

# Substance Use Disorders in ADHD: A Multimodal Approach

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## Abstract

Attention Deficit Hyperactivity Disorder (ADHD) is today one of the most relevant disorders in the clinical setting, not only because of its prevalence but also because of its high comorbidity with other diseases. Its peculiar characteristics undoubtedly represent a risk factor, which explains the connection with the use of addictive substances. This report aims to show the link between ADHD and substance use since both pathologies show significant interactions. This was possible to observe thanks to the neuropsychological deficits of the subjects with ADHD, such as impulsivity, lack of inhibitory control and emotional regulation difficulties, which interfere in aspects as significant as social behavior. Both evaluation and treatment represent a considerable challenge that requires exhaustive information as part of a differential diagnosis. The combination of adequate therapeutic strategies linked to correct pharmacological treatment represents an essential target in today's clinic.

**Keywords:** Attention Deficit Hyperactivity Disorder (ADHD); Substance use disorders; Diagnosis; Adulthood; Comorbid

## Introduction

Substance Use Disorders (SUD) is the most prevalent mental disorders in the general adult population after anxiety and mood disorders. <sup>[1]</sup> ADHD is one of the most common mental disorders in children and adolescents <sup>[2]</sup> and often persists in patients into adulthood. <sup>[3]</sup> The presence of ADHD in childhood and adolescence is also a stable predictor of tobacco, alcohol, and illegal addictive substances in adults. <sup>[4,5]</sup> Longitudinal studies from ADHD cases have revealed a significantly increased risk of alcohol, nicotine, and other drug disorders by adulthood <sup>[6]</sup> except for nicotine dependence.

The problem of the integrated treatment of adult patients with comorbidity ADHD and SUD is one of the central tasks in the clinical care of this patient group.

ADHD is a psychiatric disorder that begins in childhood and manifests in inattention, hyperactivity, and impulsiveness. These symptoms can persist into adulthood. Studies show that 50% of the children affected also suffer from the symptoms of ADHD in adulthood Smith et al. The prevalence of ADHD has been estimated to be 2.5%–5% in adults. <sup>[7,8]</sup>

Comorbid disorders are common and are estimated to occur in 60%–80% of adult patients with ADHD. <sup>[9,10]</sup> Comorbid disorders in adult ADHD include mood disorders, anxiety disorders, substance-related disorders, and personality disorders. <sup>[11]</sup> Studies have shown that patients with ADHD have an increased risk of developing SUD. <sup>[12-14]</sup> In addition, the prevalence of ADHD in populations of addiction patients is significantly increased compared to the general population. <sup>[15-17]</sup> Across all addictive substances, comorbid ADHD was determined in 5.4%–31% of the test persons according to the criteria of DSM-5. <sup>[15]</sup>

A study with 5,551,807 patients, <sup>[18]</sup> analyzed the connection

between ADHD, Substance Use Disorders (SUD), bipolar disease, depression, anxiety disorders, type 2 diabetes, and hypertension. There was a connection between ADHD in adulthood and all mentioned diseases (3.9%–44.65% vs. 0.72%–4.89%). The results about psychiatric disorders were: 42.28%, depressions; 35.12%, substance abuse; 44.65%, anxiety disorders; 14.29% bipolar disease, and for type 2 diabetes, the prevalence was 3.9% and 8.5% in hypertension. The study confirmed that even in adults with ADHD, children's increased risk of accompanying metabolic symptoms exists. The effect remained with patients who survived for over 50 years. There was an elevated risk for psychiatric comorbidities in women and an increased incidence of comorbid diabetes, addiction disorders, and hypertension for men. <sup>[18]</sup>

## Symptoms Overlap ADHD and SUD

There is an inevitable overlap of symptoms between substance dependence and previous ADHD. The main discussion is whether impulsiveness, disorders of social behavior, or external factors explains the connection between ADHD and substance use. Both with substance users as well in people with ADHD, there are higher levels of impulsivity. Impulsiveness is a core symptom of ADHD and correlated with substance use. <sup>[19,5,20]</sup> This overlap of symptoms leads to the hypothesis that the increased impulsiveness of ADHD patients explains the higher substance use. <sup>[21]</sup>

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Furthermore, a study in children with ADHD demonstrated that both impulsivity and sensation seeking play a mediating role in the risk of developing a SUD. In this area can also be shown that the neuropsychological deficits in SUD and ADHD show similarities. Given the central involvement and importance of the prefrontal cortex in executive functions, early consumption of substances can lead to significant deficits. Deficits of executive functions can be demonstrated in SUD [22] and ADHD. [23]

### Disorder of Social Behaviour

A characteristic of the subjects with ADHD is the difficulty in establishing and maintaining stable social relationships. Inevitably the peculiarities of ADHD (impulsivity, lack inhibitory control, difficulties with emotional regulation) interfere with social behavior. There is also a possible interaction effect to be considered so that the risk of substance use in people with a social behavior disorder ADHD is higher than in people with social conduct disorders without ADHD. [24]

### Discussion

It was found that subjects with ADHD tended to suffer more often illegal addictive drugs use or substance-related disorders, even if the factor of disruption of social behavior was controlled. The difference between them and healthy control persons was not found to be significant.

Substance consumption and ADHD after control for social behavior disorder are not high because there is no significant difference in a large total sample (N=1000). Brook et al. published a long-term study in 2014 that showed the subjects starting prescription of stimulants in adolescence revealed a higher risk of SUD in adulthood. The authors suspected an intricate link between ADHD and stimulant use in adulthood. They posed the hypothesis that there is a direct link between ADHD and stimulant use in adulthood, giving up an effect moderated by disruption of social behavior. There a link between the use of illegal addictive substances and the misuse of prescription stimulant drugs. The authors showed that the diagnosis of ADHD in adolescence is directly related to stimulants abuse 25 years later. An adolescent disorder social behavior was also associated with drug use in younger adulthood, which was directly related to the improper use of stimulants in the fourth decade of life. [25]

### Diagnostic Challenge

Due to the high comorbidity, a detailed addiction history should be applied in diagnosing adult ADHD. According to guidelines, continued substance consumption or a substance-related disorder makes the diagnosis of adult ADHD more difficult. Established neuropsychological diagnostic procedures are used to support the diagnosis of adult ADHD loss meaningfulness if they are processed under the influence of substances or in the withdrawal syndrome. There is also an overlap of symptoms between intoxication, withdrawal manifestations, and ADHD symptoms so that a meaningful, robust diagnosis of ADHD can only be made if the substance is absent.

When diagnosing adult ADHD, retrospective proof of the presence of ADHD is required in childhood and adolescence. It is especially true for patients with comorbid SUD because

they have the current clinical picture of ADHD symptoms due to substance use that can be distorted. Retrospective evidence is one of the most significant challenges for the diagnosis of ADHD in adulthood. Relevant diagnostic content (e.g., general conduct at school, behavior at home, or playing in the peer group) is not remembered or distorted. Besides, it is remarkable here the problem of the “confirmation bias” diagnostic questions regarding inattentiveness, hyperactivity, and impulsivity in childhood.

Furthermore, a third-party medical history should be taken into account (e.g., parents, caregivers, School certificates, medical reports from the pediatrician/psychiatrist/psychotherapist). Especially an intensive history of consumption in early adolescence can provide anamnestic information from substance-related neuropsychological changes. As part of a comprehensive differential diagnostics, this process should definitely exclude other mental disorders that could better explain the symptoms described by the patient, e.g., mood disorders or psychotic disorders.

### Therapy and Prevention

The comorbid existence of ADHD is of high relevance for the treatment of addiction. There is a more severe course of addiction, a poorer therapy outcome, and an increased risk of further mental disorders. [15-17] People with ADHD and comorbid cocaine or opiate-related disorder who were taking drugs at a younger age have an increased risk of suicide and are more likely to be hospitalized treated. [26] Substance abuse is understood as a short-term functional route to symptom management and can lead to substance dependence in the long term, e.g., nicotine and stimulants, to compensate for inattentiveness; also, the consumption of sedative substances (alcohol, cannabis) to compensate for hyperactivity/inner restlessness is conceivable. This leads to an improvement in the dependency symptoms. [27,28]

### Conclusion

In the treatment of adult ADHD, psychopharmacological immunotherapy can be used (especially with methylphenidate), psychotherapy, and a combination of both. Studies have shown that a combination therapy from pharmacological treatment and psychotherapy has a higher effect than respective mono therapy. It is also needed to determine the best strategies for parents to use during emerging adulthood when substance use reaches its peak, but individuals with ADHD histories are ill-equipped to handle the autonomy they desire.

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