperactivity Disorder (ADHD) and Substance Use Disorder (SUD) is very prevalent, and it is a highly complex comorbid relationship. Evidence highlights that individuals with ADHD have a significantly higher risk of developing SUD, with underlying mechanisms ranging from neurobiological dysfunctions, such as dopaminergic dysregulation and impulse control, to psychosocial factors, such as substance use as a form of self-medication and symptom relief. This intersection between ADHD and SUD represents a considerable challenge for clinical management, requiring an integrated and personalized therapeutic approach.

The coexistence of ADHD and SUD requires interventions that go beyond traditional pharmacological treatment. It is necessary to adopt therapeutic strategies that combine the use of medications (both psychostimulants and other classes) with psychotherapeutic approaches aimed at the management of impulsivity and inattention, in addition to specific scores regarding the SUD. In addition, the importance of early screening for ADHD in patients with SUD and vice versa is a crucial point to improve clinical and functional outcomes. Implementing treatment programs that simultaneously address both disorders can significantly reduce the negative impact of these conditions on patients' lives, enabling a better prognosis for these patients.

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